

**NATIONAL UNIVERSITY OF COMPUTER AND  
EMERGING SCIENCES  
PROGRAM: SOFTWARE ENGINEERING**



***DATA STRUCTURES LAB***  
**LAB TASK-08**

**SUBMITTED BY:**

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## ***Q1 CODE (sum):***

```
#include<iostream>

using namespace std;

int sum(int n)
{
    if(n==0)
    {
        return 0;
    }
    return n+(sum(n-1));
}

int main()
{
    int n;

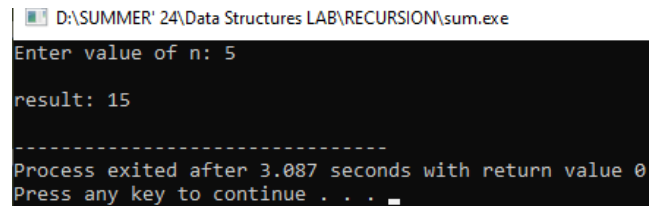
    cout<<"Enter value of n: ";

    cin>>n;

    cout<<endl<<"result: "<<sum(n)<<endl;

    return 0;
}
```

## ***Output-01:***



```
D:\SUMMER' 24\Data Structures LAB\RECURSION\sum.exe
Enter value of n: 5
result: 15
-----
Process exited after 3.087 seconds with return value 0
Press any key to continue . . .
```

## ***Q2 CODE (Combination):***

```
#include<iostream>
```

```
using namespace std;
```

```
int factorial(int n)
```

```
{
```

```
    if(n==0 || n==1)
```

```
    {
```

```
        return 1;
```

```
    }
```

```
    return n*factorial(n-1);
```

```
}
```

```
int combination(int n, int r)
```

```
{
```

```
    return factorial(n)/(factorial(r)*factorial(n-r));
```

```
}
```

```
int main()
```

```
{
```

```
    int n,r;
```

```
    cout<<"enter value of n: ";
```

```
    cin>>n;
```

```
    cout<<endl<<"enter value of r: ";
```

```
    cin>>r;
```

```
    if(r>n)
```

```
    {
```

```
        cout<<endl<<"incorrect input"<<endl;
```

```

    }

    else

    {

        cout<<"Combination: "<<combination(n,r)<<endl;

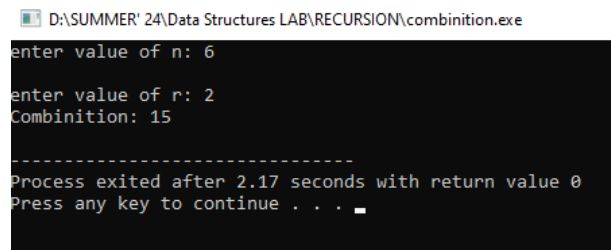
    }

    return 0;

}

```

## **Output-02:**



```

D:\SUMMER' 24\Data Structures LAB\RECURSION\combination.exe
enter value of n: 6
enter value of r: 2
Combination: 15
-----
Process exited after 2.17 seconds with return value 0
Press any key to continue . . .

```

---

## **Q3 CODE (Permutation):**

```

#include<iostream>

using namespace std;

int factorial(int n)
{
    if(n==0 || n==1)
    {
        return 1;
    }

    return n*factorial(n-1);
}

int permutation(int n, int r)

```

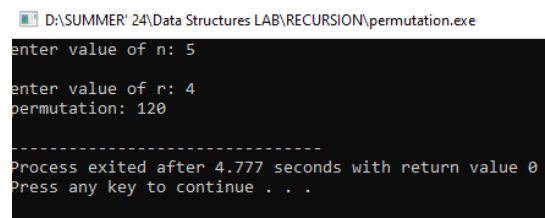
```

{
    return factorial(n)/factorial(n-r);
}

int main()
{
    int n,r;
    cout<<"enter value of n: ";
    cin>>n;
    cout<<endl<<"enter value of r: ";
    cin>>r;
    if(r>n)
    {
        cout<<endl<<"incorrect input"<<endl;
    }
    else
    {
        cout<<"permutation: "<<permutation(n,r)<<endl;
    }
    return 0;
}

```

## **Output-03:**



```

D:\SUMMER' 24\Data Structures LAB\RECURSION\permutation.exe
enter value of n: 5
enter value of r: 4
permutation: 120
-----
Process exited after 4.777 seconds with return value 0
Press any key to continue . . .

```

---

## **Q4 CODE (searching):**

```
#include<iostream>

#include<cmath>

using namespace std;

void searching(int arr[], int start, int end, int val)
{
    if(start>end)
    {
        cout<<"not found"<<endl;
        return;
    }
    int n=floor((start+end)/2);
    if(arr[n]==val)
    {
        cout<<"found, index no. : "<<n<<endl;
        return;
    }
    else if(val>arr[n])
    {
        searching(arr,n+1,end,val);
    }
    else
    {
        searching(arr,start,n-1,val);
    }
}
```

```

void print(int arr[], int size)
{
    for(int i=0; i<size; i++)
    {
        cout<<arr[i]<<" ";
    }
    cout<<endl;
}

int main()
{
    int arr[8]={1, 2, 3 ,4, 5, 6, 7, 8};
    int size=sizeof(arr)/sizeof(arr[0]);
    int val=7;

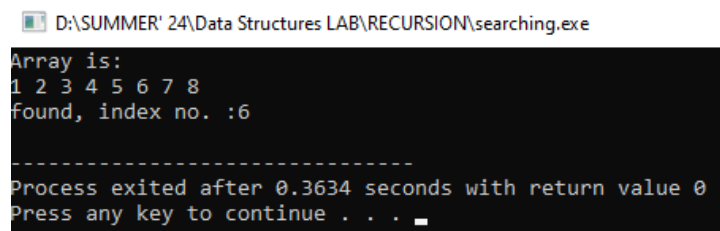
    cout<<"Array is: "<<endl;
    print(arr,size);

    searching(arr,0,size-1,val);

    return 0;
}

```

## **Output-04:**



```

D:\SUMMER' 24\Data Structures LAB\RECURSION\searching.exe
Array is:
1 2 3 4 5 6 7 8
found, index no. :6
-----
Process exited after 0.3634 seconds with return value 0
Press any key to continue . . .

```

---

