1. Elements in an array are accessed

   a) randomly

   b) sequentially

   c) exponentially

   d) logarithmically

2. 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

3. In a stack, if a user tries to remove an element from an empty stack it is called a) Underflow

b) Empty collection

c) Overflow

d) Garbage Collection

4. 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) ABCD

b) DCBA

c) DCAB

d) ABDC

5. In linked list each node contains a minimum of two fields. One field is data field to store the data second field is?

a) Pointer to character

b) Pointer to integer

c) Pointer to node

d) Node

6. A linked-list is a dynamic structure

A - true

B - false

7. In linked list implementation of a queue, where does a new element be inserted? a) At the head of link list

b) At the center position in the link list

c) At the tail of the link list

d) At any position in the linked list

8. In a Hash Table Key cannot be null, but Value can be.

A. True

B. False

9. Suppose value of the Capacity property of Array List Collection is set to 4. What will be the capacity of the Collection on adding fifth element to it? a) 4

b) 8

c) 16

d) 32

10. Which of the following statements are correct about the Collection Classes available in Framework Class Library?

a) Elements of a collection cannot be transmitted over a network.

b) Elements stored in a collection can be retrieved but cannot be modified.

c) Elements stored in a collection can be modified only if all elements are of similar types.

d) Collection classes make use of efficient algorithms to manage the collection, hence improving the performance of the program

11. What does it mean for a list to be "dynamic"?

a) You can easily add and remove elements

b) It has a set size once it has been created

c) It may contain multiple types of values

d) You can access it from anywhere in the program

12. Pushing an element into stack already having five elements and stack size of 5, then stack becomes

a) Overflow

b) Crash

c) Underflow

d) User flow

13. A linear list of elements in which deletion can be done from one end (front) and insertion can take place only at the other end (rear) is known as a) Queue

b) Stack

c) Tree

d) Linked list

14. The data structure required for Breadth First Traversal on a graph is? a) Stack

b) Array

c) Queue

d) Tree

15. In linked list each node contains a minimum of two fields. One field is data field to store the data second field is?

a) Pointer to character

b) Pointer to integer

c) Pointer to node

d) Node

16. Which of the following is false about a doubly linked list?

a) We can navigate in both the directions

b) It requires more space than a singly linked list

c) The insertion and deletion of a node take a bit longer

d) Implementing a doubly linked list is easier than singly linked list

17. What is the term for inserting into a full queue known as? a) overflow

b) underflow

c) null pointer exception

d) program won't be compiled

18. In linked list implementation of queue, if only front pointer is maintained, which of the following operation take worst case linear time?

a) Insertion

b) Deletion

c) To empty a queue

d) Both Insertion and To empty a queue

19. In linked list implementation of a queue, where does a new element be inserted? a) At the head of link list

b) At the center position in the link list

c) At the tail of the link list

d) At any position in the linked list

20. In linked list implementation of a queue, from where is the item deleted? a) At the head of link list

b) At the center position in the link list

c) At the tail of the link list

d) Node before the tail

21. Herder node is used as sentinel in .....

a) Queues

b) Stacks

c) Graphs

d) Binary tree

22. Which data structure can only be traversed in a single direction? a) Array

b) LinkedList

c) Stack

d) Queue

23. What is the difference between an array and a linked list?

a) Arrays are static data structures, while linked lists are dynamic data structures

b) Arrays can store elements of different types, while linked lists can only store elements of the same type

c) Arrays have a fixed size, while linked lists can grow or shrink as needed

d) None of the above

24. Which data structure is used to represent a hierarchical relationship between elements? a) Array

b) Linked list

c) Stack

d) Tree

25. Select non-linear data structures from the list of following data structures

A) Linked List

B) Graphs

C) Array

D) Trees

E) Both B and D

26. Stack cannot be used to

A) Evaluate an arithmetic expression in postfix form

B) Implement recursion

C) Convert infix form to postfix of an expression

D) Allocate resources by the operating system

27. If the elements '1', '2', '3' and '4' are inserted in a queue, what would be order for the removal?

A) 1234

B) 4321

C) 3241

28. What's the Method used in Queue to return First element without remove it? a. Dequeue()

b) Enqueue()

c) Pop()

d) Peek()

29. You can traverse Singly Linked List backward from the last node to the first node? a. True

b) False

30. 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 number of elements present in stack is? a)1

b) 2

c) 3

d) 4

الاسم:- يوسف صلاح حسن محمد

1- Inserting an item into the stack is not full is called …….Operation and deletion of Item from the stack, when stack is not empty is called ……. operation

A) Puch, pop
B) Pop , puch
C) Insert, delete
D) Delete, insert

2- The advantage of ……..is that they solve the problem if sequential storage representation But disadvantage in that is they are sequential lists

A) Lists
B) Linked List
C) Trees
D) Queues

3- ……..is not the operation that can be performed on queue
A) Insertion
B) Deletion
C) Retrieval
D) Traversal

4- There is an extra element at the head of the list called a ……..
A) sentinel

B) Pointer
C) List header
D) List head

5- Each node in singly linked list has …….fields.
A) 2
B) 3
C) 1

D) 4

6- Value of linked list index is …….
A) 0
B) 1
C) -1
D) 2

7- In linked list the ……field contains the address of next element in the list

A) Link field

B) Next element field

C) Start field

D) End field

8- Refers to a linear collection of data items.

A) Tree

B) Edge
C) List
D) Graph

9- A ……. is a linear list in which insertion and deletion are made to from either end of the stracture
A) circular queue
B) Random of queue
C) Dequeue

D) Priority

10- A linear list in which the pointer points only to the successive node is ……..
A) Singly linked list
B) Douply linked list
C) Circular linked list
D) None of the above

11- A doubly linked list is also called as ……
A) Linked list
B) One way chain
C) Two way chain
D) none of the above

12- ……. is the term used to insert an element into stack.
A) Puch

B) Pop
C) Pump
D) Peck

13- A pointer variable which contains the location at the top element of the stack is called ……..
A) End
B) Final
C) Top

D) Last

14 - what is the output of this code ?

```
ArrayList arr = new ArrayList();
  arr.Add (1);
arr.Add(3);
arr.Add (5);
```

```
arr.Add(7);
arr.Add(9);

arr.RemoveAt(2);
arr.RemoveAt(3);
```

```
   arr.Insert(0 , 0);
foreach(int i in arr)
{
Console.WriteLine(i);
}
```

