Practice Set MTE 2024

CSE 408 PYQs

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 (N2)
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

a. 12
b. 21
c. 19
d. 17

Answer: b

2. Evaluate following postfix expression 2 3 1 * + 9 –

a. 4
b. -4
c. 5
d. -5

Answer b

3. Evaluate following postfix expression 10 2 8 * + 3 –

a. 12
b. 22
c. 23
d. 32

Answer: c

4. Conversion of Infix to Postfix using Stack 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+

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?

a. First prints the data in order, then NULL then prints in reverse order
b. Prints all nodes of linked list in reverse order
c. Prints alternate nodes of Linked List
d. 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.

a. It will run into an infinite loop when x is not in listA.
b. It is an implementation of binary search.
c. It will always find the maximum element in listA.
d. 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 ith largest element
   B. Delete an element
   C. Find the ith 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. Θ(n)
   B. Θ(logn)
   C. Θ(log*n)
   D. Θ(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(logn).

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 = Θ(n^3)

(C) 7n^2+8n+6 = Ω(n^3)

(D) None of these

Ans: A

2. Consider the following functions:

f(n) = n

g(n) = nlogn

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) = Ω(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) = nlogn

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) = Ω(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) = Ω(g(n)) 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 ^ / 2 3 * + 5 1 * - Note that ^ 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(logn)

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