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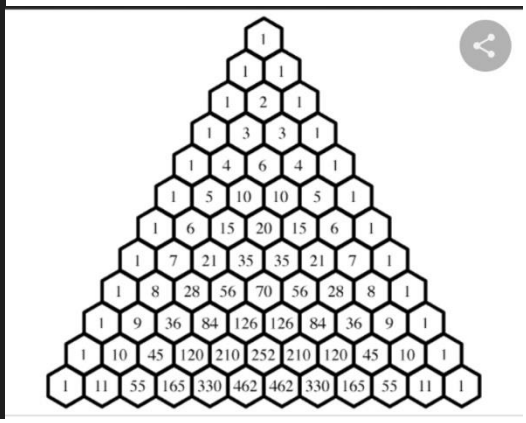
C++ PRACTICAL ASSIGNMENT – 30 DEC 2021

1. **Write a program that prints pascal's triangle:**

```cpp
#include<iostream>
using namespace std;

int main(){
    int rows;
    cout<<endl<<"Enter the number of rows : ";
    cin>>rows;
    cout<<endl;

    for (int i=0; i<rows; i++){
        int val=1;
        for (int j=1; j<(rows-1); j++){
            cout<<" ";          }
        for (int k=0; k<=i; k++){
            cout<<" "<<val;
            val=val*(i-k)/(k+1);
        }
        cout<<endl<<endl;
    }
    cout<<endl;
    return 0;
}
```

```
Enter the number of rows : 6

     1

     1 1

     1 2 1

     1 3 3 1

     1 4 6 4 1

     1 5 10 10 5 1
```



2. **Program to find the sum of the series using functions:**

S = 1/1! + 1/2! + 1/3! + 1/4! + ….1/n!

```
#include<iostream>
using namespace std;

int fact(int i)
{
    int pro=1;
    for (int k=1;k<=i;k++)
        pro=pro*k;
    return pro;
} //function fact

int main(){
    cout<<"\t* THIS PROGRAM FINDS THE SUM OF SERIES * "<<endl;
    cout<<endl<<"s=1/1!+1/2!+1/3!--- 1/n!"<<endl;

    double sum=0;
    int n;
    cout<<"-> Enter the value of n : ";
    cin>>n;
    for (int i=1;i<=n;i++){
        int x=fact(i);
        sum=sum+1.0/x;
    }   //cout<<1;

    cout<<"-> The Sum of series is "<<sum;
    return 0;
}
```

```
        * THIS PROGRAM FINDS THE SUM OF SERIES *

s=1/1!+1/2!+1/3!--- 1/n!

-> Enter the value of n : 5
-> The Sum of series is 1.71667
```

3. **Write a Program to display Fibonacci series using function.**

1,2,3,5,8….. (consists of sum of the two preceding numbers**)**

```
#include <iostream>
#include <iomanip>
using namespace std;

void fibonacciSeries(int num, int t1, int t2){
    int n=3;
    while (n<=num){
```

```
        int sum=t1+t2;
        cout<<setw(4)<<sum;
        t1=t2;
        t2=sum;
        n++;
    }
return;
}
int main(){
    int terms, t1, t2;
    cout<<endl<<"\t * FIBONACCI SERIES USING FUNCTIONS * "<<endl<<endl;
    cout<<"How many terms do you want in this fibonacci series : ";
    cin>>terms;

    cout<<endl;

    cout<<"Enter the first two terms of Fibonacci series : ";
    cin>>t1>>t2;

    cout<<endl;

    cout<<setw(4)<<t1<<setw(4)<<t2;

    fibonacciSeries(terms, t1, t2);
    cout<<endl;
    return 0;
}
```

```
          * FIBONACCI SERIES USING FUNCTIONS *

How many terms do you want in this fibonacci series : 10

Enter the first two terms of Fibonacci series : 2 3

   2   3   5   8  13  21  34  55  89 144
```

