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BCS-3J

DS Lab 05

Q1:

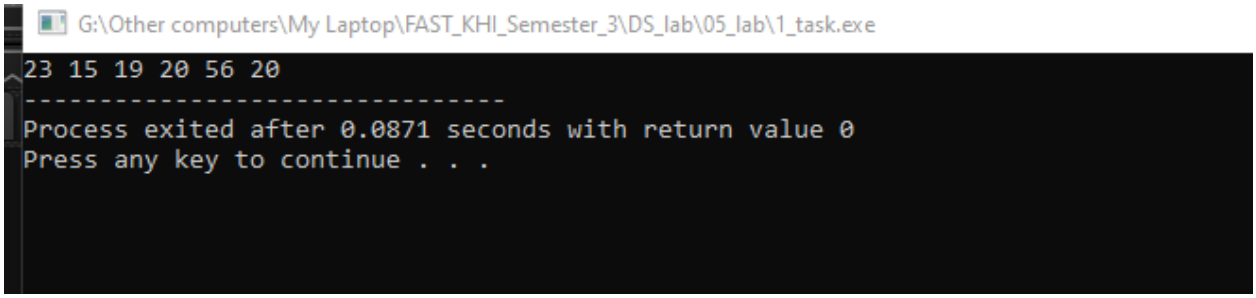
Code:

```
#include <bits/stdc++.h>


using namespace std;
class Node
{
public:
    int data;
    Node *head;
    Node *next;
    Node()
    {
        this->next = NULL;
        this->head = NULL;
    }
    Node(int data, Node *next = NULL)
    {
        this->data = data;
```

```
        this->next = next;
        this->head = NULL;
    }

    void insertElement(Node *temp, int val)
    {
        if (temp == NULL)
        {
            temp = new Node(val);
            head = temp;
            return;
        }
        if (temp->next == NULL)
        {
            temp->next = new Node(val);
            return;
        }
        insertElement(temp->next, val);
    }
    void displayReverse(Node *temp)
    {
        if (temp->next == NULL)
        {
            cout << temp->data << " ";
```

```
            return;
        }
        else if (temp == NULL)
            return;
        displayReverse(temp->next);

        cout << temp->data << " ";
    }
};
int main()
{
    Node *list = new Node(20);
    list->insertElement(list, 56);
    list->insertElement(list, 20);
    list->insertElement(list, 19);
    list->insertElement(list, 15);
    list->insertElement(list, 23);

    list->displayReverse(list);
    return 0;
}
```

Output:



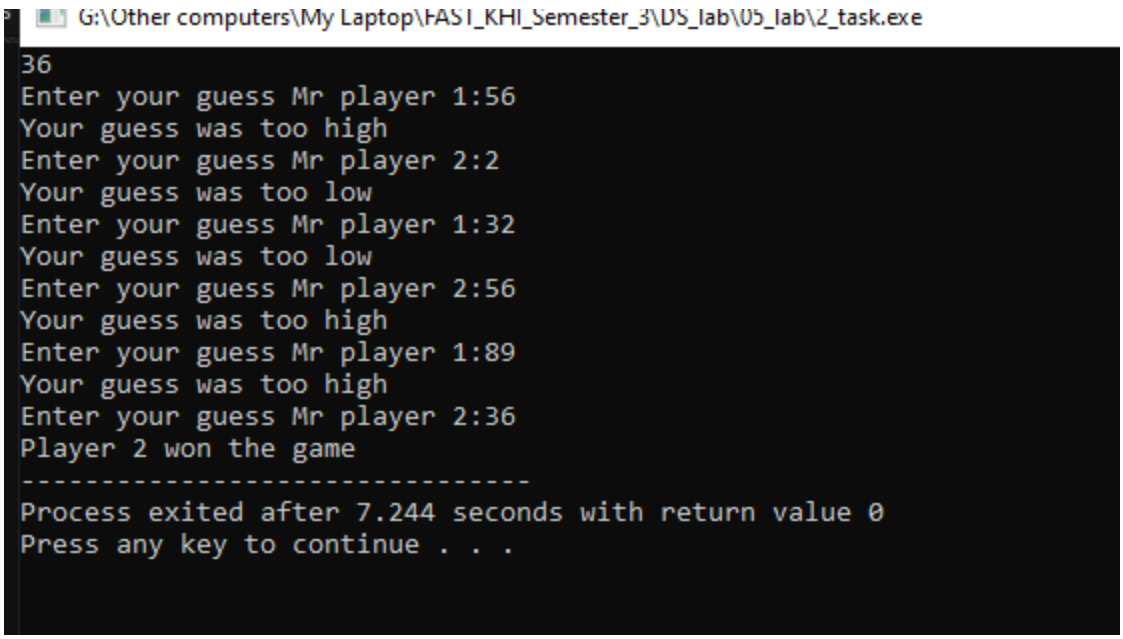
Q2:

