



South Sudan

# Secondary ICT

Information Communication Technology  
Student's Book

# 3

Secondary ICT has been written and developed by Ministry of General Education and Instruction, Government of South Sudan in conjunction with Subjects experts. This course book provides a fun and practical approach to the subject of Information Communication Technology, and at the same time imparting life long skills to the students.

The book comprehensively covers the Secondary 3 syllabus as developed by **Ministry of General Education and Instruction.**

Each year comprises of a **Student's Book** and a **Teacher's Guide.**

**The Student's Book provides:**

- Full coverage of the national syllabus.
- A strong grounding of the key concepts in Information Communication Technology.
- Clear presentation and explanation of learning points.
- A wide variety of practice exercises, often showing how Information Communication Technology can be applied to real-life situations.
- It provides opportunities for collaboration through group work activities.
- Stimulating illustrations.



All the courses in this primary series were developed by the Ministry of General Education and Instruction, Republic of South Sudan. The books have been designed to meet the primary school syllabus, and at the same time equipping the pupils with skills to fit in the modern day global society.

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South Sudan

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Student's Book

# 3



Secondary ICT 3

Student's book



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# ICT STUDENT'S BOOK 3

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GLOBAL  
PARTNERSHIP  
for EDUCATION  
*quality education for all children*

**THIS BOOK IS NOT FOR SALE**

## FOREWORD

I am delighted to present to you this textbook, which is developed by the Ministry of General Education and Instruction based on the new South Sudan National Curriculum. The National Curriculum is a learner-centered curriculum that aims to meet the needs and aspirations of the new nation. In particular, it aims to develop (a) Good citizens; (b) successful lifelong learners; (c) creative, active and productive individuals; and (d) Environmentally responsible members of our society. This textbook, like many others, has been designed to contribute to achievement of these noble aims. It has been revised thoroughly by our Subject Panels, is deemed to be fit for the purpose and has been recommended to me for approval. Therefore, I hereby grant my approval. This textbook shall be used to facilitate learning for learners in all schools of the Republic of South Sudan, except international schools, with effect from 4th February, 2019.

I am deeply grateful to the staff of the Ministry of General Education and Instruction, especially Mr Michael Lopuke Lotyam Longolio, the Undersecretary of the Ministry, the staff of the Curriculum Development Centre, under the supervision of Mr Omot Okony Olok, the Director General for Quality Assurance and Standards, the Subject Panelists, the Curriculum Foundation (UK), under the able leadership of Dr Brian Male, for providing professional guidance throughout the process of the development of National Curriculum and school textbooks for the Republic of South Sudan since 2013. I wish to thank UNICEF South Sudan for managing the project funded by the Global Partnership in Education so well and funding the development of the National Curriculum and the new textbooks. I am equally grateful for the support provided by Mr Tony Calderbank, the former Country Director of the British Council, South Sudan; Sir Richard Arden, Senior Education Advisor of DfID, South Sudan. I thank Longhorn and Mountain Top publishers in Kenya for working closely with the Ministry, the Subject Panels, UNICEF and the Curriculum Foundation UK to write the new textbooks. Finally, I thank the former Ministers of Education, Hon. Joseph Ukel Abango and Hon. Dr John Gai Nyuot Yoh, for supporting me, in my previous role as the Undersecretary of the Ministry, to lead the Technical Committee to develop and complete the consultations on the new National Curriculum Framework by 29 November 2013.

The Ministry of General Education and Instruction, Republic of South Sudan, is most grateful to all these key stakeholders for their overwhelming support to the design and development of this historic South Sudan National Curriculum. This historic reform in South Sudan's education system is intended to benefit the people of South Sudan, especially the children and youth and the future generations. It shall enhance the quality of education in the country to promote peace, justice, liberty and prosperity for all. I urge all Teachers to put this textbook to good use.

May God bless South Sudan. May He help our Teachers to inspire, educate and transform the lives of all the children and youth of South Sudan.



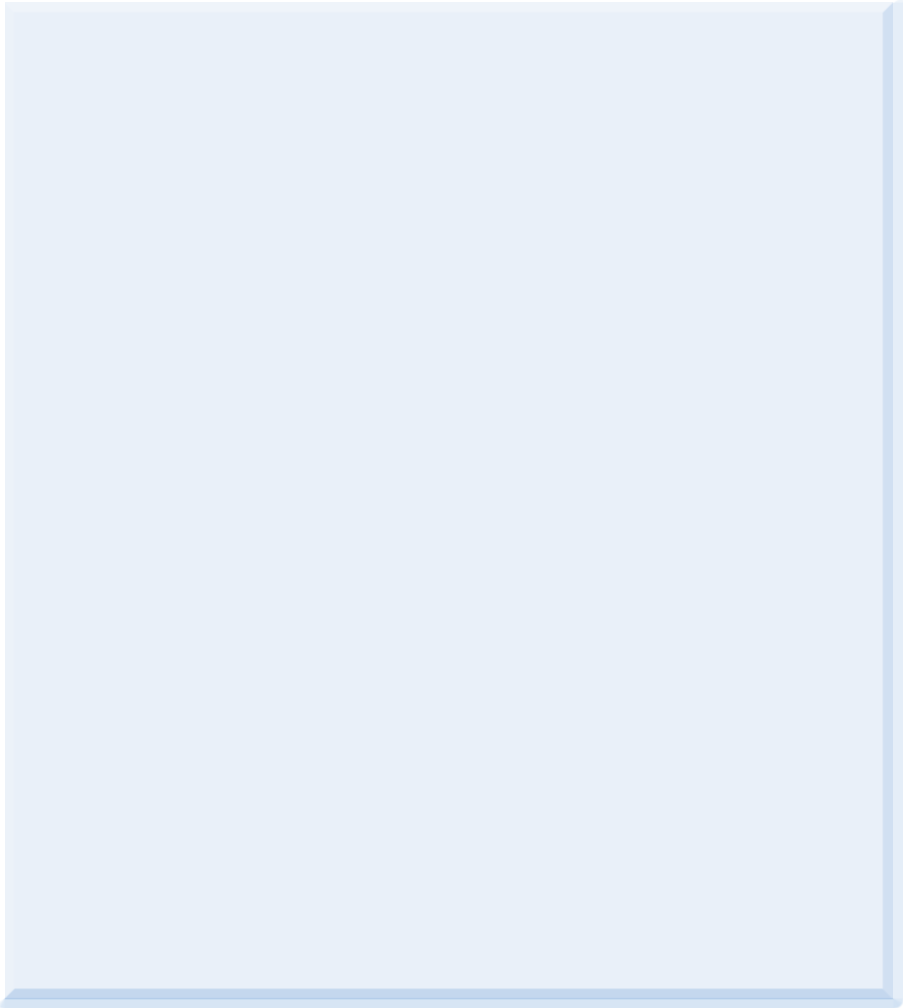
Deng Deng Hoc Yai, (Hon.)

**Minister of General Education and Instruction, Republic of South Sudan**

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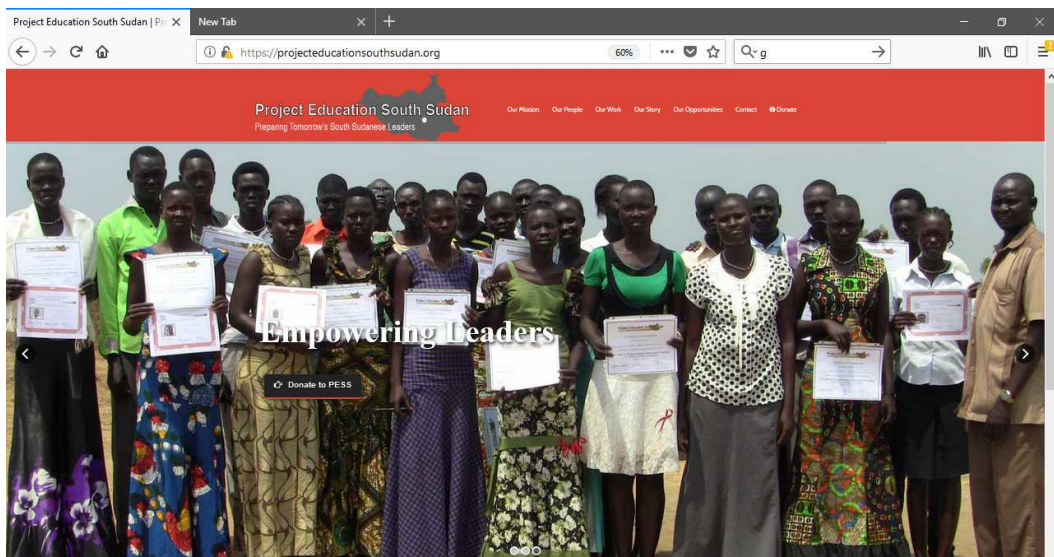
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## 1.0 Introduction to simple websites

A Web site is a related collection of World Wide Web (WWW) files that includes a start file called a home page. Companies or individuals tell you how to get to their Web site by giving you the address of their home page. From the home page, you can get all the other pages on their site. For example, the Web site for Project Education South Sudan has the home page address of <http://www.projecteducation.com>



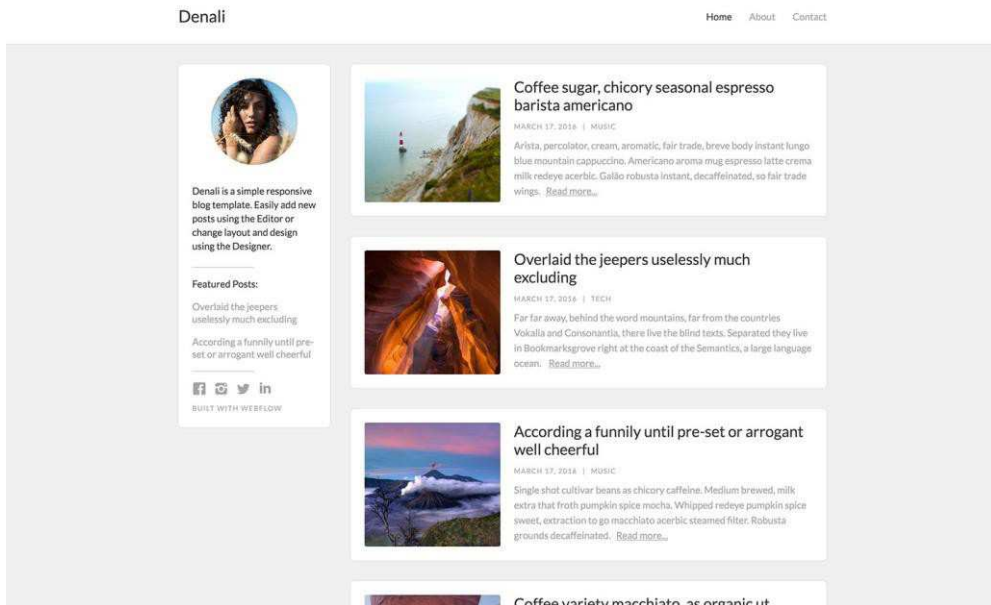
*Fig 1.1 website page*

### 1.0.1 Personal blog

A blog is a website that consists of entries called posts that appear in reverse consecutive order with the most recent entry appearing first, similar in format to a daily journal. Blogs naturally include features such as comments and links to increase user interactivity. Blogs are created using specific publishing software.

Blogs can range from personal, freelance, business, travel, media, fashion, and can focus on one narrow subject or a whole range of subjects.





*Fig 1.2 a blog*

## 1.0.2 Uses of a blog

### Personal Diary

Many people use blogs as a personal diary to log personal experiences, opinions, thoughts and content etc. Followers of personal blogs are usually those who identify with the blogger's viewpoint or value the opinions. Using a personal blog as a way to express one's self continues to be a growing use of a blog.

### Corporate Newsletter

For companies, happenings within the company are not always news-worthy enough to merit a press release. Yet, communicating the activities and events within the company can be an effective way to show how alive the company is.

### Informal Engagement

For businesses, a corporate website provides formal channel of communicating with their target audience. However, there is a need for businesses to engage with the audience at an informal level. This kind of informal interaction is best facilitated by a blog. More and more businesses are using their corporate blogs not just to talk to the audience about happenings in the company but to get feedback, interact and engage with their target audience.



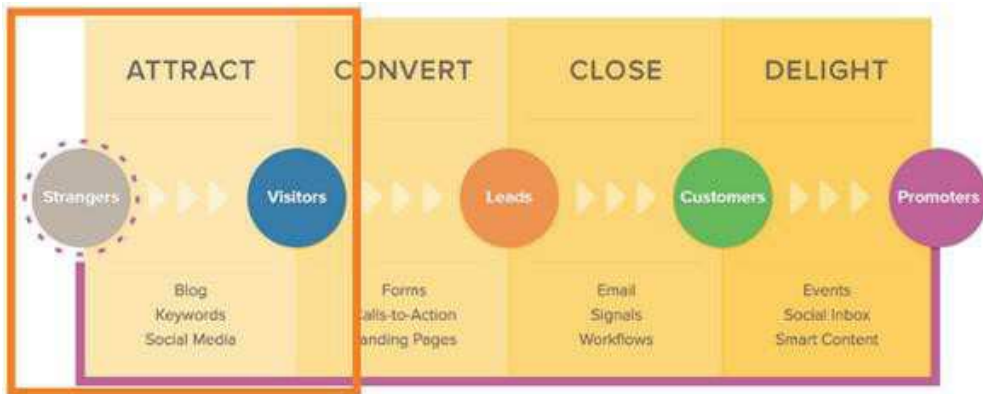


## Media Portfolios

On a static website, publishing image galleries or videos may not be the easiest method for a non-technical person. A blog for showcasing rich media not only makes it easy, but because a blog is about new and recent content, the chance of getting it indexed and ranking in search engines faster is more likely to happen.

## Building a Community

For individuals and businesses alike, having a community of followers is very useful. Not only does it build a steady and regular audience base, it helps in building a network of followers who are more likely to refer them to others potential customers. A community of followers allows you to reach the followers either as a community or to individual followers to get your message across. While email marketing is one way to achieve it, the informal environment of a blog lends itself to far more informal interactions and engagement with the community.



*Fig 1.3*

## Advantages of a blog

1. Increases search engine traffic.
2. Humanizes your brand.
3. Supports social media initiatives.
4. Establishes a brand.
5. Improves writing skills
6. Facilitates good research.

### 1.0.3 Differentiating a blog and a social network account

Social network account	Blog
<ol style="list-style-type: none"> <li>Contributions are made by users who join the site and set up individual accounts. Some networks may have different account types for individuals and organizations.</li> <li>Features and functionality may vary depending on the nature of the site. Members may be able to share links text, photos and other media and interact with one another in various ways.</li> <li>The social network may have policies in place to prevent illegal or rude behavior and may have a moderation team to enforce them.</li> <li>Networks often have a feature that allows users to friend or follow other users so they can make social networking connections and consume content from those with similar interests.</li> <li>Social networks may include measurement tools such as follower counts, upvotes and other features that members use to measure their impact.</li> </ol>	<ol style="list-style-type: none"> <li>Posts are organized chronologically with the most recent post appearing first.</li> <li>Posts can also be organized topically by being classified into categories or tags which users can browse to find posts on related topics.</li> <li>Posts may allow commenting so that readers can respond to a post and continue the conversation. The blog team may choose to moderate comments by outside contributors.</li> </ol>

#### *Activity 1.1*

(In pairs)

- Discuss various ways in which blogs could be used in education institution in South Sudan.
- What are the main disadvantages of blogs for campaigns?

## Ensuring Content Quality

The content is a very important consideration when you are managing your reputation online through a blog. A blog post is of high quality if:

- It is targeted to a specific audience.
- It is well-written.
- It is original.
- It is relevant to the needs of the targeted audience.
- It is highly informative.
- It effectively engages the target audience.
- It contains fresh and up -to-date information.

If blog posts are always of high quality, there is a good chance the blog readers will share it with others, thus helping promote the blog for free. When blog's popularity increases, rankings will likely increase as well. This, in turn, could lead to significant growth for your business or the message you are putting across.

## The Audience

Knowing your blog's audience really well is important. If you have a good grasp of their sensibilities and their interests, you will be better able to tailor your blog posts accordingly. This does not mean you should refrain from publishing thought -provoking posts on your blog, only that you should make sure your posts are well-suited to your audience's tastes.

It is advisable for you to respond to comments on your blog posts, especially if those comments are well-crafted and thought -provoking. Be sure to take the time to carefully read the comment and understand the intent behind it so you can respond accordingly. Not only does this help you in getting to know your audience, but it also sends the message that you regularly monitor your blog and are genuinely interested in your readers' opinions. When you make people feel important, they will likely develop a high regard for you.

## Schedule of Posts

One of the most important considerations in maintaining a good blog is the number of posts you make within a given period of time. If you let too much time pass from one post to the next, your readers are likely to lose interest after their first few visits. On the other hand, posting too often could result in information overload, which may turn -off many readers as well. You need to find the perfect balance in scheduling your posts. One of the best ways to



accomplish this is by creating an editorial calendar, which contains the topics you plan to discuss in your blog and the specific dates of posting for each topic.

It is advisable to publish one or two blog posts each week. Having an editorial calendar will help you ensure that you are neither posting too seldom nor too often. It also helps keep you in tune with your brand message and prevents you from writing about the same topic with the same approach more than once. Remember that while people appreciate getting regular updates from your blog, they are likely to lose interest if you keep covering the same topics and you do not even bother to write from a different perspective.

## **Keywords**

Blog posts should always be in tune with the brand message. This means they need to revolve around a general theme of sorts. Keywords can be very useful tools for delivering brand message through blog posts. It may be a good idea to include a keyword or two within each post. Other than connecting posts to the brand message, the keywords can also increase post's relevance where search engines are concerned.

Though, the keywords should not be the main focus of the blog post. You should also refrain from stuffing one post with too many keywords. Keywords should only be used when they are closely related to the topic you are discussing and in a manner that will not be deemed awkward by your readers.

