BIRLA VISHVAKARMA MAHAVIDYALAYA
(An Autonomous Institute)
INFORMATION TECHNOLOGY DEPARTMENT
AY: 2016-17 BE-IVth SEM
QUESTION BANK

IT206 DATA STRUCTURE

1) What is data structure? Explain linear and non-linear data structure with example **or** Differentiate linear and non-linear data structure.
2) List out the areas in which data structures are applied extensively?
3) What are the limitations of arrays? How to overcome it?
4) Consider the linear arrays AAA (5:50), BBB (-5:10) and CCC (18).Find the number of elements in each array.
5) What is the worst case time complexity of searching an element in a list? How?
6) What is the complexity of binary search algorithm?
7) Write a selection sort algorithm and also discuss its efficiency.
8) Define the term algorithm. Explain properties of an algorithm.
9) Discuss best case, average case and worst case time analysis with example.
10) What data structure used to perform recursion?
11) Name two divide and conquer algorithms for sorting.
12) Enlist difference between recursive and iterative algorithms. Write any one recursive function showing the stack contents while function call and return.
13) Sort following elements using 1) Selection sort 2) Quick sort
    10 50 0 20 30 10
14) Write a recursive algorithm to find factorial.
15) What is Stack? List out different operation of it and write algorithm for any two operation.
16) List operations performed on a stack.
17) Write a C program to implement a stack with all necessary overflow and underflow checks using array.
18) Write steps of procedure to insert an element to the top of the stack and remove top element from a stack.
19) Consider the following stack of characters, where STACK is allocated N = 8 memory cells
    STACK : A,C,D,F,K,_,_,_. (_ means empty allocated cell)
    Describe the stack as the following operations takes place:
    (a) POP(STACK, ITEM)
    (b) POP(STACK, ITEM)
    (c) POP(STACK, ITEM)
    (d) PUSH(STACK, R)
    (e) PUSH(STACK,L)
    (f) PUSH(STACK, S)
    (g) PUSH(STACK,P)
    (h) POP(STACK, ITEM)
20) Consider the problem in Q-11 (a) When will overflow occur? (b) When will C be deleted before R?

21) What are the notations used in Evaluation of Arithmetic Expressions using prefix and postfix forms?
22) Write a 'C' program or an algorithm to convert infix expression without parenthesis to postfix expression.
23) Translate infix expression into its equivalent post fix expression: (A-B)*(D/E)
24) Translate infix expression into its equivalent post fix expression: (A+B^D)/(EF)+ G
25) Translate infix expression into its equivalent post fix expression: A*(B+D)/E-F*(G+H/K)
26) Consider the following arithmetic expression P, written in postfix notation.
    P: 12 , 7 , 3 , - , / , 2 , 1 , 5 , + , * , + Translate P into infix expression.
27) Evaluate P: 12 , 7 , 3 , - , / , 2 , 1 , 5 , + , * , + ,)
28) Convert the following Polish(prefix) expression to Reverse Polish(suffix) notation:
    a. ++abc
    b. +a+bc
    c. +a*bc
    d. *a+bc
29) What is the advantage of Polish expression over infix notation? Write an algorithm to convert an infix expression into reverse Polish expression.
30) Write an algorithm to check if an expression has balanced parenthesis using stack.
31) Does a time sharing computer use a queue or stack?
32) What is a Queue? Write down drawback of simple queue. Also write an algorithm for deleting an element from circular queue.
33) Mention variations of the queue data structure.
34) What is priority queues? Minimum number of queues needed to implement the priority queue?
35) Write user defined C function for inserting an element into circular queue.
36) Compare: Circular queue and Simple queue.
37) Describe: (1) Recursion (2) Priority Queue
38) What care should be taken in writing recursive function? Give a recursive solution for the problem of "Towers of Hanoi".
39) Write a C program to implement a circular queue using array with all necessary overflow and underflow checks.
40) Is Queue a priority queue? Justify.
41) What is the difference between stack and queue?
42) Consider a circular queue of size 6. Let Front =2, Rear =4, and Queue : __, L, M, N, __, __
    Describe the queue as following operations are performed.
    1) Add O
    2) Add P
    3) Delete
    4) Delete
    5) Add Q, R, S
    6) Delete
43) Perform following operations in a circular queue of length 4 and give the Front, Rear and Size of the queue after each operation.
    1) Insert A, B
    2) Insert C
    3) Delete
    4) Insert D

5) Insert E
6) Insert F
7) Delete

44) What is the difference between queue & Dqueue? Explain insertion operation in queue.
45) Explain various applications of stack and queue.

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Nikita R. Patel
IT Dept.