Loop related problems (total 45 questions)

<table>
<tr><th>SL</th><th>Problem statement</th><th>Difficulty levels</th></tr>
<tr><td>1.</td><td>Write a program (WAP) that will 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 (WAP) 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 (WAP) that will print following series upto Nth terms.
2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, …….

<table><tr><th>Sample input</th><th>Sample output</th></tr><tr><td>2</td><td>2, 4</td></tr><tr><td>5</td><td>2, 4, 6, 8, 10</td></tr><tr><td>11</td><td>2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22</td></tr></table></td><td>*</td></tr>
<tr><td>4.</td><td>Write a program (WAP) that will print following series upto Nth terms.
3, 6, 9, 12, 15, 18, 21, 24, 27, 30, 33, 36, 39, 42 …….

<table><tr><th>Sample input</th><th>Sample output</th></tr><tr><td>2</td><td>3, 6</td></tr><tr><td>5</td><td>3, 6, 9, 12, 15</td></tr><tr><td>11</td><td>3, 6, 9, 12, 15, 18, 21, 24, 27, 30, 33</td></tr></table></td><td>*</td></tr>
</table>

5. Write a program (WAP) that will print following series upto N^{th} terms. *****

1, 4, 9, 16, 25, 36, 49, 64, 81, 100, 121, 144, 169, …….

Sample input	***Sample output***
3	1, 4, 9
5	1, 4, 9, 16, 25
10	1, 4, 9, 16, 25, 36, 49, 64, 81, 100

6. Write a program (WAP) that will print following series upto N^{th} terms. ******

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

Sample input	***Sample output***
3	1, -2, 3
7	1, -2, 3, -4, 5, -6, 7
10	1, -2, 3, -4, 5, -6, 7, -8, 9, -10

7. Write a program (WAP) that will print following series upto N^{th} terms. ******

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

Sample input	***Sample output***
1	1
2	1, 0
3	1, 0, 1
4	1, 0, 1, 0
7	1, 0, 1, 0, 1, 0, 1
13	1, 0, 1, 0, 1, 0, 1, 0, 1, 0, 1, 0, 1

8. Write a program (WAP) that will print following series upto N^{th} terms. ******

2, 6, 12, 20, 30, 42, 56, 72, 90, 110, 132, 156, 182, …….

Sample input	***Sample output***
1	2
2	2, 6
3	2, 6, 12
4	2, 6, 12, 20
7	2, 6, 12, 20, 30, 42, 56
10	2, 6, 12, 20, 30, 42, 56, 72, 90, 110

9. Write a program (WAP) that will print following series upto N^{th} terms. **

2, -4, 6, -8, 10, -12, 14, -16, 18, -20, 22, -24, 26, -28, 30, -32, …….

Sample input	***Sample output***
4	2, -4, 6, -8
7	2, -4, 6, -8, 10, -12, 14
10	2, -4, 6, -8, 10, -12, 14, -16, 18, -20

10. Write a program (WAP) 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***
4	Result: 10
7	Result: 28
10	Result: 55

11. Write a program (WAP) 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
7	Result: 4
10	Result: -5

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

1, 4, 9, 16, 25, 36, 49, 64, 81, 100, 121, 144, 169, …….

Sample input	***Sample output***
2	Result: 5
3	Result: 14
4	Result: 30
7	Result: 140
10	Result: 385

13. Write a program (WAP) 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

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

$$1.2 + 2.3 + 3.5 + 4.8 + 5.12 + 6.17 + \ldots\ldots\ldots$$

Sample input	***Sample output***
2	Result: 8
3	Result: 23
4	Result: 55
7	Result: 378

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

$$1.4 + 4.7 + 7.10 + 10.13 + 13.16 + \ldots\ldots$$

Sample input	***Sample output***
2	Result: 32
3	Result: 102
4	Result: 232
6	Result: 744

16. Write a program (WAP) 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
10	1, 1, 2, 3, 5, 8, 13, 21, 34, 55

17. Write a program (WAP) that will find factorial of an integer N. *****

Sample input	***Sample output***
1	1
3	6
5	120
6	720
7	5040

18. Write a program (WAP) that will find ${}^{n}C_{r}$ where n >= r and n, r are integers. ******

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

19. Write a program (WAP) 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
10 3	1000
2 0	1
6 1	6
0 5	0

20. 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
7 30	GCD: 1 LCM: 210

21. 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

22. WAP that will show the multiplicative table (upto 5) for an integer N. *

Sample input	*Sample output*
3	3 x 1 = 3 3 x 2 = 6 3 x 3 = 9 3 x 4 = 12 3 x 5 = 15
17	17 x 1 = 17 17 x 2 = 34 17 x 3 = 51 17 x 4 = 68 17 x 5 = 85

