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Objective Solved  
Questions

**Volume-8**

Data Structures and Algorithms  
Digital logic systems  
Computer Organization Architecture  
Operating Systems

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# 100-102, Ram Nagar, Bambala Puliya, Toll Tax,  
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**E-Mail** : engineers.academy.india@gmail.com

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This book has been organized and executed with a lot of care, dedication and passion for lucidity. A conscious attempt has been made to simplify the concepts to facilitate better understanding of the subject.

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We would feel satisfied if the book meets the needs of the students for whom it is meant.

Lastly, we are thankful to all the engineers, authors whose work has been the source of enlightenment, inspiration and guidance in presenting this book.

It is hoped that the book in its new form will enjoy its ever increasing popularity.

Regards

Dr. Pankaj Goyal



# Preface

✍ This book has been written to meet the growing requirements of candidates appearing for Senior Computer Instructor and other competitive Examinations. Though every candidate has ability to succeed but competitive environment, in-depth knowledge, quality guidance, time management and good source of study is required to achieve goals.

This book includes Multiple Choice Questions (MCQ's) which works as a mock exam practice for the reader. Questions of all the subject have been organized in systematic, concepts oriented and error less manner so that it become easy and interesting for even a beginner to understand. It is a very convenient book and must be solved by candidate aiming for competitive exams.

After solving this booklet students can feel encouraged and develop confidence to attempt each and every type of numerical as well as theoretical problems. Each problems explains solving approach so that at the end, so the reader is well equipped to be able to apply any type of problem solving requirement and distinctly choose one strategy or type from the other.

We hope this book will be proved an important tool to succeed in Basic and Senior Computer Instructor and other competitive Examinations.

Even though, enough readings were given for correcting the error and printing mistakes, due to human tendency there could be some minor typos in the book. If any such typos found, they will be highly appreciated and in corporated in the next edition. Also, please provide your valuable suggestions at :[engineers.academy.india@gmail.com](mailto:engineers.academy.india@gmail.com)

Wish you all the best. Have a nice reading.

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# 1

# Data Structure

## OBJECTIVE QUESTION

1. The time complexity of linear search algorithm over an array of  $n$  elements is.

- (a)  $O(\log_2 n)$  (b)  $O(n)$   
 (c)  $O(n \log_2 n)$  (d)  $O(n^2)$

2. The average time required to perform a successful sequential search for an element in an array  $A(1 : n)$  is given by.

- (a)  $\frac{n+1}{2}$  (b)  $\frac{n(n+1)}{2}$   
 (c)  $\log_2 n$  (d)  $n^2$

3. Which of the following is false?

- (a) A serial search begins with the first array element  
 (b) A serial search continues searching, element by element, either until a match is found or until the end of the array is encountered.  
 (c) A serial search is useful when the amount of data that must be search is small.  
 (d) For a serial search to work, the data in the array must be arranged in either alphabetical or numerical order.

4. To sort many large object or structures, it would be most efficient to

- (a) place reference to them in and array an sort the array  
 (b) place them in a linked list and sort the linked list  
 (c) place pointers to them in an array and sort the array  
 (d) place them in an array and sort the array

5. Which of the following is the correct output for the program given below?

```
#include<stdio.h>
int main()
{
  static int arr[] = {0, 1, 2, 3, 4};
  int *p[] = {arr, arr + 1, arr + 2, arr + 3, arr + 4};
  int **ptr = p;
  ptr++;
  printf ("%d %d %d\n", ptr - p, *ptr - arr, **ptr);
  *ptr++ ;
```

```
ptr - p, *ptr - arr, ** ptr);
  ++ptr;
  printf ("%d %d %d\n", ptr - p, *ptr - arr, ** ptr);
  ++ptr;
  printf ("%d %d %d\n", ptr - p, *ptr - arr, ** ptr);
  return 0;
}
```

- (a) 0 0 0 (b) 1 1 2  
 1 1 1 2 2 3  
 2 2 2 3 3 4  
 3 3 3 4 4 1  
 (c) 1 1 1 (d) 0 1 2  
 2 2 2 1 2 3  
 3 3 3 2 3 4  
 3 4 4 3 4 Garbage

6. What will be the output of the following program?

```
#include<stdio.h>
int main()
{
  float a[] = {12.4, 2.3, 4.5, 6.7};
  printf ("%d\n", sizeof (a)/sizeof (a[0]));
  return 0;
}
```

7. Which of these best describes an array?

- (a) A data structure that shows a hierarchical behavior  
 (b) Container of objects of similar types  
 (c) Container of objects of mixed types  
 (d) All of the mentioned

8. How do you initialize an array in C?

- (a) `intarr[3] = (1,2,3);` (b) `intarr(3) = {1,2,3};`  
 (c) `intarr[3] = {1,2,3};` (d) `intarr(3) = (1,2,3);`

9. What are the advantages of arrays?

- (a) Easier to store elements of same data type  
 (b) Used to implement other data structures like stack and queue  
 (c) Convenient way to represent matrices as a 2D array  
 (d) All of the mentioned

