# List with all exercises

### Ex001
The registration of an address book, names, age and telephone numbers of 5 people, complements an appropriate registration structure in C, that performs the following tasks:
A - registration of information: name, address, telephone number and age.
B - age research.
C - alphabetical classification.
D - alteration of a record that occurred with an error. E - exit the program.

### Ex002
Develop an algorithm that controls the ages of 50 administrative staff at a school and displays retirees and active workers. The algorithm in question should perform the following routines:
a-register the 50 administrative staff and their ages
b-classify the registered administrators
c-correct administrative and / or ages that have been registered with errors
d-search administrative by name and age
e-list retired employees ($> = 60$ years)
f-list active administrators

### Ex003
Suppose that a simple virus has infected the university's database system and that, as the only damage, it has altered the students' RA's. After some time, it was discovered that given the RA generated by the RAV virus = x1 x2 x3 x4 x5 x6 x7 x8 x9, the correct RA RAC = y1 y2 y3 y4 y5 y6 y7 y8 y9 could be obtained through the following operations: y1 = x1, y2 = x2, y3 = x8, y4 = x7, y5 = x5, y6 = x6, y7 = x3, y8 = x4, y9 = x9 For example, if RAV = 197845602 then RAC = 190645782. Design a C program that reads RAV and generates 9-digit RAC.

### Ex004
Describe a program in Language C that reads the value of an RA (number consisting of 9 digits) and generates a new RA by reversing the 4 less initiated digits of the initial RA.
For example, if the initial RA for 972845236 then the new RA should be 972846325.
If initial RA for 984475211 then the new RA must be 984471125.
The algorithm should read the initial RA and present the new RA.

### Ex005
Describe a C program that reads the value of an RA (9-digit number) and generates a new RA by reversing the 2 most significant digits and reversing the 2 least significant digits of the initial RA. For example, if the initial RA is 972845236 then the new RA must be 792845263. If the initial RA is 984475213 then the new RA must be 894475231. The algorithm must read the initial RA and print the new RA.

### Ex006
 Read 5 elements in an array A type vector.
Create a matrix B of the same dimension with the elements of matrix A multiplied by 3.
Display matrix B. Element B [1] should be implied by element A [1] * 3,
element B [2] by element A [ 2] * 3 and so on, up to 5.

### Ex007
Read a vector-type matrix A with 6 elements. Create a matrix B of the same type, with each element in matrix B being the factorial of the corresponding element in matrix A. Display matrix B.

### Ex008
Read two arrays A and B of the vector type with 5 elements each. Create a matrix C, where each element of A is the subtraction of the corresponding element of A with B. Display matrix C.

### Ex009
Make a program that receives the month (from 1 to 12) as input and returns the name of the respective month. (Use switch / case)

### Ex010
Read 12 elements of a vector-type matrix, put them in order decreasing and presenting the ordered elements.

### Ex011
Read 8 elements in an array A type vector. Create a matrix B of the same dimension with the elements of the matrix multiplied by 5. Display matrix B in ascending order. Create a routine to search for the elements stored in matrix B.

### Ex012
Read 2 matrix A and B, each of 2D with 5 rows and 3 columns. Create a matrix C of the same dimension, where C is formed by the sum of the elements of matrix A with the elements of matrix B. Display this matrix.

### Ex013
Read a 1D matrix A with 10 elements. Create a 2D matrix B with 3 columns, where:
 -The 1st column of matrix B is formed by the elements of matrix A plus 5;
 - the 2nd column is formed by the value of calculating the factorial of each corresponding element of matrix A;
 - the 3rd column should be formed by the squares of the corresponding elements of matrix A. Display matrix B.

### Ex014
Read 2 matrix A and B, each with 1D for 4 elements. Create a 2D C matrix, where the 1st column of matrix C should be formed by the elements of matrix A multiplied by 2 and the 2nd column should be formed by the elements of matrix B subtracted from 5. Display matrix C.

### Ex015
Develop a program that controls the bimonthly grades of 20 students in a classroom and that calculates the average of each student, and the student who obtains an average> = 7.0 will be considered approved. The program in question must perform the following routines:
a-register the 20 students and their grades
b-classify the registered students
c-correct students and / or grades that have been registered with errors

d-search students by name
e-list approved students
f-list failed students.

### Ex016

elaborate a program that has a subroutine that performs and allows to display the total sum of the first N whole numbers, defined by an operator.
(1 + 2 + 3 + ... + N).

### Ex017

create a program that uses a subroutine to calculate the Fibonacci series of N terms. The series is formed by the sequence: 1,1,2,3,5,8,13,21,34 ... etc. It is characterized by the sum of a later term with its subsequent previous one.

### Ex018

Explain the Difference between:
p++ // (*p)++ // *(p++)

### Ex019

Display the results of a multiplication table of any number. This should be printed in the following format:
2 X 1 = 2
2 X 2 = 4
(...)
2 X 10 = 20

### Ex020

Read an N number less than or equal to 50 and display the value obtained from successively multiplying N by 3 while the product is less than 250 (N * 3, N * 3 * 3, N * 3 * 3 * 3, etc. )

### Ex021

Create a program that displays the Fibonacci series up to the fifteenth term. The Fibonacci series is formed by the sequence: 1, 1, 2, 3, 5, 8, 13, 21, 34 .... etc. This series is characterized by the sum of a later term with its subsequent previous one.

### Ex022

Difference between do-while and while.

### Ex023

Read three values for the sides of a triangle, considering sides such as: A, B and C. Check if the sides provided really form a triangle, and if this condition is true, indicate which type of triangle is formed: isosceles, scalene, or equilateral. Triangle is a geometric shape (polygon) composed of 3 sides, where each side is less than the sum of the two other sides. BASIC RULE: It will be a triangle when A <B + C, when B <A + C and when C <A + B. A triangle is isosceles when it has 2 equal sides and a different one, being A == B or A == C or B == C; it is scalene when it has all different sides, with A <> B and B <> C and it is equilateral when it has all the same sides, with A == B and B == C.