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Subject - CAO

(Assignment-1)

Q.① Explain the Basic computer data types.

Ans① Most modern computer languages recognize five basic categories of data types:

(i) Integral,
(ii) floating Points,
(iii) Character,
(iv) Character String, and
(v) Composite types,

with various specific subtypes defined within each broad category. Most modern languages also include a number of language-specific special types, and many languages provide a means for programmers to define their own data types, and the operations that can be performed on them.

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Q.② What do you Understand by floating point representation? Explain with the help of Example.

Ans.② Representation of floating point number is not unique. For example, the number 55.66 can be represented as 5.566×10^1, 0.5566×10^2, 0.05566×10^3, and so on. The fraction part can be normalized. In the normalization form, there is only a single non-zero digit before the radix form.

Floating-point numbers have two advantages over integers. First, they can represent the values between integers. Second, because of scaling factor, they can represent a much greater range of values.

Floating point notation is essentially the same as scientific notations, only translated to binary. There are three fields: the sign

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(which is the sign of the number), the exponent (some representations have used a seperate exponent sign), and exponent sign and exponent magnitude; (IEEE formate does not), and a significant (mantissa).

8.③ Explain the register Transfer language.

Ans③ Register Transfer Language (RTL)

In symbolic notation, it is used to describe the micro-operations transfer among registers.

It is a kind of intermediate representation (IR) that is very close to assembly language, such as that which is used in compiler. The term "Register Transfer" can perform micro-operations and Transfer the result of operation to the same or other register.

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Micro-operations:

The operation executed on the data stored in registers are called micro-operations. They are detailed low-level instructions used in some designs to implement complex machine instructions.

Register Transfer:

The information transformed from one register to another is represented in symbolic form by replacement operation is called Register Transfer.

Register Replacement Operator:

In the statement, R2 <- R1, <- acts as a replacement operator. This statement defines the transfer of control of register R1 into register R2.

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Q.④ Write the short note :

(a) Arithmetic Micro-Operations :-

Ans: (a) In general, the Arithmetic Micro-operations deals with the operations performed on numeric data stored in the registers.

The basic Arithmetic Micro-operations are classified in the following categories :

1). Additions
2). Subtraction
3). Increment
4). Decrement
5). Shift

Some additional Arithmetic Micro-operations are classified as :

1). Add with carry
2). Subtract with borrow
3). Transfer / Load, etc.

Ans(b) Logic Micro-Operations :-

Logic Micro-operation specify binary

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operations on the strings of the strings of bits in registers. The others can be created from combination of these. The hardware implementation of logic micro operations requires the insertion of the most important gates like AND, OR, EXOR, and NOT for each bit or pair of bits in the registers.

Ans (c) Shift Micro-operations :-

Shift Micro-operations are those micro-operations that are used for serial transfer of information. These are also used in conjuction with arithmetic micro-operation, logical micro-operation, and other data-processing operations.

* There are three types of shifts micro-operations :

(1) Logical :- It transfers the 0 zero through the

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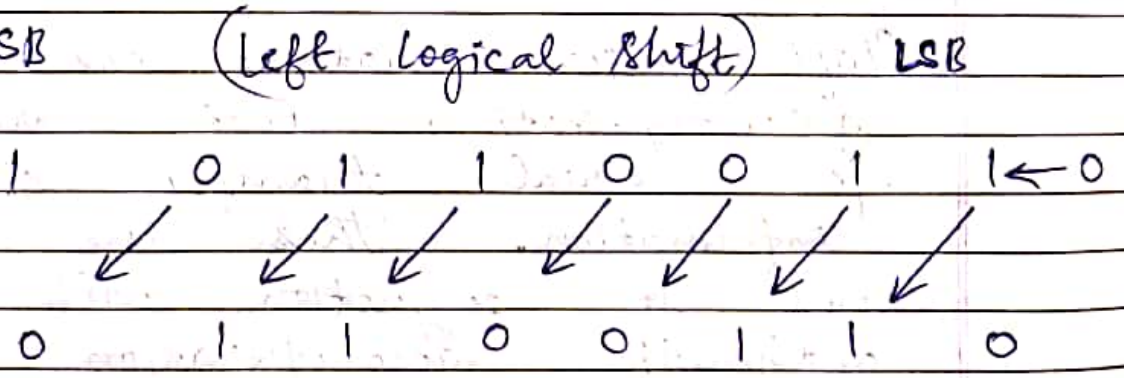
serial input. We use the symbols shl for logical shift-left and shr for shift-right.

1). In Logical Shift Left, shift one position moves each bit to the left one by one. The Empty least significant bit (LSB) is filled with zero (i.e., the serial input), and the most significant bit (MSB) is ~~reg~~ rejected.



2). In Right-Shift (Logical), one position moves each bit to the right one by one and the least significant bit (LSB) is rejected and the empty (MSB) is filled with zero.

