**INTRODUCTION TO COMPUTER PROGRAMMING**

Basic steps in programming

* Understand the problem
* Analyze the problem
* Design the problem: this is done by using algorithm: **Algorithm** is a step by step method of solving a given problem. This is done using flowchart or psuedocode.

NB: algorithm can be written using natural languages like English, French etc. or by using a programming language.

* **Flowchart** is the diagrammatic representation to a problem.
* **Pseudocode** is a way to design a solution to a problem in the computer world or real world.
* **Schema** is a sketch used to guide people in solving a particular problem
* **HIPO** (Hierarchical Input Processing Output) is a design method in which a solution to a problem can be derived.
* Coding: this translates the steps involved in solving the problem to codes using specific programming language.
* Testing: this is the process of inputting data into the program whether it will get the desired results.
* Debugging: this is the correction of errors in the code. **Bugs** are errors to be removed while running (compiling/interpreting) the codes. There are two types of error: **Syntax error and Semantic error.**
* **Syntax error:** error that occurred when the rules of the language is not followed.
* **Semantic error:** this is an error due to invalid program logic that produces incorrect results when instructions are executed.

**Definitions**

**Expression:** this is anything that evaluate into a value. It is the combination of an operand and operators.

Operand: these are values and the quantity on which an operation is to be carried out.

Operators: it triggers solution to values.

Types of Operators

* Arithmetic operators such as addition, subtraction, division and multiplication
* Relational operators such as <, >, = =, <=, >=
* Logical operators such as AND, OR, NOT, NOR and XOR
* Assignment operator such as =

Characteristics of an Algorithm

* It must not be ambiguous
* It must be input and output specified
* It must be reliable
* Finiteness (can be determined)
* It must have high level of accuracy
* It must be efficient

Example 1

Write an algorithm to find the area of a circle

Solution

Area can be represented in 3 ways

AREA = PI X RADIUS X RADIUS

AREA = PI X RADIUS^2

AREA = PI X RADIUS\*\*2

Steps involved in the algorithm of a circle

1. START THE ALGORITHM
2. ENTER THE VALUE OF PI AND RADIUS
3. COMPUTE AREA = PI X RADIUS X RADIUS
4. DISPLAY AREA
5. STOP THE ALGORITHM

Example 2

Write an algorithm to find the perimeter of a rectangle : (P = 2(L+B))

Solution

1. START
2. INPUT L, B
3. LET PERIMETER = 2(L+B)
4. OUTPUT PERIMETER
5. STOP

**FLOWCHART**

This is the diagrammatic representation to a problem.

Description of the name and meaning of the flowchart symbol are presented in the table below:

|  |  |  |
| --- | --- | --- |
| S/N | FLOWCHART | MEANING/FUNCTION |
|  |  | Terminal/terminator/start and end symbol: it marks the starting and ending point of a program. It usually contains “Start” or “End” |
|  |  | Decision/Conditional symbol: it indicates a point where the outcome determines the next step to take. |
|  |  | Document symbol: it represents a step that results in a document or represents data that can be read from the document. |
|  |  | Procedure/Subroutine symbol: it is a predefined process used to invoke a subroutine or interrupt a program. |
|  |  | Direct data symbols: it represents data that is directly accessible such as data stored on disk  drive. |
|  |  | Arrow/Flow symbol: it is a connector that shows the relationship between each step in  writing a program. |

Example 3

Draw a flowchart to find a perimeter of a rectangle

Solution

LET LENTGHT = L

LET BREADTH = B

AREA = L X B

PRINT AVERAGE

PRINT PERIMETER

PERIMETER = 2(L +B)