## **Filter Comments**

Blog comments need to be kept well under control to make sure none of them cause irreparable damage to your reputation. It has been said earlier that you need to remove malicious comments as well as complaints made just for the sake of complaining. You need to be very careful in removing blog comments, though. Refrain from doing so simply because they put your business in a bad light, as that may give your readers the impression that you are overly sensitive.

Remember that negative comments can still help you build a good reputation if you handle them well. Just make sure you remove only those comments that malign you without basis and the ones that have no substance at all.

## **Reference**

Each new blog post should reference at least one of your web pages. This could be an older blog post with related content, one of your social networking pages, a related article on your official website, or even a different blog where your business/goals are mentioned in a positive light. This increases the likelihood of your blog reader's finding out more about your business/goals when they check out your various online accounts as well as websites that talk about your brand.



This strategy may even convince readers to visit your official website and start patronizing not just your blog, but your products/services as well. The more people learn about you, the greater your popularity will likely be. The more popular you become, the easier it will be to manage your online reputation, as you will now have more people who can defend you against those malicious naysayers.

### *Activity 1.2*

In groups discuss various ways a marketing firm could use a Business Blog to market its products and services .

## Creating a blog using WordPress

There are many different blogging platforms, such as WordPress, Tumblr, and Blogger used to create blogs.

Why should you use WordPress? WordPress is the most popular platform used in creating blogs and :

- It is FREE for everyone to use (including themes, layouts and add-ons that many other blogging platforms do not provide).
- It is easy to set up.
- It is secure; WordPress is always updating their software and keeping everything sound and secure, so there is rarely a worry of having your blog come under hacking attacks
- It is highly customizable. There are hundreds of free themes and plugins that add more functionality to your blog, from contact and subscribe boxes to plugins that improve blog performance and more.



### A. Get a domain & web hosting

Domain name is your personal blog address where people find you over and over again. For example Google's Domain is [www.Google.com](http://www.Google.com). Your new blog domain should be [www.YourBlogName.com](http://www.YourBlogName.com), except you will choose what's going to be behind YourNewBlog.

Choose a good domain name that is:

1. Trustworthy – Domain extensions like “.com”, “.org” or “.net” are the most popular, with “.com” being the one most people think of first. Try to avoid eccentric extensions like “.rocks” or “.biz”, as these are less commonly used, harder to remember and not as trusted.

2. Unique and Descriptive – You want a name that reflects who you are and what you care about. Be imaginative and build an identity you are excited about.
3. Easy to Remember – Do not choose something tough to spell, or a long name full of dashes.

In order to get set up your WordPress (or any other type of websites), you are going to need two things:

- A domain name (a web address like yoursitename.com)
- Hosting (a service that connects your site to the internet)

The WordPress platform itself is free, but a domain name and hosting will cost you around \$3 – \$5 a month.

Owning your own domain name looks far more professional than having your site on someone else's domain (like yourbusiness.my-free-website.com).

Plus, having your own hosting will also make sure your website loads quickly and will not go down for hours at a time.

## Creating a blog

The following pages show an example of the process used to setup a blog.

There are many free domain name and hosting registrar online but for this case we are going to use **www.bluehost.com**

### Step 1: go to bluehost.com



Fig 1.4

## STEP 2: Choose Website Hosting Plan

Once you click “get started now,” you will be taken to a page to select the hosting plan of your choice.

The “plus” and “prime” plans are great for sites which have a lot of traffic.

	basic	plus	recommended
	normally \$7.99 <b>\$2.95*</b> per month	normally \$10.99 <b>\$5.45*</b> per month	normally \$14.99 <b>\$5.45*</b> per month
	select	select	select
websites	1	unlimited	unlimited
website space	50 GB	unmetered	unmetered
bandwidth	unmetered	unmetered	unmetered
performance	Standard	Standard	Standard
SSL Certificate	Free	Free	Free
included domains	1	1	1

Fig 1.5

## STEP 3: Pick a Domain Name

If you are making a website for your business, your domain name should match your company name. For example: **YourCompanyName.com**

If you are planning to set up a website for yourself, then **YourName.com** can be a great option.

Domain names usually end with .com, .org or .net, but in recent months, a huge amount of domain extensions (the end part of the web address, like .com) have come out, ranging from .agency to .pizza.

## STEP 4: Fill In Your Details

sign up now

Thank you for choosing Bluehost. You have made the right choice in selecting us as your web hosting and eBusiness provider. We provide excellent customer service, reliable hardware and affordable prices.

We appreciate your business and look forward to a great relationship.

**Choose a domain name for your website**

**new domain**  
Help me get my free domain!  
 .com  
Type your domain name above  
next

**i have a domain name**  
I want to sign up with my existing domain  
  
Type your domain name above  
next

Fig 1.6

To create your account, just enter in your personal information on the “create your account” page.

You will need to add in your first name, last name, country, street address, city, zip code, phone number, and email address. Your receipt will be sent to the email address you enter here.

It is optional to also add in your business name within this form.

### STEP 5: Check Your “Package Information” and Finish Registration

The next step in registering for a Bluehost account is to select your plan and package.

These are the last steps you will go through before your account creation is complete, so pay close attention to the extra options available, like Domain Privacy Protection.

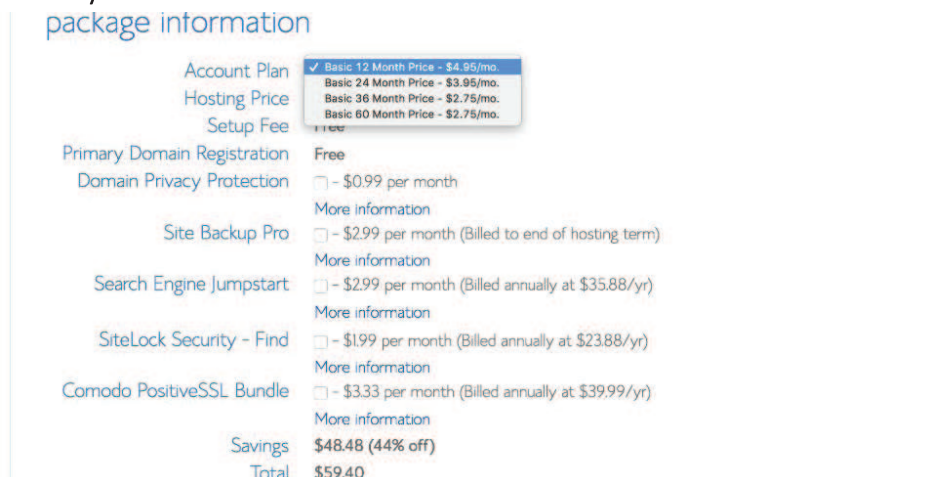


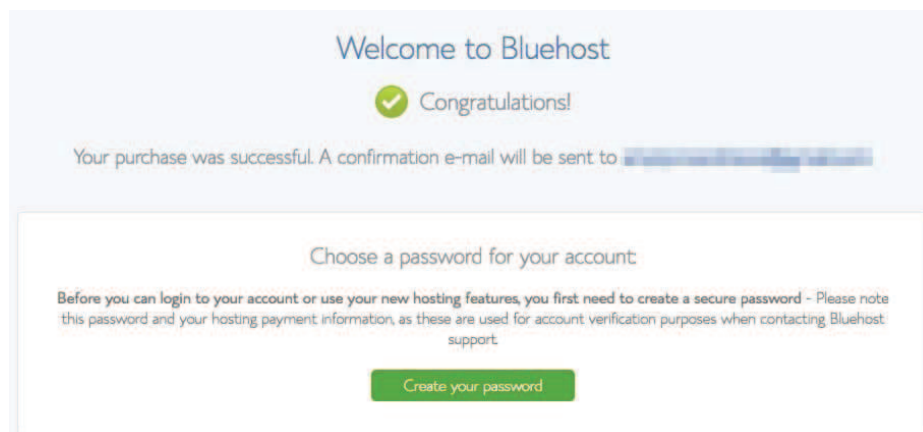
Fig 1.7

- Domain Privacy Protection is only \$0.99 cents more per month, and keeps your personal information under wraps such as your name and address.
- If you want to keep your website and domain information anonymous, go ahead and spend the extra \$0.99 per month. If you do not, be sure to uncheck this box.



## STEP 6: Create Your Password

Once paid and registered, you will be able to create your password:



*Fig 1.8*

### B: set up & customize your site

Once you have bought your domain name and set up your hosting, now it is time to get your website up and running. The first thing you will need to do is install WordPress to your domain.

#### Installing WordPress

1. Log in to your hosting account.
2. Go to your control panel.
3. Look for the “WordPress” or “Website” icon.
4. Choose the domain where you want to install your website.
5. Click the “Install Now” button and you will get access to your new WordPress website.

### C: Choosing a Theme/Template for your site

Once you have successfully installed WordPress to your domain, you will see a very basic yet clean/ minimalist site.

There are thousands of professionally designed themes you can choose from and customize for a site that is all your own.

# How to find a theme

## 1. Log into your WordPress dashboard

If you are not sure how, type in: <https://yoursite.com/wp-admin> (replace “yoursite” with your domain).

## 2. Access free themes

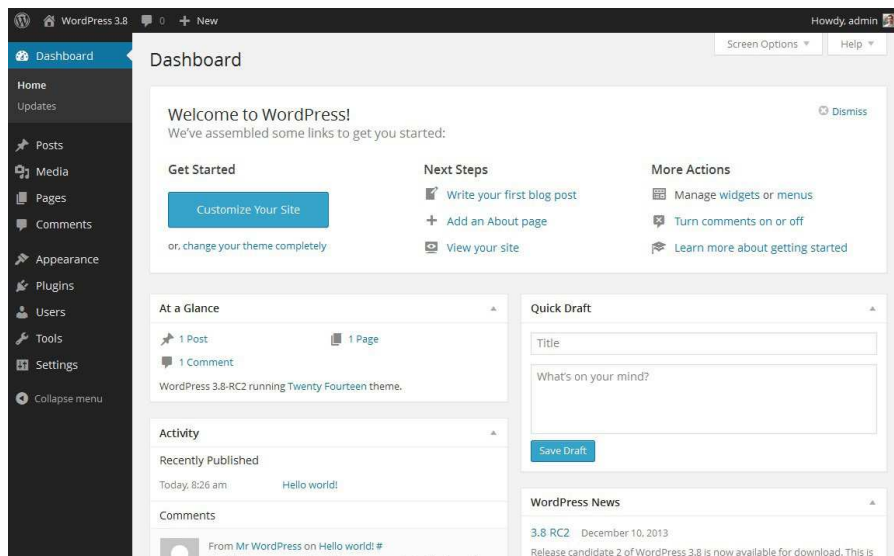


Fig 1.9

Once you are in the dashboard, you have got access to over 1500 free themes! Just look along the side bar for “Appearance”, then click “Themes”.

You can search for specific keywords and/or use filters to find themes that suit your style. Finding the perfect theme can take a while, but it is worth it.

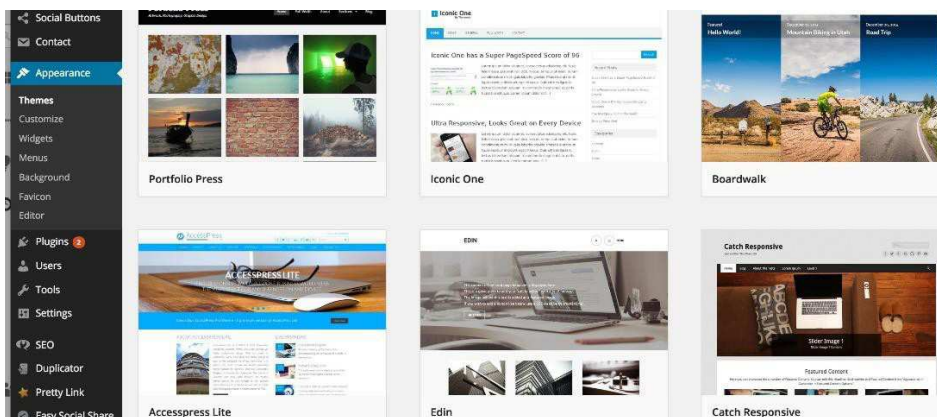


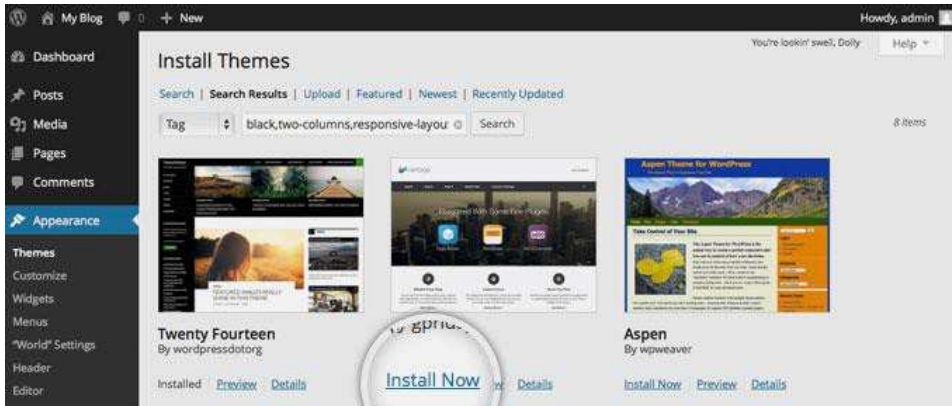
Fig 1.10



You should also look for themes that are “responsive”, as this means they will look good on any mobile device.

### 3. Install your new theme

Once you have found a theme you like click “Install” followed by “Activate”.



*Fig 1.11*

Changing themes will not delete your previous posts, pages and content. You can change themes as often as you want without having to worry about losing what you have created.

### Adding and editing pages

If you Want a “Services” page, or an “About Me” Lookalong the sidebar in the WordPress Dashboard for “Pages” -> “Add New”.

Once you have clicked,you will find a screen that looks a lot like what you have maybe seen in Microsoft Word. Add text, images and more to build the page you want, then save it when you are done.

### Adding pages to the menu

If you want your new page to be linked to in your navigation bar,

1. Save any changes you have made to the page by clicking “Update”
2. Click “Appearance”-> “Menus” in the sidebar of the WordPress Dashboard
3. Find the page you created and add it to the list by clicking the checkbox next to it and then “Add to Menu”.



## Adding and editing posts

- a) Create a new category by going to “Posts -> Categories”  
OR
- b) Create a blog post by going to “Posts -> Add New”. Once you have finished writing your blog post, you need to add the right category for it. Once you have created your category, simply add it to the menu.

## Customization

### Changing Your Title and Tagline

Page titles explain to searchers what your website is about, and they are also a big part of how search engines determine your rankings, so you want to be sure they have got the keywords you want to target in them.

You should use a unique title on every page of your site. For example, if the title is “How to Make a Website”.

(Cannot find it? Just hold your mouse over the tab at the top of your web browser).

Taglines are added at the end of titles across every page. In order to change the title and tagline on your website, go to “Settings -> General” and fill in the form:

### Disabling Comments for Posts & Pages

Some websites (business/ organization sites mostly) do not want their visitors to be able to comment on their pages.

### How to shut comments off on WordPress pages

1. While you are writing a new page, click “Screen Options” in the top right corner.
2. Click the “Discussion” box. The “Allow Comments” box will appear at the bottom.
3. Untick “Allow Comments”.

### Want to disable comments on every new page by default?

1. Go to “Settings -> Discussion” and untick “Allow people to post comments on new articles”



## Setting Up a Static Front Page

A static page is a page that does not change. Unlike a blog, where the first new article will show up at the top every time, a “static” page will show the same content every time someone comes to the site – like a home page you have designed.

### To set up a static front page:

Go to “Settings-> Reading”.

Choose a static page that you have created. “Front Page” denotes your home page, “Posts page” is the front page of your blog (if your entire site is not a blog).

If you do not choose a static page on your own, WordPress will take your latest posts and start showing them on your homepage.

## Editing sidebar

Most WordPress themes have a sidebar on the right side (in some cases it is on the left).

If you want to get rid of the sidebar or edit out items you may not need “Categories”, “Meta” and “Archives”.

1. Go to “Appearance -> Widgets” in the WordPress Dashboard.
2. From here, you can use drag and drop to add different “boxes” to your sidebar, or remove the items you do not want.

There is also a “HTML box”– a text box where you can use HTML code.

## Plugins

Plugins are extensions that are built to expand WordPress’ capabilities, adding features and functions to your site that do not come built-in.

They are shortcuts to getting your site to do what you want to, without having to build the feature from scratch.

You can use plugins to do everything from adding photo galleries and submission forms to optimizing your website and creating an online store.

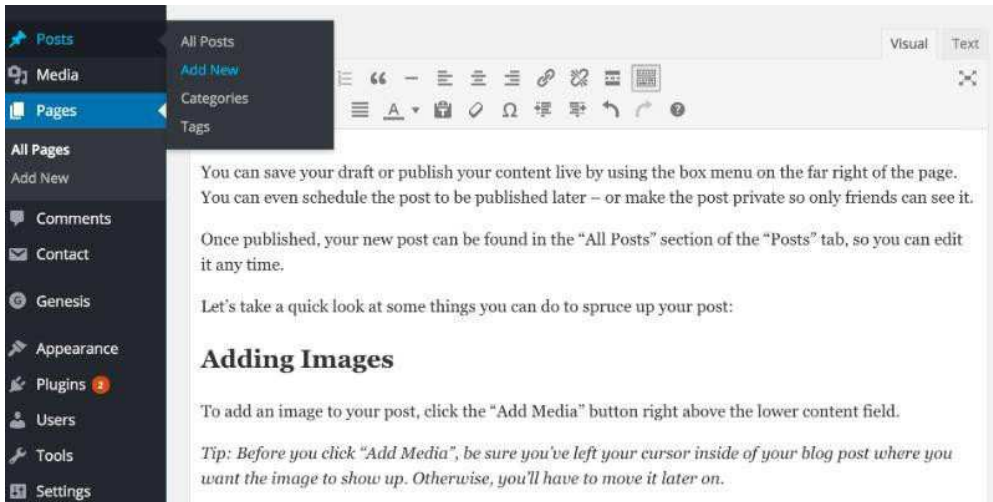
(There are over 25,000 different free plugins). Once you find a plugin you like, just click “Install”.



