Session 11

Elements of Programming Language

Objectives

❑ Define software programs

❑ Describe the program development process

❑ Explain programming languages

❑ Explain program execution

❑ Explain program testing

Introduction

❑Programming languages are used to create either system software or application software.

❑System software is used to control the operations of computer hardware.

❑Application software helps the user to perform tasks with the help of both system software and computer hardware.
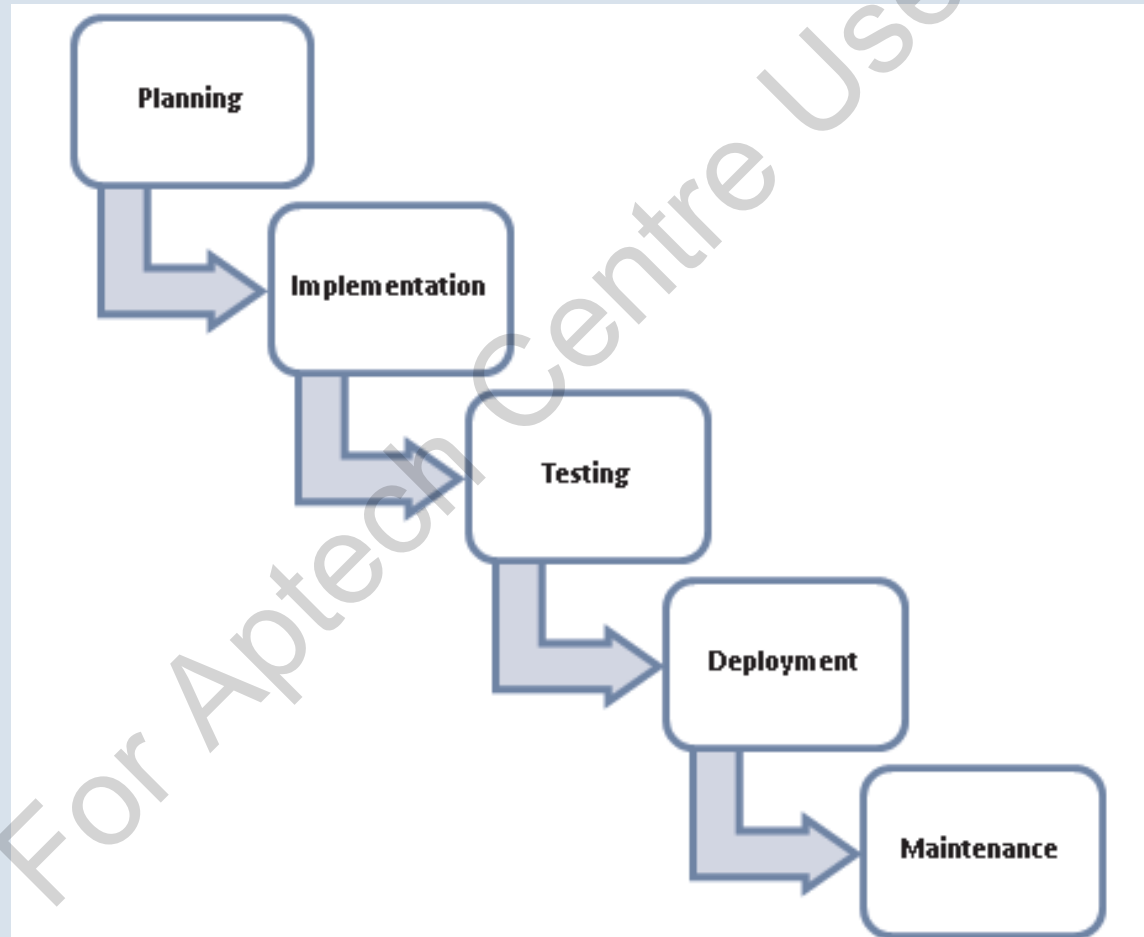
Software Programs 1-2

❑A set of written procedures or instructions in a sequential format that are used to perform specific tasks by a computer.

❑Created for business requirement as well as personal needs.

Software Programs 2-2

❑ Some of the characteristics that must be present in a software program are as follows:

- ➢ Scalability
- ➢ Security
- ➢ Usability
- ➢ Reusability
- ➢ Modularity
- ➢ Testability
- ➢ Interoperability
- ➢ Accuracy
- ➢ Efficiency
- ➢ Flexibility
- ➢ Portability
- ➢ Reliability

Program Development Process

❑ The figure shows the program development process.

Programming Languages

❑A language designed using formal codes of reserved words and symbols that express the process to be followed by a computer.

❑Contains the instructions that need to be provided to the computer for performing tasks in a precise manner.