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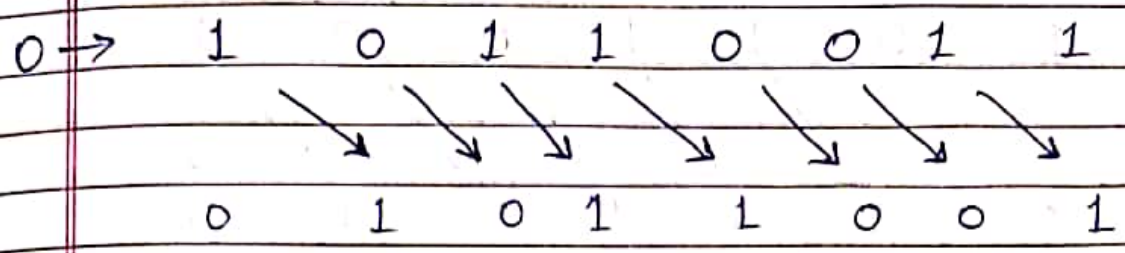
MSB (Right logical shift) LSB



(II) Arithmetic :- This micro-operation shifts a significant signed binary number to the left or to the right position.
In the arithmatic shift-left, it multiplies a signed binary number by 2 and In an arithmatic shift-right it divides the number by 2.

(1). Left Arithmatic Shift :-

In this, one position moves each bit to the left one by one. The empty least significant bit (LSB) is filled with zero and the most significant bit (MSB) is rejected.

Same as the Left Logical Shift.

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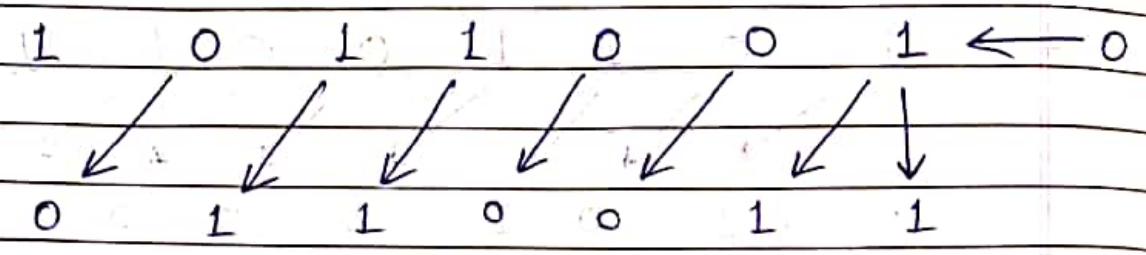
(Left Arithmatic Shift.)

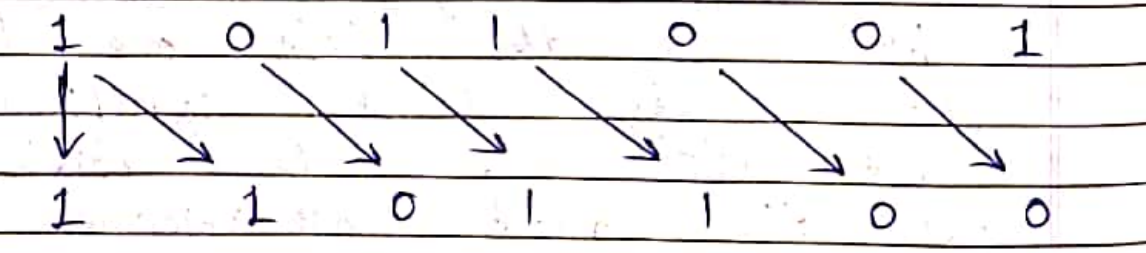
MSB LSB



(2). Right Arithmatic Shift :-

In this, one position moves each bit to the right one by one and the least significand bit is rejected and the empty MSB is filled with the value of the previous (MSB).

MSB (Right Arithmetic Shift) LSB

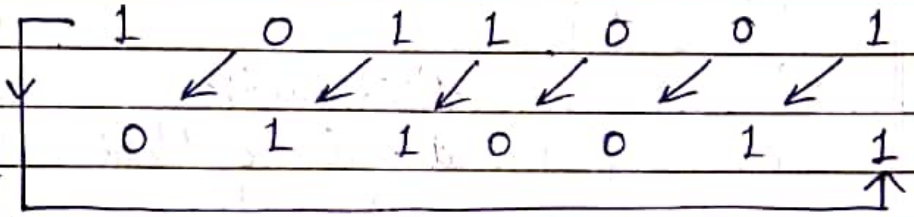


(III) Circular :- The circular shift circulates the bits in the sequence of the register

around the both ends without any loss of information.

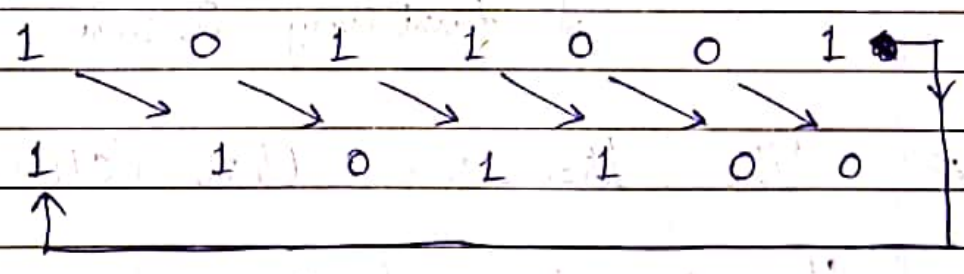
(1) Left Circular Shift –

MSB (Left Circular Shift) LSB



(2) Right Circular Shift :-

MSB (Right Circular Shift) LSB



Q.(5) How to Design of Basic computer ? Explain with the block diagram.