## 4: Adding/Writing Blog Posts and Pages

### Adding a New Post

To add a new blog post, click the “Posts” section on the left hand side - menu, then click on “Add New”.



You can add the title to your blog post in the top field, and your content goes in the big text box below the title.

You can save your draft or publish your content live by using the box menu on the far right of the page. You can even schedule the post to be published later – or make the post private so only friends can see it.

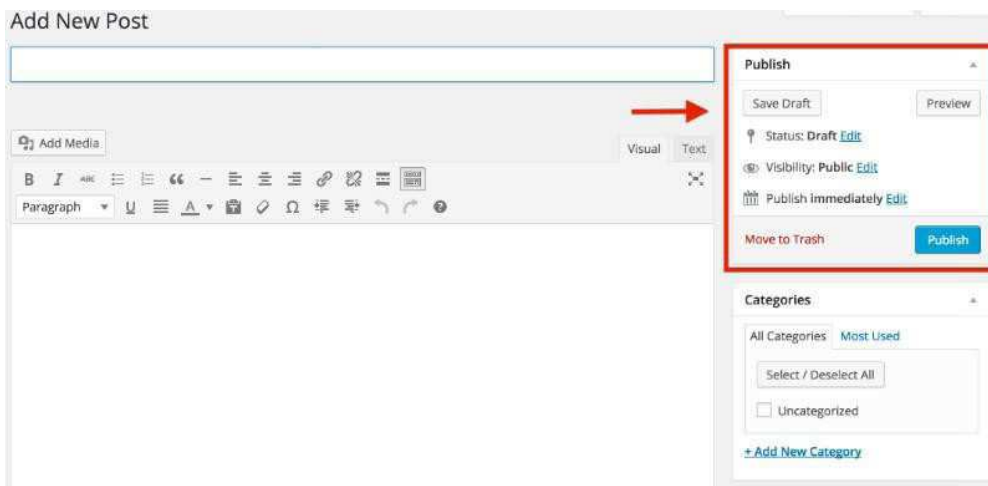


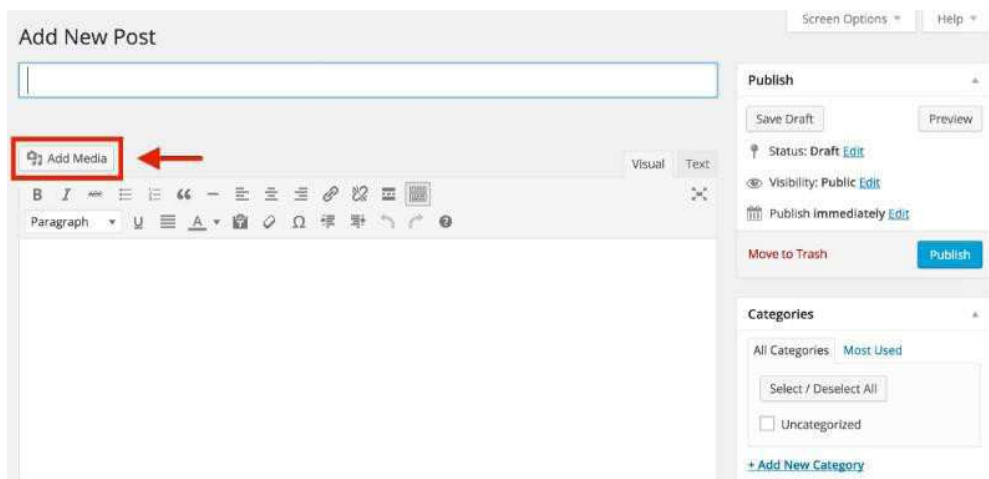
Fig 1.12



Once published, your new post can be found in the “All Posts” section of the “Posts” tab, so you can edit it any time.

## Adding Images

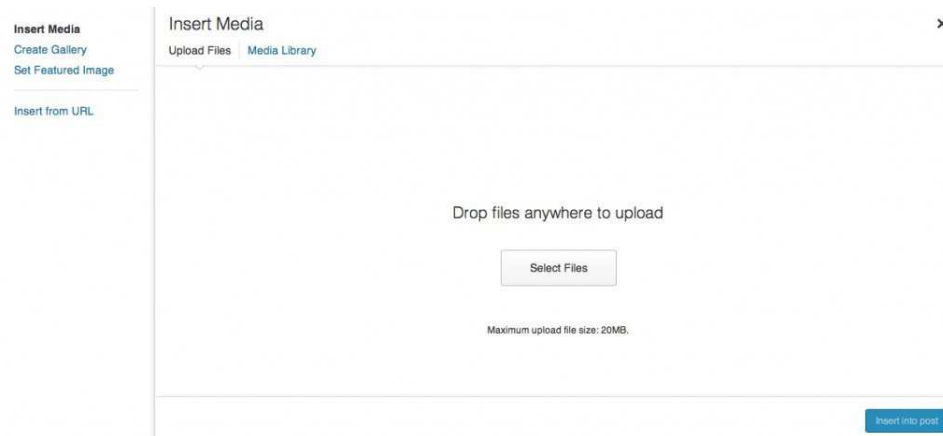
To add an image to your post, click the “Add Media” button right above the lower content field.



*Fig 1.14*

(Before you click “Add Media”, be sure you have left your cursor inside your blog’s post where you want the image to show up. Otherwise, you will have to move it later on).

Next, click the “Upload Files” tab on the screen that pops up, then click “Select Files”.



*Fig 1.15*



Once you have found the file, double click it and WordPress will upload it automatically.

When the upload is finished, make sure the image you want is selected, then click the “Insert into post” button to add the image to the post you are writing.

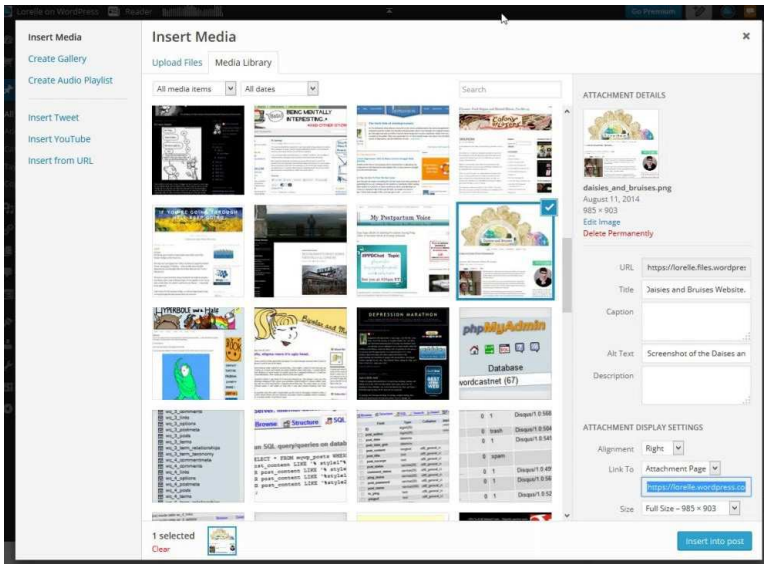


Fig 1.16

## Adding a Link

Linking out to other websites is a great way to build relationships and share interesting content.



Fig 1.17

To add a link, click on the icon in the toolbar that looks a bit like a chain link.

On the pop-up menu, you will need to enter a few important bits of information.





Enter the destination URL

URL

Link Text

Open link in a new window/tab

Or link to existing content ▲

Search

How to Promote Your Blog and Get More Visitors/Traffic	2014/12/07
How to Add an Email Signup Box to Your WordPress Blog (... And Why it Matters?)	2014/10/22
What is a BLOG? 9 Experts Share Their Opinions	2014/03/17
FREE course + updates	PAGE
Thank You!	PAGE
Almost done...	PAGE
How to Move Your Blog from WordPress.com to	2012/11/19

*Fig 1.18*

- **URL** is the web address of the link you want to share. Make sure you include “http://” before the “www.” address, or your link will be broken.
- **“Link Text”** is the text you want people to click on to get to your link. It might be “Click here”, or anything you choose.
- **“Open link in a new window/tab”**– it is a smart idea to check this box. Otherwise, when someone clicks your link, they will leave your blog.
- **If you want to link to an existing page** you can use the “Search” section to find a post or page you have already created and click it to add a link.

Finally, click “Add Link”, and your link will be added where you left your cursor in the post you were writing.

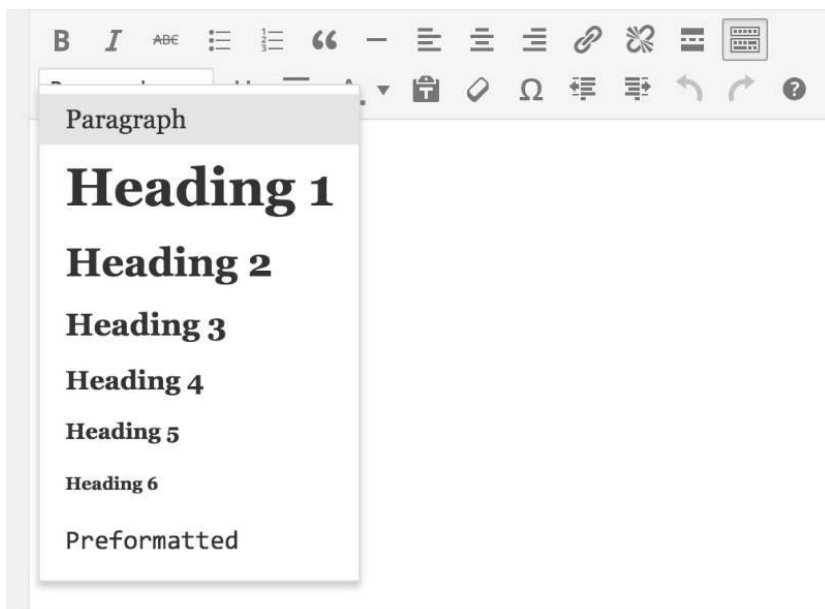


## Adding Headers & Editing Text

It is a good idea to use headers and bolding to make your content easier to read and scan.

### Adding Headings

To add a heading, click on the drop-down menu on the bottom left of the toolbar.



*Fig 1.19*

Try to only use “Heading 1” once within your page (usually at the top), and use “Heading 2” or “Heading 3” for other sections in the copy, as this is better for search engines.

(You can also highlight the text you want to change in your blog post, then click on the dropdown menu and select the format you want the text to be in).

### Editing Fonts

You can also bold, italicize, underline and even change the colour of your text in a click or two.



*Fig 1.20*







## Trademark Legal Issues

Trademarks are issued by the Patent and Trademark authority and are used to protect intellectual property in commerce. For example, company names, product names, brand names, and logos are usually trademarked to ensure competitors in the same industry do not use the same names or logos, which could confuse and mislead consumers.

Business communications typically use the copyright registration symbol (©) or the Service Mark or Trademark symbol (a superscript 'SM' or 'TM') following the trademarked name or logo the first time of that name or logo is mentioned.



Trademarks are tools of commerce, so their use is not required in most blogs. While corporations and media organizations might opt to use them, it is unlikely that the typical blog would need to do so. Even if your blog is related to a business topic, if you are simply referring to trademarked names to support your opinions in your blog posts, you do not have to include the copyright symbols within your blog post text.

However, if you use a trademarked brand name or logo in any way to mislead visitors to your blog into thinking you are affiliated with the trademark owner or represent the owner in any way, you will be held culpable for an offence punishable by law. Even if you use a trademark symbol, you will get in trouble. That is because you cannot mislead people into thinking you have a relationship with a trademark owner that could affect commerce in any way when in reality you do not have such a relationship.



## Defamation

You cannot publish untrue information about anyone or anything that could negatively affect that person or his/her reputation on your public blog. It does not matter if you get no traffic to your blog. If you publish something false about a person or entity that could damage their reputation, you have committed libel and it is an offence punishable by law.



## Privacy

Privacy is a hot topic online. In the most basic terms, you cannot capture private information about visitors to your blog and share or sell that information to a third party without permission from each person. If you do collect data about visitors in any way, you need to disclose it. Most bloggers provide a Privacy Policy on their blogs to explain how data is used. Privacy laws extend to activities off of your blog, too. For example, if you collect email addresses from your blog visitors via a contact form or any other way, you cannot simply start sending mass emails to them. While you might think it is a nice idea to send a separate weekly newsletter or special offers to those people, it is a violation of the CAN SPAM Act to email those people without first giving them a way to opt-in to receive those emails from you.

## Reputation management

Just as brand's reputation can be built or destroyed by the feedback people post about it anywhere on the Internet. In the same way, you can effectively enhance your online reputation management with a well-maintained business blog.

Blogs are among the best tools for you to use in building a solid online reputation. Basically, a blog is a reflection of your thoughts and personality. It therefore gives readers the opportunity to learn more about you, your business, and your brand. It tells them who you are, what you hope to achieve, and what you have to offer, among other things. In most cases, a blog also gives consumers a chance to express their thoughts about your products and services as well as your business in general. The opportunity to freely voice out their opinions is



something most people appreciate.

However, maintaining a blog comes with its own set of risks. When you give people free rein in commenting on your blog, the comments section can work not only to your advantage, but also to your detriment. No matter how well your blog is written and how relevant and useful your posts are, there are bound to be people with negative things to say. The smallest cause for dissatisfaction with your products and/or services can be made to look very bad online, and the ability of negative feedback to go viral very quickly does not help at all. You need to realize as well that the more popular your blog becomes, the more vulnerable you are to negative feedback. That is because there are more people reading your blog, therefore increasing the chance of your posts offending someone's sensibilities.

### Dealing with Negative Feedback

There are generally three professional ways for you to deal with negative feedback on your blog. You will have to decide which of these three approaches is the most appropriate in each instance when you are faced with negative feedback.

1. **Respond:** There are also instances when a negative comment is actually valid or can be very damaging to your reputation if left unaddressed. If someone disagrees with something you said and gives strong arguments against it, respond promptly in a peaceful manner, acknowledging your difference in opinion. If you are convinced that you are right, stand by your opinion without offending the commenter. However, if you realize you were indeed wrong, admit it and thank the commenter for correcting you. This will show your readers that you value their opinions, which is a very good way of using negative comments to your advantage.
2. **Ignore:** Sometimes people complain just for the sake of complaining. This is when they just say something bad about you or your brand without really backing their complaint with any substantial information. For example, someone could say, "You are a fraud!" and that is it. No reason as to why he thinks you are a fraud and what you said or did that warranted that reaction. In this case, most of your readers will probably ignore the comment and it may be best for you to do so as well. Responding will only bring attention to the comment and may even depict you as being too sensitive. Sometimes negative comments have something to do with product complaints. In this case, strive to get the issue resolved as quickly as you can. Always remember that addressing valid complaints is an activity that may be time-consuming, but will never be a waste of time.



3. **Remove:** Some negative comments are intentionally malicious. These may come from competitors or from people known in the Internet world as trolls. If the comment does not serve any purpose at all, you have the option to remove it. It may even be wise to block the commenter from accessing the comments section of your blog.

### *Activity 1.3*

1. Discuss various ways a personal blogger can enhance his blogging skills and reputation to develop a loyal online following .
2. How can a blogger increase traffic to his blog?

### **Review exercise**

1. What is a blog?
2. What are the features of a personal blog?
3. Compare and contrast a personal website with a social network account.
4. What are the importance of blogs in journalism and mass communication?
5. List five ways blogs could be used to spread peace and unity in communities within south Sudan.
6. What are the advantages and disadvantages of personal websites?
7. List the risks involved in publishing personal information on a personal websites.





## Remember

### SIMPLE WEBSITES

**ACCESSIBILITY:** Relates to web design/coding standards and refers to how easy it is for everyone to use your website, including people who are visually impaired or in any way physically handicapped, or limited by older or less common computers and software. These days with the smaller screen sized tablets and smart -phones, accessibility for use on all devices is important; especially with the growing number of people using smaller screen devices to go online.

**ADDRESS BAR:** The white bar towards the top of your computer screen. It will normally have something typed in it that starts with “http://” This is where you type in the address of a website that you want to visit.

**ANCHOR TEXT:** The text a link (hyperlink) uses to refer to your web page. These make a difference in your search engine results.

**ASCII:** American Standard Code for Information Interchange. A code that represents English characters as numbers, ranging from 0 to 127. Commonly used by computers and browsers, ASCII codes make it possible to transfer data from one computer to another computer (like a server). In terms of transferring data from a computer to a server (called “uploading”), you would need to use either ASCII or Binary, depending on the type of file being transferred

**BACKLINKS:** Links from other website pages to yours. Backlinks are used to increase a site’s popularity with search engines and to get more people to visit your site. The quality of a backlink and its anchor text is factored into Google’s algorithm when deciding how much importance to place on it.

**BANDWIDTH:** This relates to how much a resource is used. An analogy would be a freeway. The wider the freeway, the more traffic (users) it can handle. The narrower it is, the less people can use it at once (without problems). When a website gets a lot of visitors, it will use a lot of bandwidth.

**BETA:** A term used for software that is in a “live” testing phase. People can use it but can expect some hiccups.

**BINARY:** A numbering system that consists of only two numbers, 0 and 1. Everything that you type or input into a computer is converted into binary – a unique combination of the zeros and ones. Screens and printers then convert this binary code back into what you inputted. When uploading (transferring) information (files) from a computer to a server, certain files need to be transferred as binary in order to be correctly interpreted and rendered. The alternative to binary for uploading is ASCII.



