

Practice Set MTE 2024

CSE 408 PYQs

Notes **hub**



1. Two main measures for the efficiency of an algorithm are
- A. Processor and memory
 - B. Complexity and Capacity
 - C. Time and space
 - D. Data and Space

Answer : C

2. The worst case occurs in linear search algorithm when
- A. Item is somewhere in the middle of the array
 - B. Item is not in the array at all
 - C. Item is the last element in the array
 - D. Item is the last element in the array or in not there at all

Answer : D

3. The complexity of the average case of an algorithm is
- A. Much more complicated to analyze than that of worst case
 - B. Much simpler to analyze than that of worst case
 - C. Sometimes more complicated and some other times simpler than that of worst case
 - D. None of the above

Answer : A

4. Which of the following is a nonlinear data structure
- A. Array
 - B. Linked List
 - C. Stack
 - D. Graph

Answer : D

5. Which is not a primitive Data structure
- A. Boolean
 - B. Integer
 - C. Arrays
 - D. Character

Answer : C

6. Which of the following data structure is a linear type?
- A. Queue
 - B. Lists
 - C. Stack
 - D. All the above

Answer : D

7. Which is very useful in situation when data have to stored and then retrieved in reverse order.
- A. Linked List
 - B. Queue
 - C. Stack
 - D. Tree

Answer : C

8. In general, the binary search methods needs no more than comparisons.
- A. $(\log 2n)-1$
 - B. $(\log n)-1$
 - C. $(\log 2n)+1$
 - D. $(\log n)-1$

Answer: C

9. Which of the following is the disadvantage of the array?
- A. Stack and Queue data structures can be implemented through an array.
 - B. Index of the first element in an array can be negative
 - C. Wastage of memory if the elements inserted in an array are lesser than the allocated size
 - D. Elements can be accessed sequentially.

Answer: C

10. A queue
- A. can be created by setting up an ordinary contiguous array to hold the elements
 - B. can take care of the delete operation automatically
 - C. needs one pointer to handle addition and deletion of an element
 - D. none of these

Answer : A

11. Choose correct output for the following sequence of operations.

```
push(5)
push(8)
pop()
push(2)
push(5)
pop()
pop()
pop()
push(1)
pop()
```

- A. 8 5 5 2 1
- B. 8 5 2 5 1
- C. 5 8 2 5 1
- D. 1 5 2 8 5

Answer : B

12. If the elements “A”, “B”, “C” and “D” are placed in a queue and are deleted one at a time, in what order will they be removed?

- A. DCBA
- B. DCAB
- C. D CAB
- D. ABCD

Answer : D

13. A data structure in which elements can be inserted or deleted at/from both the ends but not in the middle is?

- A. Queue
- B. Circular queue
- C. Dequeue
- D. Priority queue

Answer: C

14. Which one of the following is not the application of the stack data structure

- A. String reversal
- B. Recursion
- C. Backtracking
- D. Asynchronous data transfer

Answer : D

15. Which of the following is the prefix form of $A+B*C$?

- A. $A+(BC^*)$
- B. $+AB*C$
- C. $ABC+^*$
- D. $+A*BC$

Answer: D

16. The result of the postfix expression $5\ 3\ * \ 9\ + \ 6\ /\ 8\ 4\ /\ +$
- A. 8
 - B. 6
 - C. 10
 - D. 9

Answer:- B

17. What is the time complexity of reversing a word using stack algorithm?
- A. $O(N \log N)$
 - B. $O(N^2)$
 - C. $O(N)$
 - D. $O(M \log N)$

Answer: C

18. What is the result of the given postfix expression? $abc*+$ where $a=1$, $b=2$, $c=3$.
- A) 4
 - B) 5
 - C) 6
 - D) 7

Answer: D

19. What is the result of the following postfix expression? $ab*cd*+$ where $a=2$, $b=2$, $c=3$, $d=4$.
- A) 16
 - B) 12
 - C) 14
 - D) 10

Answer : A

20. In Reverse Polish notation, expression $A*B+C*D$ is written as
- A. $AB*CD*+$
 - B. $A*BCD*+$
 - C. $AB*CD+*$
 - D. $A*B*CD+$

