Chapter 1

Overview of Programming and Problem Solving

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What is Computer Programming?

- It is the process of planning a sequence of steps (called instructions) for a computer to follow.
Programming Life Cycle Phases

1 Problem-Solving

2 Implementation

3 Maintenance

Problem-Solving Phase

- ANALYZE the problem and SPECIFY what the solution must do

- develop a GENERAL SOLUTION (ALGORITHM) to solve the problem

- VERIFY that your solution really solves the problem
Basic Control Structures

- a sequence is a series of statements that execute one after another
- selection (branch) is used to execute different statements depending on certain conditions
- Looping (repetition) is used to repeat statements while certain conditions are met.
- a subprogram is used to break the program into smaller units

SEQUENCE

Statement → Statement → Statement → …
SELECTION (branch)

IF Condition THEN Statement1 ELSE Statement2

LOOP (repetition)

WHILE Condition DO Statement1
SUBPROGRAM (function)

SUBPROGRAM1

a meaningful collection
of SEQUENCE,
SELECTION, LOOP,
SUBPROGRAM

Computer Components

Central Processing Unit (CPU)

Control Unit

Arithmetic Logic Unit

Memory Unit (RAM & Registers)

Peripherals

Input Device

Output Device

Auxiliary Storage Device
Memory Unit

- is an ordered sequence of storage cells, each capable of holding a piece of information
- each cell has its own unique address
- the information held can be input data, computed values, or your program instructions.

Central Processing Unit

- has 2 components to execute program instructions
  - Arithmetic/Logic Unit performs arithmetic operations, and makes logical comparisons.
  - Control Unit controls the order in which your program instructions are executed.
Peripherals

- are input, output, or auxiliary storage devices attached to a computer
  - Input Devices include keyboard and mouse.
  - Output Devices include printers, video display, LCD screens.
  - Auxiliary Storage Devices include disk drives, scanners, CD-ROM and DVD-ROM drives, modems, sound cards, speakers, and digital cameras.