Computer science class:10th week:3rd ch#02

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Introduction to Computer Programming

- The process of writing a computer program in computer language to solve a particular problem.

- It controls the operation of a computer to perform a task.

- Computer languages are also known as programming languages.

Computer Program:

- Set of instructions(statements) written in a programming language to solve a particular problem and achieving specific results.

- Computer as a problem solving tool.

- Each programming language has syntax and semantic.

Syntax and semantic:

Syntax:

▶ Rules of a programming language according to which statements of a program are to be written.

▶ Similar to the grammar of natural language.

Example

Variable = expression;

Semantic:

▶ It gives meaning to statements of a programming language.

▶ Sequence of operations.

Example:

Sum = a + b;

Programming Languages:

- Language which is understood by computer.
- Classify into two categories i.e. low level and high level languages.

Low level languages:

- Machine-oriented language.
- These include machine and assembly language.
  - **Machine Language:**
- Directly understood by computer hardware.
- Associated with architecture of computer.
- Consists of zeroes and ones.
- Impossible for humans.

➤ Assembly language

▶ Consists of symbolic codes or abbreviations known as mnemonics.

▶ Make computer programming easier than machine language.

▶ Convert into machine language before execution.

▶ Assembler converts assembly language into machine language.

Characteristics:

▶ It allows programmers to have access to all the special features of the computer they are using.

▶ A program written in assembly language will require less storage and less running time than high level language.

▶ Best choice in some applications but their use is gradually declining.

High Level Languages:

- English-oriented languages
- Use English languages words such as print, go to, if, end, etc.
- Easy to learn and use.
- Compiler/interpreter is required to translate high level language into machine language.

Compiler: It translates an entire program.

Interpreter: it translates one instruction at a time.

Examples:

Visual Basic, C, Java and Pascal.

Classification of HLLs.

Procedural languages:

- Based upon the concept of modular programming.

- Programs are divided into smaller parts known as modules.

Module: group of statements that can be executed more than once.

Advantages:

- Easy to design, modify and debug a program

- Provide better programming facilities.

Examples:

FORTRAN, Pascal, C and BASIC.

Structured languages:

▶ Consist of three fundamental elements, which are sequence, selection and repetition.

Sequence: Writing program statements in a logical sequence.

Selection: selection of any number of statements based on the result of evaluation of a condition.

Examples: if, else-if, switch, etc.

Repetition: Executing one or more statements a number of times until a condition is satisfied. For example **for** and **while** loop etc.

Examples: ALGOL, PL/1, Ada and Pascal.

Object-Oriented Programming Languages (oops):

▶ A programming method that is based on objects such as student, vehicle, building etc.

▶ It provides a set of rules for defining and managing objects.

Advantages:

▶ To solve the complicated and larger programs that are difficult to design, develop, maintain and debug.

Examples: C++, C#, php and Java.

Characteristics of High Level Languages:

- To make computer programming simple, easier and less prone to errors.

- Not machine dependent

- Translate into machine language before execution.

- Debugging is easier.

- Highly structured.

Popular High Level Languages:

C/C++:

▶ Developed in early 1970s by Dennis Ritchie at Bell Laboratories.

▶ C has become most popular programming language.

▶ Highly structures programming languages, easy to understand and use.

▶ Mainly used for writing system programs and applications programs.

▶ **C++** was developed by Bjarne Stroustrup during 1983-1985.

▶ Superset of C.

▶ To provide programming facilities to easily and quickly write more powerful programs.

Visual Basic (VB):

- VB is a high level language evolved from BASIC.

- For writing Windows and Web applications.

- Provides a graphical development environment to programmers to develop powerful applications.

- For developing business programs such as payroll system and inventory control program.

C#:

- Developed in 2000 by Microsoft Corporation

- Simple, modern, general-purpose programming language.

- Syntax is very similar to C and C++. It has some features of Java.

- To write Web Applications including games, utilities, operating systems etc.

Java:

- Developed by Sun Microsystems. Syntax very similar to C and C++.

- Write all types of programs as those written in other programming languages and small programs that can be embedded in a Web.

- Ideal language for network computing.