Answer : A

1. Evaluate following postfix expression $+ 9 * 2 6$
- 12
 - 21
 - 19
 - 17

Answer: b

2. Evaluate following postfix expression $2 3 1 * + 9 -$
- 4
 - 4
 - 5
 - 5

Answer b

3. Evaluate following postfix expression $10 2 8 * + 3 -$
- 12
 - 22
 - 23
 - 32

Answer: c

4. Conversion of Infix to Postfix using Stack $a+(b*c(d/e^f)*g)*h$
- $ab*cdef/^*g-h+$
 - $abc*def^/g*-h*+$
 - $abcd*^ed/g*-h*+$
 - $abc*de^fg/*-*h+$

Answer: b

5. Stack : Consider the following pseudocode that uses a stack. What is

```
declare a stack of characters

while ( there are more characters in the word to read )
{
    read a character
    push the character on the stack
}
while ( the stack is not empty )
{
    pop a character off the stack
    write the character to the screen
}
```

the output for input “ LPU Message”

- a. Message LPU
- b. egasseM UPL
- c. egasseMUPL
- d. UPL egasseM

Answer: b

6. Queue:

```
void fun(int n)

{
    IntQueue q = new IntQueue();
    q.enqueue(0);
    q.enqueue(1);
    for (int i = 0; i < n; i++)
    {
        int a = q.dequeue();
        q.enqueue(a + a);
        print(a);
    }
}
```

- a. Prints geometric series
- b. Prints arithmetic series
- c. Prints first n Fibonacci numbers
- d. Prints first n Fibonacci numbers in reverse order

Answer a

7. Linked list: What does the following function do for a given

```
void fun1(struct node* head) {
    printf("%d ", head->data);

    if(head == NULL)
        return;

    fun1(head->next);

    printf("%d ", head->data);
}
```

Linked List with first node as head?

- First prints the data in order, then NULL then prints in reverse order
- Prints all nodes of linked list in reverse order
- Prints alternate nodes of Linked List
- Prints alternate nodes in reverse order

Answer: a

8. Searching: Consider the C function given below. Assume that the array listA contains $n (> 0)$ elements, sorted in ascending order.
- It will run into an infinite loop when x is not in listA.
 - It is an implementation of binary search.
 - It will always find the maximum element in listA.
 - It will return -1 even when x is present in listA

```
int ProcessArray(int *listA, int x, int n){
    int i, j, k;
    i = 0;
    j = n-1;
    do {
        k = (i+j)/2;
        if (x <= listA[k])
            j = k-1;
        if (listA[k] <= x)
            i = k+1;
    } while (i <= j);
    if (listA[k] == x)
        return(k);
    else
        return -1;
}
```

Answer: b

9. Which of the following code snippet check the UNDERFLOW condition in linked list
- a. `START == NULL`
 - b. `AVAIL == NULL`
 - c. `START->NEXT = NULL`
 - d. `START != NULL`

Answer : a

10. Linked list is considered as an example of _____ type of memory allocation.
- a. Dynamic
 - b. Static
 - c. Compile time
 - d. Heap

Answer: a

1. The Average case occurs in linear search algorithm

- A. When Item is somewhere in the middle of the array
- B. When Item is not in the array at all
- C. When Item is the last element in the array
- D. When Item is the last element in the array or is not there at all

Ans: A

2. Which of the following operations is not $O(1)$ for an array of sorted data. You may assume that array elements are distinct.

- A. Find the i th largest element
- B. Delete an element
- C. Find the i th smallest element
- D. All of the above

Ans: B

3. The minimum number of comparisons required to determine if an integer appears more than $n/2$ times in a sorted array of n integers is

- A. $\Theta(n)$
- B. $\Theta(\log n)$
- C. $\Theta(\log^* n)$
- D. $\Theta(1)$

Ans: B

4. The concatenation of two lists is to be performed in $O(1)$ time. Which of the following implementations of a list should be used?

