PROGRAMMING LANGUAGE

Refers to a set of characters and symbols that are used to create a computer instruction.
Or the notation of witting computer programs.

A program refers to a set of computer instructions created using a programming language.

Programming is the process of writing computer instructions or statements to enable a computer accomplish a particular task.

Syntax refers to the grammar rules of a given language.

Debugging; refers to identifying and removing errors from the computer hardware and software.

Examples of popular programming languages

* FORTRAN (FORmular TRANslator)
* BASIC (Beginners' All-purpose Symbolic Instruction Code)
* Visual BASIC
* COBOL (COmmon Business-Oriented Language)
* C and C++
* Java
* Pascal,
* Perl
* Delphi, PHP, Python, Ruby, VB-Script, e.t.c.

Programming languages are broadly categorized into two

(i) Low level language
(iii) High level language.

LOW LEVEL LANGUAGE (LLL)

These are low-level languages because they are closely associated with processor than high-level language, which are near to the programmers. They are classified into two

- Machine language
- Assembly language

Machine language (1st generation language)

It consists of binary numbers that represent instructions, memory locations and data. All instructions in the machine are presented in the binary format e.g. 10110100111000010

Advantages of machine code language

- Programming in this particular language is done at the level which the computer understands thus no needs of using a language translators.

Disadvantages machine code language

- Tiresome
- Subjected to a number of errors
- It is not easily understood by user
- High volume of work hence time consuming
- It is very difficult to transfer programs from one computer to another, since the language depends on a particular machine (processor), which has its own language code. I.e. it is machine dependent.

An assembly language (2nd generation language)

It is a language that is an intermediate between the high level language and the machine language and uses English like tags called Mnemonics. Mnemonics are basically shortened to 2 or 3 letter words such as; Add for addition and Sub for subtraction.

Advantages of assembly language

- Programs can be written more easily than the machine language.
- It is useful for writing operating systems ad game programs which require fast and efficient use of the CPU.

Disadvantages

- They are designed for specific machines and specific processor. They are machine dependent.
- They require a translator.

HIGH LEVEL LANGUAGE

These are ones which can be easily understood by the programmer and make programming easier simpler. This is because they can be easily be understand by the humans.

Advantages of high level languages

- Easier to learn
- Easier to detect errors
- They are machine independent.
- Easy to fix errors

Disadvantages of high level languages

- They need translators

High Level Languages are further classified into;

- ➢ Third generation (3GLs)
- ➢ Fourth generation (4GLs)
- ➢ Object oriented language (OOPLS)
- ➢ Web scripting language (WSLs)

3RD Generation Language

Third generation languages specify instructions as brief statements that are more like natural language than assembly language. Programming is done in brief English statements. They are used for specific operations like business and science. Important third-generation languages include FORTRAN, COBOL, C, BASIC and PASCAL.

Fourth Generation Language

These were designed to make programming easier with a variety of software tools that enable end users to develop software applications with minimal or no technical assistance. Examples include query languages, report generator, graphic language, and application generators. 4GLs can be easily written with the use of simple, sentence-like commands, such as SELECT NAME FROM RECORDS WHERE NAME="JOHN"; examples of 4Gls include Python, SQL, JAVA

Fifth Generation Language

These types of languages are normally used in intelligent knowledge based systems such as robots. These can manipulate various facts and rules to reach a conclusion, unlike the 4th generation language that manipulates numbers, or data. They generally think as humans and are

extensively used in artificial intelligent projects like the recent mars exploration.

WEB SCRIPTING LANGUAGE …..HTML (Hyper Text Mark-up Language)

This is one of the main programming languages used in creating web pages for the internet/intranet. This language allows programmers to compose text or data, pictures, sounds and videos etc. on the screen display. It also allows the programmers to add attachments, which enable linkage to different web pages on the Internet.

TRANSLATOR

Types of language translator

Assembler: It is language translator that is used to convert assembly language program to machine code.

Compiler: it is a language translator that is used to convert the entire high level code to machine/object code at once.

Interpreter: a language translator that is used to convert high level code to object code as the program is running.

- ❑ **Linker** Is a program that combines a compound program and determines where it will be found in the computer's memory.
- ❑ **Loaders**; loader is a program that loads machine codes of a program into the system memory.

Characteristics of good programming languages:

- o It should be very simple to learn and use.

o Tedious declarations should be at minimal level.
o It shouldn't be abstract.
o It should meet the end user needs.
o It should be efficient.
o It has to be machine independent.

APPLICATION SOFTWARE

Application software is a set of programs designed to handle or solve specific tasks for a user.

EXAMPLES OF APPLICATION SOFTWARE

1. **Word processing software:**
   This is used to create and edit a document such as letters, reports, essays e.t.c.
   Examples include;
   - Word perfect
   - Word star
   - Microsoft office word
   -Lotus word pro
   -open office.org writer
2. **Database management software**; is used to create and manage databases. A database is a collection of related information or records on any subject e.g. information about account numbers in banks, information about students in a tertiary institution e.t.c.
   Examples include;

   - Microsoft Access
   - Open office.org Base
   - Oracle
   - Dbase
   - MySQL
   - Lotus Approach
3. **Spreadsheet software:**

This is used to store and process data in an electronic sheet having columns and rows. The software is commonly used for business application such as performing financial calculations and recording transactions

Examples include;
- Microsoft office Excel.
- Lotus 1-2-3
- k spread
- Open office.org calc
  Q QA QA WW aw awww qz QA awww z awww q ok

4. **Presentation Graphics software**:
   This software is used to create slides for making presentations. This also has pre0-drawn clip art images, which can be inserted into slides and can be modified. **Examples include**;

   - Screen cast
   - Microsoft power point
   - Open office.org impress
   - Adobe presentation
   - LibreOffice Impress,
   - SlideRocket

5. **Desktop publishing software.**
   These are application software used for creating publications like cards, flyers, calendars, brochures, Newsletters, certificates etc.