10. What are the disadvantages of arrays?
- We must know before hand how many elements will be there in the array
  - There are chances of wastage of memory space if elements inserted in an array are lesser than the allocated size
  - Insertion and deletion becomes tedious
  - All of the mentioned
11. Assuming int is of 4 bytes, what is the size of int arr[15]?
- 15
  - 19
  - 11
  - 60
12. What is the time complexity for inserting/deleting at the beginning of the array?
- $O(1)$
  - $O(n)$
  - $O(\log n)$
  - $O(n \log n)$
13. The expression  $5 - 2 - 3 * 5 - 2$  will evaluate to 18, if  $-$  is left associative and
- $*$  has precedence over  $-$
  - $*$  has precedence over  $-$
  - $-$  has precedence over  $*$
  - $-$  has precedence over  $-$
14. Which of the following is a collection of items into which items can be inserted arbitrarily and from which only the smallest item can be removed?
- Descending priority queue
  - Ascending priority queue
  - Fifo queue
  - Lifo queue
15. The five items: A, B, C, D, and E are pushed in a stack, one after the other starting from A. The stack is popped four times and each element is inserted in a queue. Then two elements are deleted from the queue and pushed back on the stack. Now one item is popped from the stack. The popped item is.
- A
  - B
  - C
  - D
16. Using Pop (SI, Item), Push (SI, Item), Read (Item), Print (Item), the variables SI (stack) and Item, and given the input file:
- A, B, C, D, E, F < EOF >
- which stacks are possible:
- 5 A
  - 4 B
  - 3 C
  - 2 D
  - 1 E
- 5 D
  - 3 D
  - 2 A
  - 1 F
- 5
  - 4
  - 3 F
  - 2 D
  - 1 B
- 5
  - 4
  - 3 C
  - 2 E
  - 1 B
17. A postfix expression is merely the reverse of the prefix expression.
- True
  - False
18. What can be said about the array representation of a circular queue when it contains only one element?
- Front = Rear = Null
  - Front = Rear + 1
  - Front = Rear - 1
  - None of these
19. Following sequence of operations is performed on a stack push (1), push (2), pop, push (1), push (2), pop, pop, pop, push (2), Pop. The sequence of popped out values are
- |   |    |
|---|----|
| 0 | 87 |
| 1 | S1 |
| 2 |    |
| 3 | S4 |
| 4 | S2 |
| 5 |    |
| 6 | S5 |
| 7 |    |
| 8 | S6 |
| 9 | S3 |
- 2, 2, 1, 1, 2
  - 2, 2, 1, 2, 2
  - 2, 1, 2, 2, 1
  - 2, 1, 2, 2, 2
20. In evaluating the arithmetic expression  $2 * 3 - (4 + 5)$ , using stacks to evaluate its equivalent postfix form, which of the following stack configuration is not possible?
- |   |
|---|
|   |
|   |
| 4 |
| 6 |
  - |   |
|---|
|   |
| 5 |
| 4 |
| 6 |
  - |   |
|---|
|   |
|   |
| 9 |
| 6 |
  - |   |
|---|
|   |
| 9 |
| 3 |
| 2 |
21. Stack A has the entries a, b, c (with a on top). Stack B is empty. An entry popped out of stack A can be printed immediately or pushed to stack B. An entry popped out of the stack B can only be printed. In this arrangement, which of the following permutations of a, b, c are not possible?
- b a c
  - b c a
  - c a b
  - a b c
22. Stacks can't be used to
- Evaluate an arithmetic expression in postfix form
  - Implement recursion
  - Convert a given arithmetic expression in infix form to its equivalent postfix form
  - Allocate resources (like CPU) by the operating system.
23. Which one the following permutations can be obtained in the output (in the same order), using a stack assuming that the input is the sequence 1, 2, 3, 4, 5 in that order?
- 3, 4, 5, 1, 2
  - 3, 4, 5, 2, 1
  - 1, 5, 2, 3, 4
  - 5, 4, 3, 2, 1
24. A linear list in which elements can be added or removed at either end but not in the middle is called.
- Queue
  - Deque
  - Stack
  - Tree
25. Stack is useful for implementing
- Radix
  - Breadth first search
  - Recursion
  - None of these

26. To insert a node in a circular list at rear position, it should be inserted at \_\_\_\_ of the queue.  
 (a) Front position (b) Front - 1 position  
 (c) Rear position (d) Rear - 1 position
27. Which of the following data structure may give overflow error, even though the current number of element in it is less than its size?  
 (a) Simple queue (b) Circular queue  
 (c) Stack (d) None of these
28. The following postfix expression with single digit operands is evaluated using a stack  
 $8\ 2\ 3\ \wedge / 2\ 3\ * + 5\ 1\ * -$   
 Note that  $\wedge$  is the exponentiation operator. The top two elements of the stack after the first  $*$  is evaluated are.  
 (a) 6, 1 (b) 5, 7 (c) 3, 2 (d) 1, 5
29. When an operand is read, which of the following is done?  
 (a) It is placed on to the output  
 (b) It is placed in operator stack  
 (c) It is ignored  
 (d) Operator stack is emptied
30. What should be done when a left parenthesis '(' is encountered?  
 (a) It is ignored  
 (b) It is placed in the output  
 (c) It is placed in the operator stack  
 (d) The contents of the operator stack is emptied
31. Which of the following is an infix expression?  
 (a)  $(a+b)*(c+d)$  (b)  $ab+c*$   
 (c)  $+ab$  (d)  $abc+*$
32. What is the postfix expression for the corresponding infix expression?  
 $a+b*c+(d*e)$   
 (a)  $abc*+de*$  (b)  $abc*+de*$   
 (c)  $a+bc*de+*$  (d)  $abc*+(de)*$
33. Parentheses are simply ignored in the conversion of infix to postfix expression.  
 (a) True (b) False
34. It is easier for a computer to process a postfix expression than an infix expression.  
 (a) True (b) False
35. What is the postfix expression for the infix expression?  
 $a-b-c$   
 (a)  $-ab-c$  (b)  $abc-$  (c)  $-abc$  (d)  $-ab-c$
36. What is the postfix expression for the following infix expression?  
 $a/b^c-d$   
 (a)  $abc^/d-$  (b)  $ab/cd^-$  (c)  $ab/^cd-$  (d)  $abcd^-/d-$
37. Which of the following statement is incorrect with respect to infix to postfix conversion algorithm?  
 (a) Operand is always placed in the output  
 (b) Operator is placed in the stack when the stack operator has lower precedence  
 (c) Parenthesis are included in the output  
 (d) Higher and equal priority operators follow the same condition
38. In infix to postfix conversion algorithm, the operators are associated from?  
 (a) Right to Left (b) Left to Right  
 (c) Centre to Left (d) Centre to Right
39. What is the corresponding postfix expression for the given infix expression?  
 $a*(b+c)/d$   
 (a)  $ab*+cd/$  (b)  $ab+*cd/$  (c)  $abc*+/d$  (d)  $abc+*/d/$
40. What is the corresponding postfix expression for the given infix expression?  
 $a+(b*c(d/e^f)*g)*h$   
 (a)  $ab*cdef/^*g-h+$  (b)  $abc*def/^g*-h*+$   
 (c)  $abcd*^ed/g*-h*+$  (d)  $abc*de^fg/*-h*+$
41. What is the correct postfix expression for the following expression?  
 $a+b*(c^d-e)^(f+g*h)-i$   
 (a)  $abc^de-fg+*^*+i-$  (b)  $abcde^-fg*+*^h*+i-$   
 (c)  $abcd^e-fgh*+^*+i-$  (d)  $ab^-dc*+ef^gh*+i-$
42. From the given Expression tree, identify the correct postfix expression from the list of options.
- 
- ```

graph TD
    Plus((+)) --- Star((*))
    Plus --- Minus((-))
    Star --- a((a))
    Star --- b((b))
    Minus --- c((c))
    Minus --- d((d))
  
