Two mark Question with Answer - COA

[1] What is Boolean algebra example?

→Boolean algebra is **a branch of mathematics that deals with operations on logical values with binary variables**. The Boolean variables are represented as binary numbers to represent truths: 1 = true and 0 = false.
Elementary algebra deals with numerical operations whereas Boolean algebra deals with logistical operations.

[2] What are combinational and sequential circuits?

→Combinational circuits are defined as the time independent circuits which do not depends upon previous inputs to generate any output are termed as combinational circuits.
Sequential circuits are those which are dependent on clock cycles and depend on present as well as past inputs to generate any output.

[3] What is a truth table in logic?

→The truth table of a logic system (e.g. digital electronic circuit) **describes the output(s) of the system for given input(s)**.
The input(s) and output(s) are used to label the columns of a truth table, with the rows representing all possible inputs to the circuit and the corresponding outputs.

[4] What is don't care condition in k map?
→The "Don't Care" conditions **allow us to replace the empty cell of a K-Map to form a grouping of the variables which is larger than that of forming groups without don't care**.
While forming groups of cells, we can consider a "Don't Care" cell as 1 or 0 or we can also ignore that cell. Symbol is a 'cross'.

[5] What is the use of clock pulse in flip flops?

The Clock pulse is enabling for the Flip Flops **to synchronize the gates output at particular Time**. Only when clock is high [active High] OR Low [Active Low] as per types of Gates used, the output will occur at appropriate times.

[6] Which are universal gates and why?

→A universal gate is a gate which can implement any Boolean function without need to use any other gate type.

The **NAND and NOR gates are universal gates**. In practice, this is advantageous since NAND and NOR gates are economical and easier to fabricate and are the basic gates used in all IC digital logic families.

[7] Explain SR Flip-Flop.

→SR flip-flop is **a gated set-reset flip-flop**. The S and R inputs control the state of the flip-flop when the clock pulse goes from LOW to HIGH. The flip-flop will not change until the clock pulse is on a rising edge.

When both S and R are simultaneously HIGH, it is uncertain whether the outputs will be HIGH or LOW.

[8] Explain D Flip-Flop?

→Definition. A D (or Delay) Flip Flop is **a digital electronic circuit used to delay the change of state of its output signal (Q) until the next rising edge of a clock timing input signal occurs**.

[9] What is a parity bit?

→A parity bit is a check bit, which is added to a block of data for error detection purposes. It is used to validate the integrity of the data.

The value of the parity bit is assigned either 0 or 1 that makes the number of 1s in the message block either even or odd depending upon the type of parity. Parity check is suitable for single bit error detection only.

The two types of parity checking are

- **Even Parity** − Here the total number of bits in the message is made even.
- **Odd Parity** − Here the total number of bits in the message is made odd.

[10] What is a Multiplexer?

→ A multiplexer is combination circuit that is used to direct one out of 2^n input data line to a single output line. It is also known as data selector, because it selects one of many inputs and directs it to the output.

The selection of particular input data line is controlled by a set of selection inputs. Normally there are 2^n input data lines and n input selection lines.

[11] What is a Registers?

→ Register is a group of flip-flop with each flip-flop capable of storing 1bit of digital information.

In addition to flip-flop, register may have combination gates that perform data processing tasks. In broad definition register consists of group of flip-flop and gates where flip-flop hold the binary information and gates control the information.

[12] Write note on Control Word?

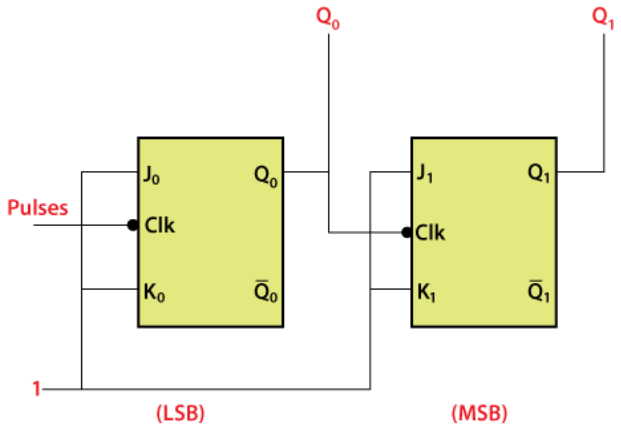
→ Control word is a 14 binary selection inputs in the units, and their combined value specifies control word. The 14 bit control word is displayed.

It consists of 4 fields. The first 3 field contain 3 bits each, while the last field contains 5 bits.

SEL A →3
SEL B →3
SEL D →3
OPR →5

[13] What is a binary ripple counter?

→ A Binary counter is **a 2-Mod counter which counts up to 2-bit state values, i.e., 22 = 4 values**. The flip flops having similar conditions for toggling like T and JK are used to construct the Ripple counter. Below is a circuit diagram of a binary ripple counter.



