1. Write a program that converts into an integer by using INT and NINT the result of the division of the following real numbers: 5.9/2.0; 4.9/2.0; 3.0/2.0 and 2.9/2.0.

2. Code a program that reads 10 numbers from a file and prints those bigger than 5.0 and writes -5.0 instead of the numbers lower or equal than 5.0.

3. Create an array that it is a derived data type variable called "patient" that holds the name and family name of the patient, the temperature (with single precision), the pulse rate (as an integer) and a diagnosis ("healthy" or "sick") of a given patient. Then assign the values for 3 patients and, finally, print the values for each patient to an output file. The program must ask whether the data of all or only one of the patients is going to be printed and, in the last case, ask for the family name of the searched patient.

4. Generate an unformatted file named "input.dat" containing a double precision vector $vec(19)$ in the first record and a row of a double precision matrix $mat(nrow, 19)$ in each of the following records. Write a program (using functions and/or subroutines) that
   a) Reads the vector and the matrix. Note that the value of $nrow$ must be found out to read the full matrix.
   b) Calculates the product $mat^T \cdot vec$
   c) Writes in a "clear form" both the input elements and the final result

5. Write (in two different files) a main program and a subroutine so that the main calls the subroutine, which receives a matrix and returns it with its diagonal scaled by a factor given in the call to the subroutine.

6. Create a module containing the subroutine written in previous exercise as well as a function that normalizes to one the array in its arguments list. Then, write a main program using this module.

7. Build a library containing all the subprograms (functions or subroutines) created until now. The simple programs written in the first exercises must be converted into subprograms and also be included in the library

8. Write a Makefile to compile and link the procedures from exercises 5 and 6.