A) 0 3 9 7
B) 0 1 3 7
C) 0 1 3 9
D) 7 1 3 0

15 - what is the out put of this code ?

```
int[] arr = new int[] { 2, 4, 8, 2 };
            List<int> list = new List<int>();
```

```
list.Add(6);
list.AddRange(arr);

list.Reverse();

foreach (int i in list)
```

```
            {
                Console.WriteLine(i);
            }
```

A) 6 2 4 8 2
B) 6 2 8 4 2
C) 2 8 4 2 6

D) 2 4 8 2 6

16 - what is the output of this code ?

```
LinkedList<int> list = new LinkedList<int>();
            list.AddLast(1);
            list.AddLast(2);
            list.AddLast(3);
```

```
list.AddAfter(list.AddLast(1) , 5);
list.AddBefore(list.AddLast(2) , 6);
list.RemoveFirst();
foreach (int i in list)
{
    Console.WriteLine(i);
```

```
            }
```

A) 6 5 1 3 2 2
B) 2 3 1 5 6 2
C) 2 3 5 6
D) 2 3 5 1 6 2

Data Structures and Algorithms Multiple Choice Questions :-

1. Which if the following is/are the levels of implementation of data structure

A) Abstract level
B) Application level

4. Stack is also called as

A) Last in first out
B) First in last out
C) Last in last out
D) First in first out

5. Which of the following is true about the characteristics of abstract data types?

i) It exports a type.

8. Inserting an item into the stack when stack is not full is called ..... Operation and deletion of item form the stack, when stack is not empty is called .....operation.

A) push, pop

B) pop, push

C) insert, delete

11. Which data structure allows deleting data elements from and inserting at rear?

A) Stacks

B) Queues

C) Dequeues

D) Binary search tree

14. Which of the following is non-liner data structure?

A) Stacks

B) List

C) Strings

D) Trees

15. Herder node is used as sentinel in .....

A) Graphs

18. Which of the following data structure is non linear type?

A) Strings

B) Lists

C) Stacks

D) Graph

19. Which of the following data structure is linear type?

A) Graph

34. The advantage of ..... is that they solve the problem if sequential storage representation. But disadvantage in that is they are sequential lists.

A) Lists

B) Linked Lists

C) Trees

D) Queues

35. What will be the value of top, if there is a size of stack

name / fawzii shaker elfaramawi

1.

Which of the following data structures are indexed structures

A. linear arrays

B. linked lists

C. both of above

D. none of above

2.

Which of the following is not the required condition for binary search algorithm

A. there must be mechanism to delete and/ or insert elements in list

B. the list must be sorted

C. there should be the direct access to the middle element in any sublist

D. none of the above

3.

Which of the following is not a limitation of binary search algorithm ?

A. binary search algorithm is not efficient when the data elements are more than 1000.

B. must use a sorted array

C. requirement of sorted array is expen- sive when a lot of insertion and dele- tions are needed

D. there must be a mechanism to access middle element directly

4.

Two dimensional arrays are also called

A. tables arrays

B. matrix arrays

C. both of the above

D. none of the above

5.

The term “push” and “pop” is related to the

A. Array

B. Lists

C. stacks

D. all of above

6.

A data structure where elements can be added or removed at either end but not in the middle is referred as

A. Linked lists

B. Stacks

C. Queues

D. Deque

7.

The following sorting algorithm is of divide- and-conquer type

A. Bubble sort

B. Insertion sort

C. Quick sort

D. None of the above

8.

An algorithm that calls itself directly or indi- rectly is known as

A. Recursion

B. Polish notation

C. Traversal algorithm

D. None of the above

9.

The elements of an array are stored suc- cessively in memory cells because

A. by this way computer can keep track only the address of the first element and the addresses of other elements can be calculated

B. the architecture of computer memory does not allow arrays to store other than serially

C. A and B both false

D. A and B both true

10.

The memory address of the first element of an array is called

A. base address

B. floor address

C. foundation address

D. first address

11.

The memory address of fifth element of an array can be calculated by the formula

A. LOC(Array[5])=Base(Array[5])+(5-lower boun(D), where w is the number of words per memory cell for the array

B. LOC(Array[5])=Base(Array[4])+(5-Upper boun(D), where w is the number of words per memory cell for the array

C. LOC(Array[5]=Base(Array)+w(5-lower bou

D. , where w is the number of words per memory cell for the array

12.

The following data structure can’t store the non-homogeneous data elements

A. Arrays

B. Records

C. Pointers

D. None of the above

13.

The in order traversal of tree will yield a sorted listing of elements of tree in

A. Binary trees

B. Binary search trees

C. Heaps

D. None of above

14.

In a Heap tree values in a node is greater than

A. every value in left sub tree and smaller than right sub tree

B. every value in children of it

C. Both of above conditions are true

D. None of above conditions are true

15.

In a graph if e=[u, v], Then u and v are called

A. endpoints of e

B. adjacent nodes

C. neighbors

D. all of the above

16.

A connected graph T without any cycles is called

A. tree graph

B. free tree

C. tree

D. All of the above

17.

The difference between linear array and a record is

A. An array is suitable for homogeneous data but hte data items in a record may have different data type

B. In a record, there may not be a natural ordering in opposed to linear array.

C. A record form a hierarchical structure but a linear array does not

D. All of above

18.

The following data structure store the ho- mogeneous data elements

A. Arrays

B. Records

C. Pointers

D. None of the above

19.

Which of the following data structure is not linear data structure?

A. Arrays

B. Linked lists

C. A and B are true

20.

A structure definition is called as

A. template

B. member

C. both 1 & 2

D. none of these

21.

If a, b and c are integer variables with the values a=8, b=3 and c=-5. Then what is the value of the arithmetic expression: 2 * b + 3 * (a-c)

A. 15

B. 6

C. -16

D. -1

22.

A global variable is a variable

A. declared in the main ( ) function

B. declared in any function other than the main ( ) function

C. declared outside the body of every function.

D. declared any where in the c program.

23.

main ( ) is an example of

A. library function

B. user defined function

C. header

D. statement

24.

While incrementing a pointer, its value gets increased by the length of the data type to which it points. This length is called

A. scale factor

B. length factor

C. pointer factor

D. increment factor

25.

a->b is systematically correct if_____

A. a is a npointer to a structure in which b is a field

B. a and b are structure

C. a is a structure and b is a pointer to a structure

D. a is a pointer to a structure and b is a structure

26.

Which of the following best describes sorting ?