```
- (a)  $ab*cd*+$  (b)  $ab*cd-+$   
 (c)  $abcd-*+$  (d)  $ab*+cd-$
43. A linear collection of data element the linear node is given by mean of pointer is called.  
 (a) Linked list (b) Node list  
 (c) Primitive list (d) None of these
44. The process of accessing data stored in a tape is similar to manipulating data on a  
 (a) Stack (b) Queue (c) List (d) Heap
45. When a new element is inserted in the middle of a linked list, then  
 (a) Only elements that appear after the new element need to be moved  
 (b) Only elements that appear before the new element need to be moved.  
 (c) Elements that appear before and after the new element need to be moved.  
 (d) None of these
46. Which of the following operations is performed more efficiently by doubly linked list than by linear linked list?  
 (a) Deleting a node whose location is given  
 (b) Searching an unsorted list for a given item  
 (c) Inserting a node after the node with a given location  
 (d) Traversing the list to process each node.

267. Which of these adjacency matrices represents a simple graph?  
 (a)  $\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$   
 (b)  $\begin{bmatrix} 1 & 1 & 1 \\ 1 & 1 & 1 \\ 1 & 1 & 1 \end{bmatrix}$   
 (c)  $\begin{bmatrix} 0 & 0 & 1 \\ 0 & 0 & 0 \\ 0 & 0 & 1 \end{bmatrix}$   
 (d)  $\begin{bmatrix} 0 & 0 & 1 \\ 1 & 0 & 1 \\ 1 & 0 & 0 \end{bmatrix}$

268. Given an adjacency matrix  $A = \begin{bmatrix} 0 & 1 & 1 \\ 1 & 0 & 1 \\ 1 & 1 & 0 \end{bmatrix}$ , The total no. of ways in which every vertex can walk to itself using 2 edges is \_\_\_\_\_  
 (a) 2 (b) 4 (c) 6 (d) 8

269. Space complexity for an adjacency list of an undirected graph having large values of V (vertices) and E (edges) is \_\_\_\_\_  
 (a)  $O(E)$  (b)  $O(V*V)$  (c)  $O(E+V)$  (d)  $O(V)$

270. For some sparse graph an adjacency list is more space efficient against an adjacency matrix.  
 (a) True (b) False

271. Time complexity to find if there is an edge between 2 particular vertices is \_\_\_\_\_  
 (a)  $O(V)$  (b)  $O(E)$  (c)  $O(1)$  (d)  $O(V+E)$

272. The number of possible undirected graphs which may have self loops but no multiple edges and have n vertices is \_\_\_\_\_  
 (a)  $2((n*(n-1))/2)$   
 (b)  $2((n*(n+1))/2)$   
 (c)  $2((n-1)*(n-1))/2)$   
 (d)  $2((n*n)/2)$

273. Given a plane graph, G having 2 connected component, having 6 vertices, 7 edges and 4 regions. What will be the number of connected components?  
 (a) 1 (b) 2 (c) 3 (d) 4

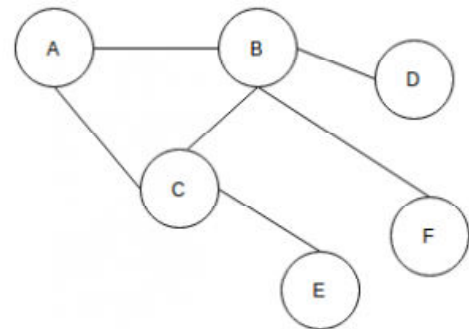
274. Number of vertices with odd degrees in a graph having a eulerian walk is \_\_\_\_\_  
 (a) 0  
 (b) Can't be predicted  
 (c) 2  
 (d) either 0 or 2

275. How many of the following statements are correct?  
 (i) All cyclic graphs are complete graphs.  
 (ii) All complete graphs are cyclic graphs.  
 (iii) All paths are bipartite.  
 (iv) All cyclic graphs are bipartite.  
 (v) There are cyclic graphs which are complete.  
 (a) 1 (b) 2 (c) 3 (d) 4

276. All paths and cyclic graphs are bipartite graphs.  
 (a) True (b) False

277. What is the number of vertices of degree 2 in a path graph having n vertices, here  $n > 2$ .  
 (a)  $n-2$  (b) n (c) 2 (d) 0