- A. singly linked list
- B. doubly linked list

- C. circular doubly linked list
- D. array implementation of lists

Ans: C

5. 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

Ans: A

6. 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. Insert a new element as a first element
 - C. Delete the last element of the list
 - D. Add a new element at the end of the list

Ans: C

7. Which of the following is not the application of stack?
- A. parentheses balancing program
 - B. Tracking of local variables at run time
 - C. Compiler Syntax Analyzer
 - D. Data Transfer between two asynchronous process

Ans: D

8. What data structure would you mostly likely see in non-recursive implementation of a recursive algorithm?
- A. Linked List
 - B. Stack
 - C. Queue
 - D. Tree

Ans: B

9. A data structure in which elements can be inserted or deleted at/from both ends but not in the middle is?
- A. Queue
 - B. Circular queue
 - C. Dequeue
 - D. Priority queue

Ans: C

10. Convert the following infix expression into its equivalent post fix expression
- $$(A + B^D) / (E - F) + G$$

- A. $ABD^+ + EF - / G +$
- B. $ABD + ^EF - / G +$
- C. $ABD + ^EF / - G +$
- D. $ABD^+ + EF / - G +$

Ans: A

1. Complete the table by matching with their correct means?

- | | |
|----------------------|--|
| (a) Completeness | (i) How long does it take to find a solution |
| (b) Time Complexity | (ii) How much memory need to perform the search. |
| (c) Space Complexity | (iii) Is the strategy guaranteed to find the solution when there in one. |

(A) a-iii, b-ii, c-i

(B) a-i, b-ii, c-iii

(C) a-iii, b-i, c-ii

(D) a-i, b-iii, c-ii

Ans C

2. If for an algorithm time complexity is given by $O(1)$ then complexity of it is:

- A. constant
- B. polynomial
- C. exponential
- D. none of the mentioned

Ans A

3. State True or False.

i) Binary search is used for searching in a sorted array.

ii) The time complexity of binary search is $O(\log n)$.

a. True, False

b. False, True

- c. False, False
- d. True, True

Ans D

4. The situation when in a linked list $START=NULL$ is
- A. Underflow
 - B. Overflow
 - C. Houseful
 - D. Saturated

Ans A

5. Which is the pointer associated with the availability list?
- A. FIRST
 - B. AVAIL
 - C. TOP
 - D. REAR

Ans B

6. Which of the following are two-way lists?
- A. Grounded header list
 - B. Circular header list
 - C. Linked list with header and trailer nodes
 - D. List traversed in two directions

Ans D

7.

Consider the following operation performed on a stack of size 5.

Push(1);

Pop();

Push(2);

Push(3);

Pop();

Push(4);

Pop();

Pop();

Push(5);

After the completion of all operation, the no of element present on stack are

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

Ans A

8. If the size of the stack is 10 and we try to add the 11th element in the stack then the condition is known as ____

- a. Underflow
- b. Garbage collection
- c. Overflow
- d. None of the above

Ans C

9. If the elements '1', '2', '3' and '4' are added in a stack, so what would be the order for the removal?

- a. 1234
- b. 2134
- c. 4321
- d. None of the above

Ans C

10. Consider these functions:

`push()` : push an element into the stack

`pop()` : pop the top-of-the-stack element

`top()` : returns the item stored in top-of-the-stack-node

What will be the output after performing these sequence of operations

`push(20);`

`push(4);`

`top();`

`pop();`

`pop();`

`pop();`

`push(5);`

`top();`

- a) 20 b) 4 c) stack underflow d) 5

Ans D

1. Which of the following statement is true?

(A) $7n^2+8n+6 = O(n^3)$

(B) $7n^2+8n+6 = \Theta(n^3)$

(C) $7n^2+8n+6 = \Omega(n^3)$

(D) None of these

Ans: A

2. Consider the following functions:

$$f(n) = n$$

$$g(n) = n \log n$$

$$h(n) = n^2$$

Which of the following statements about the asymptotic behavior of $f(n)$, $g(n)$, and $h(n)$ is true?

