CSC 1101:: Introduction to Computer Studies
Lecture-Notes:: 02

❖Introduction to Computer

➢ What is a Computer?

The word computer comes from the word "Compute" which means "to calculate". Thereby, a computer is an electronic device that can perform various kind of arithmetic operations at high speed.

It is operating under the control of instructions stored in its own memory that can accept or receive data as input, produce information as output[process the data according to specified rules], can store the information for further use and retrieve data whenever desired.

The "computer" is an ensemble of different machines which are used to get the job done. A computer is primarily made of the Central Processing Unit (usually referred to as the computer), the monitor, the keyboard, and the mouse. Other pieces of hardware are commonly referred to as peripherals.

➢ How computer does work?

▪ Input

Any information or data sent to a computer for processing is considered as input.

- **<u>Memory/storage:</u>**

Storage is a process through which digital data is saved within a data storage device by means of computing technology either temporarily or permanently

- ***<u>Processing:</u>***

    Known as the central processing unit(CPU) or brain of the computer. It is responsible for all functions and processes and considered as the most important element of a computer system. Main Parts of CPU are,

    - Arithmetic Logic Unit(ALU)
    - Control Unit(CU)

- ***<u>Output:</u>***

    Anything that comes out of a computer considered as output. it can be meaningful information and may appear in a variety of forms –

    - binary numbers
    - Characters
    - Pictures
    - printed pages

❖ *I/O Devices*

▪ *Input Device*

Input device is a piece of computer hardware equipment to provide data and control signals to an information processing system such as a computer or other information appliance. Some of most common input devices are-

- ✓ Keyboard
- ✓ Mouse (pointing device)
- ✓ Microphone
- ✓ Touch screen
- ✓ Scanner
- ✓ Webcam, etc.

▪ *Output Device*

An output device is a piece of computer hardware equipment used to communicate the results of data processing and converting the electronically generated information into human readable form.

Some of common output devices are-
- ✓ Monitor
- ✓ Speaker
- ✓ Printer
- ✓ Projector

❖ *Number System*

▪ *What is number system?*

Number System is a technique which defines how to represent a number in the computer system architecture. Moreover, the system specifies that how the same number can be represented differently in different number system using distinct symbols.

▪ *Types of number system:*

There are two types of number system:

- ✓ Non-positional number systems
- ✓ Positional number systems

❖ *Non-positional number systems*

i. Use symbols such as I for 1, II for 2, III for 3, IIII for 4, IIIII for 5, etc.

ii. Each symbol represents the same value regardless of its position in the number

iii. The symbols are simply added to find out the value of a particular number

iv.   It is difficult to perform arithmetic with such a number system

🔥 *Positional number systems*
  i.   Use only a few symbols called digits
  ii. These symbols represent different values depending on the position they occupy in the number
  iii. The value of each digit is determined by:
    1. The digit itself
    2. The position of the digit in the number
    3. The base of the number system
  iv. The maximum value of a single digit is always equal to one less than the value of the base

Some examples of Positional Number System,

  ✓ Binary number system

  ✓ Octal number system

  ✓ Decimal number system

  ✓ Hexadecimal (hex) number system

❖ *Decimal Number System*
  i.   A positional number system has total 16 symbols or digits (0, 1, 2, 3, 4, 5, 6, 7,8, 9, A, B, C, D, E, F). Hence its base = 16
  ii. The symbols A, B, C, D, E and F represent the decimal values 10, 11, 12, 13, 14 and 15 respectively
  iii. The maximum value of a single digit is 15 (one less than the value of the base)

❖ *Binary Number System*

    i.   A positional number system has only 2 symbols or digits (0 and 1). Hence its base = 2

    ii.   The maximum value of a single digit is 1 (one less than the value of the base)

    iii. Each position of a digit represents a specific power of the base (2)

    iv. This number system is used in computers

❖ *Octal Number System*

    i.   A positional number system has total 8 symbols or digits (0, 1, 2, 3, 4, 5, 6, 7).Hence, its base = 8

    ii.   The maximum value of a single digit is 7 (one less than the value of the base

    iii. Each position of a digit represents a specific power of the base (8)