278. In the given graph which edge should be removed to make it a Bipartite Graph?



- (a) A-C (b) B-E  
 (c) C-D (d) D-E

279. A graph having an edge from each vertex to every other vertex is called a \_\_\_\_\_

- (a) Tightly Connected (b) Strongly Connected  
 (c) Weakly Connected (d) Loosely Connected

280. What is the number of unlabeled simple directed graph that can be made with 1 or 2 vertices?

- (a) 2 (b) 4  
 (c) 5 (d) 9

281. All Graphs have unique representation on paper.

- (a) True (b) False

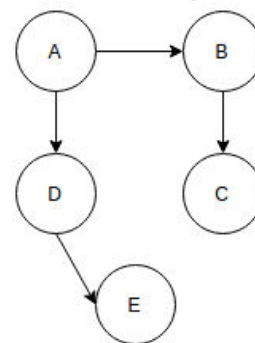
282. Assuming value of every weight to be greater than 10, in which of the following cases the shortest path of a directed weighted graph from 2 vertices u and v will never change?

- (a) Add all values by 10  
 (b) Subtract 10 from all the values  
 (c) Multiply all values by 10  
 (d) In both the cases of multiplying and adding by 10.

283. What is the maximum possible number of edges in a directed graph with no self loops having 8 vertices?

- (a) 28 (b) 64 (c) 256 (d) 56

284. What would be the DFS traversal of the given Graph?



- (a) ABCED (b) AEDCB  
 (c) EDCBA (d) ADECB

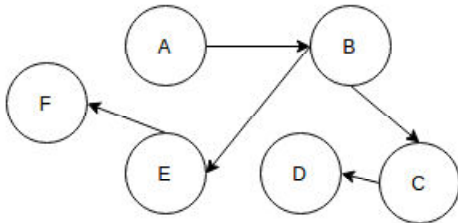
285. What is the maximum number of edges present in a simple directed graph with 7 vertices if there exists no cycles in the graph?

- (a) 21 (b) 7 (c) 6 (d) 49

286. Every Directed Acyclic Graph has at least one sink vertex.

- (a) True (b) False

287. Which of the following is not a topological sorting of the given graph?

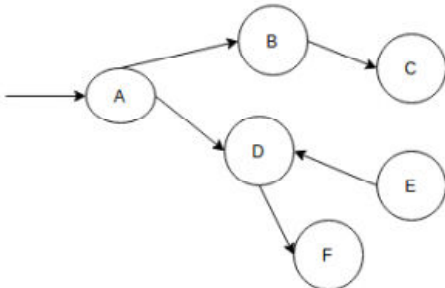


- (a) A B C D E F (b) A B F E D C  
(c) A B E C F D (d) A B C D F E

288. With  $V$  (greater than 1) vertices, how many edges at most can a Directed Acyclic Graph possess?

- (a)  $(V*(V-1))/2$  (b)  $(V*(V+1))/2$   
(c)  $(V+1)C2$  (d)  $(V-1)C2$

289. What sequence would the BFS traversal of the given graph yield?



- (a) A F D B C E (b) C B A F E D  
(c) A B D C E F (d) E F D C B A

290. What is the result of the following operation?

Top (Push (A, B))

- (a) B (b) B+A (c) B (d) BA

291. Consider the following operation performed on a stack of size 6

Push(1);  
Pop();  
Push(2);  
Push(3);  
Pop();  
Push(4);  
Pop();  
Pop();  
Push(5);  
Push(6);  
Pop();

After the completion of all operation, the number of elements present in stack is?

- (a) 1 (b) 2 (c) 3 (d) 4

292. Consider the following operation performed on a stack of size 4

Push(1);  
Pop();  
Push(2);  
Pop();  
Push(3);  
Push(4);  
Pop();  
Pop();

After the completion of all operation, the number of elements present in stack is?

- (a) 0 (b) 2 (c) 3 (d) 4

293. If the elements "A", "B", "C" "D" "E" and "F" are placed in a stack and are deleted one at a time, what is the order of removal?

- (a) ABCDEF (b) FEDCBA  
(c) FEDCAB (d) ABDCEF

294. If the elements "P", "Q", "R" "S" and "T" are placed in a stack and are deleted one at a time, what is the order of removal?

- (a) PQRST (b) TSRQP  
(c) TSRPQ (d) QPSTR

295. If the elements "P", "Q", "R" and "S" are placed in a queue and are deleted one at a time, in what order will they be removed?

- (a) PQRS (b) SRQP (c) SRPQ (d) PQSR

296. If the elements "P", "Q", "R", "S" and "T" are placed in a queue and are deleted one at a time, in what order will they be removed?

- (a) PQRST (b) TSRQP (c) SRTPQ (d) PQSRT

297. What does the following function do for a given Linked List with first node as head?

```

void abc(struct node* start)
{
    if(start == NULL)
        return;
    abc(start->next);
    printf("%d", start->data);
}
  
```

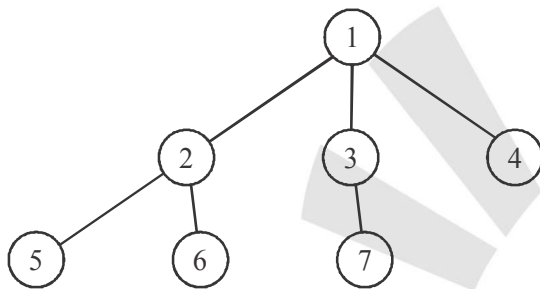
- (a) Prints all nodes of linked lists  
(b) Prints all nodes of linked list in reverse order  
(c) Prints alternate nodes of Linked List  
(d) Prints alternate nodes in reverse order

298. What does the following function do for a given Linked List with first node as head?

```
void abc(struct node* start)
{
    if(start == NULL)
        return;
    abc(start->next);
    printf("%c", start->data);
}
```

