ADSA Session-3

1.) Best optimized code to check whether given number is prime or not.

Code:

```
#include <iostream>
#include<cmath>
using namespace std;
int main() {
    int n;
    cout<<"Enter any number (to check whether it is prime or not):";
    cin>>n;
    int flag=0;
    if(n!=2 && n%2==0){
        flag = 1;
    }
    if(n!=3 && n%3==0){
        flag = 1;
    }
    else{
        for(int i=5; i<=sqrt(n); i+=6 ){
            if(n%i==0 || n%(i+2)==0){
```

```
            flag=1;
            break;
        }
    }
}
if(flag==0)
cout<<"Given number is a prime Number";
else
cout<<"Given number is not Prime Number";
return 0;
}
```

Output:

Output

```
/tmp/WV1Yj69dJJ.o
Enter any number (to check whether it is prime or not):8
Given number is not Prime Number

=== Code Execution Successful ===a
```

Output

```
/tmp/LE4iIbSOUT.o
Enter any number (to check whether it is prime or not):31
Given number is a prime Number

=== Code Execution Successful ===
```

2. Find sum of all prime numbers below that entered number(input).

Code:

```
#include <iostream>
#include<cmath>
using namespace std;
int main() {
    int n,sum;
    cout<<"Enter any number: (which you want to find sum of all prime numbers below that entered number):"<<endl;
    cin>>n;
    for(int i = 2; i < n; i++){
        int flag=0;
        if(i!=2 && i%2==0){
            flag = 1;
        }
        else if(i!=3 && i%3==0){
            flag = 1;
    }
    else{
        for(int j=5; i<=sqrt(i); j+=6 ){
            if(i%j==0 || i%(j+2)==0){
                flag=1;
```

```
            break;
        }
    }
}
if(flag==0)
        sum += i;
}
cout<<"sum of all prime numbers below "<<n<<" is "<<sum<<endl;
return 0;
}
```

Output:

```
Output                                                    Clear
/tmp/VaEL2d8UYA.o
Enter any number: (which you want to find sum of all prime numbers
    below that entered number):
101
sum of all prime numbers below 101 is 1637


=== Code Execution Successful ===
```

```
Output                                                    Clear
/tmp/75WtbWWrLT.o
Enter any number: (which you want to find sum of all prime numbers
    below that entered number):
10
sum of all prime numbers below 10 is 17


=== Code Execution Successful ===
```

3.) Pascal's Triangle generator;

Code:

```
#include <iostream>
using namespace std;
int main() {
    int n;
    cout<<"Enter a Number of rows to generate the Pascal's Triangle: ";
    cin>>n;
    int c;
    for(int i = 0; i < n; i++){
        c=1;
        for(int j = 0; j <= i; j++){
            if(i == 0 || j == 0)
                    cout<<1<<" ";
            else{
                c = c*(i-j+1)/j; //nCr = ((n-r+1)/r)*nCr-1
                cout<<c<<" ";
            }
        }
        cout<<endl;
    }
```

```
    return 0;
}
```

Output:

Output

```
/tmp/nGAlxKOua7.o
Enter a Number of rows to generate the Pascal's Triangle: 8
1
1 1
1 2 1
1 3 3 1
1 4 6 4 1
1 5 10 10 5 1
1 6 15 20 15 6 1
1 7 21 35 35 21 7 1


=== Code Execution Successful ===
```

Output

```
/tmp/nNPzEORVwo.o
Enter a Number of rows to generate the Pascal's Triangle: 15
1
1 1
1 2 1
1 3 3 1
1 4 6 4 1
1 5 10 10 5 1
1 6 15 20 15 6 1
1 7 21 35 35 21 7 1
1 8 28 56 70 56 28 8 1
1 9 36 84 126 126 84 36 9 1
1 10 45 120 210 252 210 120 45 10 1
1 11 55 165 330 462 462 330 165 55 11 1
1 12 66 220 495 792 924 792 495 220 66 12 1
1 13 78 286 715 1287 1716 1716 1287 715 286 78 13 1
1 14 91 364 1001 2002 3003 3432 3003 2002 1001 364 91 14 1


=== Code Execution Successful ===
```

```
int c;
for(int i = 0; i < n; i++){
    for(int j=1; j < n-i; j++)
        cout<<" ";
    c=1;
    for(int j = 0; j <= i; j++){
```

For this condition we align our pascal's triangle as follows;

Output

```
/tmp/AXJvekj9Rv.o
Enter a Number of rows to generate the Pascal's Triangle: 8
       1
      1 1
     1 2 1
    1 3 3 1
   1 4 6 4 1
  1 5 10 10 5 1
 1 6 15 20 15 6 1
1 7 21 35 35 21 7 1


=== Code Execution Successful ===
```