CSE-204 Quiz, Spring 2021

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Not shared

QUESTIONS

0.5 marks will be deducted for each wrong answer

Which of the following techniques is used by Merge sort for sorting an array? 1 point

- Backtracking
- Greedy Algorithm
- Divide and Conquer
- Dynamic Programming

Consider that the following operations are performed sequentially on a Stack. Identify the correct pop sequence of the Stack

1 point

```
push(6)
push(3)
pop()
push(8)
push(4)
pop()
pop()
pop()
push(9)
pop()
```

- ○ 6 3 8 4 9
- ○ 3 4 8 6 9
- ○ 3 6 4 8 9
- ○ 9 4 8 3 6

How much bigger is the new array usually allocated as once we reach the capacity of the currently allocated array in DALs?

1 point

- ○ 1.5x
- ○ 2x
- ○ 2.5x
- ○ 4x
- ○ None of the above

The following items are inserted in a queue sequentially: 1 2 3 4 5 6. In which order will they be removed? 1 point

- 1 2 3 4 5 6
- 6 5 4 3 2 1
- 2 3 4 5 6 1
- 5 4 3 2 1 6

Identify the type of graph where the "Visited" array will not be required to perform a Breadth First Search 1 point

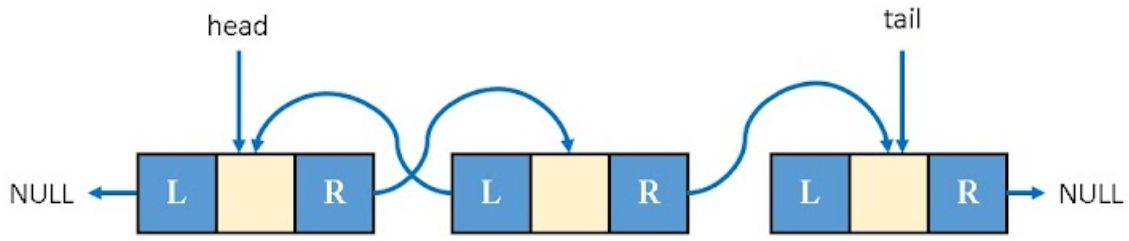
- Undirected Graph
- Directed Graph
- Binary Search Tree
- Undirected Graph that is a Tree

What would be the runtime for finding the smallest element in a singly linked list with tail? 1 point

- O(1)
- O(n)
- O(lg n)
- None of the mentioned above

Identify the appropriate statement to construct the missing link of the following Doubly Linked List

1 point



- head->R->R = tail;
- tail->L->R = head->R;
- head->R->R->L = head->R;
- head->R->R->L = tail->L;

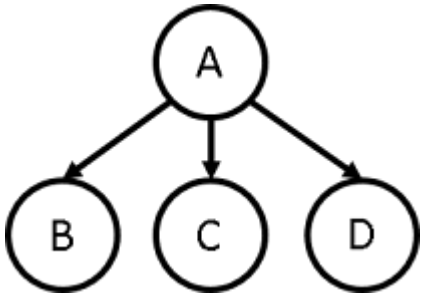
Which of the following statements describes an array best?

1 point

- A data structure that shows a hierarchical behavior.
- Container of objects of similar types.
- Container of objects of mixed types.
- All of the mentioned.

Is it possible to find the shortest distance of B,C,D from A in the following graph by Depth First Search?