**BLOG:** An online journal or diary and a very popular current method of sharing your thoughts with the world. It is also very popular as a marketing tool.

**CACHE:** Every time you do anything on your computer, it stores this in memory so that the next time you try to do the same thing, it happens quicker than having to wait from scratch. The place where it stores all this is called the “cache”. The irony is that if your cache gets too full, it in fact makes your computer work a lot slower. It is a good idea to empty your cache regularly to keep your computer working optimally.

**CASCADING STYLE SHEETS:** Also referred to simply as CSS, Cascading Style Sheets are used to define the look and feel of a web site outside of the actual HTML file(s) of the site. In recent years, CSS has replaced tables and other HTML-based methods for formatting and laying out websites. There are many benefits to using CSS but some of the most important are the simplification of a site’s HTML files (which can actually increase search engine ranking) and the ability to completely change the style of a site by changing just one file, without having to make changes to page content.

**CHAT:** In the context of the internet “chat” is a feature that allows users from all over the globe to communicate in real time or almost real time. Conventional chat is communication via typing which then appears on the recipient’s screen. This is done via a piece of software that exists on a server. In some cases you need to install complimentary software onto your own computer as well. Complete chat communities exist that allow people to join in on general conversations with many other users at the same time or with a single person at a time. These “meeting places” are referred to as “chat rooms”. One on one chat can also take place privately by using a piece of software on your computer called a messenger. This has to be especially downloaded and installed from a website that uses this technology.

**COOKIE:** A small piece of information that certain websites store on your computer when you visit them. Cookies are normally harmless and the reasons for using them vary. Sometimes it is to make sure that their website loads quickly when you next visit, by drawing the saved information from your own computer rather than from the website itself. Another use is to track visitors to see how often they come, what they do when they come and other information to help with marketing. Cookies are also used to track visits from other websites, especially when the site you are visiting is paying the other site for advertising space or needs to pay a referral fee to the originating website. A cookie can also be used to check when you last visited and, if any changes since then, to force your browser to refresh so that you see the latest information. The downside of cookies is that after you have visited a lot of sites with a lot of graphics, your computer will begin to get bogged down with all of this in its memory. It is therefore a good idea to regularly clear the cookies from your computer.

**DOMAIN:** A domain is a person or organization's unique space on the internet. It is commonly used to mean the name of your website.

**EMAIL:** The internet equivalent to post and mail, email is an encoded message that is sent instantly to someone else's computer. It is however a "best attempt" facility and not foolproof, largely because of the complexity of the internet itself and the vast number of things that can cause the process to stall or fail.

**FAVICON:** Favicons are tiny (generally 16×16 pixels, though some are 32×32 pixels), customizable icons displayed in the web address bar in most browsers next to the web address. They are either 8-bit or 24-bit in color depth and are saved in either .ico, .gif or .png file formats. The favicon used by Thinking IT is the head logo.

**FIXED WIDTH LAYOUT:** Fixed width layout has a set width (generally defined in pixels) set by the designer. The width stays the same regardless of screen resolution, monitor size, or browser window size. It allows for minute adjustments to be made to a design that will stay consistent across browsers. Designers have more control over exactly how a site will appear across platforms with this type of layout.

**FONT FAMILY:** Font family is a group designation for defining the typefaces used in CSS documents. The font family tag generally lists multiple fonts to be used, and usually ends with the generic font category (such as "serif" or "sans-serif").

**GIF:** A type of file used for images, especially animated graphics and line-drawn images (as opposed to photographs). A .gif image can be saved with a transparent background, making it ideal for graphic overlays.

**HOST / HOSTING:** In order for you to have an email address or a website, a computer somewhere, with all the necessary software, has to provide you with 3 things: an IP (domain) address, physical space to store the information and bandwidth that accommodates the flow of information that is taking place on your behalf. The company that provides you with these facilities is your host and you will pay them a fee for hosting your site and or email address.

**HTML:** Hyper Text Markup Language. This is the base language that is used for creating websites. Common uses of the term are, "html coding" and "html website". A website created in pure html is also referred to as a static website. In other words, it does not interact with the visitor other than in the most basic ways. It stores no data and cannot return data other than what is consistently on the page itself. Emails that use different fonts, colors, borders, backgrounds and graphics are also generally coded in html, with the alternative being plain text.

**HTTP:** HyperText Transfer Protocol. This is a method used to transfer information on the internet and normally precedes the “description” of the actual resource being accessed and transferred. For example, web sites and web pages are one type of resource, identified by their domain name (www.mountainpublishers.co.ke).

**HYPERLINK:** A hyperlink is a link from one web page to another, either on the same site or another one. Generally these are text or images, and are highlighted in some way (text is often underlined or put in a different color or font weight). The inclusion of hyperlinks are the “hyper” part of “hypertext.”

**HYPERTEXT:** Hypertext is any computer -based text that includes hyperlinks. Hypertext can also include presentation devices like tables or images, in addition to plain text and links.

**IP or IP ADDRESS:** Internet Protocol address refers to the actual number that a web address name translates to. (Also see “domain”). The IP number is the real address.

**JAVASCRIPT:** Coding languages used to achieve effects and functions on websites that normal html and its variants cannot achieve. These bits of coding (or scripts) are normally embedded into a web page and will automatically activate as soon as someone arrives on the page. Please note that JavaScript is distinctly different to Java.

**LAN :** Local Area Network. A method of connecting a small network of computers to each other. Using LAN enables file sharing amongst different computers and the ability to connect multiple computers to the internet using the same connection.

**LANDING PAGE:** A landing page is the page where a visitor first enters a website. Oftentimes, a special landing page is created to elicit a specific action from the new visitor (usually in connection with an advertising or marketing campaign).

**META DATA:** this is the data contained in the header that offers information about the web page that a visitor is currently on. The information contained in the metadata is not viewable on the web page (except in the source code). Meta data is contained within Meta tags.

**NAVIGATION:** Navigation refers to the system that allows visitors to a website to move around that site. Navigation is most often thought of in terms of menus, but links within pages, breadcrumbs, related links, pagination, and any other links that allow a visitor to move from one page to another are included in navigation.

**PLUG IN:** A plug-in is a bit of third party code that extends the capabilities of a website. It is most often used in conjunction with a CMS or blogging platform.

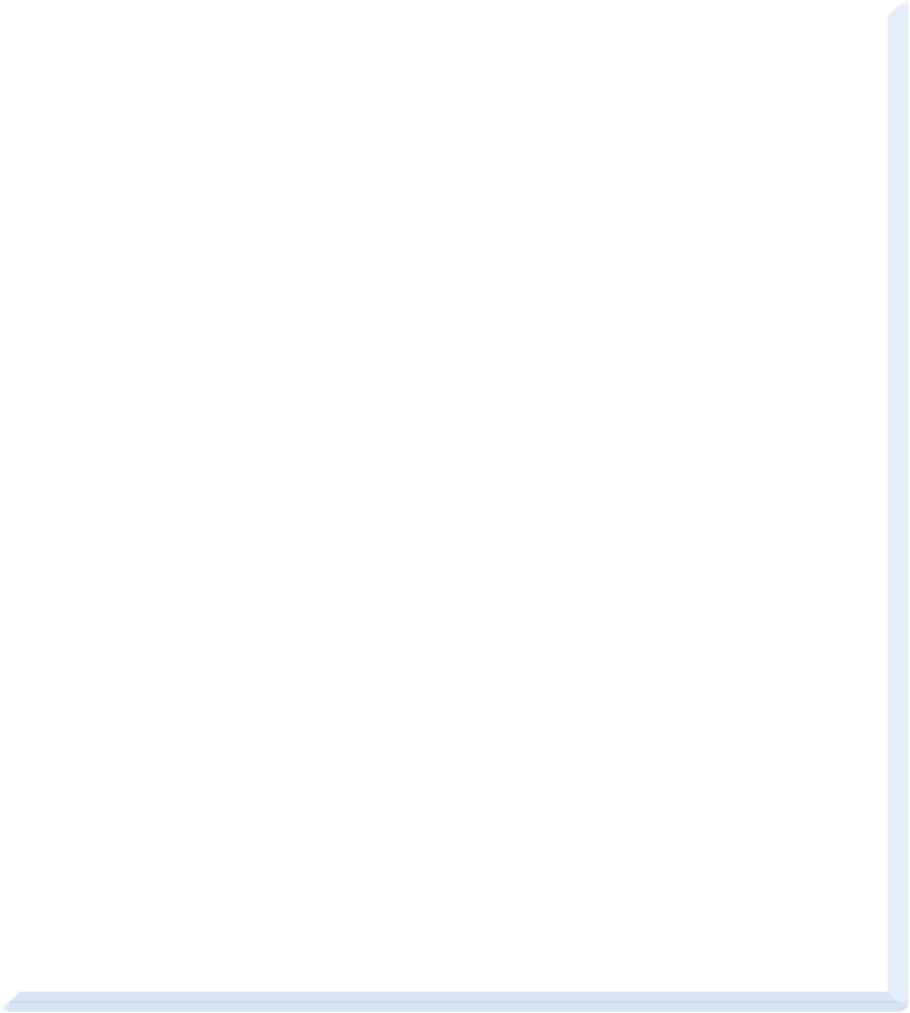
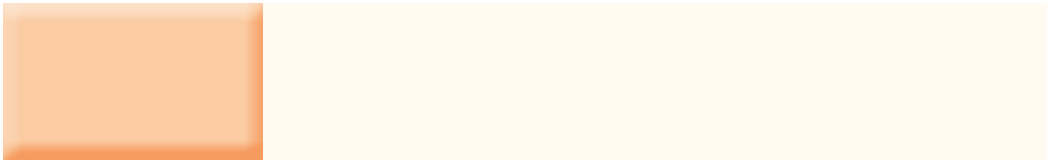
Plug-ins are a way to extend the functionality of a website without having to redo the core coding of the site. Plugins can also refer to bits of third -party software installed within a computer program to increase its functionality.

**SPAM:** Spam is junk mail, normally sent out in bulk and normally with no regard as to whether you want to receive it or not. Serious spammers will in fact use your protests as proof that you are seeing their emails and spam you even more.

**UPLOAD:** For a website to be visible to the world, it has to be put on the server that is hosting it. This process is called uploading because you are literally loading your information, pages, pictures, etc. up onto the server.

**URL:** Uniform Resource Locator. (Allows all resources on the internet to be located in a uniform manner). A URL is a website address that has all the pertinent information for finding the exact location attached to it. <http://mountainpublishers.com> is this website's url and <http://mountainpublishers.com/content.php?page=4> terminology is this exact page's url (notice the extra part after the .com ).

**WEB PAGE or PAGE:** Just one page rather than a complete website (see below). A page is not the same as, for example, the page in a book. The length is not limited by a fixed height and width, but by user -friendliness, good practice and practicality.



## 2.0 Introduction

Social networks are Website or application which enable users to communicate with each other by posting information, comments, messages, images etc.

Social networks sites allow people to build social networks or social relations with other people who share similar personal or career interests, activities, backgrounds or real-life connections.

The main purpose of social networking is to connect with other people. What social media and social networking have in common is that they both depend on viral marketing to become truly successful.

If a post or a content goes viral, more and more people will pay attention and thus more online traffic leading to a better chance of increasing your business. The difference between social media and social networking is that social media helps people to make the connection and social networking enhances that connection. People get together because they have common interests, passions, and causes and they continue to strengthen their relationships as they get to know each other through interaction over time.

Social networking is a relatively new advancement in technology. They are different platforms or websites that people can create personal profiles, share pictures, videos, and text updates to their friends, family, and people from all over the world.

### *Activity 2.1*

In pairs discuss your experiences and the differences between using various social media platforms. (Facebook, twitter, YouTube, Wikipedia etc.)

In social networking, the ultimate goal is to build a network of fans/followers and foster those relationships. There is lot of conversation and questions. You are having deep, informative conversations with people in hope of sparking a connection and gaining a new fan or follower while growing your referral network.

To be great at social networking, you have to take the time to listen and engage with others there need to be a mix of both talking and listening. If you are joining groups and networks on social media and doing all of the talking-posting about your brand or ideas you are likely going to miss out on some great opportunities because you are not engaging through interactive listening and there is no automated way to really grow relationships, and you cannot cut corners. Each interaction you have needs unique focus and attention.



## Exercise

1. List the difference between social media and social networks?
2. List the similarities between social media and social network?

## Importance of social networks

1. Great meeting platform - Social network offers integrated meeting platforms for the visitor's offering more options in terms of time and place. Virtual collaboration has replaced physical collaboration providing maximum effectiveness to the users. They do not need to travel to distant places for conducting the meeting.
2. Impact on business - Professional networking between individuals and business on social networks has helped companies to increase their customer base. Overnight they have built the brand value of their products and services. Professionals connect with their colleagues also find clients to get more projects.
3. Target the audiences - Social networking sites assist business in identifying the target audiences based on the demography or location. Majority of the sites have special tools that could help to ascertain the quality of traffic. Potential customers can be categorized into language, age and gender making targeting easy and effective.

## LinkedIn

LinkedIn is a business- and employment -oriented social networking service that operates via websites and mobile apps. It is mainly used for professional networking, including employers posting jobs and job seekers posting their CVs.

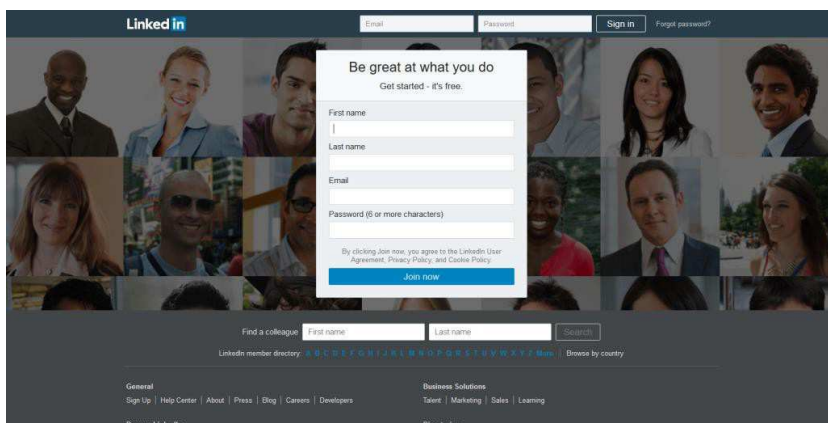


Fig 2.1

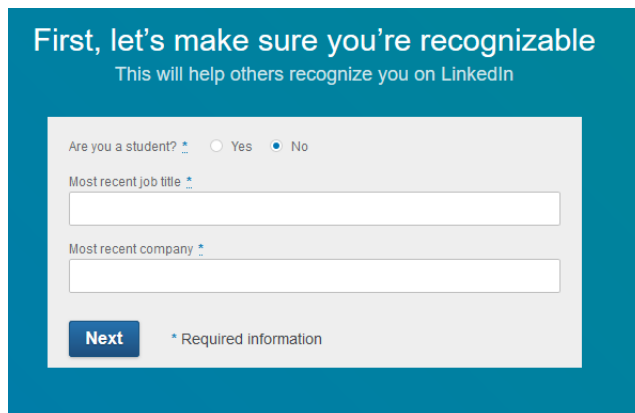


The basic functionality of LinkedIn allow users to create profiles, which for employees typically consist of a curriculum vitae describing their work experience, education and training, skills, and a personal photo. The site also enables members to make “connections” to each other in an online social network which may represent real -world professional relationships. Members can invite anyone (whether a site member or not) to become a connection. However, if the invitee selects “I do not know” or “Spam”, this counts against the inviter. If the inviter gets too many of such responses, the member’s account may be restricted or closed.

## Getting started

*Note: Before you create any account online, make sure you read through the User Agreement as well as the Privacy Policy before creating the account.*

1. Enter your first name, last name, e -mail address and a secure password, then click “Join Now.”
2. Fill the form.



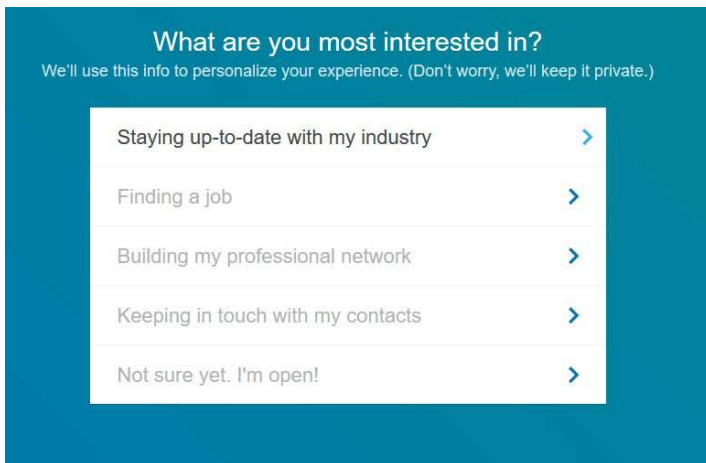
The image shows a registration form on a teal background. The title is "First, let's make sure you're recognizable" in white, with a subtitle "This will help others recognize you on LinkedIn" below it. The form itself is a light gray box containing the following elements: a radio button question "Are you a student?" with "Yes" and "No" options (the "No" option is selected); a text input field for "Most recent job title"; another text input field for "Most recent company"; a blue "Next" button; and a small asterisk icon followed by the text "\* Required information".

*Fig 2.2*

3. The form below engages you with what you want to achieve.

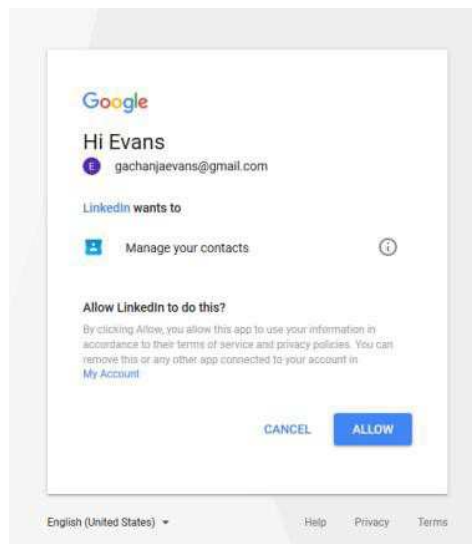






*Fig 2.3*

4. Next, you will need to confirm your e-mail address. So, login to your e-mail and click the link you received from LinkedIn. Once confirmed, you can continue building your LinkedIn profile.