(A) $f(n) = O(g(n))$

(B) $f(n) = \Omega(g(n))$

(C) $g(n) = O(f(n))$

(D) $h(n) = O(f(n))$

Ans: A

3. Consider the following functions:

$$f(n) = n$$

$$g(n) = n \log n$$

$$h(n) = n^2$$

Which of the following statements about the asymptotic behavior of $f(n)$, $g(n)$, and $h(n)$ is true?

(A) $h(n) = O(g(n))$

(B) $g(n) = O(f(n))$

(C) $h(n) = O(f(n))$

(D) $g(n) = \Omega(f(n))$

Ans: D

4. For the following statements, decide whether it is always true, never true,

or sometimes true for asymptotically non negative functions f and g .

$$f(n) = \Omega(g(n)) \text{ if and only if } g(n) = O(f(n))$$

(A) always true

(B) never true

(C) sometimes true

(D) none of these

Ans: A

5. A list is a header list where the node points back to the header node.

- A. Circular header
- B. Grounded header
- C. Two-way header
- D. One way header

Ans: A

6. The linked list that requires two pointer variables FIRST and LAST is called

- A. Circular linked list
- B. Header linked list
- C. One way linked list
- D. Two-way linked list

Ans: D

7. A is a header linked list where the last node contains the NULL in the pointer part.

- A. grounded header linked list
- B. circular header linked list
- C. down header linked list
- D. dropped header linked list

Ans: A

8. The postfix expression for the following infix expression

$A + B * (C + D) / F + D * E$ is:

(A) $A B C D + * F / D E * + +$

(B) $A B C D + * F / D + E * +$

(C) $A * B + C D / F * D E + +$

(D) $A B C D + * F / + D E * +$

Ans: D

9. If the sequence of operations - push(1), push(2), pop, push(1), push(2), pop, pop, pop, push(2),

pop are performed on a stack, the sequence of popped out values are?

(A) 2, 2, 1, 1, 2

(B) 2, 2, 1, 2, 2

(C) 2, 1, 2, 2, 1

(D) 2, 1, 2, 2, 2

Ans: A

10. 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

Ans: A

1. Which of these best describes an array?
- A. A data structure that shows a hierarchical behavior
 - B. Container of objects of similar types
 - C. Arrays are immutable once initialized
 - D. Array is not a data structure

Ans: B

2. What are the advantages of arrays?
- A. Objects of mixed data types can be stored
 - B. Elements in an array cannot be sorted
 - C. Index of first element of an array is 1
 - D. Easier to store elements of same data type

Ans: D

3. What are the disadvantages of arrays?
- A. Data structure like queue or stack cannot be implemented
 - B. There are chances of wastage of memory space if elements inserted in an array are lesser than the allocated size
 - C. Index value of an array can be negative
 - D. Elements are sequentially accessed

Ans: B

4. What is the value of the postfix expression $6\ 3\ 2\ 4\ +\ -\ *$?
- A. 1
 - B. 40
 - C. 74
 - D. -18

Ans: D

5. Which of the following application makes use of a circular linked list?

- A. Undo operation in a text editor
- B. Recursive function calls
- C. Allocating CPU to resources
- D. Implement Hash Tables

Ans: C

6. Which of the following is false about a circular linked list?

- A. Every node has a successor
- B. Time complexity of inserting a new node at the head of the list is $O(1)$
- C. Time complexity for deleting the last node is $O(n)$
- D. We can traverse the whole circular linked list by starting from any point

Ans: B

7. What is the worst case time complexity of following code snippet?
function()

```
{
for(int i=0; i<100;i++)
{
...//O(1)
}
for ( int j = n; j >1; j = j - 2)
{
if ( condition)
{
....// O(1)
}
else
for(int k=1; k<n ; k++){....}
}
```

}

- A. $O(n)$
- B. $O(n^2)$
- C. $O(\log n)$
- D. None of these

Ans-B

8. What is the worst case time complexity of following code snippet?

```
function()
{
for(int i=0; i<100;i++)
{
for ( int j = n; j >1; j = j - 2)
{
if ( condition)
{
....// O(1)
}
}
else
for(int k=1; k<n ; k++){....}
}
}
}
```

