PROGRAMMING FUNDAMENTALS

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CH # 06 Programming Exercises

Write a program in c++ that inputs salary of the employee from the user . It deducts income tax from salary on following basis :

20 % income tax of salary is above 30,000

15 % income tax if salary is between 20000 and 30,000

10 % income tax if salary is below 20,000

This program should displays salary , income tax , net salary

```
#include <iostream>

using namespace std;


int main() {

   float salary, tax, net_salary;

   cout << "Enter the salary: ";

   cin >> salary;

   if (salary >= 30000) {

      tax = 0.2 * (salary - 30000);

   } else if (salary >= 20000 && salary < 30000) {

      tax = 0.15 * (salary - 20000);

   } else {

      tax = 0.1 * salary;

   }

   n e t _ s a l a r y   =   s a l a r y   -   t a x ;

cout << "Salary: " << salary << endl;

cout << "Income Tax: " << tax << endl;

cout << "Net Salary: " << net_salary << endl;

   return 0;

}
```

Write a program in c++ that takes n numbers as input it displays total positive and negative numbers

```
#include <iostream>

using namespace std;


int main() {

int n, num, pos_count = 0, neg_count = 0;

cout << "Enter the number of elements: ";

   cin >> n;

   cout << "Enter " << n << " integers: ";

   for (int i = 0; i < n; i++) {

      cin >> num;

      if (num > 0) {

         pos_count++;

      } else if (num < 0) {

         neg_count++;

      }

   }

 cout << "Total positive numbers: " << pos_count << endl;

cout << "Total negative numbers: " << neg_count << endl;

   return 0;

}
```

Write a program in C++ to calculate and display the sum of the series X + X^2 + X^3 + X^4 + ... + X^n using a for loop.

```
#include <iostream>

using namespace std;


int main() {

   int n;
```

```
 double x, sum = 0;
   cout << "Enter the value of x: ";
   cin >> x;
   cout << "Enter the value of n: ";
   cin >> n;
   for (int i = 1; i <= n; i++) {
      sum += pow(x, i);
   }
 cout << "The sum of the series is: " << sum;
   return 0;
}
```

Write a program in c++ to calculate and display sum of the following series using for loop

1! + 2! + 3! + 4! + 5! , ! represents factorial of number.

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

int main()
{
   int n = 5; // number of terms in the series
 int sum = 0;
   for (int i = 1; i <= n; i++) {
      int factorial = 1;
      for (int j = 1; j <= i; j++) {
         factorial *= j;
      }
      s u m   + =   f a c t o r i a l ;
   }
 cout << "Sum of the series is: " << sum << endl;
```

```
    return 0;
}
```

Write a program in c++ to calculate and display sum of the following series using for loop

1 + 2x + 3x^2 + 4x^3 + 5x^4

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

int main()
{
    double x;
 double sum = 0;
    cout << "Enter a value for x: ";
    cin >> x;
    for (int i = 1; i <= 5; i++)
    {
        sum += i * pow(x, i-1);
    }
    cout << "The sum of the series is: " << sum << endl;
    return 0;
}
```

Write a program in c++ to calculate and display sum of the following series using for loop

1/2 + 2/3 + 3/4 +.....+ 99/100

```
#include <iostream>
using namespace std;
int main() {
float sum = 0.0;
```

```
   int n = 99;
   for(int i = 1; i <= n; i++) {
      sum += float(i) / float(i+1);
   }
 cout << "Sum of the series 1/2 + 2/3 + 3/4 + ... + 99/100 is: " << sum;
   return 0;
}
```

Write a program in c++ to print following sequence

64 32 16 8 4 2

```
#include <iostream>
int main() {
int num = 64;
 while (num >= 2)
{
      std::cout << num << " ";
      num /= 2;
   }
 std::cout << num;
   return 0;
```

Write a program in c++ to print following sequence

1 3 9 27 81 200

```
#include <iostream>
using namespace std;
int main() {
   int n = 1;
 while (n <= 200) {
```

```
    cout << n << " ";
    n = n * 3;
  }
  r e t u r n   0 ;
}
```

Write a program in c++ to print following sequence

8 12 17 24 28 33 ... 100

```
#include <iostream>
using namespace std;
int main() {
int num = 8;
while (num <= 100) {
      cout << num << " ";
      if (num % 4 == 0) {
         num += 5;
      } else {
         num += 4;
      }
  }
  r e t u r n   0 ;
```

}. **Write a program in c++ to add the first seven terms of following series using foor loop**

1/1! + 2/2! + 3/3! ....