A. accessing and processing each record exactly once

B. finding the location of the record with a given key

C. arranging the data (record) in some given order

D. adding a new record to the data structure

27.

A function which calls itself is called as

A. library function

B. directive

C. recursive function

D. none of above

28.

Where do we use the operator -> ?

A. to access a member of structure

B. to access member of union

C. to access an array

D. both(a) and(b).

29.

In selection sort of n elements,how many times is the swap function called in the complete execution of the algorithm?

A. 1

B. n-1

C. n(n-1)/2

D. none of these

30.

a->b is systematically correct if_____

A. a is a pointer to a structure in which b is a field

B. a and b are structure

C. a is a structure and b is a pointer to a structure

D. a is a pointer to a structure and b is a structure

Mohammed Nasr Elsayed – Section 8

When an ArrayList is out of storage space, it:			
Throws an exception	Resizes itself	Deletes the last item to make space	Combines it with an existing element
Why is it important to use the right data structure?			

Code is more readable	Program is smaller in size	Saves memory and execution time	Using the wrong ones leads to errors
Stacks operate with the following structure:			
FIFO	FILO	LIFO	LILO
Queues operate with the following structure:			
FIFO	FILO	LIFO	LILO
Abstract Data Types in C# remove the need to think about the:			
Implementation	Operations	Properties	Methods

Linked lists can act as a list and as a:			
Queue	Stack	Dictionary	Array
The special node in the beginning of many linked lists is the:			
Header	Head	Init	Root
ArrayLists are part of the following namespace:			
System.Collections	System.Threading	System.Collections.Generic	System.IO
What is the key difference between an static array and a list?			

Arrays have fixed sizes	Arrays are easier to work with	Lists are larger	Lists use less processing power
The most commonly used data structures are:			
Linear	Tree-Like	Dictionary	None of the above
The return type of the Contains(object) method in Systems.Collections.IList is:			
Bool	String	Int	Void
To access an item in Systems.Collections.IList, you use:			
Access()	Contains()	Show()	This[]

Which of the following returns the highest element of a Stack WITHOUT removing it?			
Peek()	Pop()	Push()	Show()
Static Stacks are implemented with a:			
Array	List	Dictionary	None of the above
When using the Add() method of an ArrayList, elements are added to:			
Array End	Array Beginning	Specified Index	Arrays can't be added to
When using the Add() method of an ArrayList, it returns:			

The element	Element Index	A copy of the list	Nothing (Void)
Which of the following is not a type of linked list?			
Singly-Linked	Doubly-Linked	Circular-Linked	Quad-Linked
To remove an element at a specific index with an ArrayList, you use:			
Remove(index)	RemoveAt(index)	Delete(index)	DeleteAt(index)
Linked List is a collection of objects called:			
Elements	Nodes	Indices	Values
A pile of trays at a cafeteria closely resembles the way ____ work in computers:			

Queues	Stacks	Lists	Arrays
A line of people at the cinema waiting to enter closely resembles the way ____ work in computers:			
Queues	Stacks	Lists	Arrays

Mohammed Nasr Elsayed – Section 8

Each element in a Dynamic List contains:

Just the element itself	The element, and a copy of the list	The element, and information about the next element	The element, and a copy of the next element
Queues are implemented with:			
Arrays	Lists	ArrayLists	Trees
Which of the following is NOT a linear data structure?			
Array List	Linked List	Dictionary	None of the above
Which of the following CANNOT be used to add a range to an ArrayList?			

AddRange()	InsertRange()	IncludeRange()	None of the above
Why use an Array over a Linked List?			
Fast Random Access	Easier to use	Faster insertions/deletions	Unlimited size
Which of the following is NOT included in a node?			
Element	Link	Index	None of the above
Enqueue adds the element to the ____ of the queue:			
Start	End	Index	Random Positions
The Dequeue method does the following:			

Deletes the queue	Deletes an item according to index	Retrieives the first element of the Queue	Retrieves the last element of the Queue
Why use a Linked List over an Array?			
Uses less memory	Faster to access	Faster insertions/deletions	Less dependencies

الاسم : أيمن محمد ياسين

1. A collection is a **non**-structured data type that stores data and provides operations (F)
2. Collections can be broken down into two types: linear and nonlinear.(T).

3. linear collection are normally ordered by position(T)
4. Heaps are linear collections.(F)
5. In C#, arrays are not only a built-in data type (T)
6. In C#, arrays are Class (T)
7. String is a type of direct access collection(T)
8. The GetValue method takes two arguments, an index number and the value of the element.
   (F)

9. GetUpperBound method .. return max value in array (F)
10. Rank: Returns the number of dimensions of an array.(T)
11. GetType: Returns the Type of the current array instance.(T)
12. GetLength .. Returns the total number of elements in all dimensions of an array. (F)
13. In C#, an array can have up to 32 dimensions (T)
14. You can’t use the SetValue method with a multidimensional array (T)
15. The objects in an ArrayList can be displayed using a For Each loop.(T)

16. C allow a programmer to dynamically resize an array (F)
17. The Clear method removes all the items from a stack, setting the item count to one negative. (F)
18. Stack = LIFO (T)
19. Queue = FIFO (T)
20. Items stored in a priority queue are normally constructed as key–value pairs (T)
21. A linked list is a collection of class objects called nodes (T) 22. A tree is a set of edges connected by edges (F) 23.

1. Process of inserting an element in stack is called _____

a) Create

b) Push

c) Evaluation

d) Pop

2-Process of removing an element from stack is called _____

a) Create

b) Push

c) Evaluation

d) Pop

3. 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 initialised

d) Array is not a data structure

4-How do you instantiate an array in Java?

a) int arr[] = new int(3);

b) int arr[];

c) int arr[] = new int[3];

d) int arr() = new int(3);

```
6-public class array
{
  public static void main(String args[])
  {
    int []arr = {1,2,3,4,5};
```

```
    System.out.println(arr[2]);
    System.out.println(arr[4]);
  }
}
```

a) 3 and 5

b) 5 and 3

c) 2 and 4

d) 4 and 2

7-public class array

{

```
public static void main(String args[])
{
  int []arr = {1,2,3,4,5};
  System.out.println(arr[5]);
}
```

}

a) 4

b) 5

c) ArrayIndexOutOfBoundsException

d) InavlidInputException

8-When does the ArrayIndexOutOfBoundsException occur?

a) Compile-time

b) Run-time

c) Not an error

d) Not an exception at all

9-Which of the following concepts make extensive use of arrays?