- Writing programs for a wide range of devices, computers and networks and Web Applications.

- Most of the Web browsers are made java enabled.

- Browsers that support Java are Microsoft's Internet Explorer, Firefox and Mozilla.

Programming Environment

▶ Set of processes and programming tools to develop computer programs.

▶ Included editor, compiler, liker, loader and Debugger.

▶ Using separate programs provided a difficult and time consuming environment.

▶ Integrated Development Environment is an application package that consists of editor, compiler, linker and debugger with a graphical user interface.

▶ IDE brings all the processes and tools required for program development into one place.

Programming Environment of C Language.

A C language IDE consist of following modules.

- ► Text editor
- ► Compiler
- ► Linker
- ► Loader
- ► Debugger
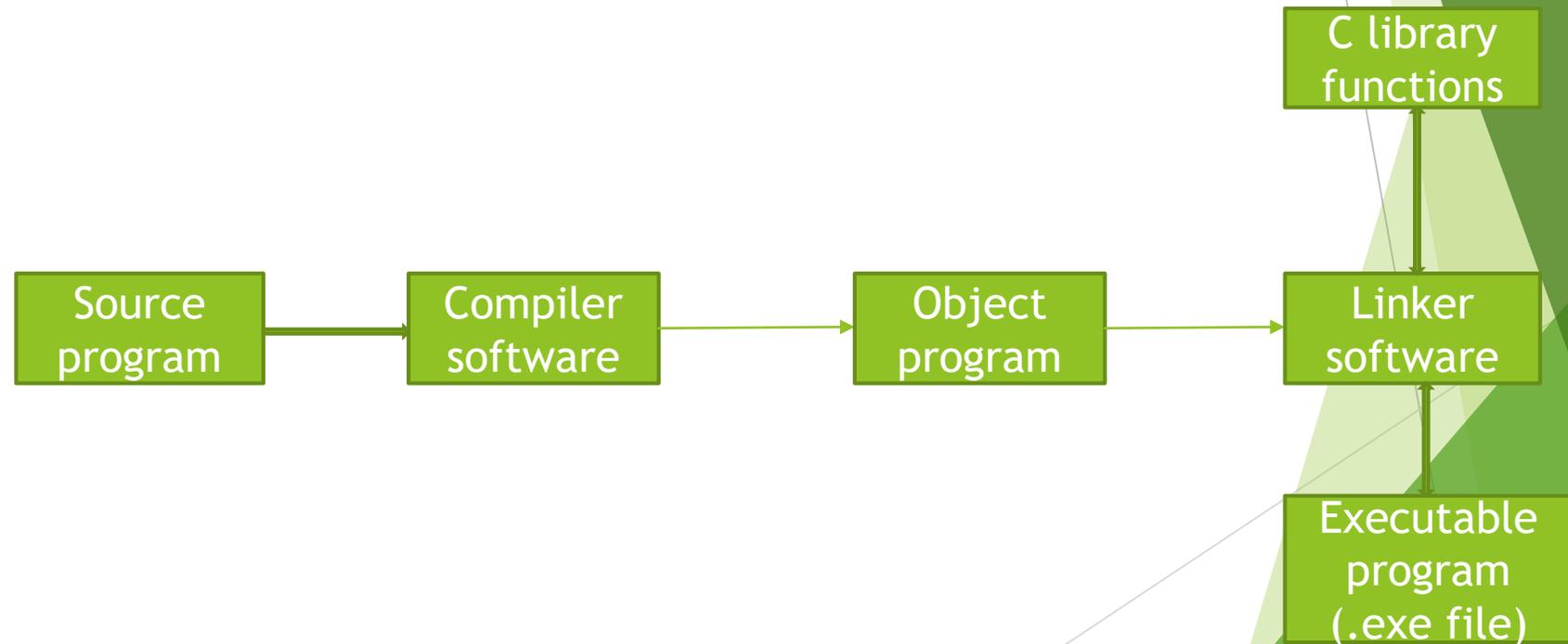
Home Work

Q1. write down the exercise questions of Q2. part (i) to part (v) on your computer note book.

Q2. Write down and learn the exercise questions No# 3,4,5 on your computer note book.