Code:

```
#include <bits/stdc++.h>


using namespace std;


string guessNumber(int n)

{

    int guess;

    cout << "Enter your guess Mr player 1:";

    cin >> guess;

    if (n == guess)

        return "Player 1";

    else if (guess > n)

        cout << "Your guess was too high" << endl;

    else

        cout << "Your guess was too low" << endl;

    cout << "Enter your guess Mr player 2:";

    cin >> guess;
```

```
    if (n == guess)
        return "Player 2";
    else if (guess > n)
        cout << "Your guess was too high" << endl;
    else
        cout << "Your guess was too low" << endl;
    return guessNumber(n);
}
int main()
{
    srand(static_cast<unsigned>(time(0)));
    int n = rand() % 100 + 1;
    cout << n << endl;
    cout << guessNumber(n) << " won the game";
    return 0;
}
```

Output:



Q3:

Code:

```
#include <iostream>


using namespace std;

class Node

{

public:

    int data;

    Node *next;

    Node()

    {

        this->next = NULL;

        data = 0;

    }
```

```
Node(int data)
{
    this->data = data;
    this->next = NULL;
}

void insertElement(Node *temp, int val)
{
    if (temp->next == NULL)
    {
        temp->next = new Node(val);
        return;
    }

    insertElement(temp->next, val);
}

void displayLLUsingRecursion(Node *mover)
{
    if (mover == NULL)
    {
        return;
    }
```

```
        cout << mover->data << " ";
        if (mover->next == NULL)
        {
            return;
        }
        displayLLUsingRecursion(mover->next);
    }

    int findLength(Node *temp, int count = 0)
    {
        if (temp == NULL)
        {
            return count;
        }
        return findLength(temp->next, count + 1);
    }
};

int main()
{
    Node *list = new Node(23);
    list->insertElement(list, 56);
    list->insertElement(list, 20);
    list->insertElement(list, 19);
```

```
    list->insertElement(list, 15);

    list->insertElement(list, 23);

    list->insertElement(list, 495);


    cout << list->findLength(list);

    return 0;

}
```

Output:

```
7
--------------------------------
Process exited after 0.06403 seconds with return value 0
Press any key to continue . . .
```

Q4:

Code:

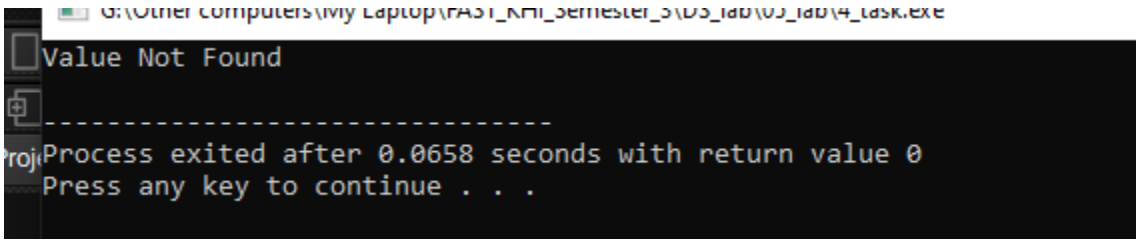
```
#include <iostream>


using namespace std;

class Node

{

public:

    int data;

    Node *next;

    Node()

    {
```

```
        this->next = NULL;
        data = 0;
    }

    Node(int data)
    {
        this->data = data;
        this->next = NULL;
    }

    void insertElement(Node *temp, int val)
    {
        if (temp->next == NULL)
        {
            temp->next = new Node(val);
            return;
        }

        insertElement(temp->next, val);
    }

    void displayLLUsingRecursion(Node *mover)
    {
        if (mover == NULL)
```

```
        {
            return;
        }
        cout << mover->data << " ";
        if (mover->next == NULL)
        {
            return;
        }
        displayLLUsingRecursion(mover->next);
    }

    Node *findVal(Node *temp, int n)
    {
        if (!temp)
        {
            cout << "Value Not Found" << endl;
            return temp;
        }
        if (temp->data == n)
        {
            cout << "Value Found" << endl;
            return temp;
        }
```

```
        return findVal(temp->next, n);
    }
};


int main()
{
    Node *list = new Node(23);
    list->insertElement(list, 56);
    list->insertElement(list, 20);
    list->insertElement(list, 19);
    list->insertElement(list, 15);
    list->insertElement(list, 23);
    list->insertElement(list, 495);

    Node *search = list->findVal(list, 95);
    return 0;
}
```