a) Binary trees

b) Scheduling of processes

c) Caching

d) Spatial locality

10-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

11-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

12- Assuming int is of 4bytes, what is the size of int arr[15];?

a) 15

b) 19

c) 11

d) 60

13-In general, the index of the first element in an array is _____

a) 0

b) -1

c) 2

d) 1

14-Elements in an array are accessed _____

a) randomly

b) sequentially

c) exponentially

d) logarithmically

15-Here is an infix expression: 4 + 3*(6*3-12). Suppose that we are using the usual stack algorithm to convert the expression from infix to postfix notation. The maximum number of symbols that will appear on the stack AT ONE TIME during the conversion of this expression?

a) 1

b) 2

c) 3

d) 4

16-What is the value of the postfix expression 6 3 2 4 + – *?

a) 1

b) 40

c) 74

d) -18

17-Consider the usual algorithm for determining whether a sequence of parentheses is balanced. Suppose that you run the algorithm on a sequence that contains 2 left parentheses and 3 right parentheses (in some order). The maximum number of parentheses that appear on the stack AT ANY ONE TIME during the computation?

a) 1

b) 2

c) 3

d) 4 or more

18-Consider the usual algorithm for determining whether a sequence of parentheses is balanced. The maximum number of parentheses that appear on the stack AT ANY ONE TIME when the algorithm analyzes: (()(())(())))?

a) 1

b) 2

c) 3

d) 4 or more

19- Which of the following is not the application of stack?

a) A parentheses balancing program

b) Tracking of local variables at run time

c) Compiler Syntax Analyzer

d) Data Transfer between two asynchronous process

20-Entries in a stack are “ordered”. What is the meaning of this statement?

a) A collection of stacks is sortable

b) Stack entries may be compared with the ‘<‘ operation

c) The entries are stored in a linked list

d) There is a Sequential entry that is one by one

21-Pushing an element into stack already having five elements and stack size of 5, then stack becomes _____

a) Overflow

b) Crash

c) Underflow

d) User flow

22- In a stack, if a user tries to remove an element from an empty stack it is called _____

a) Underflow

b) Empty collection

c) Overflow

d) Garbage Collection

23-A linear collection of data elements where the linear node is given by means of pointer is called?

a) Linked list

b) Node list

c) Primitive list

d) Unordered list

24-Consider an implementation of unsorted singly linked list. Suppose it has its representation with a head pointer only. Given the representation, which of the following operation can be implemented in O(1) time?

i) Insertion at the front of the linked list

ii) Insertion at the end of the linked list

iii) Deletion of the front node of the linked list

iv) Deletion of the last node of the linked list

a) I and II

b) I and III

c) I, II and III

d) I, II and IV

25- In linked list each node contains a minimum of two fields. One field is data field to store the data second field is?

a) Pointer to character

b) Pointer to integer

c) Pointer to node

d) Node

26-What would be the asymptotic time complexity to add a node at the end of singly linked list, if the pointer is initially pointing to the head of the list?

a) O(1)

b) O(n)

c) θ(n)

d) θ(1)

27- What would be the asymptotic time complexity to insert an element at the front of the linked list (head is known)?

a) O(1)

b) O(n)

c) O(n2)

d) O(n3)

28-Consider the following definition in c programming language.

```
struct node
{
   int data;
   struct node * next;
}
```

typedef struct node NODE;

NODE *ptr;

Which of the following c code is used to create new node?

a) ptr = (NODE*)malloc(sizeof(NODE));

b) ptr = (NODE*)malloc(NODE);

c) ptr = (NODE*)malloc(sizeof(NODE*));

d) ptr = (NODE)malloc(sizeof(NODE));

29- The concatenation of two lists can be performed in O(1) time. Which of the following variation of the linked list can be used?

a) Singly linked list

b) Doubly linked list

c) Circular doubly linked list

d) Array implementation of list

30-A queue follows _____

a) FIFO (First In First Out) principle

b) LIFO (Last In First Out) principle

c) Ordered array

d) Linear tree

31-. A linear list of elements in which deletion can be done from one end (front) and insertion can take place only at the other end (rear) is known as _____

a) Queue

b) Stack

c) Tree

d) Linked list

32-In a circular queue, how do you increment the rear end of the queue?

a) rear++

b) (rear+1) % CAPACITY

c) (rear % CAPACITY)+1

d) rear–

33-What is the term for inserting into a full queue known as?

a) overflow

b) underflow

c) null pointer exception

d) program won’t be compiled

34-Which of the following properties is associated with a queue?

a) First In Last Out

b) First In First Out

c) Last In First Out

d) Last In Last Out

35-What is the time complexity of enqueue operation?

a) O(logn)

b) O(nlogn)

c) O(n)

d) O(1)

36-public Object function()

{

if(isEmpty())

```
return -999;
else
{
  Object high;
  high = q[front];
```

```
    return high;
  }
}
```

37-What is the need for a circular queue?

a) effective usage of memory

b) easier computations

c) to delete elements based on priority

d) implement LIFO principle in queues

38-Which of the following represents a dequeue operation? (count is the number of elements in the queue)

a)

```
public Object dequeue()
{
  if(count == 0)
  {
```

```
  System.out.println("Queue underflow");
  return 0;
}
else
{
```

```
Object ele = q[front];

q[front] = null;

front = (front+1)%CAPACITY;

count--;

return ele;
```

```
  }
}
```

b)

```
public Object dequeue()
```

```
{
  if(count == 0)
  {
    System.out.println("Queue underflow");
    return 0;
```

```
}
else
{
  Object ele = q[front];
  front = (front+1)%CAPACITY;
```

```
    q[front] = null;
    count--;
    return ele;
  }
}
```

c)

```
public Object dequeue()
{
  if(count == 0)
```

```
{
  System.out.println("Queue underflow");
  return 0;
}
else
```

```
{
  front = (front+1)%CAPACITY;
  Object ele = q[front];
  q[front] = null;
  count--;
```

```
    return ele;
  }
}
}
```

d)

```
public Object dequeue()
{
  if(count == 0)
  {
    System.out.println("Queue underflow");
```

```
  return 0;
}
else
{
  Object ele = q[front];
```

```
  q[front] = null;
  front = (front+1)%CAPACITY;
  return ele;
  count--;
}
```

}

39-What is the space complexity of a linear queue having n elements?

a) O(n)

b) O(nlogn)

c) O(logn)

d) O(1)

40- To implement a stack using queue(with only enqueue and dequeue operations), how many queues will you need?

a) 1

b) 2

c) 3

d) 4

1. Stack is non linear data structure which follows a par particular order in which the operations are performed (F)

2. Array has a dynamic size. (F) 3. Array allow adding on different position. (F) 4. Count gets the elements

contained in the stack. (F) 5. Array is data structure containing a number of data values and it have different datatype (F) 6. Array has fast access (T)

7. Non-linear data structure include lists , stacks ,queues (F)

8-Non-linear data structure most commonly used and it kind of rows and sequences (F) 8-In linked list size is not fixed.
(T) 9- In linked list insert and delete is difficult (F) 10-Array list is collection of nodes with various fields , and it contains data field and

address field .