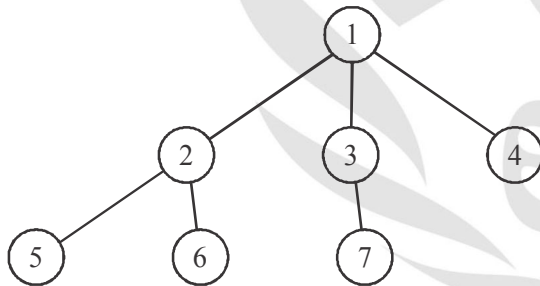
- (a) Prints all nodes of linked lists
- (b) Prints all nodes of linked list in reverse order
- (c) Prints alternate nodes of Linked List
- (d) Error

299. Which nodes are the siblings of Node 2 of given ternary tree?



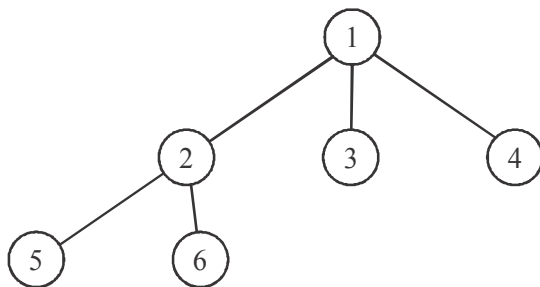
- (a) 5
- (b) 6
- (c) Both 5 and 6
- (d) 7

300. Which node is the child node of the Node 4 in the following ternary tree?



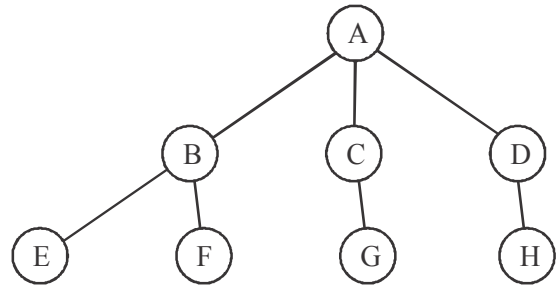
- (a) 5
- (b) 6
- (c) 7
- (d) No child node

301. Which node is the parent node of Node 5?



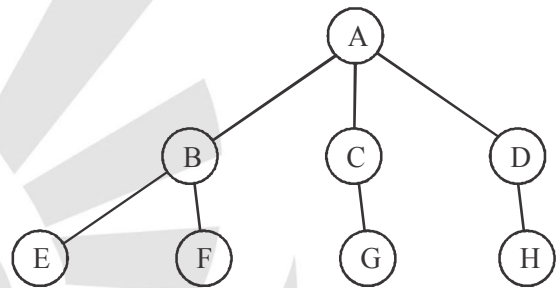
- (a) 1
- (b) 5
- (c) 2
- (d) 3

302. Who is the ancestor of Node H?



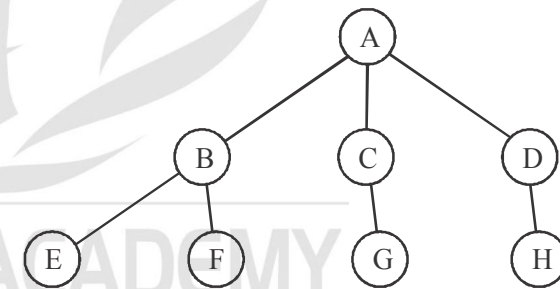
- (a) D
- (b) F
- (c) H
- (d) A

303. Who is descendant of Node C?



- (a) A
- (b) E
- (c) F
- (d) G

304. Who is descendant of Node D?



- (a) A
- (b) E
- (c) H
- (d) G



107. The DMA transfer is initiated by \_\_\_\_\_  
 (a) Processor (b) The process being executed  
 (c) I/O devices (d) OS
108. ANSI stands for \_\_\_\_\_  
 (a) American National Standards Institute  
 (b) American National Standard Interface  
 (c) American Network Standard Interfacing  
 (d) American Network Security Interrupt
109. The main advantage of multiple bus organisation over a single bus is \_\_\_\_\_  
 (a) Reduction in the number of cycles for execution  
 (b) Increase in size of the registers  
 (c) Better Connectivity  
 (d) None of the mentioned
110. The instruction, Add #45,R1 does \_\_\_\_\_  
 (a) Adds the value of 45 to the address of R1 and stores 45 in that address  
 (b) Adds 45 to the value of R1 and stores it in R1  
 (c) Finds the memory location 45 and adds that content to that of R1  
 (d) None of the mentioned
111. In the case of, Zero-address instruction method the operands are stored in \_\_\_\_\_  
 (a) Registers (b) Accumulators  
 (c) Push down stack (d) Cache
112. In which mode the operand is placed in one of 8 bit or 16 bit general purpose registers?  
 (a) Immediate addressing (b) Register mode  
 (c) Implied addressing (d) Register Indirect
113. The addressing mode which makes use of in-direction pointers is \_\_\_\_\_  
 (a) Indirect addressing mode (b) Index addressing mode  
 (c) Relative addressing mode (d) Offset addressing mode
114. The addressing mode/s, which uses the PC instead of a general purpose register is \_\_\_\_\_  
 (a) Indexed with offset  
 (b) Relative  
 (c) Direct  
 (d) Both Indexed with offset and direct
115. Sign bit 1 represents  
 (a) Positive number (b) FALSE  
 (c) TRUE (d) Negative Number
116. Which addressing mode execute its instructions within CPU without the necessity of reference memory for operands?  
 (a) Implied Mode (b) Immediate Mode  
 (c) Direct Mode (d) Register Mode
117. In \_\_\_\_\_ the operand is specified in the instruction itself  
 (a) Immediate addressing (b) Register mode  
 (c) Implied addressing (d) Register Indirect
118. Sign magnitude is a very simple representation of?  
 (a) Positive number (b) Negative numbers  
 (c) Infinity (d) Zero
119. In which of these modes, the immediate operand is included in the instruction itself?  
 (a) register operand mode  
 (b) immediate operand mode  
 (c) register and immediate operand mode  
 (d) none of the mentioned
120. A machine language instruction format consists of  
 (a) Operand field  
 (b) Operation code field  
 (c) Operation code field & operand field  
 (d) none of the mentioned

### Computer Organization (CS)

121. Consider the following statement?

**[RRB-JEE 2014 Green shift]**

- (a) Register to register arithmetic operator  
 (b) Fixed length instruction format

Which of the following is the characteristic of RISC processor?