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

```
 double sum = 0;
   int factorial = 1;
   for (int i = 1; i <= 7; i++) {
      factorial *= i;
      sum += (double) i / factorial;
   }
 cout << "The sum of the first seven terms of the series is: " << sum << endl;
   return 0;
}
```

A person invests $1000.00 in a saving account yielding 5% interest . Assuming all interest is left deposit in the account , calculate and print amount of money in the account at the end of each year for ten years Formula : (a= p(1+r)^n where

p=original amount invested r=annual interest rate n=number of years a=amount on deposit at

the end of nth years

```
#include <iostream>
#include <cmath>
using namespace std;
int main() {
   double p = 1000.00;
   double r = 0.05;
   double a;
   for (int n = 1; n <= 10; n++) {
      a = p * pow(1 + r, n);
      cout << "Amount on deposit after " << n << " years: $" << a << endl;
   }
```

```
   return 0;
}
```

Write a program in c++ to write a loop that will calculate sum of every third integer beginning with i=2 , for all values of i that are less than 100 .

write loop using for , while , dowhile loops .

Using for loop:

```
#include <iostream>
using namespace std;
int main()
{
   int sum = 0;
   for(int i=2; i<100; i+=3)
   {
      sum += i;
   }
 cout << "Sum using for loop: " << sum << endl;
   return 0;
}
```

Using while loop:

```
#include <iostream>
using namespace std;
int main()
{
   int sum = 0;
   int i = 2;
 while(i<100)
```

```
    {
        sum += i;
        i += 3;
    }
 cout << "Sum using while loop: " << sum << endl;
    return 0;
}
```

Using do-while loop:

```
#include <iostream>
using namespace std;
int main()
{
    int sum = 0;
    int i = 2;
    do
    {
        sum += i;
        i += 3;
 } while(i<100);
cout << "Sum using do-while loop: " << sum << endl;
    return 0;
}
```

Write a program in c++ to add first nine terms of following series using for and while loop

1/3! + 5/4! + 9/5! ....

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

```
int main() {
 double sum = 0, factorial = 1;
   for(int i = 3, j = 1; j <= 9; i += 2, j++) {
      factorial *= i * (i - 1);
      sum += (double)(i + j*4) / factorial;
   }
 cout << "The sum of the first nine terms of the series is: " << sum << endl;
   return 0;
}
```

```
#include <iostream>
using namespace std;
int main() {
double sum = 0, factorial = 1;
   int i = 3, j = 1;
 while(j <= 9) {
      factorial *= i * (i - 1);
      sum += (double)(i + j*4) / factorial;
      i += 2;
      j++;
   }
 cout << "The sum of the first nine terms of the series is: " << sum << endl;
   return 0;
}
```

Both programs will produce the same output: the sum of the first nine terms of the series.

Write a program in c++ to add first nine terms of following series using for and while loop

1/3 + 3/5 + 5/7 ..... 97/99

Using for loop:

```
#include<iostream>
using namespace std;
int main()
{
  float sum=0;
 int i;
for(i=1;i<=9;i++)
  {
    sum=sum+(float)((2*i-1)/(2*i+1.0));
  }
 cout<<"Sum of the first 9 terms of the series is "<<sum<<endl;
return 0;
}
```

Using while loop:

```
#include<iostream>
using namespace std;
int main()
{
  float sum=0;
 int i=1;
while(i<=9)
  {
    sum=sum+(float)((2*i-1)/(2*i+1.0));
    i++;
```

```
  }
 cout<<"Sum of the first 9 terms of the series is "<<sum<<endl;
return 0;
}
```