(F) 11-linkedlist types are singly and doubly linked list only (F)

12-linked list size < array size (F) 13- In linked list the elements not stored at contiguous memory location (T) 14-The elements in the array list must be of the same datatype (F) 15- The list cannot be modified (F) 16- IN array the last in is first out (F)

1- What will be the output of the following code:

```
            int[] x = new int[3] { 3, 6, 9 };
             Console.Write(x[0]);             for (int i = 0; i <
x.Length; i++)
            {
                Console.Write(x[i]);
            }
```

a) 3696
b) 3396
c) 3369
d) Error

2- What will be the output of the following code:

```
            List<int>my_list=new List<int>() { 5,6,7,9};
my_list.Remove(7);              my_list.Add(10);              foreach(int i in
my_list)
            {
                Console.Write(i);
             }
```

a)5 6 10 9

b)5 6 9 10

c)10 5 6 9

d)5 6 7 9

3– What will be the output of the following code:

```
            ArrayList A = new ArrayList();
            A.Add(1);              A.Add("Hello");
foreach(int i in A)
            {
                Console.Write(i);
             }
```

a) Hello

b) 1

c)1 Hello

d)Hello 1

4- What will be the output of the following code:

```
List <int> x= new List<int>() { 1,2,3};
x.Clear();
x.Add(5);
x.Add(6);
x.Add(9);
foreach (int i in x)
{
    Console.Write(i);
 }
```

a) 1 2 3

b) 5 6 9

c) 1 2 3 5 6 9

d) 1 2 3 6 5 9

5– What will be the output of the following code:

```
List <int> x= new List<int>() {1,2,3,4,5,6};
```

```
            x.RemoveRange(0, 3);
            x.InsertRange(0,new List<int>() { 4,5,6});              foreach (int i
in x)
            {
                Console.Write(i);
             }
```

a) 1 2 3 4 5 6

b) 4 5 6

c) 4 5 6 4 5 6

d) 1 2 3

6– What will be the output of the following code:

```
Stack<int> s = new Stack<int>();
s.Push(1);
s.Push(5);
s.Push(10);
```

```
s.Push(15);
s.Pop();
foreach (int i in s)
{
    Console.Write(i);
 }
```

a) 1 5 10 15

b) 1 5 10

c) **15 10 5 1**

d) 10 5 1

7- What will be the output of the following code:

```
            ArrayList A = new ArrayList();
            A.Add(1);               A.Add("Hello");
foreach(var i in A)
```

```
        {
            Console.Write(i);              }
```

a) 1 Hello

b) Hello

c) Hello 1

d) Error

8– The problems with arrays:

a)Size is fixed

b)Array items are stored contiguously

c)Insertions , deletion at particular position complex.

d)All true

9- Which of the following in not true about Linked list: a)Size is fixed

b)Data can be stored at any place

c)Insert and delete simple and fast

d) All not true

10-What are the parts of a Linked list?

a)head , tail

b) tail , node

c) head , tail , node

d)head , node

11– What will be the output of the following code:

```
            LinkedList<int> ll = new LinkedList<int>(new int[] {1,2,3,4});
ll.AddLast(5);              ll.AddFirst(6);             Console.Write(ll.Count);
foreach (int i in ll)
            {
                Console.Write(i);             }
```

a)1 2 3 4 5 6

b)6 1 2 3 4 5

c)5 1 2 3 4 6

d) 6 6 1 2 3 4 5

12– What will be the output of the following code:

```
            LinkedList<int> ll = new LinkedList<int>(new int[] {1,2,3,4});
ll.AddLast(5);              ll.AddFirst(6);
```

```
            Console.Write(ll.Contains(6));
Console.Write(ll.Contains(7));              foreach (int i in ll)
            {
                Console.Write(i);
            }
```

a)6 1 2 3 4 5 true false

b)false true 1 2 3 4 5 6

c)true false 5 1 2 3 4 6

d) true false 6 1 2 3 4 5

13– What will be the output of the following code:

```
            Stack<int> stack = new Stack<int>();
stack.Push(1);              stack.Push(2);              stack.Push(3);
```

```
stack.Push(4);              stack.Pop(4);              foreach (int i
in stack)
            {
                Console.Write(i);
            }
```

a) 1 2 3 4

b) 4 3 2 1

c) 3 2 1

d) Syntax error

14– What will be the output of the following code:

```
            Stack<int> stack = new Stack<int>();
stack.Push(1);              stack.Push(2);              stack.Push(3);
stack.Push(4);              stack.Push(6);
            Console.WriteLine(stack.Count);             foreach (int i
in stack)
            {
                Console.WriteLine(i);
            }
```

a) 5 1 2 3 4 6

b) 1 2 3 4 6 5

c) 5 6 4 3 2 1

d) 6 5 4 3 2 1

Choose the most correct Answer

1- The Big _O of insertion sort algorithm is …… 2- The Big _O of selection Sort algorithm is …….

3- The Big _O of Bubble sort algorithm is ……..

4- The Big _ O of Binary search Algorithm is …….

5- The pre-order traversal of the following tree is ……..

6- Select the minimum element from unsorted sub list and place it into the sorted list ……

7-Take the first element from unsorted sub list and put it into a suitable position in a sorted List “this technique repeated with all elements in unsorted sub list “

8- The Big_O of Binary search Algorithm is …….

9- in full binary tree, each node has exactly zero or two children.in this tree, if there are L leaves, then total number of nodes N in the tree are?

(12) In full binary tree, each node has exactly zero or two children. In this tree, if there are L leaves then total number of nodes N in the tree are?

(a) $N = 2L$ (b) $N = L + 1$ (c) $N = 2L - 1$ (d) $N = L - 1$

(13) Which of the following array element will return the top-of-the-stack-element for a stack of siz N elements? ....

