### Problem 1. Numbers from 1 to N

Write a program that enters from the console a positive integer n and prints all the numbers from 1 to n, on a single line, separated by a space.

##### Examples:

| n | output |
| --- | --- |
| 3 | 1 2 3 |
| 5 | 1 2 3 4 5 |

### Problem 2. Numbers Not Divisible by 3 and 7

Write a program that enters from the console a positive integer n and prints all the numbers from 1 to n not divisible by 3 or 7, on a single line, separated by a space.

##### Examples:

| n | output |
| --- | --- |
| 3 | 1 2 |
| 10 | 1 2 4 5 8 10 |

### Problem 3. Number Wave

Write a program that reads from the console a positive integer number n and prints a "wave" i.e. the numbers from 1 to n and then the numbers from n - 1 to 1 on a single line separated by space.

##### Examples:

| n | the wave 1…n...1 |
| --- | --- |
| 3 | 1 2 3 2 1 |
| 6 | 1 2 3 4 5 6 5 4 3 2 1 |

### Problem 4. Smaller, greater or equal?

Write a program that reads from the console a sequence of n integer numbers and returns these numbers on a single line with the correct sign (<, > or =) between the numbers.

##### Examples:

| input | output |
| --- | --- |
| 3 2 5 1 | 2<5>1 |

| input | output |
| --- | --- |
| 4 -1 4 4 4 | -1<4=4=4 |

### Problem 5. Min, Max, Sum and Average of N Numbers

Write a program that reads from the console a sequence of n integer numbers and returns the minimal, the maximal number, the sum and the average of all numbers (displayed with 2 digits after the decimal point).

* The input starts by the number n (alone in a line) followed by n lines, each holding an integer number.
* The output is like in the examples below.

##### Examples:

| n | output |
| --- | --- |
| 3 2 5 1 | min = 1 max = 5 sum = 8 avg = 2.66 |

| n | output |
| --- | --- |
| 2 -1 4 | min = -1 max = 4 sum = 3 avg = 1.5 |

### Problem 6. Word or Number

Write a program that reads text from the console. Check if this text is a number or a word. If the text is a word print it reversed on the console. If it is a number add 1 to it and print it.

* The input is text on a single line (without intervals).
* If the input is a word it won't contain any digits!
* The output is like in the examples below.

##### Examples:

| input | output |
| --- | --- |
| good | doog |
| TA | AT |
| 32 | 33 |
| 42.5 | 43.50 |
| -1 | 0 |

### Problem 7. Print a Deck of 52 Cards

Write a program that generates and prints all possible cards from a [standard deck of 52 cards](http://en.wikipedia.org/wiki/Standard_52-card_deck) (without the jokers).

* The cards should be printed using the classical notation (like 5 of spades, A of hearts, 9 of clubs; and K of diamonds).
* The card faces should start from 2 to A.
* Print each card face in its four possible suits: clubs, diamonds, hearts and spades.
* Use 2 nested for-loops and a switch-case statement.

Note: You may use the suit symbols instead of text.

##### Examples:

|  |  |
| --- | --- |
|  | 2 of spades, 2 of clubs, 2 of hearts, 2 of diamonds |
|  | 3 of spades, 3 of clubs, 3 of hearts, 3 of diamonds |
|  | … |
|  | K of spades, K of clubs, K of hearts, K of diamonds |
|  | A of spades, A of clubs, A of hearts, A of diamonds |

### Problem 8. Calculate 1 + 1!/X + 2!/X^2 + … + N!/X^N

Write a program that, for a given two integer numbers n and x, calculates the sum S = 1 + 1!/x + 2!/x2 + … + n!/x^n.

* Use only one loop. Print the result with 5 digits after the decimal point.
* Note that each element can be calculated from the previous by this "formula": (previous\_element) \* i / x

##### Examples:

| n | x | S |
| --- | --- | --- |
| 3 | 2 | 2.75000 |
| 4 | 3 | 2.07407 |
| 5 | -4 | 0.75781 |

### Problem 9. Matrix of Numbers

Write a program that reads from the console a positive integer number n (1 ≤ n ≤ 20) and prints a matrix like in the examples below.