Ans (5) In the ~~above~~ below diagram, both control (control unit or CU) and arithmatic and

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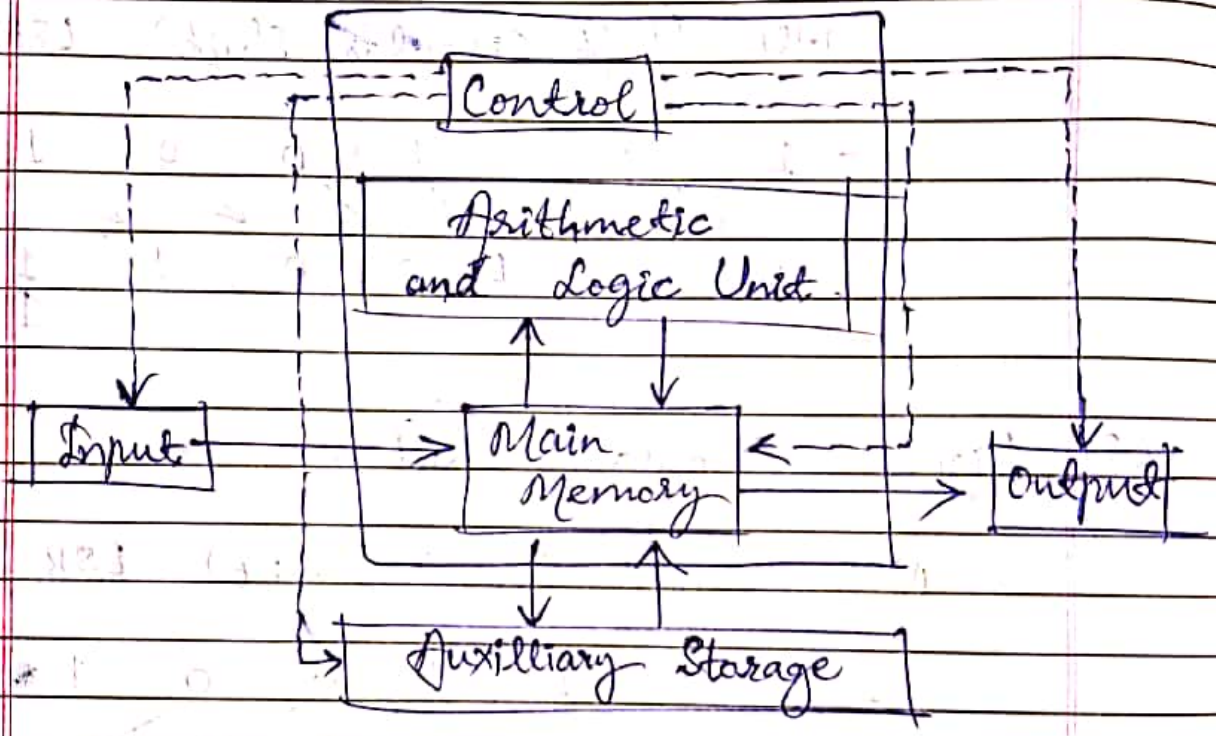
logic unit (ALU) combinely called as Central Processing Unit (CPU).

The (fig.) Block Diagram of Computer



* The Processing Unit (CPU) :-

It is the brain of a computer system.

All major calculation and comparisons are made inside the CPU and it is also responsible for activation and controlling the operation of other unit.

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This unit consists of two major computers components, that are arithmetic logical unit (ALU) and control unit (CU).

* Arithmetic Logical Unit (ALU) :- It performs all the arithmetic operations such as addition, subtraction, multiplication and division. It also uses logic operation for comparison.

* Control Unit :- CU of CPU controls the entire operation of a computer. It also controls all devices such as memory, input/output devices connected to the CPU.

* Input/Output Unit :- It consists of devices used to transmit information between the external world and computer memory.

* Memory unit :- Memory unit is an essential component of a digital computer. It is where all the data

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intermediate and final results are stored.

The data read from the main storage or an input unit are transferred to the computer's memory where they are available for processing.

* Disk Storage Unit :-

Data and instruction enters into a computer system through input device have to stored inside the computer before actual processing start.

* Two types of storage unit are primary and secondary storage unit.

(i) Primary Storage unit :- It has direct link with input unit and output unit. It stores the input data, calculation result.

(ii) Secondary Storage unit :- The

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primary storage is not able to store data permanently for future use. So some other types of storage technology is required to storage the data permanently for the long time, it is called secondary or auxilary storage.