❖ *Hexadecimal Number System*

    i.   A positional number system has total 16 symbols or digits (0, 1, 2, 3, 4, 5, 6, 7,8, 9, A, B, C, D, E, F). Hence its base = 16

    ii.   The symbols A, B, C, D, E and F represent the decimal values 10, 11, 12, 13, 14 and 15 respectively

    iii. The maximum value of a single digit is 15 (one less than the value of the base)

- ## *Conversion*
  Some of the conversions are given below-

  - ✓ Decimal to Binary
  - ✓ Binary to Decimal
  - ✓ Octal to Binary
  - ✓ Binary to Octal
  - ✓ Hexadecimal to Binary
  - ✓ Binary to Hexadecimal
  - ✓ Converting a number of any base to a number of another other base

- ## *Example*
  Some of the examples are given below:

  - ### Binary to Decimal

  $$10101_2 = (1 \times 2^4) + (0 \times 2^3) + (1 \times 2^2) + (0 \times 2^1) \times (1 \times 2^0)$$

  $$= 16 + 0 + 4 + 0 + 1$$

  $$= 21_{10}$$

  - ### Octal to Binary

  $$562_8 = ?_2$$

  Step 1: Convert each octal digit to 3 binary digits
  $$5_8 = 101_2, \quad 6_8 = 110_2, \quad 2_8 = 010_2$$

  Step 2: Combine the binary groups
  $$562_8 = \underline{101} \quad \underline{110} \quad \underline{010}$$
  $$\qquad\qquad 5 \qquad 6 \qquad 2$$

  Hence, $562_8 = 101110010_2$

- Octal to Decimal

$2057_8 = (2 \times 8^3) + (0 \times 8^2) + (5 \times 8^1) + (7 \times 8^0)$

$\quad = 1024 + 0 + 40 + 7$

$\quad = 1071_{10}$

- Binary to Octal

$1101010_2 = ?_8$

Step 1: Divide the binary digits into groups of 3 starting from right

$\underline{001} \qquad \underline{101} \qquad \underline{010}$

Step 2: Convert each group into one octal digit

$001_2 = 0 \times 2^2 + 0 \times 2^1 + 1 \times 2^0 = 1$
$101_2 = 1 \times 2^2 + 0 \times 2^1 + 1 \times 2^0 = 5$
$010_2 = 0 \times 2^2 + 1 \times 2^1 + 0 \times 2^0 = 2$

Hence, $1101010_2 = 152_8$

- Hexadecimal to Decimal

$$1AF_{16} = (1 \times 16^2) + (A \times 16^1) + (F \times 16^0)$$
$$= 1 \times 256 + 10 \times 16 + 15 \times 1$$
$$= 256 + 160 + 15$$
$$= 431_{10}$$

- ***Significance of Number System in Computing***

In order to understand the language used by computers and other digital system it is crucial to have a better understanding of number system.

❖ *Course Adding/ Dropping Procedure*

1. All ADD/DROP procedure can be completed online.

2. Login into the VUES account   Click ADD/DROP button Select the courses to ADD/DROP   Click CONFIRM button.

3. Full Course Fee should be paid for the Added Courses within 24 hours. The printout for the payment must be collected from the concerned department.

4. 10% Penalty will be charged for dropped course.

5. Minimum load should be maintained even after dropping (as per following table):

Program	Minimum Number of credits	
	Regular Load	Load for Discount/Scholarship
Undergraduate	12	14-15

6. Adding / Dropping is not allowed for PROBATION STUDENTS.

7. A student can Add or Drop a course after first week of a semester.

8. In case of **less than 12 credits** approval must be taken from **Dean / Director**.

References

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