   Examples include;

   - Microsoft office publisher
   - celframe publisher
   - Adobe page maker etc

6. **Web browsing software**

This is the type of software used for displaying web pages from the internet or html document on a computer.

Examples include;

- Mozilla firefox
- Internet Explorer
- Safari
- Opera
- Navigator, etc.

7. **Media players**
   These are used for Audio and video playback on computer.
   Example include
   - Windows media player
   - VLC media player
   - Nero show time
   - Jet Audio
   - Power DVD
8. **Graphics software**
   Used by graphic designers to create and design artistic graphics and to manipulate visual images on a computer such as logos, cartoons etc

   Examples include;

   - Paint
   - Adobe photo shop
   - Corel draw
   - Adobe illustrator etc

9. **Images viewing software.**
   This refers to computer applications primarily used for previewing digital photographs on the computer screen.

Examples include;

- Microsoft office picture manager
- Windows photo viewer etc

10. **Web authorizing software**
    This is the type of software used by webmasters for building websites

    Examples include

    - Microsoft front page
    - Adobe dream weaver
    - Microsoft Expression web

11. **Audio and video Editing software.**
    Audio editing software lets users produce studio quality sound tracks. With video editing software you can modify video clips.

12. **Reference software.**
    This provides valuable and thorough information for all individuals.

    Examples include

    - Encyclopedia Britannica 2011
    - Ultimate Reference DVD
    - Microsoft student with Encarta Premium etc.

13. **Text Editors.**
    Are simple word processors that are generally used to type without any special formatting. E.g. Notepad

14. **E-mail software /Email client.**
    Is a computer program used to access and manage a user's email account. **Examples include**

    - Gmail,

- Yahoo,
- Hotmail
- Microsoft outlook
- Apple mail

CLASSES OF APPLICATION SOFTWARE

Application software is grouped into two basic classes which include;

➢ Off-the-shelf/ standard/ general purpose software/ packaged
➢ tailor made software/ Custom software/ bespoke

Off-the-shelf software

This is the class of application software which is always available on the market for general use

Or

This refers to packaged software that is designed to meet the needs of a wide variety of end users.

Off- shelf application software can further be divided into **Horizontal market application**s (common applications you can find on every office computer) for example word processors, spreadsheet programs, database programs, communication programs etc. and **vertical market application**s also known as specialized application programs for example include Computer Aided Designs (CAD), Bakery recipes, Bridge analysis, airline ticketing, airplane wing structure, robots swivel control, electronic testing etc.

Advantages of general purpose software

- They are relatively cheap since they are available at any time.

- It is tested by so many people thus has less effect to users.

- Used by many users

Disadvantages

- General purpose software which is shared online carries a very real threat of infection by computer viruses or threat of malicious code.

- They are very easy to manipulate since they are almost known by everyone.

- May not handle some problem with ease.

Tailor made software

Are computer programs which are designed and developed for a specific customer.

Or

Is software developed at a user's request to perform specific functions.

Examples include of this kind of software can be report making software, loan portfolio software for Cairo bank, programming in D-base dealing in hotel operations etc.

Advantages custom/bespoke software

- Meets the specific needs of the user.
- It can be changed over time to meet your needs. It is flexible
- It improves the organization's image

Disadvantages

- They are very expensive to design and develop.
- They are very rigid. Since they can only be used by one customer.
- They are time consuming to develop.
- They need a lot of specialized skills which require expensive special training.

Other forms of computer software

1. **Open source software;** it is any computer software in which its source code is released under a license in which the copyright holder grants the right to study, change and distribute the software to any one for a purpose.
2. **Shareware software;** is software that is distributed freely on a trial basis with the understanding that the user will pay for it later for continued use.
3. **Freeware software;** is a copyrighted software availed to the public at no cost.
4. **Public domain software;** is any software that has no legal, copyright restrictions associated with it. It is free and open source.
5. **Integrated software;** is a collection of programs that work similarly. For example Microsoft office, adobe in design, star office etc.
6. **Software suite;** is a collection of individual programs available together as a unit. For example Microsoft Office, Apple iWork, Corel word perfect office etc

Note

Software release; refers to the distribution of a new version of a given application to the public or market.

Software version; is a way to categories a computer software as it is developed and released.

Software update or patch; it provides fixes for features that are not working as intended or adds minor software enhancements.

Revision questions

1. (a). Define the term software.
   (b). State the two branches of computer software.
   (c). Write short notes on the following terms:

   (i).   Freeware
   (ii).   Shareware
   (iii).   Custom software:
   (iv).   Public domain software

2. (a). Define the term 'operating system' and give four examples of
       OS.
   (b).State any four functions of operating system in a computer.
   (c) (i).   Give the difference between command line and graphical
           user interface.
   (ii). Give two advantages of disadvantages of command line and
       GUI.
   (d).(i). Define the term application software.
      (ii). Explain any 10 examples of application software applications.