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This is a program to calculate 3 things

1- AP & GP Series

2- GCD & LCM of two numbers

3- nTH number in Fibonacci series using recursion

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#include <iostream>

#include <math.h>

using namespace std;

// function to print to the user a list of choices

void menu()

{ cout<<"Enter 1 to calculate AP series"<<endl;

cout<<" Enter 2 to calculate GP series "<<endl;

cout<<" Enter 3 to calculate GCD & LCM "<<endl;

cout<<" Enter 4 to calculate nth number (Fibonacci series) "<<endl;

}

// Function to find nTH term of AP series

float termAP (float term, float difference, float number)

{

return (term + (number - 1) \* difference);

}

// Function to find sum of AP series

float sumAP (float term, float difference, float number)

{

return (number / 2 \* (2 \* term + (number - 1) \* difference));

}

// Function to find nTH term of GP series

float termGp (float term,float difference,float number)

{return (term\* pow(difference,number-1));

}

// Function to find sum of GP series

float sumGP (float term, float difference, float number)

{return term\*(1-pow(difference,number))/(1-difference);

}

// Function to find GCD of two numbers

int gcd ( int a, int b)

{

if (b == 0)

return a;

return gcd(b, a % b);

}

// Function to find LCM of two numbers

int lcm(int a, int b)

{

return (a / gcd(a, b)) \* b;

}

// Function to find the nth Fibonacci number

int fib(int n)

{

if(n==0)

return 0;

else if(n==1)

return 1;

else

return fib(n-1)+fib(n-2);

}

int main ()

{

float a, d, n,APterm,APsum,term,Gpsum,Gpterm,r,l,c;

int b,callinggcd,callinglcm,num,callingfib;

char choice;

cout<<"please choose from the menu"<<endl;

do

{

menu();

cin>>b; // the user will choose from the menu

switch (b)

{

case 1:// if he choose the first "1" then it will calculate the term and sum of AP series

cout <<

"Enter initial term, The common difference and Number of terms:\t";

cin >> a >> d >> n;// prompt the user to enter initial term, The common difference and Number of terms

APterm = termAP (a, d, n);// calling for the AP functions

APsum = sumAP (a, d, n);

cout<<"the n-th term of AP is:\t"<<APterm<<endl;

cout<<"Sum of nTH term of AP is:\t"<<APsum<<endl;

break;

case 2:// if he choose the first "2" then it will calculate the term and sum of Gp series

cout<<"Enter initial term ,The common difference and Number of terms:\t";

cin >> a >> r >> n;// prompt the user to enter initial term, The common difference and Number of terms

Gpterm=termGp(a,r,n);

Gpsum=sumGP(a,r,n);

cout<<" The nTH term of GP is:\t"<<Gpterm<<endl;

cout<<" Sum of nTH term of GP is:\t"<<Gpsum<<endl;

break;

case 3:// if he choose the first "3" then it will calculate LCM and GCD

cout<<"Enter two numbers\t";

cin>>l>>c;// prompt the user to enter two numbers

callinglcm = lcm (l,c);// calling the function of LCM AND GCD

callinggcd=gcd(l,c);

cout<<" The GCD of these numbers is:\t"<<callinggcd<<endl;

cout<<" The LCM of these numbers is:\t"<<callinglcm<<endl;

break;

case 4:// if he choose the first "4" then it will calculate nth number

cout<<"Enter a number\t";

cin>>num;

callingfib = fib(num);// calling the function of nth number

cout<<" The nth number in Fibonacci series is:\t"<<callingfib<<endl;

break;}

cout << "Do you want to continue y/n? ";

cin >> choice;

}while (choice == 'y' || choice == 'Y');

cout<<"thank you for using our program";

return 0;

}