- (a) A only (b) B only  
 (c) Both A and B (d) None of the above

122. Consider the struct defined below:

**RRB-JEE 2014 Green shift]**

```
Struct data
{
  Intid[50];
  Char subject;
  Int roll number;
}; struct data student;
```

The base address of the student is available in the register. The field student. Grade can be accessed efficiently using:

- (a) Post-increment addressing mode R1+  
 (b) Pre-decrement addressing mode, -R1  
 (c) Register direct addressing mode, R1  
 (d) Index addressing mode, X (R1) where X is an offset represented in 2's complement 16 bit representation

123. RAM is used as a short memory because it:

**RRB-JEE 2014 Red shift]**

- (a) is volatile (b) is very expensive  
 (c) has small capacity (d) is programmable

124. Which of the following are typical characteristics of a RISC machine?  
**RRB-JEE 2014 Green shift]**

- (a) Instruction taking multiple cycles  
 (b) Highly pipelined  
 (c) Multiple register sets  
 (d) Both (b) & (c)

125. The Central Processing Unit (CPU) consists of:  
**RRB-JEE 2014 Green shift]**  
 (a) input, output and processing  
 (b) control unit, primary storage and secondary storage  
 (c) control unit, arithmetic-logic unit and primary storage  
 (d) control unit, processing and primary storage
126. Programming in a language that actually controls the path of signals or data within the computer is called:  
**RRB-JEE 2014 Green shift]**  
 (a) micro programming  
 (b) system programming  
 (c) assembly language programming  
 (d) machine language programming
127. A processor can support a maximum memory of 4GB where the memory is word-addressable (a word consists of two bytes). The size of the address bus of the processor is at least bits.  
**RRB-JEE 2014 Red shift]**  
 (a) 30 (b) 31  
 (c) 28 (d) None of the above
128. Which bus is bidirectional?  
**RRB-JEE 2014 Yellow shift]**  
 (a) Address bus (b) Control bus  
 (c) Data bus (d) none of these
129. The software used to drive microprocessor-based systems is called:  
**RRB-JEE 2014 Yellow shift]**  
 (a) Assembly language programs  
 (b) Firmware  
 (c) BASIC interpreter instructions  
 (d) Flowchart instructions]
130. Which of the following is the most widely used alphanumeric code for computer input and output?  
**RRB-JEE 2014 Yellow shift]**  
 (a) Gray (b) ASCII  
 (c) Parity (d) EBCDIC
131. The circuits in the 8085 that provide the arithmetic and logic functions are called-  
**RRB-JEE 2014 Yellow shift]**  
 (a) CPU (b) ALU  
 (c) I/O (d) Bus decoder
132. Which of the following is NOT a basic element within the microprocessor?  
**RRB-JEE 2014 Yellow shift]**  
 (a) Microcontroller (b) Arithmetic-logic unit  
 (c) Temporary registers (d) Accumulator
133. Convert the following binary number to decimal  
**RRB-JEE 2014 Yellow shift]**  
 $01011_2$   
 (a) 11 (b) 35 (c) 15 (d) 10
135. Which of the following is not used to measure the speed of CPU?  
**[RRB-JEE 2015 4th Sep. 2nd shift]**  
 (a) Hertz (Hz) (b) MFLOPS  
 (c) MIPS (d) KBPS
136. Which of the following statements about Static RAM (SRAM) is not correct?  
**[RRB-JEE 2015 4th Sep. 2nd shift]**  
 (a) SRAM uses flip-flops  
 (b) SRAM is faster than DRAM  
 (c) SRAM uses capacitors  
 (d) SRAM is costlier than DRAM
137. Magnetic Tape is a  
**[RRB-JEE 2015 4th Sep. 2nd shift]**  
 (a) Random access memory (b) Volatile memory  
 (c) Read only memory (d) Sequential access memory
138. In which of the following machines, all arithmetic operations take place using the top one or two positions data of the stack?  
**[RRB-JE 2015 4th Sep. 2nd shift]**  
 (a) Zero-address machine (b) One-address machine  
 (c) Two-address machine (d) Three-address machine
139. What is the maximum addressing capability of Intel 8085?  
**[RRB-JE 30 Aug, 2019]**  
 (a) 64KB (b) 11 MB (c) 4 KB (d) 32 KB
140. Which of the following interrupts is non-maskable in 8085 microprocessor?  
**[RRB-JE 30 Aug, 2019]**  
 (a) RST 6.5 (b) TRAP (c) RST 5.5 (d) INTR
141. Which of the following is the time taken to move an access arm to a certain track on a disk?  
**[RRB-JE 30 Aug, 2019]**  
 (a) Data Transfer Time (b) Seek Time  
 (c) Search Time (d) Head Switching Time
142. To increase the speed of memory access in pipelining, we make use of .....  
**[RRB-JE 30 Aug, 2019]**  
 (a) Buffer (b) Special purpose registers  
 (c) Cache (d) Special memory location
143. \_\_\_\_\_ is the time taken to locate the disk arm to a specified track for data read/write.  
**[RRB-JE 30 Aug, 2019]**  
 (a) Rotational delay (b) Transfer Time  
 (c) Rotational Time (d) Disk Access Time
144. A ..... is an interconnection of computer devices, peripherals, or network nodes in series, one after another.  
**[RRB-JE 30 Aug, 2019]**  
 (a) Daisy chain (b) Star  
 (c) Bus (d) Ring
145. How many buses are connected to the 8085 microprocessor?  
**[RRB-JE 30 Aug, 2019]**  
 (a) Five (b) Three (c) Two (d) Four
146. The method of mapping the consecutive memory blocks to consecutive cache blocks is called .....  
**[RRB-JE 30 Aug, 2019]**  
 (a) Set associative (b) Associative  
 (c) Direct (d) Indirect
146. The fastest data access is provided using .....  
 (a) Static random-access memory  
 (b) Registers  
 (c) Dynamic random-access memory  
 (d) Caches

