

UNIVERSITY OF PARMA

Department of Engineering and Architecture

Degree course in Computer, Electronic and Communications Engineering

**PRACTICAL TEXT IN COMPUTER SCIENCE & PROGRAMMING LABORATORY**

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Nome: \_\_\_\_\_ Cognome: \_\_\_\_\_ Matr: \_\_\_\_\_ Postazione \_\_\_\_\_

Write a program using the C language (name the project with your student ID) that behaves as described below. The available time is 120 minutes. At the end of the time, the saved files on **U:\** are going to be automatically collected. Additional documents, files... are available in **T:\Bertozzi**, and it is recommended to use WordPad to read text files.

A file called 'comuni.csv' line by line, contains data for the 7900 Italian municipalities, namely: the name, a ';', the province code (2 characters), another ';', and the real estate registry code of the municipality (4 characters). Example:

SOMMARIVA DEL BOSCO ; CN ; I822

Develop a C program that:

1. (8) Define a suitable structure that allows the storage of data contained in the file. To this end, exploit knowledge of the number of municipalities in the file and the presence of fixed-length data; however, you have to use dynamic memory allocation for the municipality name.
2. (10) Include a function **leggiriga(FILE \*, ??)**; that reads a single line from the file and returns its content based on what is defined in "??". It is left to the developer's choice whether to return the data using "return" or by passing arguments to the function. If the function fails to read from the file, it should terminate the program.  
In the main(), implement a loop that, after opening the file, calls this function and fills the structure defined in point #1.
3. (3) Include a function **void stampacomuni(??)**; that prints the content of the structure defined in point #1.  
In the main(), invoke this function after the code indicated in point #2. After verifying the correct functioning, comment out the invocation before moving on to the next point.
4. (4) Include a function **void stampaprovincia(??, char [ ])**; that takes as input the data structure defined in point #1 and a string containing the abbreviation of a province. This function prints the names of all municipalities in that province.  
For debugging purposes, in the main(), invoke this function to evaluate the correct operation.
5. (6) Include a function **void ordinacomuni(??)**; that takes as input the data structure defined in point #1 and, using the predefined qsort() function, changes the order of the elements of the data structure so that they are sorted by province in ascending order.  
In the main(), invoke this function and then use the printmunicipalities() function defined in point #3 to verify the correct operation of the developed code.

**The code must be developed following the proposed order. The correction ends at the first point not correctly implemented.**

**Hint: if fscanf() is intended to be used to read from the file, please consider that the format specifier "%[^;]" can be used to read a string until the first ';' character that is left in the read buffer**