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Course : Data Structures and Algorithms

Lab # 02

Short Questions

1. Write the output of the following program.

#include<iostream>
using namespace std;
int mystery(int,int);
int main()
{

int x=5,y=2;
cout<<"Result = "<<mystery(x,y);
return 0;
}
int mystery(int a, int b)
{
if(b==1)
return a;
else
return a + mystery(a, b-1);
}
Output :

```
  Result = 10
[Program finished]
```

2.Let J and K be integers and suppose Q(J, K) is recursively defined by :
Q(J,K) = {
5, J < K
Q(J − K, K + 2) + J, J ≥ K
Trace and Find Q(5, 3).

ANSWER:
    10

3.Let 'a' and 'b' be integers and suppose Q(a, b) is recursively defined by :
Q(a, b) = {
0, a < b
Q(a − b, b) + 1, b ≤ a
Find Q(14,3).

Answer :
    5

4.Identify the problem with the following recursive function.
void recurse(int count)
{

cout<< count <<"\n";
recurse (count + 1);
}
ANSWER:

In this recursive function, output will be "infinity" , there is no ending of this program. The problem is inrecurse (count+1). Whichever value is passed, the function will keep on adding + 1.

5 Given the following function, write the output if the user enters 'abcz' as input.
void rev()
{
char c;
cin>>c;
if(c!='z'){
rev();
cout<<c;
}
}

Output:

```
Enter the input :
abcz
  c  b  a

[Program finished]
```
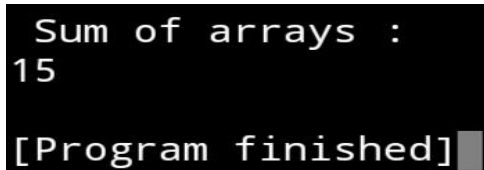
Question 1
#include<iostream>
using namespace std;
int Sum(int a[],int size)
{
      if (size==0)
      return 0;
      else
      return a[size-1]+ Sum (a,size-1);

```cpp
}
int main()
{
        int arr[]={1,2,3,4,5};
        cout<<" Sum of arrays : "<<endl;
        int result= Sum (arr,5);
        cout<<result<<endl;
        return 0;
}
```

Output :


```
 Sum of arrays :
15

[Program finished]
```

Question 2

```cpp
#include<iostream>
using namespace std;
void N(int x)
{
        if (x== - 1)
        return ;
        else
        cout<<" "<<x<<endl;
        N(x-1);
}
int main()
{
        int x=10;
        cout<<"  Print the numbers : "<<endl;
        N(x);
        return 0;
        system("pause");
}
```

Output:

```
  Print the numbers :
  10
  9
  8
  7
  6
  5
  4
  3
  2
  1
  0
[Program finished]▮
```

Question 3

```cpp
#include<iostream>
using namespace std;
int Ackermann(int m,int n)
{
    if (m==0)
    {
    return n+1;
}
else if (m!=0 && n==0)
{
    return Ackermann(m-1,1);
}
else
{
    return Ackermann(m-1,Ackermann(m,n-1));
}
}
int main()
{
    int m,n;
    cout<<" Enter the positive integer M"<<endl;
    cin>>m;
    cout<<" Enter the positive integer N "<<endl;    cin>>n;
    cout<<endl;
    cout<<" Result of Ackermann = "<<endl;
```

```
        cout<<"  "<<Ackermann(m,n)<<endl;
        return 0;
}
```

Output :

```
 Enter the positive integer M
 2
 Enter the positive integer N
 5

 Result of Ackermann =    13

[Program finished]
```

Question 4

```
#include<iostream>
using namespace std;
int Bin (int n, int m)
{
        if (m==0 || n==m)
        {
        return 1;
        }
        else
        {
        return Bin (n-1,m)+Bin(n-1,m-1);
        }
}
int main()
{
        cout<<endl;
        cout<<" Binomial coefficient =";
        cout<<"  "<<Bin(10 ,5)<<endl;
        return 0;
}
```

Output :

```
Binomial coefficient = 252

[Program finished]
```