4. **Write a Program to check whether the given no is prime number or not.**

```
#include<iostream>
#include<iomanip>
using namespace std;

void primeTest(int num){
    int k=2;
    int flag=0;
    while(k<num){
        if (num%k==0) flag=1;
        k++;
```

```
    }
    if (flag!=1) cout<<"\t->"<<num<<" is the Prime Number"<<endl<<endl;
    else cout<<"\t->"<<num<<" is a Composite Number."<<endl<<endl;
    return ;
}

int main(){
    cout<<setw(45)<<"\n __* PRIME - COMPOSITE NUMBER TEST *__"<<endl;

    int num;
    char ch='y';
    while (ch=='y'){
        cout<<"Enter the number : ";
        cin>>num;
        primeTest(num);
        cout<<"Do you wish to continue (y/n)?? ";
        cin>>ch;
    }
    cout<<"\t *PROGRAM ENDS HERE* "<<endl;
    return 0;
}
```

```
 __* PRIME - COMPOSITE NUMBER TEST *__

Enter the number : 13
        ->13 is the Prime Number

Do you wish to continue (y/n)?? y
Enter the number : 15
        ->15 is a Composite Number.

Do you wish to continue (y/n)?? y
Enter the number : 71
        ->71 is the Prime Number

Do you wish to continue (y/n)?? n
         *PROGRAM ENDS HERE*
```

5. **Write a Program to perform different operations on the given values. (The Calculator Program)**

```
#include<iostream>
#include<iomanip>
using namespace std;

int getInput(){
    int num;
    cout<<"Enter a numerical value here : ";
    cin>>num;
    return num;
```

```
}

int operations(int a, int b, char ch){
    int z;

    switch(ch){
        case '+' :  z=a+b;
                    break;
        case '*' :  z=a*b;
                    break;
        case '/' :  z=a/b;
                    break;
        case '%' :  z=a%b;
                    break;
        default: cout<<"Invalid Operation";
    }
    return z;
}
int main(){
    char ch,ch1;
    int a,b,z;
    ch1='y';

    cout<<"================="<<endl;
    cout<<" + for Addition"<<endl<<" * for Multiplication"<<endl<<" / for
    Division"<<endl<<" % for Modulus"<<endl;
    cout<<"================="<<endl;

    while (ch1=='y') {
        a = getInput();
        b = getInput();
        cout<<"\t -> a = "<<a<<endl<<"\t -> b = "<<b<<endl;

        cout<<endl<<"Enter the operation you want to perform : ";
        cin>>ch;
        z=operations(a,b,ch);
        cout<<"\t -> The Result of Operation = "<<z<<endl;
        cout<<endl;

        cout<<"Do you want to continue y/n : ";
        cin>>ch1;
    }
    cout<<"\t * Program ends here! * "<<endl;
    return 0;
}
```

```
=================
 + for Addition
 * for Multiplication
 / for Division
 % for Modulus
=================

Enter a numerical value here : 15
Enter a numerical value here : 3
         -> a = 15
         -> b = 3

Enter the operation you want to perform : +
         -> The Result of Operation = 18

Do you want to continue y/n : y
Enter a numerical value here : 80
Enter a numerical value here : 23
         -> a = 80
         -> b = 23

Enter the operation you want to perform : %
         -> The Result of Operation = 11

Do you want to continue y/n : y
Enter a numerical value here : 10003
Enter a numerical value here : 29
         -> a = 10003
         -> b = 29

Enter the operation you want to perform : /
         -> The Result of Operation = 344

Do you want to continue y/n : 234
         * Program ends here! *
```

