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
   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. What is the output of following function for start pointing to first node of following linked list? 1->2->3->4->5->6
   ```c
   void fun ( struct node* start ) {
     if ( start == NULL )
       return;
     printf(“%d ”, start->data);
     if ( start->next != NULL )
       fun ( start->next->next );
     printf(“%d ”, start->data);
   } // end of fun
   ```
   A. 1 3 5 1 3 5 B. 1 2 3 5 C. 1 4 6 6 4 1 D. 1 3 5 5 3 1 ✔

3. What is the value of the postfix expression 6 3 2 4 + - *:
   A. Something between 5 and -5
   B. Something between -15 and -100 ✔
   C. Something between 5 and 15
   D. Something between -5 and -15

4. Suppose we have an array implementation of the stack class, with ten items in the stack stored at data[0] through data[9]. The CAPACITY is 42. Where does the push member function place the new entry in the array?

5. Following is C like pseudo code of a function that takes a Queue as an argument, and uses a stack \(S\) to do processing.
void fun(Queue *Q) {
    Stack S;  // Say it creates an empty stack S
    // Run while Q is not empty
    while (!isEmpty(Q)) {
        // deQueue an item from Q and push the dequeued item to S
        push(&S, deQueue(Q));
    }
    // Run while Stack S is not empty
    while (!isEmpty(&S)) {
        // Pop an item from S and enqueue the popped item to Q
        enQueue(Q, pop(&S));
    }
}  // end of fun

What does the above function do in general?
A. reverses the Q ✓
B. makes Q empty
C. removes the last item from Q
D. keeps the Q same as it was before

6. What kind of list is best to answer questions such as ”What is the item at position n?”
A. Singly-linked lists.
B. Lists implemented with an array.
C. Doubly-linked or singly-linked lists are equally best ✓
D. Doubly-linked lists.

7. Each item in priority queue has a value denoting its ...
A. search key
B. address
C. relative priority ✓
D. none of the above

8. Consider a queue Q and empty stack S. Initially Q has A, B, C and D items - 'A' being the front item. If you perform the following operations sequentially, what will be the final configuration of queue Q?
Operations are as follows:
1. Remove first three items from queue Q and push them in stack S
2. Pop each item from stack S and insert it into queue Q.
   A. DABC (D being the front item)
   B. ABCD (A being the front item)
   C. DCAB (D being the front item)
   D. DCBA (D being the front item) ✓

9. Which of the following points is/are true about Linked List data structure when it is compared with array
   A. It is easy to insert and delete elements in Linked List
   B. all of the above ✓
C. Random access is not allowed in a typical implementation of Linked Lists
D. The size of array has to be pre-decided, linked lists can change their size any time.

10. If data is a circular array of SIZE elements, and last is an index into that array, what is the formula for the index after last?
   A. last % (1 + SIZE)
   B. (last + 1) % SIZE ✓
   C. last + (1 % SIZE)
   D. (last % 1) + SIZE

11. Entries in a stack are "ordered". What is the meaning of this statement?
   A. A collection of stacks can be sorted.
   B. The entries must be stored in a linked list.
   C. Stack entries may be compared with the '<' operation.
   D. There is a first entry, a second entry, and so on. ✓

12. Which of the following stack operations could result in stack underflow?
    A. push   B. initStack   C. pop ✓   D. isempty

13. You are given pointers to first and last nodes of a singly linked list, which of the following operations are dependent on the length of the linked list?
    A. Delete the first element
    B. Delete the last element of the list ✓
    C. Insert a new element as a first element
    D. Add a new element at the end of the list

14. In linked list, each node contains at least two fields, one is called data field and another one is a type of
    A. pointer to an Integer
    B. pointer to a Character
    C. point to a float
    D. pointer to a node ✓

15. Consider the usual algorithm for determining whether a sequence of parentheses is balanced. What is the maximum number of parentheses that will appear on the stack AT ANY ONE TIME when the algorithm analyzes: (())())(()))?
    A. 4 B. 3 ✓ C. 1 D. 2

16. In your opinion, what is the degree of difficulty level of this quiz?
   1 being the easiest and 10 being the most difficult one.
   1 2 3 4 5 6 7 8 9 10

   *** THE END ***

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