*Fig 2.4*



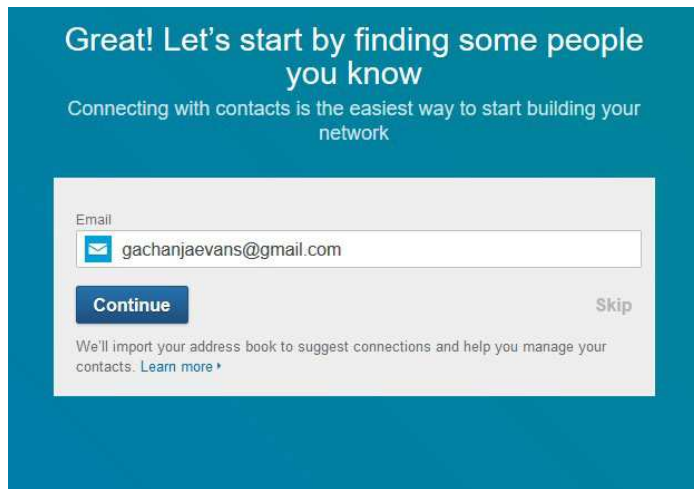


Fig 2.5

You will need to login one more time to continue, so enter your e-mail address and password, and then click "Sign In." Now, your basic LinkedIn profile is ready to share, you can opt to share the link to it on Facebook and Twitter or you can opt to skip the step until you complete it.

Add your photo to your profile for easy recognition.

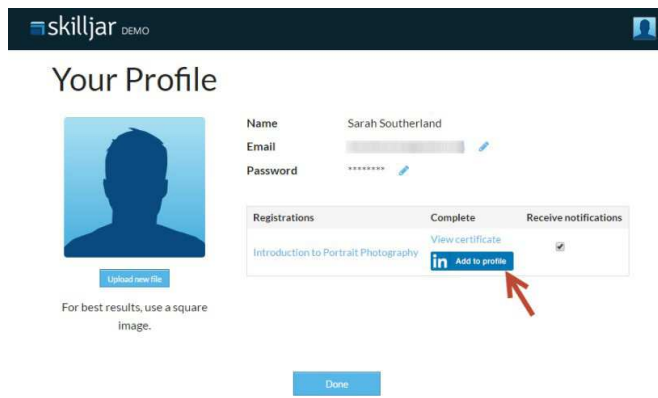


Fig 2.6

After completing all the steps you should have a page like this.

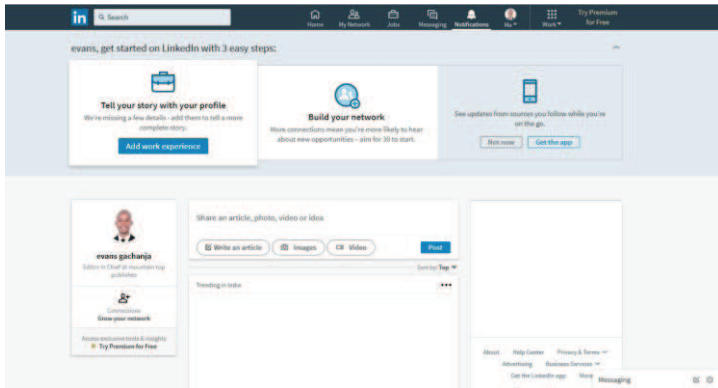


Fig 2.7

## Activity 2.2

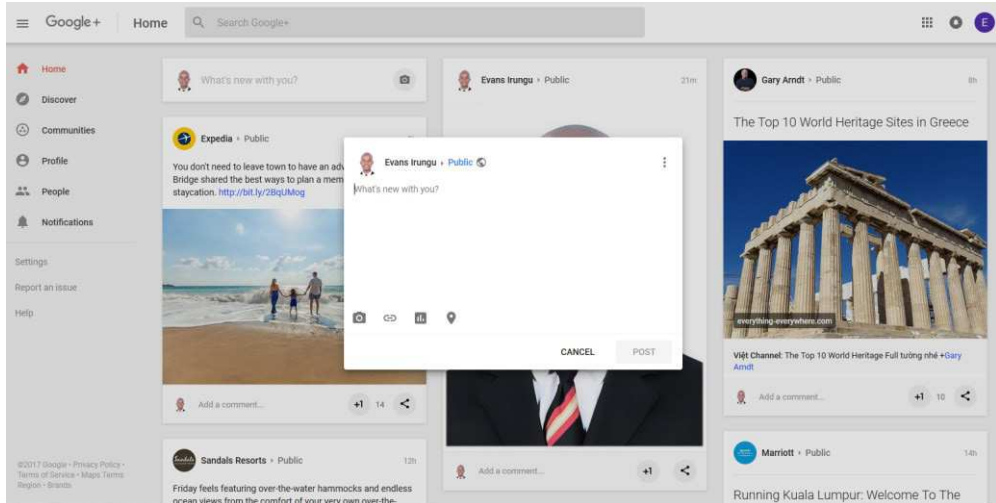
1. Create your own account with LinkedIn. Write your profile, job preference, and interest. Make connections with friends, classmates and peers by inviting them to connect.
2. Discuss the importance of reading through the User Agreement and the Privacy Policy before creating the account.

## Exercise

1. How can LinkedIn be used to promote business growth and entrepreneurship in south Sudan.
2. List various ways in which LinkedIn could be used to address various challenges affecting the society.

## 2.1 Google+

This is an internet based social networking site owned by Google.



*Fig 2.8: Google+ webpage*

### 2.1.1 Google features

#### Comprehensive product integration

Google+ neatly integrates all Google services, making it easy to share and manage content across all Google services which helps to make your activities more efficient.

#### +1 lets people 'like' your Google+ page

People are able to +1 your Google+ page which is essentially the same as a Facebook like. Google uses the number of +1s that your page has to help it determine how popular your business / brand is, making +1 an important ranking signal.

#### Google+ circles

Circles allow you to group followers according to interests or any other criteria you wish to assign (for example, current customers, prospects or competitors). This means you can use groups to closely target your messaging.

#### Hangouts

A Google+ Hangout refers to either video or text chats that you can host or participate in with multiple people at the same time. Think of a hangout like an



instant chat room that you control. Creation of hangouts allow you to schedule online group events, such as a live question and answers session that allows multiple people or entire groups to participate.

## Communities

Google+ Communities allow you to create, or participate in focused groups of both individuals and companies who share a particular interest. Participating in existing communities is an excellent way of raising brand awareness, creating trust and getting direct feedback from customers. Creating a group allows you to start a community, closely aligned to your own brand values. This can help to improve your brand awareness this helps to position you as an authority, and to nurture relationships.

## Events

Google+ Events work much in the same way as Facebook Events do, the key difference being higher levels of interactivity. Anyone using Gmail or Google Calendar can easily add the event right onto their calendars and event invites will automatically go out to whoever you select from individuals or groups.

## Insights

Google+ has an analytical insights that allow you to see key stats from your Google+ dashboard including how many views your business listing has received, how many times you have been viewed in local search and how many people are engaging with you.

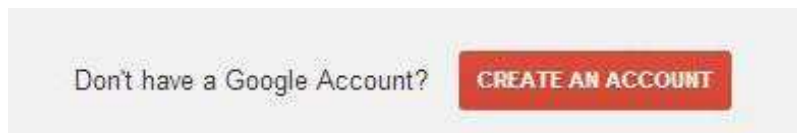
## Google My Business

Google My Business is a local business listing page that is perfect for local businesses. They allow you to display reviews, photos, key business information like opening times and contact details, as well as displaying a fully integrated Google location map. This provides you with another customer touch point and it helps you to enhance your visibility in search results and to drive traffic. If you are totally new to Google, avoid setting up a regular page, set up a location based Google My Business page instead, so you do not end up running two pages in tandem.



## Creating a google+ account

Go to [plus.google.com](https://plus.google.com) and click “Create an Account” on the top right.



Fill in your info and click “Next Step.”

At this point, you can add a profile photo. Choosing a great profile photo is extremely important, as this will be how you will be recognized and remembered across the web.

It is advisable to use the same profile photo across platforms (your website, Facebook, Twitter, etc.). Once you have selected and adjusted your profile photo, click “Next Step.”

You now have a Google+ account.

### 2.1.2 Build Your Circles

The most important and use ful part of Google+ is your Circles; Circles allow you to categorize your friends in the most appropriate ways. For instance, when you add a relative on Google+, you can add them to your “Family” circle; add your coworkers to your “Work” circle etc.

The importance of these circles is if post some pictures from your family vacation on Google+. Your sports buddies and your co-workers do not need to see those pictures, so you can share them with only your “Family” circle. Your family does not want to see your massive collection of your car racing videos Share them with only your “race car” circle. The possibilities are endless.

To add people to your circles, select “People” in the left navigation panel. Right off the bat, you can connect your address book from other email accounts to Google+ to see if any of your friends already have G+ profiles. You can also search for friends by entering your company or school name.

You can also just type someone’s name into the search bar if the result of in the search page you find his profile, then clicked the button “Add.”

If you have filled out your profile info well, clicking “Suggestions” on the left will show you a list of people that Google+ thinks you will likely add as friends, based on common interests. There is a significant difference between adding friends on Google+ and adding friends on Facebook: on Facebook, both parties must confirm a friend request. Google+, on the other hand, allows for one-sided



following, similar to Twitter. When you add someone to your circles, they do not have to add you back.

In “Your Circles” on the top navigation bar, you can control your circles. You can make new circles (like “church friends,” “study group,” “Classmates,” etc.), or delete current circles. At the top, you will see all the people you have circled; you can click on their pictures and drag them to whatever circle you desire. People can be added to more than one circle.

### **2.1.3 Posting content**

To write a post, click “Home” on the top left. Click on “Share what’s new...” to type whatever you’d like to post.

Unlike Twitter, there is no character limit to what you type; you can type as much as you want! In addition, you can add some basic formatting to your text. Once you click “Share,” the formatting will be applied.

In the share box, you can share text, photos, links, videos, and events. Once you have added whatever content you want to your post, it is time to share it. Click the box next to the word “To:” to select which friends you’d like to share your post with. You can select individual circles or people, or you can share to friend in all your circles, or you can share publicly.

#### ***Activity 2.3***

Create your own google + account, complete with a profile and make connections with friends and classmates and people you admire in your area of interest.

## **2.2 Students circle network**

Students Circle Network is an international, educational social network for college and high school students, providing free course resources, peer to peer learning, study groups and support services.





OpenCourseWare (OCW) are course lessons created at universities and published for free via the Internet. Students circle network is an OpenCourseWare consortium member and lists over 10,400 academic courses from over 200 OpenCourseWare member universities around the world, free to students in business, computing, engineering, sciences and humanities.

Students Circle Network has members from over 120 countries and 200 universities. Membership is open to students, researchers and teachers. The network has introductory courses for high school students.

### 2.2.1 Features

1. **Social network:** As a social network, Students Circle allows its members to create personal profiles, private message, chat, share multimedia content, create networks and check into academic contents.
2. **Academic resources:** Students Circle presents aggregated courses from all OpenCourseWare consortium members and creates social interaction and learning collaboration around that content. Academic resources are divided into graduate courses, undergraduate courses, language studies, and introductory courses.
3. **Study groups:** There are over 15 study groups in different academic disciplines that allow students to schedule live online study sessions with each other. This live chat is powered by Tiny Chat and provides creative space for peer -to-peer learning.
4. **Social games:** Social games are an integral part of the network allowing students to interact over games.

#### *Activity 2.4*

1. Create a student circle account and check into academic contents that are relevant to your area of study.
2. Using this account create a study group with live study sessions among the groups in your class.



## Exercise

1. What are the similarities of different social networking platforms?
2. How can social networking be used to promote peace and unity in south Sudan.
3. How could students and institutions benefit from social networks like student circle networks?

### 2.2.2 Advantages of social networking

1. **Commonality of Interest:** When you opt to participate in a social network community, you can pick and choose individuals whose likes and dislikes are similar to yours and build your network around those commonalities. For instance, if you are a chess fan, a book lover or have a particular social leaning, you can find and interact with those who share your interest.  
It can also be a great way to share tips and ideas. Social networking Sites have been very successful due to the ease in which a person can learn - and share - information about hobbies, crafts, cooking, gardening and other do -it-yourself activities. By pinning and sharing, you can attract like-minded individuals into your circle.
2. **Real-Time Information Sharing:** Many social networking sites incorporate an instant messaging feature, which lets people exchange information in real -time via a chat. This is a great feature for teachers to use to facilitate classroom discussions because it lets them utilize the vast store of information available on the Web. This can be a great time saver for the teacher - since students no longer need to visit a library to conduct research - and it can be a great way to engage learners.  
Social networking can provide a tool for managers to utilize in team meetings, for conference organizers to use to update attendees and for business people to use as a means of interacting with clients or prospects. This approach can make events more interactive and help the presenter reach a larger audience.
3. **Targeted Advertising:** One of the best aspects of social networking is the ability to deliver your content only to those users with the most potential interest in your product or service. Networking works on a chain principle. Often, a chain of contacts is built by contacting a single person who refers another. This web of contacts moves on at a rapid pace and an audience is built up in a very short while. This approach can maximize targeted reach while minimizing waste.

Professional networking sites like LinkedIn gives updates on jobs



available and profiles of candidates these are reliable sources for recruiting candidates.

A person's online profile gives employers an insight into a person's past career, qualifications and also contacts.

4. **Guaranteed Meeting Places:** When attempting to plan meetings with colleagues or friends, having access to social networking sites expands the available times and places in which meetings can occur. Individuals can meet each other and chat over LinkedIn, or open a video chat through Google+. Rather than having to travel to specific locations, or try to work times out in which everyone is near a central location, people can plan to meet at times that work for all of their schedules.

### *Activity 2.5*

1. Discuss the disadvantages of social networking.
2. Discuss various challenges facing social networking in South Sudan.
3. How can a small company in business use social networking to promote its brand.

### **Review exercise**

1. What do you understand by social networking?
2. What are the 5 major difference between social media and social networks?
3. Outline are risks involved in interacting in social networks?
4. What is the importance security and privacy in social networks?
5. What are the contribution of social networks to globalization?
6. Compared to Facebook and Twitter, what are the unique opportunities social networks offer to brands ?
7. What are the emerging trends and technology in social networks ?





## SOCIAL NETWORKS

**Company Page** - A place for businesses to include information about their business and create updates about their business and their industry.

**Mention** - Just like Facebook and Twitter, you can mention others in your LinkedIn updates.

**Connection** - An indicator that you and a person are connected to each other.

**Invitation** - Invite someone to join your network and connect with you.

**Introduction** - A way to introduce yourself to those you are not currently connected to.

**Groups** - These can be public or private, and can be created by an individual or company. It allows users to come together and talk about a specific subject on one page.

**Network** - Your connections which also includes the connections of your connections.

**Recommendation** - A way to recommend a friend/colleague, based on their professional experience, to anyone who views their profile.

**Influencers** - Key and influential people in your industry that can provide you with great content.

**LinkedIn Today**- A source for all of your industry news in one place.

**Profile** - This is the landing page that displays your profile picture, the information you have provided, and the content you have posted to Google Plus.

**Page** - Similar to a profile, a Google Plus Page is created by a business or a brand.

**Constant** - An identifier that is bound to an invariant value.

**Constructor** - A class method (in object-oriented programming) that creates and initializes each instance of an object.

**Data type** - A classification or category of various types of data that states the possible values that can be taken, how they are stored, and what range of operations are allowed on them.

**Destructor** - In object-oriented programming, the command sequence that is launched when the execution of an object is finished.

**Dump** - A formatted listing of the contents of program storage, especially when produced automatically by a failing program

**Enumeration** - A data type whose values are a set of mutually exclusive named constants.

**Exception** - An interruption in normal processing, especially as caused by an error condition.

**Floating point** - A method of representing real numbers as a pair of integers.

**Flow chart** - A schematic representation of the logic that defines the flow of control through a program

**Formal argument** - A parameter in a function definition.

**Function** - A routine that receives zero or more arguments and may return a result.

**Functional programming** - A programming paradigm that treats computation as the evaluation of mathematical functions, avoids state and mutable data, and makes it easy to construct functions as if they were data objects.

**goto / go to** - A statement (in source code) that transfers control unconditionally to another part of a program .

**Heap** - An area of memory reserved for dynamically allocated data objects, contrasted to the stack.

**+1 Button**- This functions as a Facebook “like” button does. The +1 button allows users to indicate they appreciated your content.

**Share** - This button, which looks like an arrow, allows others to share your content on their Google Plus Streams.

**Comment**- This one’s easy...people can comment on your content!

**Tag** - When mentioning an individual or business in your Google Plus content, make sure to tag them. When you do, they get a notification that you have mentioned them. This feature operates like it does on Facebook, so before typing the person or businesses name, include the “@” symbol.

This will produce a drop-down box that will change based on the letters you type. Find the person you are trying to tag and click on their name.

**Google Plus Streams** - This is your view when you log in to Google Plus. It shows the stream of content posted from others in your circles.

**Circles** - These are the categories you create to organize your followers and the people you follow. These categories can be anything you’d like them to be, but the most common examples include “Family,” “Friends,” “Work,” “Local Businesses” etc. When posting content, you can choose to expose your content to the public, your Circles, or Extended Circles.