Types of Programming Languages

❑ For easier understanding, the programming languages are classified in the following types:

- ➢ Structured Programming
- ➢ Object-oriented Programming
- ➢ Aspect-oriented Programming

Features of a Programming Language 1-2

❑ Some of these common features are as follows:

➢ All languages must be compiled preferably using a compiler. There can be different ways to implement the compiling process but the process must be followed for all the programming languages.

➢ A program should have a memory handling and data storage facility. Usually arrays are used for data storage and are also known as data structures.

➢ Control statements must be included in a programming language for logical implementation of the program.

➢ The programs, functions, and procedures should be written as well as provision should be provided for editing as required.

Features of a Programming Language 2-2

➢ The built-in functionalities of a program such as classes and functions must be used to write better programs.

➢ Libraries must be created in a software program so that these libraries can be used in other software programs also.

➢ Most programming languages support exception handling. This feature of a programming language must be used to find any errors that may be present in the computer program that is developed.

➢ Operators must be used to execute operations especially those that are mathematical in nature.

➢ Ground rules for writing a program must be specified and followed by all programmers before starting to write a code for a program.

➢ Procedures are used to execute a program and functions must be used to return values after the execution of a program.
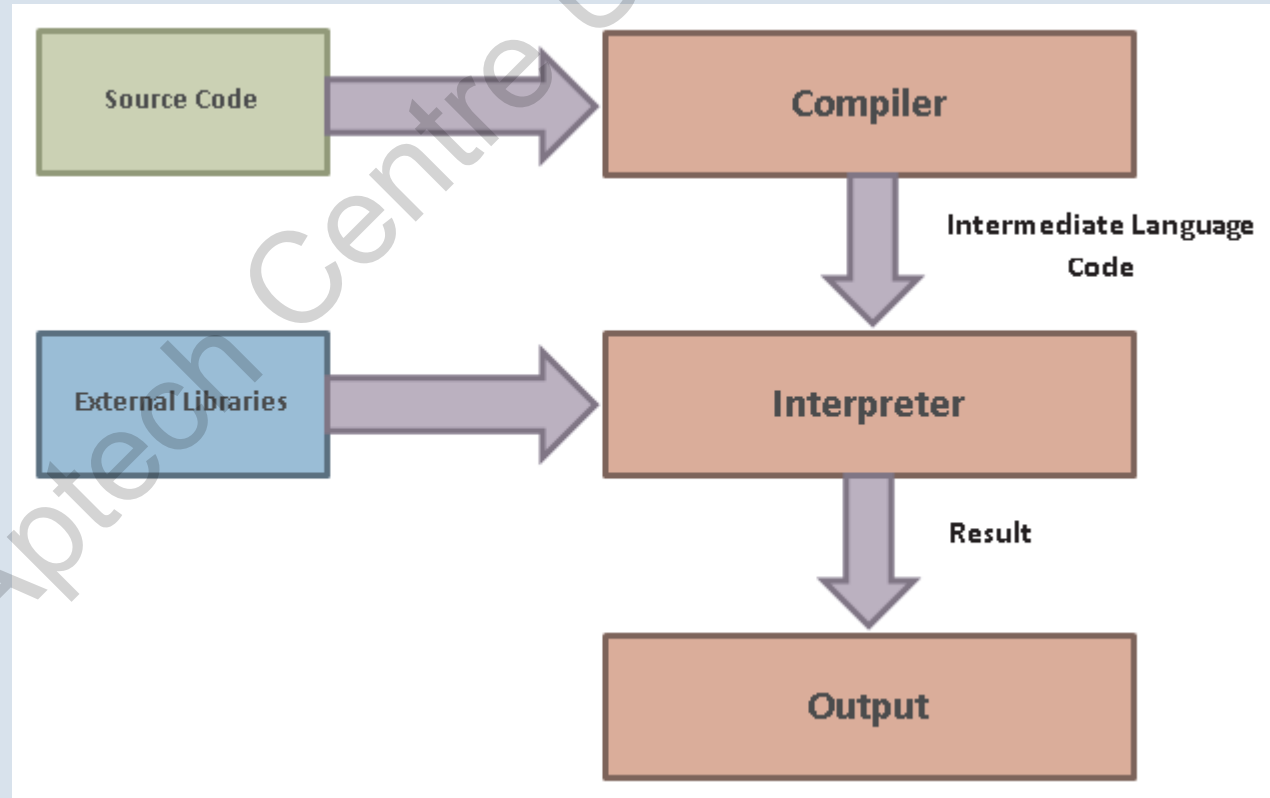
Program Execution 1-2

❑A process where the computer performs the instructions that are given to it by a computer program.