1 point

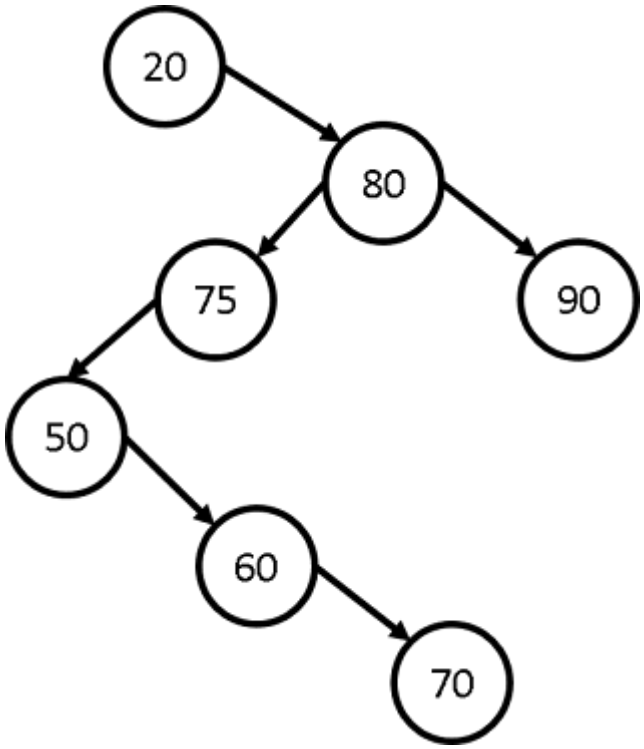


- YES
- No

What will happen if in a C program you assign a value to an array element whose subscript exceeds the size of the array? 1 point

- The element will be set to 0.
- The compiler would report an error.
- The program may crash if some important data gets overwritten.
- The array size would appropriately grow.

Consider 20 as the root of the following Binary Search Tree. Now identify the parent of 60 after deleting 20 from the following Binary Search Tree 1 point



- 80
- 75
- 90
- 50
- 70
- NULL
- Either NULL or 75

What is the output of the following piece of code? 1 point

```
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]);
}
}
```

- 3 and 5.
- 5 and 3.
- 2 and 4.
- 4 and 2.

Identify the sequence that will take maximum time to be inserted in a Binary Search Tree 1 point

- 1 2 3 4 5
- 1 3 2 5 4
- 5 3 2 1 4
- 4 3 2 1 5

If the sequence of operations - enqueue (1), enqueue (2), enqueue (1), dequeue(), enqueue (1), enqueue (2), dequeue(), dequeue(), dequeue(), enqueue (2), dequeue(), dequeue(), dequeue() are performed on a queue, which of the following statements is correct? 1 point

- Underflow occurs
- Overflow occurs
- Queue operations are performed smoothly
- None of the mentioned above

If user attempts to pop from an empty stack then the condition is known as 1 point

- Overflow of Stack
- Underflow of Stack
- Empty Collection
- Garbage Collection

A singly linked list stores the following data: 1 -> 2 -> 3 -> 4 -> 5 -> 6 -> null. What will be the output of the following function when it is called with head as parameter? 1 point

```
void func(listNode* node)
{
    if(!node) return;
    func(node->next);
    printf("%d ",node->item);
}
```

- No output
- 1 1 1 1 1 1 1 1 1 1 1 1 ....
- 1 2 3 4 5 6
- 6 5 4 3 2 1

The term LIFO/FILO is related to 1 point

- Static Array
- Linked List
- Stack
- Queue

Consider that, the value of n is 7 and the value of x is located at a[0] in the following program. Now identify the value that will be returned by the following "binarySearch" function. 1 point

```
int binarySearch(int a[], int n, int x){
    int low = 0;
    int high = n-1;
    int count=0;

    while(low<=high){
        count++;
        int mid = (low+high)/2;
        if(x==a[mid])    break;
        else if(x<a[mid])    high = mid-1;
        else    low=mid+1;
    }
    return count;
}
```

- 0
- 1
- 2
- 3
- 4
- 5
- 6

Identify the appropriate task that can be performed by Bisection algorithm 1 point

- Finding the square root of a number
- Finding the shortest distance of vertices of a graph
- Finding the parent child relationship between the vertices of a graph

A series of 6 values [1 0 4 3 6 5] is inserted sequentially in a Binary Search Tree. Identify the height of the Binary Search Tree 1 point

- ○ 1
- ○ 2
- ○ 3
- ○ 4
- ○ 5
- ○ 6

Which of the following is not true for Dynamic Array Lists? (choose all correct answers) 1 point