**Extended Circles** - These are tricky because just like Facebook's algorithm, Google decides who to show your extended content to. Essentially, by sharing your content with your Extended Circles, your "friends of friends" MAY see your content.

**Local** - This one is huge for you and your business because 97 percent of consumers search for local businesses online . This means that your business information needs to be readily available to all search engines. A Local Google Plus Page allows your customers to find your hours, address, and phone number all in one place. This information is displayed within a Google Search, so you want to make sure your information is accurate and up to date.

**Hangout**- A Hangout is a video chat with up to 10 people at one time.

**Hangout on Air (HOA)**- This is a Google Hangout that is "broadcasted" (on air), and can be watched both live on your Google Plus Page or after the Hangout. The finished product can be found on both your Google Plus Page as well as your YouTube page, which makes Hangout's on Air a perfect content marketing platform for customer promotions via social media, email, and website.

**Communities**- Google Plus Communities are created by brands or individuals to encourage conversations and share information around one specific topic or service.

**Google Plus Bar (or Sand Bar)** - The Google Plus Bar is the gray bar that lives at the top of any Google property with your image and a drop-down arrow. This function allows you to share content from other Google properties to your Google Plus Page quickly.

**Update** - Status updates and content that you post.

**Profile** - Similar to a resume, you add information about you and your job history.



## LEARNING OUTCOMES

By the end of this unit you should;

- Know how to write a simple program, e.g. to print 'Hello world' on the monitor, and compute quadratic equation.
- Understand ethical conduct in computer usage.
- Be able to write simple computer programs.
- Perform the conversion of a numerical algorithm into a program.
- Recognize ethical issues in computer usage.

## Key inquiry questions

1. What is programming?
2. What is an algorithm?
3. How is a simple computer program designed and created?
4. How is a numerical algorithm translated into a computer program?
5. What is the ethical conduct in the computer usage (copyrights)?

## 3.0 Computer Programming

This is the process of developing and implementing various sets of instructions to enable a computer to do a certain task . It is a process that leads from an original formulation of a computing problem to executable computer programs.

### 3.0.1 Characteristics of a computer program.

1. **Consistency**: how often the results of a program are correct. This depends on conceptual correctness of algorithms, and minimization of programming mistakes, such as mistakes in resource management (e.g., buffer overflows and race conditions) and logic errors (such as division by zero or off-by-one errors).
2. **Robustness** : how well a program anticipates problems due to errors (not bugs). This includes situations such as incorrect, inappropriate or corrupt data, unavailability of need ed resources such as memory, operating system services and network connections, user error, and unexpected power outages.
3. **Usability**: the ergonomics of a program: the ease with which a person can use the program for its intended purpose or in some cases even unanticipated purposes. Such issues can make or break its success even regardless of other issues. This involves a wide range of textual, graphical and sometimes hardware elements that improve the clarity, intuitiveness, cohesiveness and completeness of a program's user interface.
4. **Portability**: the range of computer hardware and operating system platforms on which the source code of a program can be compiled/interpreted and run. This depends on differences in the programming facilities provided by the different platforms, including hardware and operating system resources, expected behavior of the hardware and operating system, and availability of platform specific compilers (and sometimes libraries) for the language of the source code.
5. **Maintainability**: the ease with which a program can be modified by its present or future developers in order to make improvements or customizations, fix bugs and security holes, or adapt it to new environments. Good practices during initial development make the difference in this regard. This quality may not be directly apparent to the end user but it can significantly affect the fate of a program over the long term.
6. **Efficiency/performance** : Measure of system resources a program consumes (processor time, memory space, slow devices such as disks, network bandwidth and to some extent even user interaction): the less, the better. This also includes careful management of resources, for example cleaning up temporary files and eliminating memory leaks.



## Programming language

A programming language is a coded language used by programmers to write instructions that a computer can understand. Programming languages generally consist of instructions for a computer. Programming languages can be used to create programs that implement specific algorithms.

## Types of Programming Languages

### 1. Procedural Programming Language

The procedural programming language is used to execute a sequence of statements which lead to a result. This type of programming language uses multiple variables, heavy loops and other elements, which separates them from functional programming languages. Functions of procedural language may control variables, other than function's value returns. For example, printing out information.

### 2. Functional Programming Language

Functional programming language typically uses stored data, frequently avoiding loops in favor of recursive functions. The functional programming's primary focus is on the return values of functions, and side effects and different suggests that storing state are powerfully discouraged. Functional languages are usually easier and build it easier to figure on abstract issues, however, they will even be "further from the machine" therein their programming model makes it difficult to know precisely, but the code is decoded into machine language (which are often problematic for system programming).

### 3. Object-oriented Programming Language

This programming language views the world as a group of objects that have internal data and external accessing parts of that data. The aim of this programming language is to think about the fault by separating it into a collection of objects that offer services which can be used to solve a specific problem.

### 4. Scripting Programming Language

These programming languages are often procedural and may comprise object-oriented language elements, but they fall into their own category as they are normally not full-fledged programming languages with support for development of large systems. For example, they may not have compile-time type checking. Usually, these languages require tiny syntax to get started.

### 5. Logic Programming Language

These types of languages let programmers make declarative statements and



then allow the machine to reason about the consequences of those statements. In a sense, this language does not tell the computer how to do something, but employing restrictions on what it must consider doing.

To call these group “types of language” is really a bit confusing. It is easy to program in an object-oriented style in C language. In truth, most of the languages include ideas and features from various domains, which only helps to increase the usefulness of these types of languages

### 3.0.2 Commonly used programming language

#### 1. Java

Java is a class-based, object-oriented programming language developed by Sun Microsystems in the 1990s. It's one of the most in-demand programming languages, a standard for enterprise software, web-based content, games and mobile apps, as well as the Android operating system. Java is designed to work across multiple software platforms, meaning a program written on Mac OS X, for example, could also run on Windows.

#### 2. C Language

A general-purpose, imperative programming language developed in the early '70s, C is the oldest and most widely used language, providing the building blocks for other popular languages, such as C#, Java, JavaScript and Python. C is mostly used for implementing operating systems and embedded applications. Because it provides the foundation for many other languages, it is advisable to learn C (and C++) before moving on to others.

#### 3. C++

C++ is an intermediate-level language with object-oriented programming features, originally designed to enhance the C language. C++ powers major software like Firefox, Winamp and Adobe programs. It's used to develop systems software, application software, high-performance server and client applications and video games.

#### 4. C#

Pronounced “C-sharp,” C# is a multi-paradigm language developed by Microsoft as part of its .NET initiative. Combining principles from C and C++, C# is a general-purpose language used to develop software for Microsoft and Windows platforms.



## 5. Objective-C

Objective-C is a general-purpose, object-oriented programming language used by the Apple operating system. It powers Apple's OS X and iOS, as well as its APIs, and can be used to create iPhone apps, which has generated a huge demand for this once-outmoded programming language.

## 6. PHP

PHP (Hypertext Processor) is a free, server-side scripting language designed for dynamic websites and app development. It can be directly embedded into an HTML source document rather than an external file, which has made it a popular programming language for web developers. PHP powers more than 200 million websites, including Wordpress, Digg and Facebook.

## 7. Python

Python is a high-level, server-side scripting language for websites and mobile apps. It's considered a fairly easy language for beginners due to its readability and compact syntax, meaning developers can use fewer lines of code to express a concept than they would in other languages. It powers the web apps for Instagram, Pinterest and Rdio through its associated web framework, Django, and is used by Google, Yahoo! and NASA.

## 8. Ruby

A dynamic, object-oriented scripting language for developing websites and mobile apps, Ruby was designed to be simple and easy to write. It powers the Ruby on Rails (or Rails) framework, which is used on Scribd, GitHub, Groupon and Shopify. Like Python, Ruby is considered a fairly user-friendly language for beginners.

## 9. JavaScript

JavaScript is a client and server-side scripting language developed by Netscape that derives much of its syntax from C. It can be used across multiple web browsers and is considered essential for developing interactive or animated web functions. It is also used in game development and writing desktop applications. JavaScript interpreters are embedded in Google's Chrome extensions, Apple's Safari extensions, Adobe Acrobat and Reader, and Adobe's Creative Suite.

## 10. SQL

Structured Query Language (SQL) is a special-purpose language for managing data in relational database management systems. It is most commonly used



for its “Query” function, which searches informational databases. SQL was standardized by the American National Standards Institute (ANSI) and the International Organization for Standardization (ISO) in the 1980s.

### 3.0.3 Similarities between different programming languages

1. Arithmetic: Perform basic arithmetical operations like addition and multiplication.
2. Conditional Execution: Check for certain conditions and execute the appropriate sequence of statements.
3. Repetition: Perform some action repeatedly, usually with some variation.
4. Input: Gather data from the keyboard, a file, or some other device.
5. Output: Display data on the screen or send data to a file or other device.

### The Difference between Different Programming Languages

Different programming languages support different styles of programming. The choice of language used is subject to many considerations, such as company policy, suitability to task, availability of third-party packages, or individual preference.

### Data types

All programs involve storing and manipulating data. A data type is a classification that specifies which type of value a variable has and what type of mathematical, relational or logical operations can be applied to it without causing an error. A string, for example, is a data type that is used to classify text. An integer is a data type used to classify whole numbers. Data types simply refers to the type and size of data associated with variables and functions.

The data types can roughly be described as: numbers, Booleans, characters, arrays, and structures. Some languages like ActionScript replace characters with “strings”. Object oriented languages, such as C++ and Java replace “structures” with “objects”.

The data type defines which operations can safely be performed to create, transform and use the variable in another computation. When a program language requires a variable to only be used in ways that respect its data type, that language is said to be strongly typed. This prevents errors, because while it is logical to ask the computer to multiply a float by an integer (1.5 x 5), it is illogical to ask the computer to multiply a float by a string (1.5 x Alice). The extent to which a programming language discourages or prevents type error is known as type safety.

Data types can roughly be described as: numbers (e.g., 7, 3.14), Booleans (true or false) , characters ('a', 'b', ... 'z', '1', '2', ... '9', '!', '^', etc) , arrays (a list of data (all of the Same Data Type!)), and structures (a collection of named data referring to a single entity) . Some languages like ActionScript replace characters with “strings”. Object oriented languages, such as C++ and Java replace “structures” with “objects”.

## 1. Strings

One of the most widely used data types is a string. A **string** consists of one or more characters, which can include letters, numbers, and other types of characters. A string is like a plain text.

A string represents alphanumeric data. This means that a string can contain many different characters, but they are all considered as if they were text, even if the characters are numbers. A string can also contain spaces. This presents a bit of an issue. How are you going to distinguish between the value of a string and the actual code of the program? The solution is to mark the beginning and end of a string with a special character, typically a quote. For example, the following code is used to print text to the screen: `print 'Hello World!'`

The use of quotes ensures that the text 'Hello World!' is recognized as a string and not as two separate words that may have some special meaning in the programming language. The use of quotes also makes it possible to use numeric characters as part of a string. For example, the following code is used to store a street address: `address = '123 Central Avenue'`

Without the quotes, the numeric characters 123 would be interpreted as a number, but with the quotes, it is recognized as being part of a string that represents a street address.

## 2. Numeric Data Types

The second most important data type is numeric data. There are several different ones.

An integer is a numeric value without a decimal. Integers are whole numbers and can be positive or negative. Sometimes a distinction is made between short and long integers, referring to how much data storage is used for the number. A short integer is typically stored using 16 bits, which means you can store up to  $2^{16}$ , or 65,536, unique values. For any number larger than that, you would need to use a long integer, which uses 32 bits or more.

A number with a decimal is referred to as a decimal, a float or a double. The terminology varies somewhat with the programming language being used. The term 'float' comes from floating point, which means you can control where the decimal point is located. The term 'double' refers to using double the amount of storage relative to a float. Working with numbers in code is a little bit like using a calculator. Here is an example of how numeric values are used in code, in this case using a multiplication character: `result = 3 * 117.89`

The value stored in the 'result' would be 353.67.

## 3. Boolean data

Boolean data type is any data type that has either a true or false value, yes or no value, or on or off (1 or 0) value. A Boolean data type enables you to represent logical values.

By default, the boolean data type is set to false. In some programming languages such as Perl there is no special boolean data type. However, when using if it will return as either true or false.

In programming, a boolean can be used with conditional statements (i.e. if statement).

### Example

```
use strict;
my ($name, $password); print
"\nName: "; chomp($name =
<STDIN>); print "\nPassword:
"; chomp($password = <STDIN>);

if (($name eq "bob") && ($password eq "example"))
{
    print "Success\n";
} else {
    print "Fail\n";
    die;
}
```



The if statement is looking for a username that is equal to “bob” and a password that is equal to “example”. If either the name or password is not correct, the program prints “Fail” and terminates.

## 4. Character data type

Character data strings consist of a sequence of character from a defined character set. A character string may have a fixed or varying length. Fixed-length strings are right -extended with spaces on output; variable -length strings are not extended.

- The data types CHARACTER (CHAR) and CHARACTER VARYING (VARCHAR) are collectively referred to as *character string types*, and the values of character string types are known as *character strings*.
- CHAR is conceptually a fixed-length, blank-padded string. Any trailing blanks (spaces) are removed on input, and only restored on output. The default length is 1, and the maximum length is 65000 [octets](#) (bytes).
- VARCHAR is a variable-length character data type. The default length is 80, and the maximum length is 65000 octets. Values can include trailing spaces.
- When you define character columns, specify the maximum size of any string to be stored in a column. For example, to store strings up to 24 octets in length, use either of the following definitions:

```
CHAR(24) /* fixed -length */VARCHAR(24) /* variable -length */
```

## 5. Objects

This is a series of objects all of which are the same size and type. Each object in an array is called an array element. For example, you could have an array of integers or an array of characters or an array of anything that has a defined data type.

- In arrays each element has the same data type (although they may have different values).
- The entire array is stored in memory (without gaps between elements).
- Arrays can have more than one dimension. A one -dimensional array is called a vector; a two-dimensional array is called a matrix.



An element is accessed by indexing the array name. This is done by placing the index of the element within square brackets after the name of the array. For example –

```
int var = number[9];
```

The above statement will take the 10th element from the array and assign the value to **var** variable. The following example uses all the above- mentioned three concepts viz. creation, assignment, and access ing arrays.

```
#include <stdio.h>

int main () {

int number[10]; /* number is an array of 10 integers */
int i = 0;

/* Initialize elements of array n to 0 */
while( i < 10 ) {

/* Set element at location i to i + 100 */
number[ i ] = i + 100;
i = i + 1;
}

/* Output each array element's value */
i = 0;
while( i < 10 ) {

printf("number[%d] = %d\n", i, number[i] );
i = i + 1;
}

return 0;
}
```



When the above code is compiled and executed, it produces the following result –

```
number[0] = 100
number[1] = 101
number[2] = 102
number[3] = 103
number[4] = 104
number[5] = 105
number[6] = 106
number[7] = 107
number[8] = 108
number[9] = 109
```

## 6. Structures

Structure is a group of variables of different data types represented by a single name.

Let's say we need to store the data of students like student name, age, address, id etc. One way of doing this would be creating a different variable for each attribute, however when you need to store the data of multiple students then in that case, you would need to create these several variables again for each student. This is such a challenge to store data in this way.

We can solve this problem easily by using structure. We can create a structure that has members for name, id, address and age and then we can create the variables of this structure for each student.

We use struct keyword to create a structure in C. The struct keyword is a short form of structured data type.

```
struct struct_name { DataType member1_name
DataType member2_name; DataType member3_name;
...
};
```

Here struct\_name can be anything of your choice. Members data type can be same or different. Once we have declared the structure we can use the struct name as a data type like int, float etc.

First we will see the syntax of creating struct variable, accessing struct members etc. and then we will see a complete example.

## 1. Declare variable of a structure

```
struct    struct_name var_name;
```

or

```
struct struct_name {  
    DataType member1_name; DataType member2_name;  
    DataType member3_name;  
    ...  
} var_name;
```

## 2. access data members of a structure using a struct variable

```
var_name.member1_name;  
var_name.member2_name;  
...
```

## 3. assign values to structure members

### a) Using Dot(.) operator

```
var_name.memeber_name = value;
```

### b) All members assigned in one statement.

```
struct struct_name var_name =  
{value for memeber1, value for memeber2 ...so on for all the  
members}
```



## Example of Structure in C

```
#include <stdio.h>
/* Created a structure here. The name of the structure is
 * StudentData.
 */
struct StudentData{ char *stu_name; int stu_id;
int stu_age;
};
int main()
{
/* student is the variable of structure StudentData*/
struct StudentData student;

/*Assigning the values of each struct member here*/
student.stu_name = "Steve";
student.stu_id = 1234;
student.stu_age = 30;

/* Displaying the values of struct members */
printf("Student Name is: %s", student.stu_name);
printf("\nStudent Id is: %d", student.stu_id); printf("\nStudent
Age is: %d", student.stu_age); return 0;
}
```

### Output:

```
Student Name is: Steve
Student Id is: 1234
Student Age is: 30
```



## Data structure

A data structure is a particular way of organizing and storing data in a computer so that it can be accessed and modified efficiently.

This is a collection of data values, the relationships among them, and the functions or operations that can be applied to the data.

### Types of data structures

Array	An array is a number of elements in a specific order, typically all of the same type. Elements are accessed using an integer index to specify which element is required (Depending on the language, individual elements may either all be forced to be the same type, or may be of almost any type). Typical implementations allocate contiguous memory words for the elements of arrays (but this is not always a necessity). Arrays may be fixed-length or resizable.
List	A list is a linear collection of data elements of any type, called nodes, where each node has itself a value, and points to the next node in the linked list. The principal advantage of a linked list over an array, is that values can always be efficiently inserted and removed without relocating the rest of the list. Certain other operations, such as random access to a certain element, are however slower on lists than on arrays.
Struct	Struct is an aggregate data structure.it is a value that contains other values, typically in fixed number and sequence and typically indexed by names. The elements of struct are usually called fields or members.
Union	A union is a data structure that specifies which of a number of permitted primitive types may be stored in its instances, e.g. float or long integer. Contrast with a record, which could be defined to contain a float and an integer; whereas in a union, there is only one value at a time. Enough space is allocated to contain the widest member datatype.
Variant	A variant contains an additional field indicating its current type, for enhanced type safety.