147. Which of the following is/are the types of shifts in shift registers?  
[RRB-JE 30 Aug, 2019]  
(a) All of the options (b) Arithmetic  
(c) Logical (d) Circular
148. A disc is divided into several concentric circles called.....  
[RRB-JE 30 Aug, 2019]  
(a) Sectors (b) Tracks (c) Clusters (d) Cylinders
149. What is the decimal equivalent of the hexadecimal number  $(AB60)_{16}$ ?  
[RRB - JE- 2014 Green shift]  
(a) 48732 (b) 48723 (c) 43872 (d) 47382
150. What is the answer yielded by the binary division  $1101_2 \div 101_2$ ?  
[RRB - JE- 2014 Green shift]  
(a)  $11_2$  (b)  $101_2$  (c)  $110_2$  (d)  $1100_2$
151. The method used by computers to represent real number, is:  
[RRB - JE- 2014 Green shift]  
(a) floating-point notation (b) mantissa  
(c) base (d) exponent
152. In 16-bit 2's complement representation, the decimal number -29 is:  
[RRB - JE- 2014 Green shift]  
(a) 1111111100011100 (b) 0000000011100100  
(c) 1111111111000011 (d) 1000000011100100
153. The 2's complement of the Binary number  $(11011100)_2$  is  
[RRB - JE- 2015 4th Sep. 2nd Shift]  
(a)  $(00100011)_2$  (b)  $(11110000)_2$   
(c)  $(00100100)_2$  (d)  $(00001111)_2$
154. What is the binary representation of 73?  
[RRB - JE- 30 Aug 2019]  
(a) 1001100 (b) 1001101  
(c) 1001111 (d) 1001001
155. If an integer needs two bytes of storage, then the maximum value of the signed integer is  
[RRB - JE- 30 Aug 2019]  
(a)  $2^{16} - 1$  (b)  $2^{15} - 1$   
(c)  $2^{15}$  (d)  $2^{16}$
156. Numbers that are written with base 8 are classified as  
[RRB - JE- 30 Aug 2019]  
(a) Real numbers (b) Octal numbers  
(c) Negative numbers (d) Hexadecimal numbers
157.  $(1235)_8$  Is equivalent to  
[RRB - JE- 30 Aug 2019]  
(a)  $(029D)_{16}$  (b)  $(0B17)_{16}$   
(c)  $(1217)_{16}$  (d)  $(2297)_{16}$
158. Which of the following is also referred to as universal Gate?  
[RRB-JE- 2014 Green Shift]  
(a) AND (b) NOR (c) OR (d) NOT
159. IC chips used in computers are usually made of :  
[RRB-JE- 2014 Green Shift]  
(a) Lead (b) Silicon (c) Chromium (d) Gold
160. The digital equivalent of an electric series circuit is the ..... Gate. [RRB-JE- 2014 Green Shift]  
(a) NOR (b) NAND (c) OR (d) AND
161. In Binary Algebra,  $A + B$  can be implemented by:  
[RRB-JE- 2014 Red Shift]  
(a) NAND gates alone (b) NOR gates alone  
(c) AND gates alone (d) Both (a) and (b)
162. The output of an exclusive-NOR gate is 1. Which input combination is correct? [RRB-JE- 2014 Yellow Shift]  
(a)  $A = 1, B = 0$  (b)  $A = 0, B = 1$   
(c)  $A = 0, B = 0$  (d) None of these
163. The output of an AND gate with three inputs, A, B and C, is HIGH when [RRB-JE- 2014 Yellow Shift]  
(a)  $A = 1, B = 1, C = 0$  (b)  $A = 0, B = 0, C = 0$   
(c)  $A = 1, B = 1, C = 1$  (d)  $A = 1, B = 0, C = 1$
164. If a signal passing through a gate is inhibited by sending a LOW into one of the inputs and the output is HIGH, the gate is:  
[RRB-JE- 2014 Yellow Shift]  
(a) AND (b) NAND  
(c) NOR (d) OR
165. Which of the following is known as universal logic gate?  
[RRB-JE- 2014 Yellow Shift]  
(a) AND gate (b) OR gate  
(c) NAND gate (d) Exclusive OR gate
166. The output of XOR gate is one (1) when  
[RRB-JE-2015 4th Sep. 2nd. Shift]  
(a) Both inputs are different (b) Both inputs are zero  
(c) Both inputs are one (d) Both inputs are same
167. A flip-flop can store: [RRB-JE-2014 Shifts]  
(a) One bit of data (b) Two bits of data  
(c) Three bits of data (d) Any number of bits of data
168. A flip-flop circuit can be used for: [RRB-JE-2014 Red Shifts]  
(a) counting (b) scaling  
(c) Three bits of data (d) Any number of bits of data
169. A flip-flop has [RRB-JE-2014]  
(a) One stable state (b) Two stable states  
(c) No stable states (d) None of these
170. Determine the output frequency for a frequency division circuit that contains 12 flip-flops with an input clock frequency of 20.48 MHz [RRB-JE-2014 Yellow Shifts]  
(a) 10.24 kHz (b) 5 kHz  
(c) 30.24 kHz (d) 15 kHz
171. Flip-Flop is a [RRB-JE-2015 4th Sep. 2nd Shift]  
(a) 1- state device (b) 2- state device  
(c) 3- state device (d) 4- state device
172. Boolean Algebra is essentially based on  
[RRB - JE-2014 Green shift]  
(a) symbols (b) truth  
(c) logic (d) numbers

