Loop related problems (total 20 questions)

<table>
<tr><th>SL</th><th>Problem statement</th><th>Difficulty levels</th></tr>
<tr><td>1.</td><td>Write a program that will take a number N from the keyboard and print following series upto Nth terms.

1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, …….

<table>
<tr><th>Sample input</th><th>Sample output</th></tr>
<tr><td>2</td><td>1, 2</td></tr>
<tr><td>5</td><td>1, 2, 3, 4, 5</td></tr>
<tr><td>11</td><td>1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11</td></tr>
</table>
</td><td>*</td></tr>
<tr><td>2.</td><td>Write a program that will print following series upto Nth terms.

1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31 …….

<table>
<tr><th>Sample input</th><th>Sample output</th></tr>
<tr><td>2</td><td>1, 3</td></tr>
<tr><td>5</td><td>1, 3, 5, 7, 9</td></tr>
<tr><td>11</td><td>1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21</td></tr>
</table>
</td><td>*</td></tr>
<tr><td>3.</td><td>Write a program that will print following series upto Nth terms.

1, 0, 1, 0, 1, 0, 1, 0, 1, 0, 1, 0, 1, 0, 1, 0, 1, …….

<table>
<tr><th>Sample input</th><th>Sample output</th></tr>
<tr><td>1</td><td>1</td></tr>
<tr><td>2</td><td>1, 0</td></tr>
<tr><td>3</td><td>1, 0, 1</td></tr>
<tr><td>4</td><td>1, 0, 1, 0</td></tr>
<tr><td>7</td><td>1, 0, 1, 0, 1, 0, 1</td></tr>
<tr><td>13</td><td>1, 0, 1, 0, 1, 0, 1, 0, 1, 0, 1, 0, 1</td></tr>
</table>
</td><td>**</td></tr>
<tr><td>4.</td><td>Write a program that will take N numbers as inputs and compute their average.

(Restriction: Without using any array)

<table>
<tr><th>Sample input</th><th>Sample output</th></tr>
<tr><td>3
10 20 30.5</td><td>AVG of 3 inputs: 20.166667</td></tr>
<tr><td>2</td><td>AVG of 2 inputs: 16.750000</td></tr>
</table>
</td><td>*</td></tr>
</table>

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5.	Write a program that will take two numbers **X** and **Y** as inputs. Then it will print the square of **X** and increment (**if X<Y**) or decrement (**if X>Y**) **X** by 1, until **X** reaches **Y.** If and when **X** is equal to **Y**, the program prints "Reached!" ***Sample input(X,Y)*** | ***Sample output*** 10 5 | 100, 81, 64, 49, 36, Reached! 5 10 | 25, 36, 49, 64, 81, Reached! 10 10 | Reached!		*****
6.	Write a program for the described scenario: Player-1 picks a number **X** and Player-2 has to guess that number within **N** tries. For each wrong guess by Player-2, the program prints "Wrong, **N-1** Choice(s) Left!" If Player-2 at any time successfully guesses the number, the program prints "Right, Player-2 wins!" and terminates right away. Otherwise after the completion of **N** wrong tries, the program prints "Player-1 wins!" and halts. (**Hint:** Use break/continue) ***Sample input (X,N,n1, n2,..,nN)*** | ***Sample output*** 5 3 12 8 5 | Wrong, 2 Choice(s) Left! Wrong, 1 Choice(s) Left! Right, Player-2 wins! 100 5 50 100 | Wrong, 4 Choice(s) Left! Right, Player-2 wins! 20 3 12 8 5 | Wrong, 2 Choice(s) Left! Wrong, 1 Choice(s) Left! Wrong, 0 Choice(s) Left! Player-1 wins!		******
7.	Write a program that will run and show keyboard inputs until the user types an 'A' at the keyboard. ***Sample input*** | ***Sample output*** X 1 a A | Input 1: X Input 2: 1 Input 3: a		*****

8. Write a program that will reverse the digits of an input integer. **

Sample input	*Sample output*
13579	97531
4321	1234

9. Write a program that will find the grade of **N** students. For each student, it will take the marks of his/her the attendance (on 5 marks), assignment (on 10 marks), class test (on 15 marks), midterm (on 50 marks), term final (on 100 marks). Then based on the tables shown below, the program will output his grade. *

Attendance (A)	5%
Assignments (HW)	10%
Class Tests (CT)	15%
Midterm (MT)	30%
Final (TF)	40%

Marks	Letter Grade	Marks	Letter Grade	Marks	Letter Grade
90-100	A	70-73	C+	Less than 55	F
86-89	A-	66-69	C		
82-85	B+	62-65	C-		
78-81	B	58-61	D+		
74-77	B-	55-57	D		

Sample input (A,HW,CT,MT,TF)	**Sample output**
2 5 10 15 44.5 92.5 0 7.5 5 20 55.5	Student 1 : A Student 2 : F

10. Write a program that will give the sum of first N^{th} terms for the following series. **

1, -2, 3, -4, 5, -6, 7, -8, 9, -10, 11, -12, 13, -14, …….

Sample input	*Sample output*
2	Result: -1
3	Result: 2
4	Result: -2

11. Write a program that will calculate the result for the first N^{th} terms of the following series. [In that series sum, dot sign (.) means multiplication] **

$$1^2.2 + 2^2.3 + 3^2.4 + 4^2.5 + \ldots\ldots.$$

Sample input	***Sample output***
2	Result: 14
3	Result: 50
4	Result: 130
7	Result: 924

12. Write a program that will print Fibonacci series upto N^{th} terms. **

1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89, …….

Sample input	***Sample output***
1	1
2	1, 1
4	1, 1, 2, 3
7	1, 1, 2, 3, 5, 8, 13

13. Write a program that will print the factorial (**N!)** of a given number **N**. Please see the sample input output. **

Sample input	**Sample output**
1	1! = 1 = 1
2	2! = 2 X 1 = 2
3	3! = 3 X 2 X 1 = 6
4	4! = 4 X 3 X 2 X 1 = 24

14. Write a program that will find ${}^{n}C_{r}$ where **n >= r**; **n** and **r** are integers. **

Sample input	***Sample output***
5 2	10
10 3	120
7 7	1
6 1	6

15. Write a program that will find x^y (x to the power y) where x, y are positive integers. *****

Sample input(x,y)	***Sample output***
5 2	25
2 0	1
6 1	6
0 5	0

16. WAP that will find the GCD (greatest common divisor) and LCM (least common multiple) of two positive integers. ******

Sample input	***Sample output***
5 7	GCD: 1 LCM: 35
12 12	GCD: 12 LCM: 12
12 32	GCD: 4 LCM: 96

17. WAP that will determine whether a number is prime or not. ******

Sample input	***Sample output***
1	Not prime
2	Prime
11	Prime
39	Not prime
101	Prime

18. WAP that will determine whether an integer is palindrome number or not. ******

Sample input	***Sample output***
9	Yes
91	No
222	Yes
12321	Yes
110	No

19.	WAP that will calculate following mathematical function for the input of x. Use only the series to solve the problem. $$Sinx = x - \frac{x^3}{3!} + \frac{x^5}{5!} - \frac{x^7}{7!} + \cdots \ldots \ldots \infty$$ ***Sample input*** | ***Sample output*** 1 | 0.841 2 | 0.909 3 | 0.141	***
20.	Write a program that takes an integer number n as input and find out the sum of the following series up to n terms. 1 + 12 + 123 + 1234 + ……. ***Sample input*** | ***Sample output*** 1 | 1 2 | 13 3 | 136 4 | 1370	**