Q1. A Smith number is a composite number, whose sum of the digits is equal to the sum of its prime factors. For example:  
4, 22, 27, 58, 85, 94, 121 ………. are Smith numbers.  
  
Write a program in Java to enter a number and check whether it is a Smith number or not.  
  
Sample Input: 666  
Sum of the digits: 6 + 6 + 6 = 18  
Prime factors are: 2, 3, 3, 37  
Sum of the digits of the prime factors: 2 + 3 + 3 + (3 + 7) = 18  
Thus, 666 is a Smith Number.  
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Q2. A Composite Magic number is a positive integer which is composite as well as a magic number.  
  
Composite number: A composite number is a number which has more than two factors.  
For example:  
Factors of 10 are: 1, 2, 5, 10  
  
Magic number: A Magic number is a number in which the eventual sum of the digit is equal to 1.  
For example: 28 = 2+8=10= 1+0=1  
  
Accept two positive integers 'm' and 'n', where m is less than n. Display the number of composite magic integers that are in the range between m and n (both inclusive) and output them along with frequency, in the format specified below:  
  
Sample Input:  
m=10 n=100  
Output: The composite magic numbers are 10,28,46,55,64,82,91,100  
Frequency of composite magic numbers: 8  
  
Sample Input:  
m=120 n=90  
Output: Invalid input  
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Q3. A Goldbach number is a positive even integer that can be expressed as the sum of two odd primes.  
  
Note: All even integer numbers greater than 4 are Goldbach numbers.  
  
Example:  
  
6 = 3 + 3  
10 = 3 + 7  
10 = 5 + 5  
  
Hence, 6 has one odd prime pair 3 and 3. Similarly, 10 has two odd prime pairs, i.e. 3 and 7, 5 and 5.  
  
Write a program to accept an even integer 'N' where N > 9 and N < 50. Find all the odd prime pairs whose sum is equal to the number 'N'.  
  
Test your program with the following data and some random data:  
  
Example 1  
  
INPUT:  
N = 14  
  
OUTPUT:  
PRIME PAIRS ARE:  
3, 11  
7, 7  
  
Example 2  
  
INPUT:  
N = 30  
  
OUTPUT:  
PRIME PAIRS ARE:  
7, 23  
11, 19  
13, 17  
  
Example 3  
  
INPUT:  
N = 17  
  
OUTPUT:  
INVALID INPUT. NUMBER IS ODD.  
  
Example 4  
  
INPUT:  
N = 126  
  
OUTPUT:  
INVALID INPUT. NUMBER OUT OF RANGE.  
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Q4. A triangular number is formed by the addition of consecutive integers starting with 1. For example,  
1 + 2 = 3  
1 + 2 + 3 = 6  
1 + 2 + 3 + 4 = 10  
1 + 2 + 3 + 4 + 5 = 15  
Thus, 3, 6, 10, 15, are triangular numbers.  
Write a program in Java to display all the triangular numbers from 3 to n, taking the value of n as an input.  
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Q5. Armstrong Number Program in Java  
  
Armstrong Number is a positive number if it is equal to the sum of cubes of its digits is called Armstrong number and if its sum is not equal to the number then its not a Armstrong number. Armstrong Number Program is very popular in java, c language, python etc. Examples: 153 is Armstrong, (1\*1\*1)+(5\*5\*5)+(3\*3\*3) = 153  
  
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