173. Convert the following SOP expression to an equivalent POS expression [RRB - JE-2014 Yellow shift]
- $$ABC + A\bar{B}\bar{C} + A\bar{B}C + AB\bar{C} + \bar{A}\bar{B}C$$
- (a)  $(\bar{A} + \bar{B} + \bar{C})(\bar{A} + B + \bar{C})(\bar{A} + B + C)$   
 (b)  $(A + B + C)(A + \bar{B} + C)(A + \bar{B} + \bar{C})$   
 (c)  $(\bar{A} + \bar{B} + \bar{C})(A + \bar{B} + C)(A + \bar{B} + C)$   
 (d)  $(A + B + C)(\bar{A} + B + \bar{C})(A + \bar{B} + C)$
174. The expression  $W(X+YZ)$  can be converted to SOP from by applying which law? [RRB - JE-2014 Yellow shift]
- (a) Associative law (b) Commutative law  
 (c) Distributive law (d) None of these
175. Considering X and Y as Boolean variables, the simplest form of the Boolean expression  $X + XY$
- [RRB-JE- 2015 4th Sep. 2nd Shift]
- (a) 0 (b) 1 (c) X (d) Y
176. The correct matching for the following pair is
- [RRB-JE-2014 Red Shift]
- |                             |                    |
|-----------------------------|--------------------|
| (A) DMA I/O                 | (i) High speed RAM |
| (B) Cache                   | (ii) Disk          |
| (C) Interrupt I/O           | (iii) Printer      |
| (D) Condition Code Register | (iv) ALU           |
- (A) (B) (C) (D)  
 (a) (iv) (iii) (i) (ii)  
 (b) (ii) (i) (iii) (iv)  
 (c) (iv) (iii) (ii) (i)  
 (d) (ii) (iii) (iv) (i)
176. DMA is particularly suited for data transfer between the .....
- [RRB-JE-2014 Yellow Shift]
- (a) Disk drive and CPU (b) Disk drive and RAM  
 (c) Disk drive and ROM (d) Disk drive and O
- Cache and Main Memory**
177. The principle of locality justifies the use of
- [GATE-1995 : 1Marks]
- (a) Interrupts (b) DMA  
 (c) Polling (d) Cache Memory
178. The main memory of a computer has 2 cm blocks while the cache has 2 c blocks. If the cache uses the set associative mapping scheme with 2 blocks per set, then block k of the main memory maps to the set [GATE-1999 : 1 Mark]
- (a)  $(k \text{ mod } m)$  of the cache (b)  $(k \text{ mod } c)$  of the cache  
 (c)  $(k \text{ mod } 2 c)$  of the cache (d)  $(k \text{ mod } 2 cm)$  of the cache
179. Which of the following requires a device driver? [GATE-2001 : 1 Mark]
- (a) Register (b) Cache  
 (c) Main memory (d) Disk
180. More than one word are put in one cache block to
- [GATE-2001 : 1 Mark]
- (a) exploit the temporal locality of reference in a program  
 (b) exploit the spatial locality of reference in a program  
 (c) reduce the miss penalty  
 (d) None of the above
181. Which of the following statements is false? [GATE-2001 : 1 Mark]
- (a) Virtual memory implements the translation of a program's address space into physical memory address space  
 (b) Virtual memory allows each program to exceed the size of the primary memory  
 (c) Virtual memory increases the degree of multiprogramming  
 (d) Virtual memory reduces the context switching overhead
182. Consider a system with 2 level cache. Access times of Level 1 cache, Level 2 cache and main memory are 1 ns, 10 ns, and 500 ns, respectively. The hit rates of Level 1 and Level 2 caches are 0.8 and 0.9 respectively. What is the average access time of the system ignoring the search time within the cache? [GATE-2004 : 1 Mark]
- (a) 13.0 ns (b) 12.8 ns (c) 12.6 ns (d) 12.4 ns
183. A dynamic RAM has a memory cycle time of 64 nsec. It has to be refreshed 100 times per msec and each refresh takes 100 nsec. What percentage of the memory cycle time is used for refreshing? [GATE-2005 : 1 Mark]
- (a) 10 (b) 6.4 (c) 1 (d) 0.64
184. Increasing the RAM of a computer typically improves performance because [GATE-2005 : 1 Mark]
- (a) Virtual memory increases  
 (b) Larger RAMs are faster  
 (c) Fewer page faults occur  
 (d) Fewer segmentation faults occur
185. Consider a 4-way set associative cache consisting of 128 lines with a line size of 64 words. The CPU generates a 20-bit address of a word in main memory. The number of bits in the TAG, LINE and WORD fields are respectively [GATE-2007 : 1 Mark]
- (a) 9, 6, 5 (b) 7, 7, 6  
 (c) 7, 5, 8 (d) 9, 5, 6
186. How many  $32K \times 1$  RAM chips are needed to provide a memory capacity of 256 K-bytes? [GATE-2009 : 1 Mark]
- (a) 8 (b) 32 (c) 64 (d) 128
187. A main memory unit with a capacity of 4 megabytes is built using  $1M \times 1$ -bit DRAM chips. Each DRAM chip has 1K rows of cells with 1K cells in each row. The time taken for a single refresh operation is 100 nanoseconds. The time