**C Programming Exercises**

**Topic - 1**

**Formula Evaluation**

**Level - Easy**

1.

Write a C program to perform all arithmetic operations on given two integers and print the results.

**Sample Test cases:**

**Test ase 1:**

Input:

10 2

Expected Output:

10 + 2 = 12

10 - 2 = 8

10 \* 2 = 20

10 / 2 = 5

10 % 2 = 0

**Test case 2:**

Input:

18 4

Expected Output:

18 + 4 = 22

18 - 4 = 14

18 \* 4 = 72

18 / 4 = 4

18 % 4 = 2

**Test case 3:**

Input:

4 11

Expected Output:

4 + 11 = 15

4 - 11 = -7

4 \* 11 = 44

4 / 11 = 0

4 % 11 = 4

2.

Write a C Program to Find the **Area** and **Perimeter** of a **square** when **side** is given.

**Constraint:**

Side value will always be a positive integer.

**Sample Test cases:**

**Test case 1:**

Input:

3

Expected Output:

Area of a square with side 3 is: 9

Perimeter of a square with side 3 is: 12

**Test case 2:**

Input:

9

Expected Output:

Area of a square with side 9 is: 81

Perimeter of a square with side 9 is: 36

3.

Write a C Program to Find the **Area** and **Perimeter** of a rectangle when **length(l)** and **width(w)** are given.

**Constraint:**

Positive integer values will be given as length and width. Always.

**Sample Test cases:**

**Test case 1:**

Input:

4 6

Expected Output:

Area of a rectangle with length 4 and width 3 is: 24

Perimeter of a rectangle with length 4 and width 3 is: 20

**Test case 2:**

Input:

2 7

Expected Output:

Area of a rectangle with length 2 and width 7 is: 14

Perimeter of a rectangle with length 2 and width 7 is: 18

4.

Write a C program to find out and print the **sum of first n natural numbers** when n (a positive integer) is given.

**Sample Test cases:**

**Test case 1:**

Input:

5

Expected Output:

Sum of first 5 natural numbers is 15

**Test case 2:**

Input:

15

Expected Output:

Sum of first 15 natural numbers is 120

**Test case 3:**

Input:

126

Expected Output:

Sum of first 126 natural numbers is 8001

5.

Write a C program to find out and print the **sum of first n even natural numbers** when n (a positive integer) is given.

**Sample Test cases:**

**Test case 1:**

Input:

5

Expected Output:

Sum of first 5 even natural numbers is 30

**Test case 2:**

Input:

15

Expected Output:

Sum of first 15 even natural numbers is 240

**Test case 3:**

Input:

126

Expected Output:

Sum of first 126 even natural numbers is 16002

6.

Write a C program to find out and print the **sum of first n odd natural numbers** when n (a positive integer) is given.

**Sample Test cases:**

**Test case 1:**

Input:

5

Expected Output:

Sum of first 5 odd natural numbers is 25

**Test case 2:**

Input:

15

Expected Output:

Sum of first 15 odd natural numbers is 225

**Test case 3:**

Input:

126

Expected Output:

Sum of first 126 odd natural numbers is 15876

**Special Task 1:**

Try to combine Program 4, 5 and 6 and make them as a single program, i.e., Write a C program to Find out

Sum of n natural numbers

Sum of n even natural numbers

Sum of n odd natural numbers

when a positive integer n is given.

7.

Write a C program to find out the **Area** and **Perimeter** of a circle, when radius is given.

**Note:** Consider pi value as 3.14.

**Sample Test cases:**

**Test case 1:**

Input:

5

Expected Output:

Area of circle with radius 5 is: 78.50

Perimeter of circle with radius 5 is: 31.40

**Test case 2:**

Input:

7.5

Expected Output:

Area of circle with radius 7.5 is: 176.63

Perimeter of circle with radius 7.5 is: 47.10

**Test case 3:**

Input:

126

Expected Output:

Area of circle with radius 3 is: 28.26

Perimeter of circle with radius 3 is: 18.84

8.

Write a C program to compute **Simple Interest (SI)** on a **Principal amount (P)** for **Time (T)** in years at a **Rate of Interest (R)**.

**Sample Test cases:**

**Test case 1:**

Input:

10000

2

7.5

Expected Output:

Simple Interest on an amount of 10000.00 for 2 years at 7.50 interest rate is: 1500.00

**Test case 2:**

Input:

20000

3

9.2

Expected Output:

Simple Interest on an amount of 20000.00 for 3 years at 9.20 interest rate is: 5520.00

**Level - Medium**

1.