6. **Write a Program to print different patterns using functions.**

```cpp
#include<iostream>
#include<iomanip>
using namespace std;

void pyramid1(){
    cout<<endl;
    for (int i =0; i<=5; i++) {
            for (int j=1; j<=i;j++){
            cout<<" * " ;
            }
    cout<<endl;
    }
    return;}

void pyramid2(){
    for (int i=5; i>=0; i--) {
            for (int j=0; j<=i;j++){
            cout<<" * " ;
```

```
            }
    cout<<endl; }
    return ;
}

void pyramid3(){
    cout<<endl;
    char ch='A';
    for (int i =0; i<=5; i++) {
            for (int j=0; j<=i;j++){
            cout<<ch<<" "; }
    ch++;
    cout<<endl;
    }
    return;
}
void pyramid4(){
    for (int i =0; i<=5; i++) {
            for (int j=1; j<=i;j++){
            cout<<j<<" ";
            }
    cout<<endl;
    }
    return;
}
void pyramid5(){
    for (int i=5; i>=0; i--) {
        for (int j=1; j<=i;j++){
        cout<<j<<" "; }
    cout<<endl;
    }
    return;
}
void pyramid6(){
    int j=1;
    int i;
    int max=10;
    for (i =1; i<=5; i++) {
            cout<<setw(max);
            for (int k=i; k<=j;k++)
                cout<<k;

            for (int u=j-1; u>=i; u--)
                cout<<u;

            cout<<endl;
            j=j+2;
            max=max-1;
```

```
            }
    return;
}

int main(){

    cout<<setw(40)<<" * DISPLAY VARIOUS PATTERNS * "<<endl;
    cout<<endl;

    cout<<"============================="<<endl;
    cout<<"\tPRESS : "<<endl;
    cout<<"1 for Ascending Pyramid of *"<<endl;
    cout<<"2 for Descending Pyramid of *"<<endl;
    cout<<"3 for Ascending Pyramid of Alphabets"<<endl;
    cout<<"4 for Ascending Pyramid of Numbers"<<endl;
    cout<<"5 for Descending Pyramid of Numbers"<<endl;
    cout<<"6 for Dynamic Full Pyramid"<<endl;
    cout<<"============================="<<endl;
    cout<<endl;

    int choice;
    char run='y';
    while (run=='y'){

    cout<<"Enter your choice here: ";
    cin>>choice;

    switch (choice){
        case 1 : pyramid1();
                 break;
        case 2 : pyramid2();
                 break;
        case 3 : pyramid3();
                 break;
        case 4 : pyramid4();
                 break;
        case 5 : pyramid5();
                 break;
        case 6 : pyramid6();
                 break;
        default : cout<<"Invalid Choice. Try again!"<<endl;
    }
    cout<<endl<<"Do you want to continue?? (y/n) ";
    cin>>run;
    cout<<endl;
    }

    cout<<endl<<" * PROGRAM ENDS HERE * "<<endl;
```

```
    return 0;
}
```

```
           * DISPLAY VARIOUS PATTERNS *

==============================
        PRESS :
1 for Ascending Pyramid of *
2 for Descending Pyramid of *
3 for Ascending Pyramid of Alphabets
4 for Ascending Pyramid of Numbers
5 for Descending Pyramid of Numbers
6 for Dynamic Full Pyramid
==============================

Enter your choice here: 1


 *
 *  *
 *  *  *
 *  *  *  *
 *  *  *  *  *
```

```
Do you want to continue?? (y/n) y

Enter your choice here: 2
 *  *  *  *  *  *
 *  *  *  *  *
 *  *  *  *
 *  *  *
 *  *
 *

Do you want to continue?? (y/n) y

Enter your choice here: 3

A
B B
C C C
D D D D
E E E E E
F F F F F F

Do you want to continue?? (y/n) y

Do you want to continue?? (y/n) y

Enter your choice here: 4

1
1 2
1 2 3
1 2 3 4
1 2 3 4 5

Do you want to continue?? (y/n) y

Enter your choice here: 5
1 2 3 4 5
1 2 3 4
1 2 3
1 2
1


Do you want to continue?? (y/n) y

Enter your choice here: 6
         1
        232
       34543
      4567654
     567898765

Do you want to continue?? (y/n) n


 * PROGRAM ENDS HERE *
```