(a) S[N+1] (b) S[N-1] (c) S[N] (d) Nothing

(14) ..... Selects the minimum element from unsorted sub-list and places it into the sorted list. Th iterates unless all the elements are consumed into sorted sub-list.

(a) Insertion Sort (b) Bubble Sort (c) Selection Sort (d) Nothing

(I) ***Chose*** **the correct answer for the following sentences,** ***write only the choice*****:** **(14 Marks)**

(1) A linear collection of data elements where the linear node is given by means of poin is called .....

(a) Array List **(b)** List **(c)** Linked List **(d)** Nothing

(2) In linked list each node contain minimum of two fields. One field is data field to store the da second field is .....

(a) Pointer to character **(b)** Pointer to integer **(c)** Pointer to node **(d)** Nothing

(3) What would be the asymptotic time complexity to find an element in the linked list?

(a) O(1) **(b)** O(n) **(c)** $O(n^2)$ **(d)** Nothing

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

Q2. Write the term that refers to each sentence

1- Is the list where the last node refer to the first node ( )

2- In it, each element contains its value and two pointers – to the previous and to the next element ( )

3- The maximum degree in a tree ( )

4- In it , Traverse a tree layer by layer ( )

5- In it, Visit each node in a tree ( )

6- The maximum depth In tree ( )

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

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

2- A linear collection of data elements where the linear node is given by means of pointer is

a) array list
b) list
c) linked list
d) no thing

3-in linked list each node contain minimum of two fields . one field is data field to store the data , second field is .....

a) pointer to character
b) pointer to integer
c) pointer to node
d) nothing

4-what is the disadvantage of array data structure

a) The amount of memory to be allocated should be known beforehand.
b) Elements of an array can be accessed in constant time
c) Elements are stored in contiguous memory blocks.
d) Multiple other data structures can be implemented using arrays.

5- . In doubly linked lists, traversal can be performed?

a) Only in forward direction

b) Only in reverse direction
c) In both directions
d) None

6- . What is the result of the following operation Top (Push (S, X))
a) X
b) Null
c) S
d) None

7- Consider the linked list implementation of a stack. Which of the following node is considered as Top of the stack?

a) First node
b) Last node
c) Any node
d) Middle node

8- Which of the following operations is performed more efficiently by doubly linked list than by singly linked list?

a) Deleting a node whose location in given
b) Searching of an unsorted list for a given item
c) Inverting a node after the node with given location
d) Traversing a list to process each node

9- In general, the index of the first element in an array is _____
a) 0
b) -1
c) 2
d) 1

10- A queue follows _____
a) FIFO (First In First Out) principle
b) LIFO (Last In First Out) principle
c) Ordered array

12. The two basic operations in the stack are __C .
A) Insertion and deletion
B) Searching and sorting
C) Push and pop
D) None of these

13. Before executing push operation one must check for the B condition.
A) Underflow
B) Overflow
C) Full
D) Empty

14. Before executing the pop operation we must check for the A_ condition.
A) Underflow
B) Overflow
C) Full
D) Empty

15. A C is a non-linear data structure consisting of a root node.
A) Stack
B) Queue
C) Tree
D) Graph

16. Which method adds a new item to the queue? C
A) Addition.
B) Insertion.
C) Enqueue.
D) Dequeue.

17. A tree with no nodes is called A .
A) Null
B) Void
C) Free
D) Open

18. B_ and _B are examples of linear and non-linear data structures, respectively.

A) Stack, queue
B) Array, graphs
C) Trees, files
D) Graphs, linked list

19. Name the two parts in which a node is divided. D

A) Next field, raw field
B) Next field, data field
C) Link field, raw field
D) Data field, link field

20. Stack cannot be used to D

A) Evaluate an arithmetic expression in postfix form
B) Implement recursion
C) Convert infix form to postfix of an expression
D) Allocate resources by the operating system

21. If the elements '1', '2', '3' and '4' are inserted in a queue, what would be order for the removal? A

A) 1234

B) 4321

C) 3241

D) None of the above

22. A list of elements in which En queue operation takes place from one end, and De queue operation takes place from one end is C

A) Binary tree

B) Stack

C) Queue

D) Linked list

23. which of the following type of data structure is used in recursion? D

A) Queues type of data structure

B) Array type of data structures

C) List type of data structures

D) Stack type of data structures

24. Name the type of data structure among the following that could be used to implement queues? D

A) Linked List type of data structure

B) Arrays type of data structure

C) Stack type of data structure

D) All of the above following type

25. The advantage of B is that they solve the problem if sequential storage representation. But disadvantage in that is they are sequential lists.

A) Lists

B) Linked Lists

C) Trees

D) Queues

26-4. In Linked List implementation, a node carries information regarding _____

a) Data
b) Link
c) Data and Link
d) Node

27- Linked list is considered as an example of _____ type of memory allocation.

a) Dynamic
b) Static
c) Compile time
d) Heap

28- Which of the following properties is associated with a queue?

a) First In Last Out
b) First In First Out
c) Last In First Out
d) Last In Last Out

29- To implement a stack using queue(with only enqueue and dequeue operations), how many queues will you need?

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

30-The ... method removes and returns the object at the begining of the Queue.

a) public virtual void Dequeue();
b) public virtual void Delete();
c) public virtual void Clear();
d) public virtual object Dequeue();

الاسم /طه طارق سعد بليله

1-what is the difference between list and array in c#?
A-List allows adding and removing items at runtime, while the size of an array is determined at creation
B-List is a collection of items linked sequentially, while an array is a collection of items linked linearly.
C-List uses IEnumerable and ICollection, while array only uses IEnumerable.
D-All of the above are correct.

2-What is the difference between a Stack and a Queue in C # ?