[14] What is a Infix notation?

→ Infix notation: X + Y

Operators are written in-between their operands. This is the usual way we write expressions. An expression such as A * (B + C) / D is usually taken to mean something like: "First add B and C together, then multiply the result by A, then divide by D to give the final answer."

Infix notation needs extra information to make the order of evaluation of the operators clear: rules built into the language about operator precedence and associatively, and brackets ( ) to allow users to override these rules. For example, the usual rules for associatively say that we perform operations from left to right, so the multiplication by A is assumed to come before the division by D. Similarly, the usual rules for precedence say that we perform multiplication and division before we perform addition and subtraction.

[13] What is a Prefix notation?

→ Prefix notation: + X Y

Operators are written before their operands. The expressions given above are equivalent to / * A + B C D
As for Postfix, operators are evaluated left-to-right and brackets are superfluous. Operators act on the two nearest values on the right. I have again added (totally unnecessary) brackets to make this clear:
(/ (* A (+ B C)) D)

Although Prefix "operators are evaluated left-to-right", they use values to their right, and if these values themselves involve computations then this changes the order that the operators have to be evaluated in.

In the example above, although the division is the first operator on the left, it acts on the result of the multiplication, and so the multiplication has to happen before the division (and similarly the addition has to happen before the multiplication).
Because Postfix operators use values to their left, any values involving computations will already have been calculated as we go left-to-right, and so the order of evaluation of the operators is not disrupted in the same way as in Prefix expressions.

[14] What is a Postfix notation?

→ Postfix notation (also known as "Reverse Polish notation"): X Y +

Operators are written after their operands. The infix expression given above is equivalent to A B C + * D /
The order of evaluation of operators is always left-to-right, and brackets cannot be used to change this order. Because the "+" is to the left of the "*" in the example above, the addition must be performed before the

multiplication.
Operators act on values immediately to the left of them. For example, the "+" above uses the "B" and "C". We can add (totally unnecessary) brackets to make this explicit:
((A (B C +) *) D /)
Thus, the "*" uses the two values immediately preceding: "A", and the result of the addition. Similarly, the "/" uses the result of the multiplication and the "D".

[15] What is an Address Bus?
→Definition of address bus

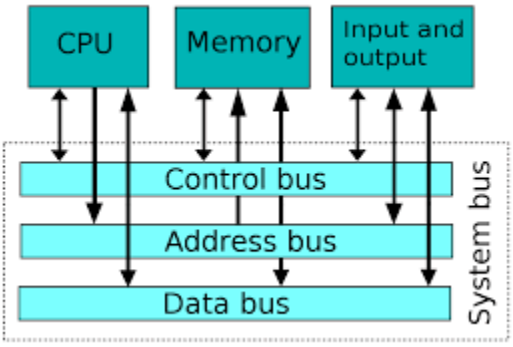
Computers. : **an element in a computer CPU that transmits the location of stored information** The address bus allows the CPU to send the address to RAM, and the data bus allows the actual data transfer to the CPU.

[16] What is a Data Bus?
→A databus is **a data-centric software framework for distributing and managing real-time data in intelligent distributed systems**.

It allows applications and devices to work together as one, integrated system. The databus simplifies application and integration logic with a powerful data-centric paradigm.

[17] What is a Control Bus?
→In computer architecture, a control bus is **part of the system bus and is used by CPUs for communicating with other devices within the computer**.

A control bus is **a computer bus that is used by the CPU to communicate with devices that are contained within the computer**. This occurs through physical connections such as cables or printed circuits.



[18] What is a Memory Bus?

→The memory bus connects the memory system and the **Northbridge** area of the **chipset**.

This section of the chipset also connects directly to the **central processing unit** and the graphics system.

While this means the Northbridge is the center of many important computer functions, it is actually the computer's memory that determines the bus's speed. In essence, the speed of the computer's memory creates the speed of this bus, which determines the speed of the rest of the system.

[19] What is register stack and memory stack?

→The stack in digital computers is essentially a memory unit with an address register that can count only (after an initial value is loaded into it).

The register that holds the address for the stack is called a stack pointer (SP) because its value always points at the top item in the stack.

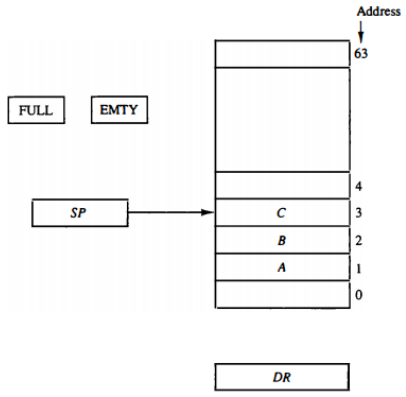


Figure 3 Block diagram of a 64-word stack.