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Data structures

SE(E&TC)

Sample Assignment questions for better BT levels.

1. Suppose a circular queue of capacity (n – 1) elements is implemented with an array of n elements. Assume that the insertion and deletion operation are carried out using REAR and FRONT as array index variables, respectively. Initially, REAR = FRONT = 0. The conditions to detect queue full and queue empty are (4)
   (A) Full: (REAR+1) mod n == FRONT, empty: REAR == FRONT
   (B) Full: (REAR+1) mod n == FRONT, empty: (FRONT+1) mod n == REAR
   (C) Full: REAR == FRONT, empty: (REAR+1) mod n == FRONT
   (D) Full: (FRONT+1) mod n == REAR, empty: REAR == FRONT
2. Let S be a stack of size n >= 1. Starting with the empty stack, suppose we push the first n natural numbers in sequence, and then perform n pop operations. Assume that Push and Pop operation take X seconds each, and Y seconds elapse between the end of one such stack operation and the start of the next operation. For m >= 1, define the stack-life of m as the time elapsed from the end of Push(m) to the start of the pop operation that removes m from S. The average stack-life of an element of this stack is (4)

   (A) n(X+ Y)

   (B) 3Y + 2X

   (C) **n(X + Y)-X**

   (D) Y + 2X

3. Write an efficient algorithm and C code to shuffle a pack of cards (4)
4. A list is ordered from smaller to largest when a sort is called. Which sort would take the longest time to execute? (4)
5. What is the bucket size, when the overlapping and collision occur at same time? (6)
6. There are 8, 15, 13, 14 nodes were there in 4 different trees. Which of them could have formed a full binary tree? (5)
7. Whether Linked List is linear or Non-linear data structure? (5)
8. Stack can be described as a pointer. Elaborate.(3)
9. In which data structure, elements can be added or removed at either end, but not in the middle?
10. Parenthesis are never needed in prefix or postfix expressions. Justify? (5)
11. Classify the areas in which data structures are applied extensively? (3)
12. Develop the program to swap numbers without using third variable.(6)
13. How will you implement a stack using queue and vice-versa?

14. Could you give a brief explanation of the various approaches for developing algorithms?
15. How does insertion sort differ from selection sort?
16. Please explain how does an Array differ from a Linked List?
17. What Actions Are Performed When A Function Is Called?
18. Difference Between Abstract Data Type, Data Type And Data Structure?