A-.Out (FIFO) order-First-In-Out (LIFO) order, while a Queue follows First-First-In-Stack follows Last

B-A Stack allows access to its elements through a single endpoint, while a Queue allows access through both .endpoints

C-.methods ()A Stack uses Push() and Pop() methods, while a Queue uses Enqueue() and Dequeue

D-.All of the above are correct

3-What the output:

```
using System.Collections;

public class Program
{
    public static void Main()
    {
        // adding elements using ArrayList.Add() method
        var arlist1 = new ArrayList();
        arlist1.Add(1);
        arlist1.Add("Bill");
        arlist1.Add(" ");
        arlist1.Add(true);
        arlist1.Add(4.5);
        arlist1.Add(null);

        Console.WriteLine("Arraylist 1 Elements");

        for(int i = 0; i< arlist1.Count; i++)
            Console.Write(" "+arlist1[i]);


    }
}
```

A-1 Bill True 4.5

B-Bill True 4.5 1
C-Error
D-There is no correct answer

4-what the output

```
// Creating an ArrayList
ArrayList myList = new ArrayList();

// Adding elements to ArrayList
myList.Add("Hello");
myList.Add("World");

Console.WriteLine("Count : " + myList.Count);
Console.WriteLine("Capacity : " + myList.Capacity);
```

A-Count : 2 ,Capacity : 4 B-Count : 2 ,Capacity : 2
B-Count : 0 ,Capacity : 2 D-there is no correct answer

5-What is a LinkedList in C#?

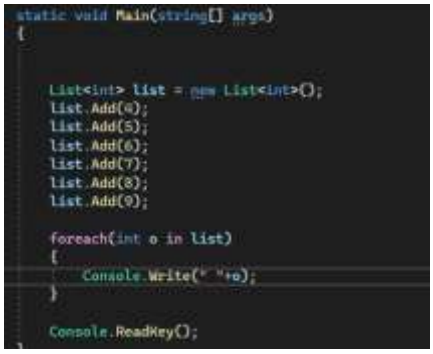
a. It is a collection that stores items in a sequential order.

b. It is a collection that allows duplicate items.

c. It is a collection that stores items as nodes that are linked together.

d. It is a collection that allows random access to its elements.

6-What the output



A- 4 5 6 7 8 9 B-456789
C-45 67 89 D-error

7-

A-5 B-4

C-6 D-0

8-What is a SortedList in C#?

a. It is a collection that stores key-value pairs sorted by the keys.

b. It is a collection that stores items in a sequential order.

c. It is a collection that allows duplicate items.

d. It is a collection that stores unique items in an unordered collection.

9-How can you reverse a string in C#?

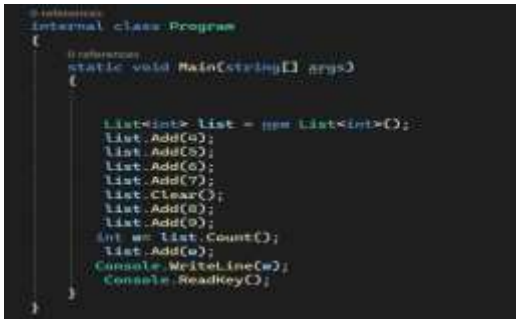
a. Using the built-in Array.Reverse() method.

b. Using the built-in String.Reverse() method.

c. Implementing a custom string reversal algorithm.

d. All of the above are correct.

10-what the output



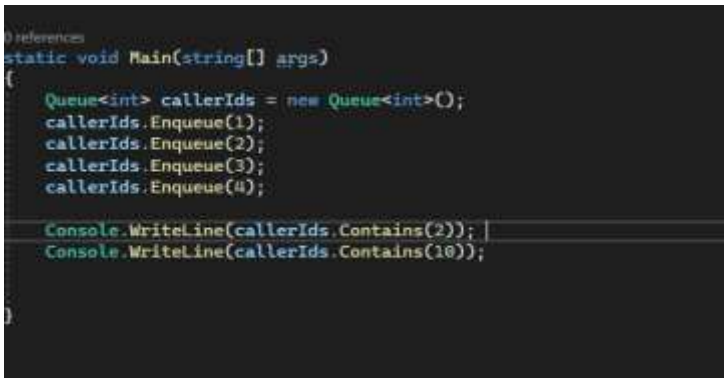
```
internal class Program
{
    static void Main(string[] args)
    {

        List<int> list = new List<int>();
        list.Add(4);
        list.Add(5);
        list.Add(6);
        list.Add(7);
        list.Clear();
        list.Add(8);
        list.Add(9);
        int w= list.Count();
        list.Add(w);
        Console.WriteLine(w);
        Console.ReadKey();
    }
}
```

A-3 B-2

C-4 D-8 9 2

11-what the output



```
static void Main(string[] args)
{
    Queue<int> callerIds = new Queue<int>();
    callerIds.Enqueue(1);
    callerIds.Enqueue(2);
    callerIds.Enqueue(3);
    callerIds.Enqueue(4);

    Console.WriteLine(callerIds.Contains(2));
    Console.WriteLine(callerIds.Contains(10));


}
```

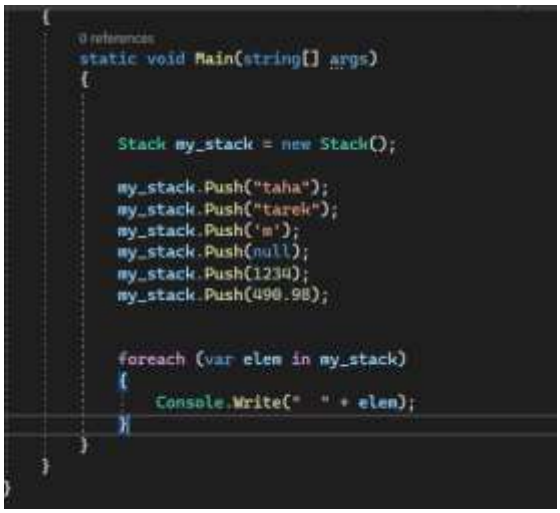
A-A-True
False

B-True
True

C-False
False

D-False
True

12-what the output



```
{
    0 references
    static void Main(string[] args)
    {


        Stack my_stack = new Stack();

        my_stack.Push("taha");
        my_stack.Push("tarek");
        my_stack.Push('m');
        my_stack.Push(null);
        my_stack.Push(1234);
        my_stack.Push(490.98);


        foreach (var elem in my_stack)
        {
            Console.Write("  " + elem);
        }
    }
}
```

A- taha tarek m null 1234 490.98
B- 1234 490.98 null m taha tarek
C- taha tarek 1234 490.98
D- 490.98 1234 m tarek taha

13-The operation ----------does not effect stack.

