PROGRAM DESIGN

Developing a computer program involves devising a solution to a problem. Good program only come from good program design and good program design only comes from giving sufficient thought and efforts to the early stages of programming i.e. a programmer cannot solve a programming problem satisfactorily if the problem has not been properly stated. The longer an error goes undetected the more costly it is to correct hence early stages of program design are very important. Program design aims at the following:

i). **Reliability: -** The program can be depended upon always to do what it is supposed to do
ii). **Maintainability: -** The program will be easy to change and modify when need arises
iii). **Readability: -** The program will be easy for the program to read and understand
iv). **Portability: -** The program will be transferable to a different computer with minimum of modification.
v). **Performance: -** The program causes tasks to be done quickly and efficiently
vi). **Storage saving: -** The program is not allowed to be necessarily long

PROGRAM DEVELOPMENT CYCLE (STAGES IN PROGRAMMING)

The following are stages necessary for producing a program.

i). Identifying the Problem (Requirement Specification)
ii). Outlining the Solution
iii). Developing the Outline into an Algorithm
iv). Testing for correctness of the Algorithm
v). Testing and Debugging
vi). Documentation and Maintenance of the Program

i) Identifying the Problem (Requirement Specification)

This step involves the careful reading of the problem until the programmer understands properly what is to be done. A good specification will usually specify what processing is needed by giving the exact relationship between the outputs and inputs from which there are derived rather than prescribing how the program should be written

ii) Outline the Solution

This is where the programmer may decide to break the problem into smaller tasks or steps. It usually takes the steps of hierarchy or structure chart.

iii) Develop the Outline into an Algorithm (Algorithm Design)

This is where the outline developed in step two is expanded into a set of precise steps which describes exactly the tasks to be performed under the order in which they are to be carried out.

iv) Test for Correctness of the Algorithm

This is the step where data is 'walked' through the algorithm to check that the instructions described in the algorithm will do what there are supposed to do. If logical errors are detected the are easily corrected

v) Translate the Design into a Program: -This step involves translating the algorithm into a program using an appropriate programming language

vi) Testing and Debugging

Debugging is the detection and correction of errors that may exists in the program. *Program testing* involves creating test data designed to produce predictable output and comparing the actual output with the predicted output. Careful design in the early stages of the programming will help to minimize these errors

vii) Documentation and Maintenance of the Program

Documentation involves external documentation such as hierarchy charts, the algorithm and test data reports. It also involves internal documentation coded in the program.
Program Maintenance involves changes that may be made in a program.