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COMPUTER PROGRAMMING

Introduction to Computer Programing

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Computer and How It Works

- An electronic device capable of performing computations at speed millions/billions of time faster than human being
- Hardware – the physical components of the computer
 - Central processing unit
 - Disk drive
 - Monitor
- Software – the instructions that tell the computer what to do

Computer and How It Works

- Computer process a set of instruction to solve a certain kind of problem called program
- A computer program is a sequence of instructions. It can consist of only a few instructions or millions of lines of instructions
- Computer program is a set of instruction written by **YOU**, to do what you want the computer to do
- Instruction and data are fed into the computer memory (input)
- Data is then processed by the computer program (processing)
- The end result is then obtained (output)



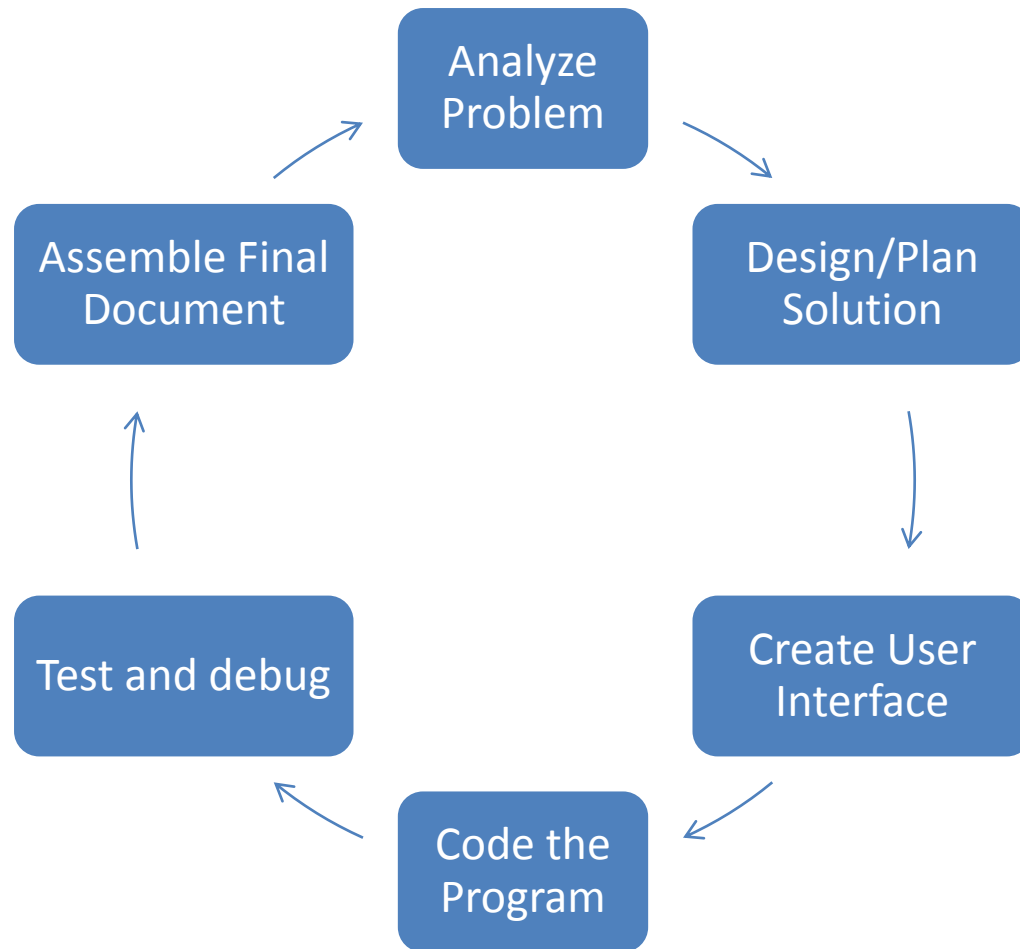
Program and Programming

- Program is a sequence of instructions that can be understood by computer to solve a particular problem
- Programming refers to the process or steps of constructing the instructions mentioned above
- Programming requires a systematic planning to ensure time efficiency and help to design error-free programs
- A systematic process of developing a program is called **program development cycle (PDC)**

Program Development Cycle (PDC)

1. **Analyse:** Define the **problem** that need to be solved.
2. **Design:** Plan the **flow of solution** (assisted by algorithm) to the problem.
3. **Choose the interface:** Select related **objects** (such as labels, text boxes, buttons, list boxes, etc.).
4. **Code:** Translate the **algorithm** into a programming language (coding).
5. **Test and debug:** Find and remove any **errors** in the program.
6. **Complete the documentation:** Organize all the **materials** that describe the program so that other user/programmer can understand. It is very essential especially for future use (such as modification of the program).