23. 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

24. WAP that will count number of digits, as well as, sum up each digit for a given integer N. **

Sample input	*Sample output*
12	Count: 2, Sum: 3
2673	Count: 4, Sum: 18
3	Count: 1, Sum: 3

25. WAP that will count number of 1's in the binary version of a given integer N. **

Sample input	*Sample output*
15	Count: 4
128	Count: 1
67	Count: 3

26. WAP that will find all the factors of a given integer N. *

Sample input	*Sample output*
12	1 2 3 4 6 12
50	1 2 5 10 25 50
8	1 2 4 8

27. WAP that will take N number of integers from the user and calculate sum, average and maximum of them. *

Sample input	*Sample output*
6 2 3 4 6 10 7	Sum: 32 Avg: 5.333 Max: 10
3 1 2 3	Sum: 6 Avg: 2.000 Max: 3

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

$$1^2/1! + 2^2/2! + 3^2/3! + 4^2/4! + \ldots\ldots.$$

Sample input	*Sample output*
1	Result: 1.00
2	Result: 3.00
3	Result: 4.50
4	Result: 5.17

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

1.2/3 + 2.3/4 + 3.4/5 + 4.5/6 + ……..

Sample input	***Sample output***
1	Result: 0.67
2	Result: 2.17
3	Result: 4.57
4	Result: 7.90

30. WAP that multiplies two integer numbers and prints the result. The program runs repeatedly as per the user's desire after showing the result, the program will ask the user to type 'Y' for another run or 'N' to stop execution. The user will also input the two integer numbers to multiply. *****

31. Write a program (WAP) that will print following series upto N^{th} terms. ******

1, 2, 6, 24, 120, 720, 5040, 40320, ……

Sample input	***Sample output***
3	1, 2, 6
5	1, 2, 6, 24, 120, 720
7	1, 2, 6, 24, 120, 720, 5040, 40320

32. WAP that will print (as an integer) the reverse of a given integer number N. ******

Sample input	***Sample output***
237	732
100	1
7	7
1001	1001

33. WAP to find the numbers divisible by 7 within a range. Give the range as an input. *****

Sample input	***Sample output***
7 25	7, 14, 21
10 13	
1 100	7, 14, 21, 28, 35, 42, 49, 56, 63, 70, 77, 84, 91, 98
6 13	7

34. WAP that will show the prime factorization of a given integer. ***

Sample input	*Sample output*
60	2 x 2 x 3 x 5
100	2 x 2 x 5 x 5
147	3 x 7 x 7
32	2 x 2 x 2 x 2 x 2

35. WAP that will determine whether a positive integer is Perfect number or not. ***
Reference: http://en.wikipedia.org/wiki/Perfect_number

Sample input	*Sample output*
6	Yes
100	No
28	Yes
496	Yes
8128	Yes

36. WAP that will determine whether a positive integer is Armstrong number or not. ***
Reference: http://en.wikipedia.org/wiki/Narcissistic_number

Sample input	*Sample output*
6	Yes
100	No
370	Yes
371	Yes
352	No

37. WAP to find all the prime numbers within a range. Give the range as an input. **

Sample input	*Sample output*
1 20	2, 3, 5, 7, 11, 13, 17, 19
23 29	23, 29
1 100	2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67, 71, 73, 79, 83, 89, 97

38. WAP that will show one Goldbach's Conjecture representation of any given even integers. Reference: http://en.wikipedia.org/wiki/Goldbach's_conjecture *******

Sample input	***Sample output***
10	3+7
100	3+97
8	3+5
6	3+3

39. WAP that will show all the Goldbach's Conjecture representation of any given even integers. Reference: http://en.wikipedia.org/wiki/Goldbach's_conjecture *******

Sample input	***Sample output***
10	3+5 5+5
100	3+97 11 + 89 17 + 83 29 + 71 41 + 59 47 + 53

40. WAP to find all the twin-prime pair within a range. Give the range as an input. Reference: http://en.wikipedia.org/wiki/Twin_prime ******

Sample input	***Sample output***
1 20	(3,5) (5,7) (11,13) (17,19)
25 100	(29,31) (41,43) (59, 61) (71,73)

41. WAP that will give the output of function e^x (exponential function). Use the power series to solve this function. Reference: http://en.wikipedia.org/wiki/Exponential_function *******

Sample input	***Sample output***
1	2.718
2	7.389
3	20.086

42. WAP that will calculate following mathematical function for the input of x and n. Use only the series to solve the problem. Reference: http://en.wikipedia.org/wiki/Binomial_theorem *******

$$(1+x)^n = \sum_{k=0}^{n} \binom{n}{k} x^k$$

Sample input(x,n)	*Sample output*
1 3	8
2 2	9
3 5	1024

43. 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

44. Write a program that takes an integer n as input and find out the sum of the following series up to n terms using loop. ******

7 + 77 + 777 + 7777 +…….

Sample input	*Sample output*
1	7
2	84
3	861

45. 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