❑After the tasks are performed, the user receives certain results as specified in the program.

Program Execution 2-2

❑ The two methods that are used to execute a program written in a high-level language are as follows:

➢ Interpreter

➢ Compiler

Program Testing 1-3

❑ A process of validating, evaluating, and verifying the capability of a software program and determining if the software program has met the required results.

❑ Some of the aspects that form a part of testing are as follows:

   a. The software must meet the requirements specified
   b. All the operations of the software must be in working condition
   c. The implementation of the software at the client-end must not create any issues
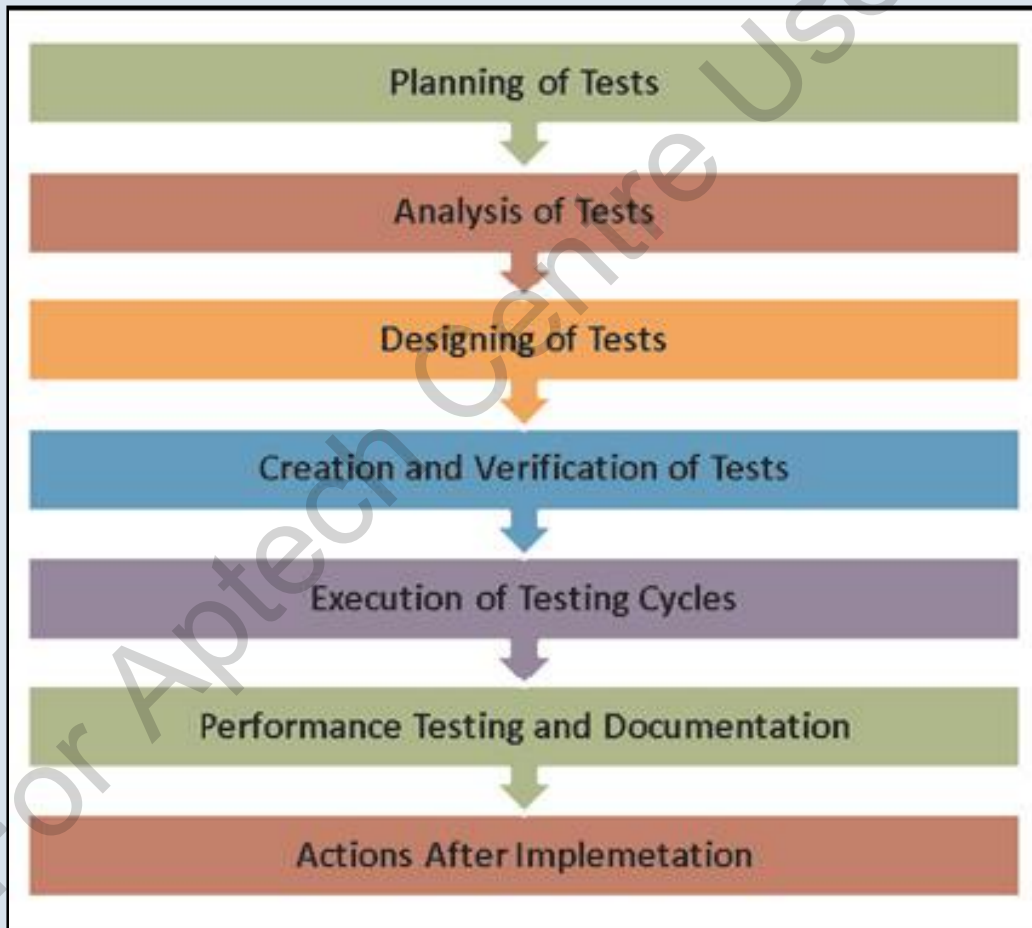   d. The software must satisfy the needs of the users

Program Testing 2-3

❑The popular software testing tools available are as follows:

➢ HP QuickTest Pro

➢ Rational Robot

➢ eggPlant

➢ SilkTest

➢ TestComplete

➢ TestPartner

➢ TestManager

➢ Visual Studio Test Professional

Program Testing 3-3

❑The process of testing is shown in the figure.

Summary

❑ Software programs are a set of written procedures or instructions in a sequential format that are used to perform specific tasks by a computer.

❑ The program development process includes planning, implementation, testing, deployment, and maintenance.

❑ A programming language is a language designed using formal codes of reserved words and symbols that express the process to be followed by a computer.

❑ The programming languages are classified as structured programming, object-oriented programming, and aspect-oriented programming.

❑ An interpreter is used to execute instructions that are written in high-level languages.

❑ A compiler is used to translate the source code into the object code.

❑ Program testing is a process of validating, evaluating, and verifying the capability of a software program and determining if the software program has met the required results.