Program Development Cycle (PDC)



Programming Tools

- Three tools are used to convert **algorithms** into computer programs:
 - **Algorithms**: A step-by-step series of instructions for solving a problem
1. **Flowchart** – Graphical representation of the logical steps to carry out a task and shows the relationship of these steps.
 2. **Pseudocode** - Uses sentences/phrases with Visual Basic (VB) terms to outline the program.
 3. **Hierarchy chart** - Shows how the different parts of a program relate to each other.

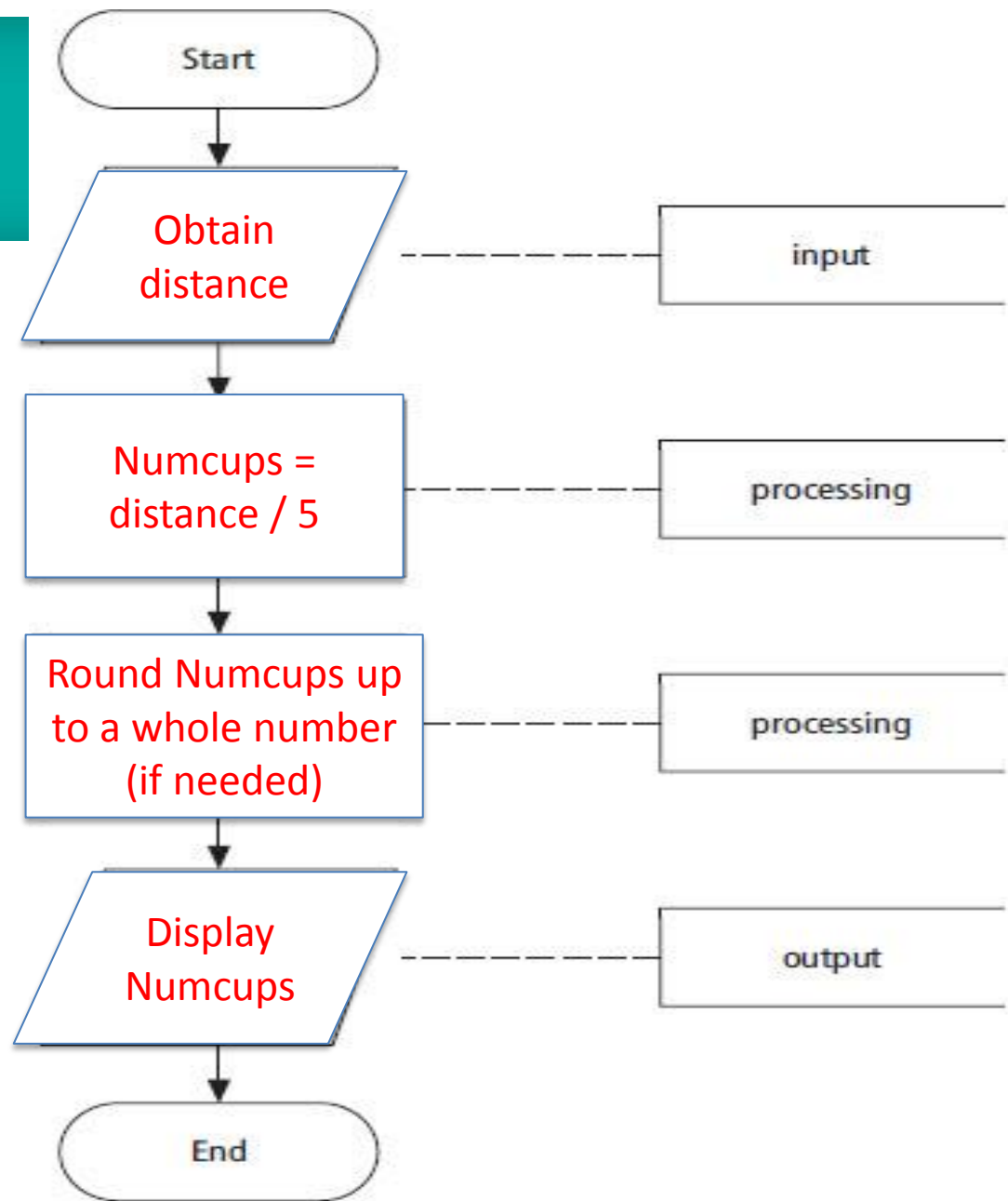
Problem Solving Example

- How many cups of water should a runner consume for long distance running?
- A simple guidance is to consume one cup of water for every 5km of running.

Algorithm

1. Request the running distance of the runner; call it *distance*. (input)
2. Divide *distance* by 5. (processing)
3. Round the quotient up to the next highest whole number; call it *Numcups*. (processing)
4. Reply with the number *Numcups*. (output)

Flowchart



Pseudocode

1. Determine the proper number of water consumption (*Numcups*) for a long distance runner
2. Read *distance* (input)
3. Set the number of cups to $distance / 5$ (processing)
4. Round the number of cups (*Numcups*) up to the next whole number (processing)
5. Display the number of cups (output)

Hierarchy Chart