Output:



Q5:

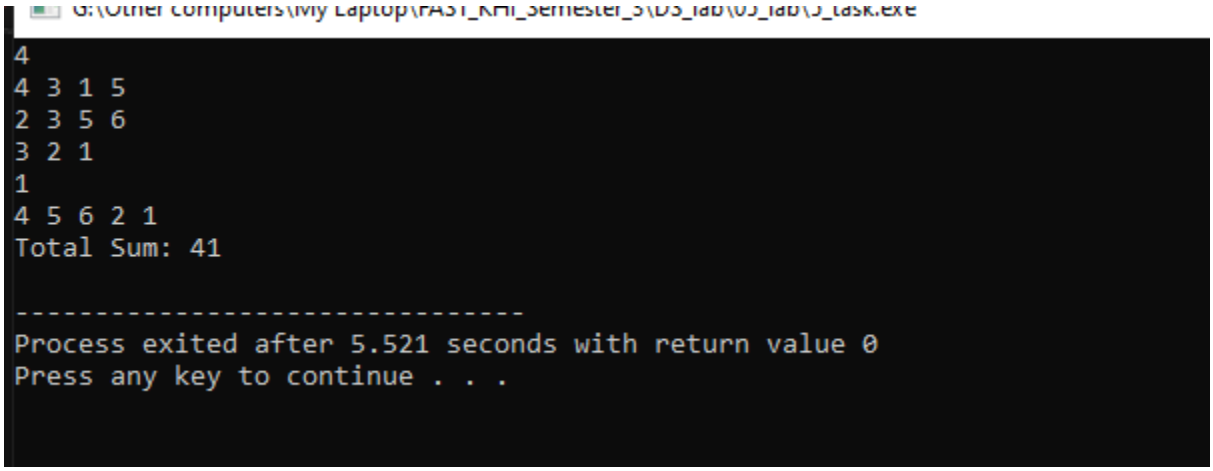
Code:

```cpp
#include <bits/stdc++.h>
using namespace std;

int sum(int i, int cols, int *arr)
{
    if (cols == i)
        return 0;

    return arr[i] + sum(i + 1, cols, arr);
}

int rows;
int recursiveArraySum(int *arr[], int sizes[], int dim)
{
    int sumOfRow = sum(0, sizes[dim], arr[dim]);
    if (dim == rows)
    {
        return sumOfRow;
    }

    return sumOfRow + recursiveArraySum(arr, sizes, dim + 1);
}

int main()
```

```
{
    cin >> rows;
    int **array = new int *[rows];
    int *sizes = new int[rows];

    for (int i = 0; i < rows; i++)
    {
        cin >> sizes[i];
        array[i] = new int[sizes[i]];
    }

    for (int i = 0; i < rows; i++)
    {
        for (int j = 0; j < sizes[i]; j++)
        {
            cin >> array[i][j];
        }
    }

    cout << "Total Sum: " << recursiveArraySum(array, sizes, 0) <<
endl;
    return 0;
}
```

```
/*
input values
4
4 3 1 5
2 3 5 6
3 2 1
1
4 5 6 2 1

output : 41
*/
```

Output:



Q6:

Code:

Output:

Q7:

Code:

Output: