

1. Develop a flowchart to show how to determine all the 3-digit Armstrong numbers. A number is called an Armstrong number if the sum of the values of the digits each raised to the power equal to the number of digits in the number equals the number. For example, 153 is an Armstrong number, because $153 = 1^3 + 5^3 + 3^3$.

2. Some three-digit numbers show the property that the sum of the factorials of the digits equals the numbers, for example, $145 = 1! + 4! + 5!$. Develop a flowchart to show how to determine all such numbers.

3. Create a pyramid of numbers consisting of a given number of lines. For example, if the given number is 5, then we should see the following:

```

      1
     1 2 1
    1 2 3 2 1
   1 2 3 4 3 2 1
  1 2 3 4 5 4 3 2 1
  
```

4. Construct a flowchart to print the following patterns with flexible dimensions as supplied by the user:

Note: Use nested loops and not string multiplication to print these patterns.

```

                ★
              ★ ★
            ★ ★ ★
          ★ ★ ★ ★
        ★ ★ ★ ★ ★
a. N = 5
b. N = 4
c. C = 3
  
```

```

    ★ ★ ★ ★ ★ ★ ★
  ★ ★ ★ ★ ★ ★ ★
a. N = 3 ★ ★ ★ ★ ★ ★ ★
        ★ ★ ★ ★ ★ ★ ★
        ★
b. N = 3 ★ ★ ★ ★ ★ ★ ★
  
```

```

★ ★ ★ ★ ★
★ ★ ★ ★
★ ★ ★
★ ★

```

c. N = 5 ★

```

★ ★ ★ ★ ★
★ ★ ★ ★
★ ★ ★
★ ★

```

d. N = 4 ★

5. Construct a flowchart to determine the HCF of n given numbers. Input a value n from the user then input n numbers from the user.
6. Construct a flowchart to determine the maximum and the minimum out of n given numbers.
7. Construct a flowchart to find the second max of given N numbers.
8. Construct a flowchart to find the third max of given N numbers.
9. Construct a flowchart to input a number, N, and print the first N prime numbers.
10. Write a program to find the sum of all prime numbers between 1 to n. (n input from the user)
11. Construct a flowchart to print only the prime factors of a given number N.
12. Construct a flowchart to show the logic of printing the first N Fibonacci numbers. Fibonacci numbers are obtained from the relationship $t_i = t_{i-1} + t_{i-2}$, $i = 2$ to n where $t_0 = 0$, $t_1 = 1$.
13. Construct a flowchart to find a series of five consecutive numbers, the sum of the squares of the first three of which is equal to the sum of the squares of the last two. For example,

$$(-2)^2 + (-1)^2 + 0^2 = 1^2 + 2^2$$
14. Some two-digit numbers have the property that the sum of the squares of the numbers equals the sum of the squares of the numbers with reversed digits (for example, $48^2 + 52^2 + 63^2 = 84^2 + 25^2 + 36^2$). Construct a flowchart to show how to determine all such two-digit numbers.
15. Construct a flowchart to determine all the permutations of some given number n. (n input from the user)

For example, if $n = 123$, then the permutations are:

123

321

231

132

213

312