Class	A class is a data structure that contains data fields, like a record, as well as various methods which operate on the contents of the record. In the context of object-oriented programming, records are known as plain old data structures to distinguish them from classes.
-------	---

### 3.1 Activity

Differentiate data types and data structures.

### 3.0.4 Basic types of Data Structures

Anything that can store data can be called as a data structure, hence Integer, Float, Boolean, Char etc., all are data structures. They are known as Primitive Data Structures.

Then we also have some complex Data Structures, which are used to store large and connected data. Some example of Abstract Data Structure are:

- Linked List
- Tree
- Graph
- Stack, Queue etc.

All these data structures allow us to perform different operations on data. We select these data structures based on which type of operation is required.

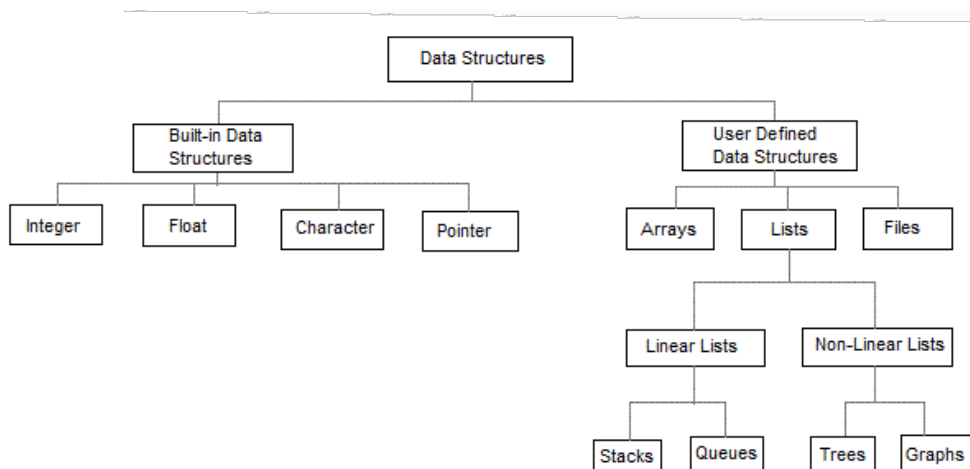


Fig 3.1




## Characteristics of data structures

1. Linear- In Linear data structures, the data items are arranged in a linear sequence. Example: Array.
2. Non-linear – in this case the data items are not in sequence. Example: Tree, Graph.
3. Homogenous - In homogeneous data structures, all the elements are of same type. Example: Array
4. Non-homogenous - In Non-Homogeneous data structure, the elements may or may not be of the same type. Example: Structures
5. Static - Static data structures are those whose sizes and structures associated memory locations are fixed, at compile time. Example: Array
6. Dynamic - Dynamic structures are those which expands or shrinks depending upon the program need and its execution. Also, their associated memory locations changes. Example: Linked List created using pointers

### *Activity 3.2*

1. Discuss how computer programming can be used to create better learning environment in south Sudan.
2. Discuss the importance of computer programming in Africa.
3. Discuss how computer programming can be used in environmental conservation.

### **Exercise**

1. What is a computer program?
  2. What are the characteristics of a computer program?
  3. What is a programming language?
  4. What are the types of computer language?
  5. List and describe common programming languages.
  6. Compare and contrast major programming languages.
  7. What is a data type?
  8. Describe various data types.
  9. What is a data structure?
  10. Describe 5 types of data structures
  11. Describe 5 characteristics of data structure
- 

## Visual basics

Visual Basic is a user-friendly programming language designed for beginners, and it enables anyone to develop GUI (graphic user interface) window applications easily. It is a third-generation event-driven programming language first released by Microsoft in 1991. It evolved from the earlier disk operating systems (DOS) version called BASIC (**B**eginners' **A**ll-purpose **S**ymbolic **I**nstruction **C**ode).

### Creating a Hello World in C++ using Visual Studio 2017

1. Launch Visual Studio 2017:
2. Choose the Win32 Console Application template to create your HelloWorld project:

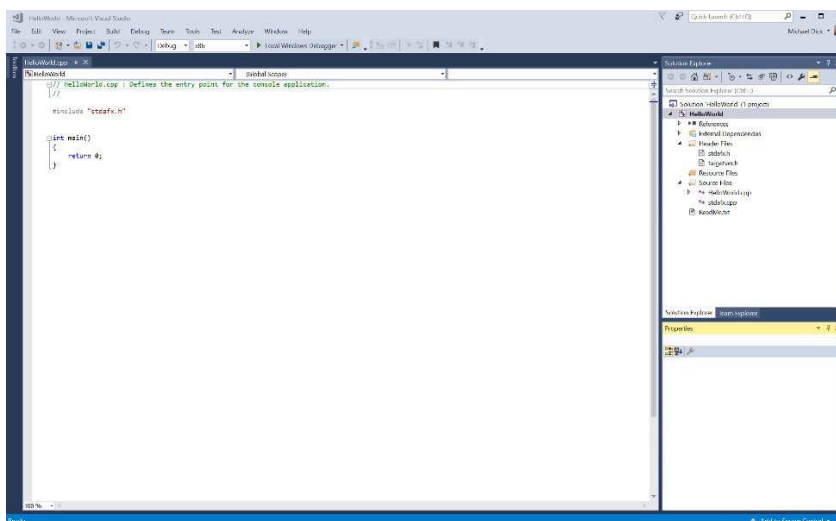


Fig 3.2

3. **Replace** the code with below lines:

```
#include "stdafx.h"
#include <iostream>
using namespace std;

int main()
{
    cout << "Hello World! ";
    return 0;
}
```



```
Toolbox
HelloWorld.cpp* [icon] X
HelloWorld (Global Scope)
// HelloWorld.cpp : Defines the entry point for the console a
//
#include "stdafx.h"
#include <iostream>
using namespace std;

int main()
{
    cout << "Hello World! ";
    return 0;
}
```

Fig 3.3

4. Next, add a **breakpoint** by clicking the grey area in front of **line 12**:
5. Compile and run your project by clicking the green triangle in the tool bar (Local Windows Debugger) or press F5. (Visual Studio allows single-click for build and debugging. Click Yes to build the project)
6. You can see a “Hello World!” in the **console window**.

```
Hello World!
```

### Activity 3.3

1. Repeat the above steps to create your own “hello world” application.
2. Write a program that prints the first stanza of South Sudan national anthem.



## 3.1 Algorithm

An algorithm is a well-defined instruction in sequence that allows a computer to solve a problem. It is a sequence of unambiguous instructions. The use of the term 'unambiguous' indicates that there is no room for subjective interpretation. Every time you ask your computer to carry out the same algorithm, it will do it in exactly the same manner with the exact same result.

Algorithms can perform calculation, data processing and automated reasoning tasks. Algorithms are essential to the way computers process data. Many computer programs contain algorithms that detail the specific instructions a computer should perform (in a specific order) to carry out a specified task, such as calculating employees' paychecks or printing students' report cards. An algorithm can be implemented in more than one programming language.

### 3.1.1 Categories of algorithms

- Search – Algorithm to search an item in a data -structure.
- Sort – Algorithm to sort items in certain order
- Insert – Algorithm to insert item in a data -structure
- Update – Algorithm to update an existing item in a data -structure
- Delete – Algorithm to delete an existing item from a data -structure

### 3.1.2 Characteristics of an Algorithm

- Definite – Algorithm should be clear and certain. Each of its steps (or phases), and their input/outputs should be clear and must lead to only one meaning.
- Input – an algorithm should have 0 or more well defined inputs.
- Output – an algorithm should have 1 or more well defined outputs, and should match the desired output.
- Finiteness – Algorithms must terminate after a finite number of steps.
- Feasibility– should be feasible with the available resources.
- Independent – an algorithm should have step -by-step directions which should be independent of any programming code.

### 3.1.3 How to write an algorithm

Algorithms are never written to support a particular programming code but problem and resource dependent.

All programming languages share basic code constructs like loops (do, for, while), flow-control (if-else) etc. These common constructs can be used to write an algorithm.



Algorithms are written in step by step manner, but it is not always the case. Algorithm writing is a process and is executed after the problem domain is well-defined. That is, knowing the problem domain, for which you are designing a solution.

Sum of Two Numbers:

- step 1** - START ADD
- step 2** - get values of **a** & **b**
- step 3** -  $c \leftarrow a + b$
- step 4** - display **c**
- step 5** - STOP

## Examples of algorithm in programming

1. Write an algorithm to add two numbers entered by user.

Step 1: Start

Step 2: Declare variables num1, num2 and sum.

Step 3: Read values num1 and num2.

Step 4: Add num1 and num2 and assign the result to sum.  $\text{sum} \leftarrow \text{num1} + \text{num2}$

Step 5: Display sum

Step 6: Stop

2. Write an algorithm to find all roots of a quadratic equation  $ax^2+bx+c=0$ .

Step 1: Start

Step 2: Declare variables a, b, c, D, x1, x2, rp and ip;

Step 3: Calculate discriminant

$$D \leftarrow b^2 - 4ac$$

Step 4: If  $D \geq 0$

$$r1 \leftarrow \frac{-b + \sqrt{D}}{2a}$$

$$r2 \leftarrow \frac{-b - \sqrt{D}}{2a}$$

Display r1 and r2 as roots.

Else

Calculate real part and imaginary part

$$rp \leftarrow -b/2a$$

$$ip \leftarrow \sqrt{-D}/2a$$

Display  $rp + j(ip)$  and  $rp - j(ip)$  as roots

Step 5: Stop



### Activity 3.5

In groups:

1. Write an algorithm to find the largest among three different numbers entered by user.
2. Write an algorithm to find the factorial of a number entered by user.
3. Write an algorithm to check whether a number entered by user is prime or not.

Example of an algorithm in linear regression

```
SUB Regress(x, y, n, a1, a0, syx, r2) Sumx=0: sumxy=0: st=0
Sumy=0: sumx2=0: sr=0
DOFOR i=1, n Sumx=sumx+xi Sumy=sumy+yi Sumxy=sumxy+xi*yi
sumx2=sumx2+xi*xi
END DO
Xm=sumx/n
Ym=sumy/n
a1=(n*sumxy -sumx*sumy) / (n*sumx2-sumx*sumx)
a0=ym-a1*xm DOFOR i=1, n St=st+(yi-ym)2
Sr=sr=(yi-a1*xi-a0)2
END DO
Syx=(sr/(n-2))0.5
r2=(st-sr)/st
END Regress
```

### 3.1.4 Translating algorithm into a computer program

Translating an algorithm into a programming language is called coding.

#### Building a Program

Whatever type of problem needs to be solved, a careful thought out plan of attack, (algorithm), is needed before a computer solution can be determined. The steps include:

- a) Developing the algorithm.
- b) Writing the program.
- c) Documenting the program.
- d) Testing and debugging the program.



2) Developing the algorithm; a detailed description of the exact methods used for solving a particular problem.

To develop the algorithm, the programmer needs to ask:

- a) What data has to be fed into the computer?
- b) What information do I want to get out of the computer?

Logic: this is planning the processing of the program. It contains the instructions that cause the input data to be turned into the desired output data.

The three major notations for planning detailed algorithms:

- a) **Flowchart:** Series of visual symbols representing the logical flow of a program.
- b) **Nassi Schneider Mann charts:** Uses specific shapes and symbols to represent different types of program statements.
- c) **Pseudocode:** A verbal shorthand method that closely resembles a programming language, but does not have to follow a rigid syntax structure.

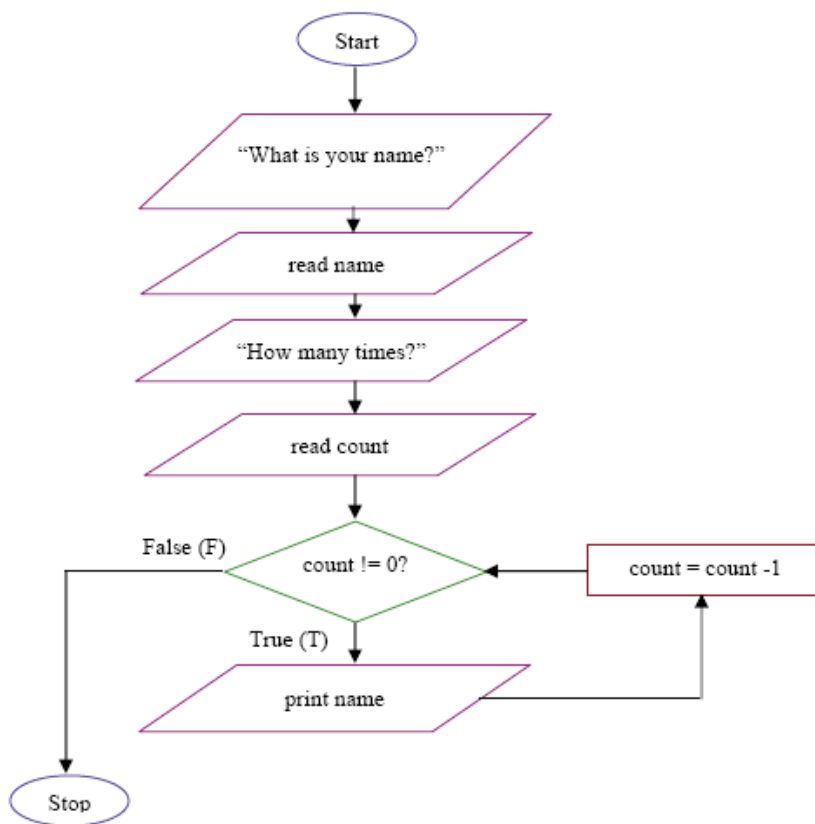


Fig 3.4: program flow chart

- 3) Writing the Program; if analysis and planning have been thoroughly done, translating the plan into a programming language should be a quick and easy task.
- 4) Documenting the Program; during both the algorithm development and program writing stages explanations called documentation are added to the code. Helps users as well as programmers understand the exact processes to be performed.
- 5) Testing and Debugging the Program.
  - The program must be free of syntax errors.
  - The program must be free of logic errors.
  - The program must be reliable (produces correct results).
  - The program must be robust (able to detect execution errors).

### Program to Find All Roots of a Quadratic Equation

For a quadratic equation  $ax^2+bx+c = 0$  (where a, b and c are coefficients), its roots are given by the following formula.

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

The term  $b^2 - 4ac$  is known as the discriminant of a quadratic equation. The discriminant tells the nature of the roots.

- If discriminant is greater than 0, the roots are real and different.
- If discriminant is equal to 0, the roots are real and equal.
- If discriminant is less than 0, the roots are complex and different.



If <code>discriminant &gt; 0</code> ,	$\text{root1} = \frac{-b + \sqrt{(b^2 - 4ac)}}{2a}$ $\text{root2} = \frac{-b - \sqrt{(b^2 - 4ac)}}{2a}$
If <code>discriminant = 0</code> ,	$\text{root1} = \text{root2} = \frac{-b}{2a}$
If <code>discriminant &lt; 0</code> ,	$\text{root1} = \frac{-b}{2a} + i \frac{\sqrt{-(b^2 - 4ac)}}{2a}$ $\text{root2} = \frac{-b}{2a} - i \frac{\sqrt{-(b^2 - 4ac)}}{2a}$

### Example: Roots of a Quadratic Equation

```
#include <iostream>
#include <cmath>
using namespace std;

int main() {

float a, b, c, x1, x2, discriminant, realPart, imaginaryPart;
cout << "Enter coefficients a, b and c: " << endl;
cin >> a >> b >> c;
discriminant = b*b - 4*a*c;

if (discriminant > 0) {
x1 = (-b + sqrt(discriminant)) / (2*a);
x2 = (-b - sqrt(discriminant)) / (2*a);
cout << "Roots are real and different." << endl;
cout << "x1 = " << x1 << endl;
cout << "x2 = " << x2 << endl;
}
}
```



```

else if (discriminant == 0) {
cout << "Roots are real and same." << endl;
x1 = (-b + sqrt(discriminant)) / (2*a);
cout << "x1 = x2 =" << x1 << endl;
}

else {
realPart = -b/(2*a);
imaginaryPart =sqrt(-discriminant)/(2*a);
cout << "Roots are complex and different." << endl;

cout << "x1 = " << realPart << "+" << imaginaryPart
<< "i" << endl;
cout << "x2 = " << realPart << "-" << imaginaryPart
<< "i" << endl;
}

return 0;
}

```

## Output

```

Enter coefficients a, b and c: 4
5
1
Roots are real and different. x1 = -0.25
x2 = -1

```



## Basic Declarations and Expressions

### Practical example:

1. Write a C program to convert a given integer (in days) to years, months and days, assumes that all months have 30 days and all years have 365 days. Test Data:

Input no. of days: 2535

Expected Output:

6 Year(s)

11 Month(s)

15 Day(s)

```
#include <stdio.h>
```

```
int main() {
```

```
    int ndays, y, m, d;
```

```
    printf("Input no. of days: ");
```

```
    scanf("%d", &ndays); y = (int) ndays/365; ndays = ndays-(365*y); m = (int)
    ndays/30;
```

```
    d = (int)ndays-(m*30);
```

```
    printf(" %d Year(s)\ n %d Month(s) \ n %d Day(s)", y, m, d);
```

```
    return 0;
```



2. Write a C program that prints all even numbers between 1 and 50 (inclusive).

Test Data :

Even numbers between 1 to 50 (inclusive): Expected Output:

2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50

### **Solution**

```
#include <stdio.h>
```

```
int main() {
```

```
int i;
```

```
printf("Even numbers between 1 to 50 (inclusive): \n");
```

```
for (i = 1; i <= 50; i++)
```

```
{
```

```
if(i%2 == 0)
```

```
{
```

```
prin("%d ", i);
```

```
}
```

```
}
```

```
return 0;
```

```
}
```



### 3.3 How to Make a Program Using Notepad

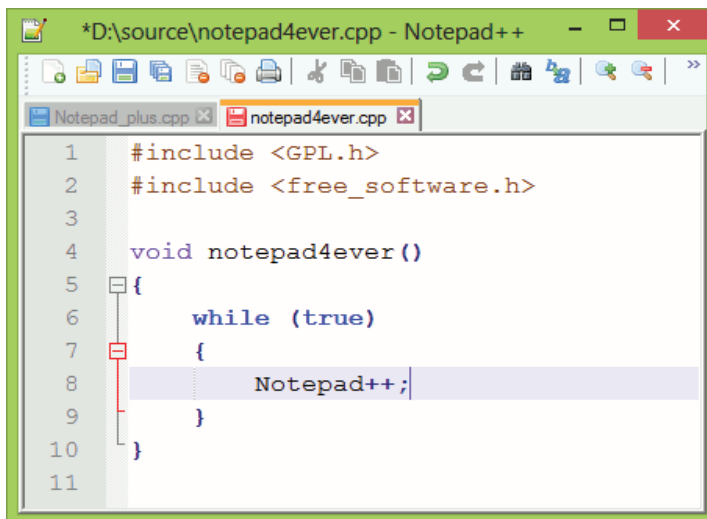
You can technically write and run a program in Notepad using any coding language available, but you must save the program in the correct format for the program to run. All Notepad files save as text documents by default.