- A. $O(n)$
- B. $O(n^2)$
- C. $O(n^3)$
- D. None of these

Ans-B

9. What is the worst case time complexity of following code snippet?

```
function()
{
for(int i=0; i<100;i++)
{
for ( int j = n; j >1; j = j - j )
{
if ( condition)
{
....// O(1)
}
}
else
for(int k=1; k<n ; k++){....}
}
}
}
```

- A. $O(n)$
- B. $O(n^2)$
- C. $O(n^3)$
- D. None of these

Ans-A

10. What is the worst case time complexity of following code snippet?

```
function()
{
for(int i=0; i < n; i = i + 1)
for ( int j = n; j >1; j = j - 3 )
{
if ( condition)
{
....// O(1)
}
}
else
for(int k=1; k<n ; k++){....}
```

```
}  
}  
}
```

- A. $O(n)$
- B. $O(n^2)$
- C. $O(n^3)$
- D. None of these

Ans-C

1. An array A holds following 6 elements. 77, 42, 35, 12, 101, 5. The elements are placed from index number 1 to index number 6. Which of the following is the index of 5 after second pass of bubble sort?
- A. 3
 - B. 4
 - C. 5
 - D. 6

Answer: B

2. For an array A with indexes from 1 to n. The following code signifies? $A[I+1]=A[I]$
- A. The element at I index is copied to I+1 index.
 - B. The element at I+1 index is copied to I index.
 - C. The subscript of an array can never include operators like '+', etc.

Answer: A

3. Algorithm involves putting an element in the appropriate place in a sorted list and thus yielding a larger sorted order list.
- A. Selection Sort
 - B. Bubble Sort
 - C. Insertion Sort
 - D. None of the mentioned follows this mechanism.

Answer: C

4. Binary Search algorithm does not require this condition to be true?
- A. Direct access is required to the middle element.
 - B. Deletion and insertion in the array must be possible.
 - C. The elements are required to be sorted.

Answer: B

5.

```
ptr=start;
while(ptr!=NULL)
{
    if(ptr->data==d)
        break;
    ptr=ptr->next;
}
if(ptr==NULL)
{
    printf("True");
}
```

Let's say that the given code is executed and it displayed true on the screen. What does it mean?

- A. Element d is present at the beginning of the linked list.
- B. Element d is present at the last node of the linked list.
- C. Element d is not present in the linked list.
- D. The given code will never display True.

Answer: C

6. The UB of an array is 2456 and the lower bound is 1477. How many total number of elements can be stored in this array?

- A. 978
- B. 979
- C. 980
- D. 981

Answer: C

7. For a character array with the lower index as 0, the address of 5th element will be calculated as (here BA is the Base Address):
- A. BA+5
 - B. BA+4
 - C. BA+3
 - D. BA+6

Answer: B

8. The data structure allowing the deletion from the front and insertion from rear is?
- A. Stacks
 - B. Queues
 - C. Dequeues
 - D. Tree

Answer: B

9. Consider that the ptr is pointing to a node in the linked list. We want to delete the node highlighted in red color in the below diagram. Which of the following code line is true?
- A. `Ptr=ptr->next`
 - B. `Ptr->next=(ptr->next)->next`
 - C. `Ptr->next=(ptr->next->next)`
 - D. `Ptr->next=ptr->next`

Answer: B

10. Consider a linked list pointed by START node. What does this line of code mean? `START=START->NEXT`.
- A. Start is now pointing to the second node
 - B. Start is pointing to the first node.
 - C. The first node is no longer accessible.
 - D. More than one options are true.

Answer: D

Q.1 What is the Overflow condition in Stack?

- A. TOP=MAXSTK
- B. TOP=Avail
- C. TOP=NEW
- D. TOP=Rear

Ans:A

Q.2 What will be the result of PEEK operation after evaluating following Postfix Expression:-

P:- 2,3,+,1,*,4,9,+,2,^

- A. 2
- B. 164
- C. 169
- D. 5

Ans: C

Q.3 What is the Underflow condition in Stack?