- ☐ Dynamic Arrays are actually static at a given time
- ☐ Dynamic arrays grow in size during compile time according to need
- ☐ Dynamic arrays are more space efficient than static arrays
- ☐ Dynamic arrays are usually faster than static arrays
- ☐ We increase the size of dynamic arrays as soon as max capacity is reached

Consider a Complete graph with 6 vertices where vertices are labeled from A to F and A is taken as source vertex. If the start time of A is considered as 1 then identify the end time (finish time) of A after applying the Depth First Search on the graph. Note that a Complete Graph contains edges between every pair of vertices. 1 point

- 2
- 8
- 11
- 12
- 13
- 14
- None of the above

Consider that a graph G with n vertices is represented by an adjacency matrix (2D array). If the vertices are labeled from 0 to n-1 then identify the best possible order to determine whether the edge (X Y) exists in G or not where 0<=X<=Y<=n-1 1 point

- O(1)
- O(n)
- O(logn)
- O(degree of X) or O(degree of Y)

An undirected graph with 5 vertices and 5 edges is represented by an adjacency list. The vertices are marked from 0 to 4 and the edges are given as input by the following sequence: [(2 4), (3 2) , (4 0), (3 1), (1 2)]. Identify the vertex visiting sequence of the graph by Breadth First Search considering 2 as source

1 point

- ○ 2 4 1 3 0
- ○ 2 1 3 4 0
- ○ 2 3 4 1 0
- ○ 2 4 3 1 0
- ○ 2 0 1 3 4

Which of the following are true about a singly linked list?

1 point

- ☐ Singly linked list use static memory allocation.
- ☐ Singly linked list use dynamic memory allocation.
- ☐ An item can be inserted at any position of singly linked list in constant time.
- ☐ An item from head can be deleted in constant time.

Identify the case for which the following algorithm will lead to an infinite loop. Note that the difference between the traditional Binary Search algorithm and the following algorithm is that, the value of high, low is set to mid inside the following while loop where the traditional Binary Search algorithm sets the value of high to mid-1 and low to mid+1 inside the while loop

1 point

```
int binarySearch(int a[], int n, int x){
    int low = 0;
    int high = n-1;

    while(low<=high){
        int mid = (low+high)/2;
        if(x==a[mid])    return mid;
        else if(x<a[mid])    high = mid;
        else    low=mid;
    }
    return -1;
}
```

- ○ n is 5 and the value of x is located at a[0]
- ○ n is 5 and the value of x is located at a[2]
- ○ n is 6 and the value of x is located at a[4]
- ○ n is 5 and the value of x is located at a[4]

For the following add() function for a DAL implementation, which of the following do you think slows down the programs that use this Dynamic Array list the most? 1 point

```
// insert a new item to the end of the list
void add(T item) {
    if (isFull()) {
        // create temporary list with double size
        max_size = 2 * max_size;
        T *temp_list = new T[2* max_size];

        // move all the elements to the temporary list
        for (int i = 0; i < length; i++) {
            temp_list[i] = list[i];
        }

        // delete the old list
        delete [] list;

        // rename temp list
        list = temp_list;
    }
```

- ◯ Having to check each time is the array is full
- ◯ Allocating another array if the array is full
- ◯ Having to copy each element to a new array if the array is full
- ◯ None of the above

If an array is sorted, then what happens if Merge Sort is performed on that array? i.e Array: {10, 23, 45, 56, 64, 73, 98} 1 point

- ◯ It immediately ends the sorting
- ◯ Goes through the whole process of sorting and then ends
- ◯ Goes through half way and realizes it's already sorted and ends sorting
- ◯ Falls into infinite loop

If a queue is implemented using stacks, what would be the space complexity? 1 point

- O(1)
- O(n)
- O(n*n)
- None of the above

What is the best case time complexity of merge sort? 1 point

- O(n^2)
- O(n log n)
- O(n^2 log n)
- O(n log n^2)

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