The easiest way to open Notepad is by clicking Start, typing in `notepad`, and clicking the blue Notepad icon at the top of the Start window.

Determine your programming language. Notepad does not exclude any languages, but you will need to use the same language throughout the document to remain consistent.

Press `Enter` after you complete a line of code. As with most code editors, you will always need to place new lines of code on a new Notepad line.

Close any open brackets and parentheses. Whenever you open a bracket or parenthesis (e.g., { or [ ), you must close it with the opposite-facing counterpart in order to complete a line of code. Failing to do so will result in errors.



```
*D:\source\notepad4ever.cpp - Notepad++
1  #include <GPL.h>
2  #include <free_software.h>
3
4  void notepad4ever()
5  {
6      while (true)
7      {
8          Notepad++;
9      }
10 }
11
```

*Fig. 3.5*

While you can certainly write entire programs in Notepad, it is definitely not the easiest way—Notepad does not contain any syntax highlighting or indentation options, making it difficult to use for writing larger pieces of code.

Notepad++ is a great free option for coding.

### 3.3.1 Creating a program

1. **Open Notepad.** This is how you will create and save any program regardless of the programming language that you use.
2. **Enter your program's code.** Make sure that the language you use is consistent throughout the document.
3. **Click File.** It is in the top-left corner of the Notepad window. A drop - down menu will appear.
4. **Click Save As....** This option is near the top of the drop-down menu. Doing so opens the "Save" window.
5. **Select a save location.** Click a folder (e.g., Desktop) on the left side of the "Save" window to select that folder as your program's destination.
6. **Click the "Save as type" box.** You will find it near the bottom of the "Save" window. This prompts a drop-down menu.
7. **Click All Files.** It is in the drop-down menu. This option allows you to save the Notepad file as any type of program.
8. **Enter a name for your program.** Click the "File name" text field and enter your preferred name for your program.
9. **Add the program's extension to the name.** Regardless of the program's name, you will need to place a period and the programming language's extension tag after the name in order for the program to be saved correctly. Common programming languages and their extensions include the following:
  - Batch (BAT) - `.bat`
  - HTML - `.htm`
  - Python - `.py`
  - C++ - `.cpp`
  - For example: to save a batch file as "watermelons", you would type `watermelons.bat` into the "File name" field.
10. **Click Save.** It is in the bottom-right corner of the window. Doing so saves your program in your selected format. You can run it by double-clicking it, though you may need to select a program in which to open it after doing so.



### 3.3.2 Ethical conduct in computer usage

These are moral principles that govern a person's behavior on computer usage. Unethical use of computers involves violation of privacy using intrusive software and disrespect of other users. Music and file sharing is considered unethical, but it is debatable whether it is illegal or not. However, unethical uses can lead to illegal acts; for example, using spyware to obtain information from other users is considered unethical, and also unlawful. Music and File Sharing: The ethicality and legality of music and file sharing is often debated. Sharing of files, though they are not a physical object, can violate the copyright law.

There are mainly four big areas of computer ethics.

- a) **Computer crime**-This involves any computer-related activity which is not sanctioned or approved of by an employer or owner of a system or network. Another area involves privacy issue which focuses on the computer's most basic functions, its capacity to store, organise, and exchange records. A major concern has to do with the amount of information gathering that is made possible by computers. This puts people's personal information in a vulnerable position. If someone hacks into a computer system, all this information is at his/her disposal. In this way, such crimes as identity theft can occur.
- b) **Responsibility for computer failure** - When software is written and then utilized in complex computer systems, problems often occur. Sometimes these problems cause a system to malfunction, and in some instances such malfunctions cause harm.
- c) **Protection of computer property, records, and software.** - Information, communication and technology bring many benefits, but also threaten some of the most important values, such as security and privacy. Also information and communication technologies, changing concepts: ownership, buying and selling, right to possession, theft, justice in the distribution of resources and access rights.
- d) **Privacy of the company, workers, and customers.** - There are plenty of good reasons for companies to collect personal data. Personal data creates opportunities for businesses to get to know their customers better, to develop new revenue streams, and to provide a more customized level of service through both Web-based channels and the growing use of mobile devices. But with these new opportunities come new responsibilities, including an obligation to create privacy policies that protect customers' data from a host of perils, including fraud, identity theft and inconsistent international privacy standards.



## General code of conduct in computing

1. **Contribute to society and human well-being.** The aim of computing experts is to minimize negative consequences of computing systems, including threats to health and safety. When designing or implementing systems, computing professionals must attempt to ensure that the products of their efforts will be used in socially responsible ways, will meet social needs, and will avoid harmful effects to health and welfare. Therefore, computing professionals who design and develop systems must be alert to, and make others aware of, any potential damage to the local or global environment.
2. **Avoid harm to others.** This includes injury or negative consequences, such as undesirable loss of information, loss of property, property damage, or unwanted environmental impacts. This principle prohibits use of computing technology in ways that result in harm to any of the following: users, the general public, employees, and employers. Harmful actions include intentional destruction or modification of files and programs leading to serious loss of resources or unnecessary expenditure of human resources such as the time and effort required to purge systems of “computer viruses.”

To minimize the possibility of indirectly harming others, computing professionals must minimize malfunctions by following generally accepted standards for system design and testing. Furthermore, it is often necessary to assess the social consequences of systems to project the likelihood of any serious harm to others. If system features are misrepresented to users, coworkers, or supervisors, the individual computing professional is responsible for any resulting injury.

3. **Be honest and trustworthy.** Honest computing professionals will not make deliberately false or deceptive claims about a system or system design, but will instead provide full disclosure of all pertinent system limitations and problems.
4. **Be fair and take action not to discriminate.** Discrimination on the basis of race, sex, religion, age, disability, national origin, or other such factors is an explicit violation of professionalism standards in computing.

Inequities between different groups of people may result from the use or misuse of information and technology. In a fair society, all individuals would have equal opportunity to participate in, or benefit from, the use of computer resources regardless of race, sex, religion, age, disability, national origin or other such similar factors

5. **Honor property rights including copyrights and patent.** Violation of copyrights, patents, trade secrets and the terms of licence agreements



is prohibited by law in most circumstances. Even when software is not so protected, such violations are contrary to professional behaviour. Copies of software should be made only with proper authorization. Unauthorized duplication of materials must not be condoned.

6. **Give proper credit for intellectual property.** Computing professionals are obligated to protect the integrity of intellectual property. Specifically, one must not take credit for other's ideas or work, even in cases where the work has not been explicitly protected by copyright, patent, etc.
7. **Respect the privacy of others.** It is the responsibility of professionals to maintain the privacy and integrity of data describing individuals. This includes taking precautions to ensure the accuracy of data, as well as protecting it from unauthorized access or accidental disclosure to inappropriate individuals. Furthermore, procedures must be established to allow individuals to review their records and correct inaccuracies.

User data observed during the normal duties of system operation and maintenance must be treated with strictest confidentiality, except in cases where it is evidence for the violation of law, organizational regulations. In these cases, the nature or contents of that information must be disclosed only to proper authorities.

8. **Honour confidentiality.** The principle of honesty extends to issues of confidentiality of information whenever one has made an explicit promise to honor confidentiality or, implicitly, when private information not directly related to the performance of one's duties becomes available. The ethical concern is to respect all obligations of confidentiality to employers, clients, and users unless discharged from such obligations by requirements of the law or other principles of this Code.

## Intellectual property rights

Intellectual property rights are the rights granted to the creators of Intellectual property, and include trademarks, copyright, patents and industrial design rights.

These right allow creators, or owners, of patents, trademarks or copyrighted works to benefit from their own work or investment in a creation.

Intellectual property refers to creations of the mind, such as inventions; literary and artistic works; designs; and symbols, names and images used in commerce.

1. Patent- this is an exclusive right granted for an invention, a product or process that provides a new way of doing something, or that offers a new technical solution to a problem. Patents provide incentives to individuals by



recognizing their creativity and offering the possibility of material reward for their marketable inventions. These incentives encourage innovation, which in turn enhances the quality of human life.

2. Trademark- this is a distinctive sign that identifies certain goods or services produced or provided by an individual or a company.

Trademark registration and protection helps consumers to identify and purchase a product or service based on whether its specific characteristics and quality as indicated by its unique trademark meet their needs.

3. Copyright – this is an exclusive legal right, given to the originator of a print, publish, perform, film, or record literary, artistic, or musical material. This covers literary works (such as novels, poems and plays), films, music, artistic works (e.g., drawings, paintings, photographs and sculptures) and architectural design. Rights related to copyright include those of performing artists in their performances, producers of phonograms in their recordings, and broadcasters in their radio and television programs.

### *Activity 3.6*

What steps would you take if you wanted to protect:

- a) Some music you have written yourself and recorded?
- b) A new process you have invented for developing new apps?
- c) Your company from others that may want to copy your products or services and poach your customers?

### **Exercise**

1. What is an algorithm in computing?
2. State and describe the characteristics of an algorithm
3. What is the use of algorithm in programming?
4. Define the categories in algorithms
5. What is graphical user interface?
6. What is coding?
7. Describe the following terms
  - Patent



- Copyright
  - Trademark
  - Intellectual property
8. What are the 5 key areas that ethical use of computers usually addresses?
  9. State and explain codes of conduct in computing?
  10. What is the importance patent, copyright and trademark rights in programming?

## Practical exercise

1. Write a C program that accepts an employee's ID, total worked hours of a month and the amount he received per hour. Print the employee's ID and salary (with two decimal places) of a particular month.

Test Data:

- Input the Employees ID(Max. 10 chars): 0342
- Input the working hrs: 8
- Salary amount/hr: 15000
- Expected Output:
- Employees ID = 0342
- Salary = U\$ 120000.00

2. Write a C program to calculate a bike's average consumption from the given total distance (integer value) traveled (in km) and spent fuel (in liters, float number – 2 decimal point).

Test Data:

- Input total distance in km: 350
- Input total fuel spent in liters: 5
- Expected Output:
- Average consumption (km/lit) 70.000

3. Write a C program to calculate the distance between the two points. Test Data :

- Input x1: 25
- Input y1: 15
- Input x2: 35
- Input y2: 10
- Expected Output:





- Distance between the said points: 11.1803

4. Write a C program to read an amount (integer value) and break the amount into smallest possible number of bank notes.

Test Data:

- Input the amount: 375
- Expected Output:
- There are:
- 3 Note(s) of 100.00
- 1 Note(s) of 50.00
- 1 Note(s) of 20.00
- 0 Note(s) of 10.00
- 1 Note(s) of 5.00
- 0 Note(s) of 2.00
- 0 Note(s) of 1.00

5. Write a C program to convert a given integer (in seconds) to hours, minutes and seconds.

Test Data:

- Input seconds: 25300
- Expected Output:
- There are:
- H:M:S - 7:1:40

6. Write a C program that reads an integer between 1 and 12 and print the month of the year in English. Go to the editor

Test Data:

- Input a number between 1 to 12 to get the month name: 8
- Expected Output:
- August

7. Write a C program to read a password until it is correct. For wrong password print "Incorrect password" and for correct password print "Correct password" and quit the program. The correct password is 1234. Test Data:

- Input the password: 1234
- Expected Output:
- Correct password



8. Write a C program to print 3 numbers in a line, starting from 1 and print n lines. Accept number of lines (n, integer) from the user.

Test Data:

- Input number of lines: 5
- Expected Output:
- 1 2 3
- 4 5 6
- 7 8 9
- 10 11 12
- 13 14 15

9. Write a C program to read an array of length 6 and find the smallest element and its position.

Test Data:

- Input the length of the array: 5 Input the array elements:
- 25
- 35
- 20
- 14
- 45
- Expected Output:
- Smallest Value: 14
- Position of the element: 3

10. Write a C program to read the coordinates(x, y) (in Cartesian system) and find the quadrant to which it belongs (Quadrant -I, Quadrant -II, Quadrant -III, Quadrant -IV). Note: A Cartesian coordinate system is a coordinate system that specifies each point uniquely in a plane by a pair of numerical coordinates. These are often numbered from 1st to 4th and denoted by Roman numerals: I (where the signs of the (x,y) coordinates are I(+,+), II (-,+), III (-,-), and IV (+,-).

Test Data:

- Input the Coordinate(x,y):
- x: 25
- y: 15
- Expected Output:
- Quadrant-I(+,+)





## Remember

### Programming

**Abstract class** - A class that cannot be directly constructed, one that can be constructed only through construction of some of its subclasses.

**Abstract type** - A type in a nominative type system that cannot be instantiated.

**Actual argument** - A value, or reference to a value, passed to a function.

**App** - An application that executes on a small, handheld device.

**Application** - A program or integrated suite of programs that has a defined function.

**Argument** - A value, or reference to a value, passed to a function; an actual argument.

**Argument** - A parameter in a function definition; a formal argument.

**Array** - An ordered sequence of same-typed values whose elements are fast to access by their numerical index in the array.

**Boolean** - A data type for yes or no, true or false values.

**Class** - A set of objects having the same behavior (but typically differing in state), or a template defining such a set.

**Compiler** - A computer program which transforms source code into object code.

**Constant** - An identifier that is bound to an invariant value.

**Constructor** - A class method (in object-oriented programming) that creates and initializes each instance of an object.

**Data type** - A classification or category of various types of data that states the possible values that can be taken, how they are stored, and what range of operations are allowed on them.

**Destructor** - In object-oriented programming, the command sequence that is launched when the execution of an object is finished.

**Dump** - A formatted listing of the contents of program storage, especially when produced automatically by a failing program

**Enumeration** - A data type whose values are a set of mutually exclusive named constants.

**Exception** - An interruption in normal processing, especially as caused by an error condition.



**Floating point** - A method of representing real numbers as a pair of integers.

**Flow chart** - A schematic representation of the logic that defines the flow of control through a program

**Formal argument** - A parameter in a function definition.

**Function** - A routine that receives zero or more arguments and may return a result.

**Functional programming** - A programming paradigm that treats computation as the evaluation of mathematical functions, avoids state and mutable data, and makes it easy to construct functions as if they were data objects.

**goto / go to** - A statement (in source code) that transfers control unconditionally to another part of a program.

**Heap** - An area of memory reserved for dynamically allocated data objects, contrasted to the stack.

**Identifier** A formal name used in source code to refer to a variable, function, procedure, package, etc.

**Integer** - A data type for integer values.

**Interpreter** - A program which executes another program written in a programming language other than machine code.

**Linker / link editor** - A computer program that takes one or more objects generated by compilers and assembles them into a single executable program.

**Logic programming** - A style or paradigm of computer programming exemplified by the language Prolog.

**Machine code** - System of instructions and data directly understandable by a computer's central processing unit.

**Method** - In object-oriented languages, a subroutine or function belonging to a class or object.

**Module** - A program that is linked with others to form a functioning application; one method of implementing a subroutine

**Object** - An instance of a class.

**Object code** - The output of a compiler or assembler, not necessarily executable directly without linking to other modules.

**Object-oriented** - Using entities called objects that can process data and exchange messages with other objects.

**Paradigm**- A fundamental style of computer programming to which the design of a programming language typically has to cater, such as imperative programming,



declarative programming, or, on a finer level, functional programming, logic programming or object-oriented programming.

**Parameter** - A name in a function or subroutine definition that is replaced by, or bound to, the corresponding actual argument when the function or subroutine is called.

**Procedure** - A subroutine or function coded to perform a specific task.

**Program** - A software application, or a collection of software applications, designed to perform a specific task.

**Real** - a number containing a decimal point, e.g. the number pi is a real number with a value of approximately 3.14159268

**Run time** - The time during which a program is executing, as oppose to the compile time.

**Source code** - Human-readable instructions in a programming language, to be transformed into machine instructions by a compiler, interpreter, assembler or other such system.

**Stack** - The portion of the computer memory used to keep track of called procedures or call instructions.

**String** - A data type for a sequence of characters such as letters of English alphabet.

**Subclass** - In object-oriented programming, an object class derived from another class (its superclass) from which it inherits a base set of properties and methods.

**Subprogram** - A program contained within a larger program.

**Subroutine** - A section of code that implements a task. While it may be used at more than one point in a program, it need not be.

**Superclass** - A class that passes attributes and methods down the hierarchy to subclasses.

**Type** - A tag attached to variables and values used in determining what values may be assigned to what variables.

**Variable** - A named memory location in which a program can store intermediate results and from which it can read them.

