**SCS 050- Introduction to**

**Computer Programming**

**IT/OS/ICT/CR/10/6- Develop Computer Program**

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# Career Options in programming

Software developer

System Auditor

Software Project managers

System Administrators

Software Quality Assurance Engineer

Among others

# Preamble

* Most people are familiar with the existing tasks the computer can perform.
* You will learn how to command computers to perform those tasks. i.e software-instructions you write to command computers to perform actions and make decisions that controls computer hardware.

# Programming Concepts

* **Program-**it is a sequence of instructions, statements, and series of codes that instruct a computer to perform certain tasks.
* **Programmer-**this is a person that writes the programs to the computer through orderly set of actions.
* **Programming-**This is the act of writing, coding, testing and running a series of instructions to perform a certain task.
* **Programming language-**This is an organized collection of symbols with syntax and semantics to prepare computer programs.
* **Modules-**smaller programs units, also known as subsets of a program

# Programming Paradigms

There are three categories of programming languages:

* ***Machine Language:*** This is the only language that the computer understands. It consists of a set of numbers i.e 0’s and 1’s
* **Assembly Language:** it is an upgrade to machine language, it uses keywords and symbols to represent instructions. Assembly language needs to be translated to machine language.
* **High-level Languages:** Modern programming languages. They are machine independent. Their syntax is much easier to use than the previous two.

They can be divided into procedural and object-oriented languages.

They include; C, C#, visual Basic, Java, Python

# Characteristics of High-level languages

* **Clarity of the source code**-The ability of the code to be readable, understandable and also reflect the logical structure of the program.
* **Maintainability**-Ability to modify a program in future
* **Portability-**The ability of the program to be transferred from one hardware/software environment to another e.g from windows to Unix or Linux system or from one machine to another
* **Reliability-**This is the ability of the language to perform its intended function satisfactorily throughout their expected time of the process.
* **Generality/ Universal-**Features of a programming language should remain constant e.g when you want to print to the screen, we use printf which is used all through in programming.

# Programming Paradigms

* A programming paradigm is an approach to solving programming problems
* A programming paradigm may consist of many programming languages.
* Programming paradigms are the result of people’s ideas about how programs should be constructed
* A programming language can belong to more than one paradigm
* They include: Procedural/sequential, Object-oriented, Event-Oriented, Functional, Scripting, modular

# Programming Paradigms

## Imperative/procedural/sequential paradigm

* Designs a program that follows a series of instructions in a sequential manner.
* i.e it follows top-bottom approach in program execution.
* Example C programming **Functional Programming:**
* In this paradigm, a program consists of functions and uses functions in a similar way as used in mathematics
* Execution involves functions calling one another.
* Example FOTRAN

# Programming Paradigms

## Object-Oriented Programming

* This paradigm uses classes and objects.
* It has other concepts such as inheritance, polymorphism, encapsulation, etc. Example, Java, C++, Python, Visual Basic

## Event-driven Programming

* Programming that is based on user events such as clicking a button, hoovering a mouse, etc. These user actions are called **events**
* Mainly uses a Graphical user Interface (GUI)
* Example; Visual Basic programming, Java

# Programming Paradigms

**Scripting:**

* Scripting is a very “high” level of programming which glues together different programs.
* Scripts are written in presence of core programming language, though they are different from the core programming language
* They are mostly used in website development and mobile application development. Example: JavaScript is used to make a website to be responsive.

**Modular:**

* Divides the program into sections known as modules, each module is developed independent of one another then the modules are integrated to create the final program.
* Majority of programming especially event-driven and OOP apply modular approach

# THE END