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LAB: DATA STRUCTURES AND ALGORITHMS

SUBMITTED TO: SIR ADIL

Task #1

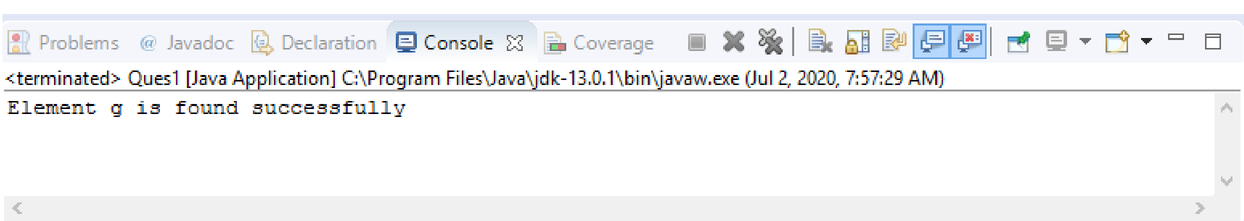
Design a linear array B [] of size 7 elements. Put the following elements in it.   s, u, g, a, z, e, y a. Implement the Linear Search Algorithm on it to find "g" and display the message   Element g is found successfully b. Search for element "m" and message should be displayed Search is Unsuccessful

Answer:

Program:

```
public class Ques1 {
	public static void main (String[] args) {
		char b[] = {'s','u','g','a','z','e','y' };
		boolean found = false;
		int i = 1;
		int max = 6;
		char item='g';
		while (i<=max && found==false)
		{
			if(b[i]==item)
			{
				found=true;
			}
			else
			{
				i++;
			}
		}
		if(found==true)
		{
			System.out.println("Element g is found successfully");
		}
		else {
			System.out.println("search is unsuccessfull");
		}
		
		}

}
```

Output:



Task# 2

Suppose there is a list of 6 unsorted elements.   15, 10, 12, 11, 9, 10

Design a Program to create an array A [] and store this list in it, and then apply Insertion Sort Algorithm to Sort the list.

ANSWER:

DATA:

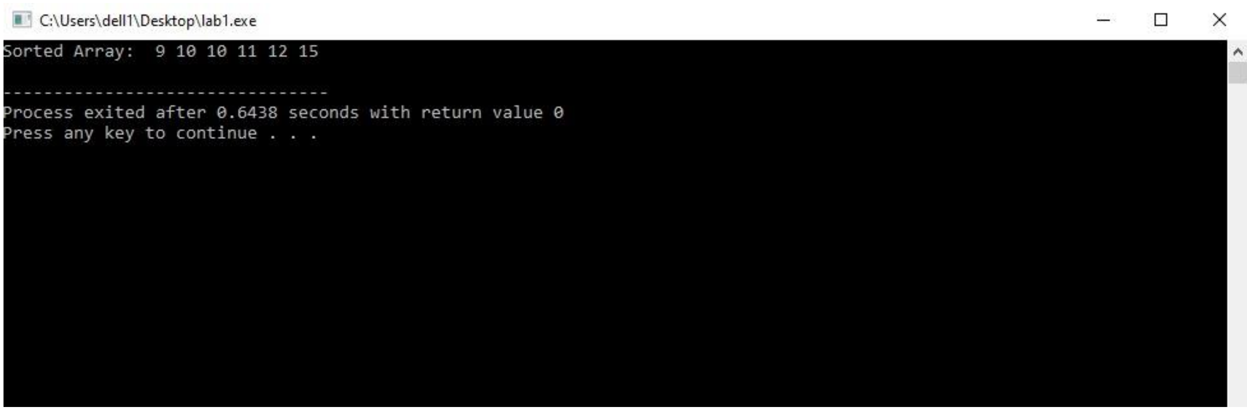
15, 10, 12, 11, 9, 10 (unsorted lists)

Program:

```
using namespace std;


/* Function to sort an array using insertion sort*/

void insertionSort(int arr[], int n)

{

  int i, key, j;

  for (i = 1; i < n; i++)

  {

    key = arr[i];

    j = i - 1;


    /* Move elements of arr[0..i-1], that are

    greater than key, to one position ahead

    of their current position */

    while (j >= 0 && arr[j] > key)

    {

      arr[j + 1] = arr[j];

      j = j - 1;
```

```
        }
        arr[j + 1] = key;
    }
}

// A utility function to print an array of size n
void printArray(int arr[], int n)
{
    int i;
    for (i = 0; i < n; i++)
        cout << arr[i] << " ";
    cout << endl;
}

/* Driver code */
int main()
{
    int arr[] = { 12, 11, 13, 5, 6 };
    int n = sizeof(arr) / sizeof(arr[0]);

    insertionSort(arr, n);
    printArray(arr, n);

    return 0;
}
```

<u>OUTPUT:</u>


C:\Users\dell1\Desktop\lab1.exe
Sorted Array: 9 10 10 11 12 15

Process exited after 0.6438 seconds with return value 0
Press any key to continue . . .