A-pop B-push
C-top D-none of above

14-what the output

```
{
    0 references
    static void Main(string[] args)
    {


        Stack my_stack = new Stack();

        my_stack.Push("taha");
        my_stack.Push("tarek");
        my_stack.Push("1234");
        my_stack.Push("ramadan");

        Console.WriteLine("Total elements present in" +
                    " my_stack: {0}", my_stack.Count);

        my_stack.Pop();
        Console.WriteLine("Total elements present in " + "my_stack: {0}", my_stack.Count);

        my_stack.Clear();


        Console.WriteLine("Total elements present in " +
                      "my_stack: {0}", my_stack.Count);
    }
}
```

A-Total elements present in my_stack:4
Total elements present in my_stack:3

Total elements present in my_stack:3

B- Total elements present in my_stack:4
Total elements present in my_stack:0

Total elements present in my_stack:3

C-Total elements present in my_stack:4

Total elements present in my_stack:3

Total elements present in my_stack:0

D- Total elements present in my_stack:4

Total elements present in my_stack:0

15----------is an example of non-linear data structure

A-stack
B-Graph
B-Array
D-Queue

16----------is an example of LIFO (Last is First Out)data structure

A-stack
B-Array

C-Graph
D-Queue

17-The operation ---------- does not effect on a stack.

A-push
B-top
B-pop
D-clear

18-what the output

```
static void Main(string[] args)
{

    Stack my_stack = new Stack();
    my_stack.Push("taha");
    my_stack.Push("tarek");
    my_stack.Push("1230");
    my_stack.Push("ramadan");

    if (my_stack.Contains("1230") == true)
    {
        Console.WriteLine("Element is found...!!");
    }

    else
    {
        Console.WriteLine("Element is not found...!!");
    }
}
```

A-Element is found...!! B-Element is not found...!!
B-error D-none of above

19-what output

```
Sec2.Program
{
    static void Main(string[] args)
    {

        Queue my = new Queue();

        my.Enqueue("taha");
        my.Enqueue(1);
        my.Enqueue(100);
        my.Enqueue(1.22);
        my.Enqueue("tarek");

        Console.WriteLine("Total elements present in my: {0}", my.Count);
        my.Dequeue();
        Console.WriteLine("Total elements present in my: {0}",my.Count);


        my.Clear();
        Console.WriteLine("Total elements present in my: {0}", my.Count);
    }
}
}
```

A-Total elements present in my: 5 B-Total elements present in my: 5
Total elements present in my: 4 Total elements present in my: 5
Total elements present in my: 0 Total elements present in my: 5

C-Total elements present in my: 5 D-error
Total elements present in my: 4
Total elements present in my: 0

20- What the output

A-All items deleted successfully B-error
B-none of above D-10 20 30 40

21-…… form of access is used to add and remove nodes from a queue.

A. LIFO, Last In First Out B. FIFO, First In First Out

C. Both a and b D. None of these

22- The term push and pop is related to

A- Array B-Lists

C- Stacks D-Trees

23- To perform level-order traversal on a binary tree, which of the following data structure will be required?

A- Hash table B- Queue

C-Binary search tree D-Stack

24-Which of the following data structure can't store the nonhomogeneous data elements?

A- Arrays B -Stacks

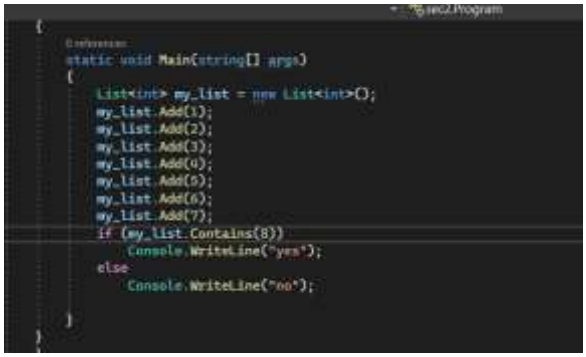
C -Records D -None of the above

25- A linear list in which the pointer points only to the successive node is.....

A -singly linked list B- circular linked list

C -doubly linked list D -none of the above

26-what the output



A-yes B-no
B-error D-none of above

27-What is a Stack in C#?

a. It is a collection that stores key-value pairs.

b. It is a collection that stores items in a sequential order.

c. It is a collection that allows duplicate items.

d. It is a collection that stores items in a Last-In-First-Out (LIFO) order.

28-what the output

```
static void Main(string[] args)
{
    List<int> my_list = new List<int>();
    my_list.Add(1);
    my_list.Add(2);
    my_list.Add(3);
    my_list.Add(4);
    my_list.Add(5);
    my_list.Add(6);
    my_list.Add(7);
    my_list.Clear();
    my_list.Add(8);
    if (my_list.Contains(8))
        Console.WriteLine("yes");
    else
        Console.WriteLine("no");
}
```

A-yes B-no
C-none of above D-error

29-what the output

```
internal class Program
{
    static void Main(string[] args)
    {
        Stack myStack = new Stack();
        myStack.Push(1);
        myStack.Push(2);
        myStack.Push(3);
        myStack.Push(4);
        while (myStack.Count > 0)
            Console.Write(myStack.Pop() + ",");
        Console.WriteLine();
        Console.WriteLine("Number of elements in Stack: {0}", myStack.Count);

    }
}
```

A- 4,3,2,1
Number of elements in Stack:0

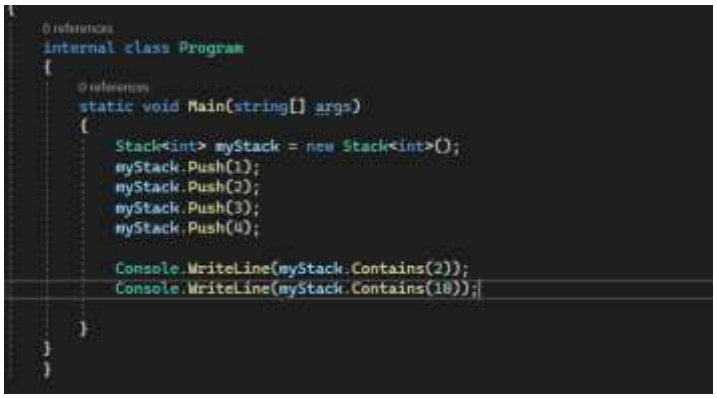
B- Number of elements in Stack:0
1,2,3,4

C-1,2,3,4

D-none of above

Number of elements in Stack:0

30-What the output



```
internal class Program
{
    static void Main(string[] args)
    {
        Stack<int> myStack = new Stack<int>();
        myStack.Push(1);
        myStack.Push(2);
        myStack.Push(3);
        myStack.Push(4);

        Console.WriteLine(myStack.Contains(2));
        Console.WriteLine(myStack.Contains(10));

    }
}
}
```

B-True
False

B-True
True

C-False
False

D-False
True