Write a C program to convert the given minutes into hours and minutes.

**Sample Test cases**

**Test case 1:**

Input:

65

Expected Output:

1 hour(s) 5 minute(s)

**Test case 2:**

Input:

371

Expected Output:

6 hour(s) 11 minute(s)

**Test case 3:**

Input:

45

Expected Output:

0 hour(s) 45 minute(s)

2.

Write a C program to convert given seconds into hours, minutes and seconds (H:M:S).

**Sample Test cases**

**Test case 1:**

Input:

3600

Expected Output:

H:M:S --> 1:0:0

**Test case 2:**

Input:

3671

Expected Output:

H:M:S --> 1:1:1

**Test case 3:**

Input:

45

Expected Output:

H:M:S --> 0:0:45

**Level - Hard**

1.

Write a C program to split the given amount into mentioned denominations.

**Denominations that are currently in use across India (From highest to lowest).**

|  |
| --- |
| **Denominations** |
| Rs. 2000 |
| Rs. 500 |
| Rs. 200 |
| Rs. 100 |
| Rs. 50 |
| Rs. 20 |
| Rs. 10 |
| Rs. 5 |
| Rs. 2 |
| Rs. 1 |

**Sample Test cases:**

**Test case 1:**

Input:

2500

Expected Output:

2000 Note(s) --> 1

500 Note(s) --> 1

200 Note(s) --> 0

100 Note(s) --> 0

50 Note(s) --> 0

20 Note(s) --> 0

10 Note(s) --> 0

5 Coin(s) --> 0

2 Coin(s) --> 0

1 Coin(s) --> 0

**Test case 2:**

Input:

2888

Expected Output:

2000 Note(s) --> 1

500 Note(s) --> 1

200 Note(s) --> 1

100 Note(s) --> 1

50 Note(s) --> 1

20 Note(s) --> 1

10 Note(s) --> 1

5 Coin(s) --> 1

2 Coin(s) --> 1

1 Coin(s) --> 1

**Test case 3:**

Input:

976

Expected Output:

2000 Note(s) --> 0

500 Note(s) --> 1

200 Note(s) --> 2

100 Note(s) --> 0

50 Note(s) --> 1

20 Note(s) --> 1

10 Note(s) --> 0

5 Coin(s) --> 1

2 Coin(s) --> 0

1 Coin(s) --> 1

**Note:** You always have to give priority to the highest denomination possible, i.e., **if you have Rs. 2000 you should use one 2000 note**, instead of using four 500 notes or ten 200 notes or twenty 100 notes.

2.

**Arithmetic Progression:**

We can say that a given series of numbers is in A.P when there a constant difference between two consecutive terms.

Ex:

We can say that the series

1, 2, 3, ….., 10 is in A.P, because there is a constant difference of 1 between any two consecutive terms.

To find out the sum of the terms of a series that is in A.P, all you need to do is to use the formula

**S = n\*(a+l)/2**, where

n --> **number of terms in the series**

a --> **first term of the series**

l --> **last term of the series**

Now, lets apply the same on the series

1, 2, 3, …., 10.

Here

n --> 10 (number of terms)

a --> 1 (first term)

l --> 10 (last term)

Substituting them in the formula

S = n\*(a + l)/2

S = 10\*(1 + 10)/2

= 10\*11/2

= 110/2

= 55.

**Based on the information given above,**

Write a C program to find out the sum of all **x multiples under y (inclusive).** You will be given x, y values as inputs.

**Sample Test cases:**

**Test case 1:**

Input:

3 10

Expected Output:

18

**Explanation:**

In this test case, x value is 3 and y value is 10.

3 multiples under 10 (inclusive) are

3, 6, 9

If we add them 3 + 6 + 9, we get 18 which is our output.

**Test case 2:**

Input:

15 59

Expected Output:

90

**Explanation:**

In this test case, x value is 15 and y value is 59.

15 multiples under 59 (inclusive) are

15, 30, 45

If we add them 15 + 30 + 45, we get 90 which is our output.

**Test case 3:**

Input:

4 20

Expected Output:

60

**Explanation:**

In this test case, x value is 4 and y value is 20.

4 multiples under 20 (inclusive) are

4, 8, 12, 16, 20

If we add them 4 + 8 + 12 + 16 + 20, we get 60 which is our output.