* Use two nested loops.

##### Examples:

| n | matrix |
| --- | --- |
| 2 | 1 2 |
|  | 2 3 |

| n | matrix |
| --- | --- |
| 3 | 1 2 3 |
|  | 2 3 4 |
|  | 3 4 5 |

| n | matrix |
| --- | --- |
| 4 | 1 2 3 4 |
|  | 2 3 4 5 |
|  | 3 4 5 6 |
|  | 4 5 6 7 |

### Problem 10. Word or Number 2

You are given an integer number n and then n new lines of text: numbers or words (see Problem 6). This time when we have a word we concatenate it with the previous words with a dash - between them. If we have a number we add it to all previous numbers.

* The input starts by the number n (alone in a line) followed by n lines, each holding a text without a space.
* Again all words contain no digits.
* The output is like in the examples below.
  + On the first line there are all words concatenated with - between them or no words if there were no words in the input.
  + On the second line is the sum of all the numbers or 0 if there were no numbers.

##### Examples:

| input | output |
| --- | --- |
| 5 1 go 1 there 5 | go-there 7 |

| input | output |
| --- | --- |
| 3 1 1 7 | no words 9 |

| input | output |
| --- | --- |
| 3 try google it | try-google-it 0 |

### Advanced Optional Problems

### Problem 11: Word or Number 3

You are given an integer number n and then n new lines of text: numbers or words (see Problem 6 and 10). This time we concatenate words (with a dash - between them) only if they are adjacent. And we add numbers only when they are adjacent. Each time we have a number after a word we print the concatenated words so far and go on a new line. Each time we have a word after a number we print the sum so far and go on the next line.

* The input starts by the number n (alone in a line) followed by n lines, each holding a text without a space.
* Again all words contain no digits.
* The output is like in the examples below.

##### Examples:

| input | output |
| --- | --- |
| 6 1 go 1 1 there IT | 1 go 2 there-IT |

* Explanation:
  + First we have 6 - the number of lines with text.
  + The first line of text is the number 1.
  + It is followed by a word go - we print 1
  + The word go is followed by a number - print go and move on.
  + Then we have two numbers - sum them.
  + Next is the word there - print the sum so far (2) and move on.
  + Two words are adjacent - concatenate and print them.

| input | output |
| --- | --- |
| 3 1 1 7 | 9 |

| input | output |
| --- | --- |
| 3 try google it | try-google-it |

| input | output |
| --- | --- |
| 9 try google it 2 plus 2 = 52 -10 | try-google-it 2 plus 2 = 42 |

### Problem 12: Calculate N! / K!

Write a program that calculates n! / k! for given n and k (1 < k < n < 100).

* Use only one loop.

##### Examples:

| n | k | n! / k! |
| --- | --- | --- |
| 5 | 2 | 60 |
| 6 | 5 | 6 |
| 8 | 3 | 6720 |

### Problem 13: Odd and Even Product

You are given n integers (given in a single line, separated by a space).

Write a program that checks whether the product of the odd elements is equal to the product of the even elements.

* Elements are counted from 1 to n, so the first element is odd, the second is even, etc.

##### Examples:

| numbers | result |
| --- | --- |
| 2 1 1 6 3 | yes |
| product = 6 |  |
|  |  |
| 3 10 4 6 5 1 | yes |
| product = 60 |  |
|  |  |
| 4 3 2 5 2 | no |
| odd\_product = 16 |  |
| even\_product = 15 |  |

### Problem 14: Spiral Matrix

Write a program that reads from the console a positive integer number n (1 ≤ n ≤ 20) and prints a matrix holding the numbers from 1 to n\*n in the form of square spiral like in the examples below.

##### Examples:

| n | matrix |
| --- | --- |
| 2 | 1 2 |
|  | 4 3 |

| n | matrix |
| --- | --- |
| 3 | 1 2 3 |
|  | 8 9 4 |
|  | 7 6 5 |

| n | matrix |
| --- | --- |
| 4 | 1 2 3 4 |
|  | 12 13 14 5 |
|  | 11 16 15 6 |
|  | 10 9 8 7 |