- A. Top=Front
- B. Top=0
- C. Top=MAXSTK
- D. Top=Rear

Ans: B

Q.4 Evaluate the following Postfix Expression:-

P:- 6,3,2,4,+,-,*

- A. 18
- B. -16
- C. -17
- D. -18

Ans: D

Q.5 Evaluate the following Infix to Postfix Expression:-

Q:- $(A+B)*(C*D-E)*F/G$

- A. $AB+CD*E-*F*G/$
- B. $AB+CD*EF-**G/$
- C. $AB+CD*E-*F*/G$
- D. $AB+CD*E-F**G/$

Ans: A

Q.6 What is the time complexity of following code:-

```
int queue[100], n = 100, front = - 1, rear = - 1;
```

```
void Insert()
```

```
{
```

```
    int val;
```

```
    if (rear == n - 1)
```

```
        cout<<"Queue Overflow"<<endl;
```

```

else {
    if (front == - 1)
front = 0;

    cout<<"Insert the element in queue : "<<endl;
    cin>>val;

    rear++;

    queue[rear] = val;
}
}

```

- A. $O(n)$
- B. $O(n^2)$
- C. $O(1)$
- D. $O(\log n)$

Ans: C

Q.7 Complete the following logic to perform deletion from Stack:-

1.[Stack has an item to be removed]

If $TOP=0$, then

Write: UNDERFLOW and Return

[end of if structure]

2. Set $ITEM:=STACK[TOP]$

3. Set **[Write Here]**

4. Return

- A. $TOP:=TOP-1$
- B. $TOP:=TOP+1$

- C. Front:=Front-1
- D. Front:=Front+1

Ans: A

Q.8 Consider the stack size is 5 and what is the output after performing following operations

Push A

Push B

Push C

Push D

Pop

Push E

Push F

- A. Underflow
- B. Overflow
- C. F
- D. E

Ans: B

Q.9 What is the output of Bubble sort after executing pass 1/iteration 1

90,89,79,69,52

- a) 89,79,69,52,90
- b) 89,90,79,69,52
- c) 89,79,90,69,52
- d) 52,69,79,89,90

Ans: A

Q.10 Complete the algorithm to perform deletion from middle using linked list

1. If Head == NULL, then

Write: underflow and Exit

2. Set item = Start → info

3. If Loc == NULL then,

Set [Write here] [deletes 1st node]

Else

Set LocP → link = Loc → link [deletes node N]

[Return deleted node to avail list]

Set Avail → link = Loc and Avail = Loc and Loc → Link = Null

4. Exit.

- a) Start = Start → avail
- b) Start = Start → info
- c) Start = Start → link
- d) Start = null

Ans: C

1. void f7(int n)
- ```
{
 for(int i=1;i<n;) {
 cout<<i;
 i=i*2;
 }
}
```
- a.  $O(n)$   
b.  $O(n^2)$   
c.  $O(n+1)$   
d.  $O(\log n)$

Ans D

2. In binary search, find the sequence of mid for searching element=22 in following sorted array

4,7,8,10,14,21,22,36,62,77,81,91

- a. 22,62,21  
b. 21,62,22  
c. 22,77,21  
d. 21,77,22

Ans B

3. The list is 15,7,10,12,3,18,5. What is the sorted list after first pass using bubble sort

- a. 7,10,12,3,15,5,18  
b. 7,10,12,3,5,15,18  
c. 7,10,5,3,12,15,18  
d. 3,7,10,12,5,15,18

Ans: A

4. In Circular Linked list

- a. address of last node is stored in the next part of the first node.
- b. address of the first node is stored in the next part of the last node.
- c. address of last node is stored in the next part of the last node
- d. all the above

Ans B

5. What is the output of following code

```
struct node *p;
p=(struct node *)malloc(sizeof(struct node));
if (p==NULL) then
```

- a. Node is created
- b. Node is not created
- c. Node may be created or not
- d. None of these

Ans B

6. Last in First Out followed by

- a. STACK
- b. Queue
- c. Priority Queue
- d. All the above

Ans A

7. In the queue, Front is pointing to the first index of the queue i.e. 0 and Rear is pointing to the last index number of the queue.

- a. It is underflow condition
- b It is Overflow condition
- c. Both
- d. None of these

Ans B