COMPUTER ENGINEERING LABORATORY

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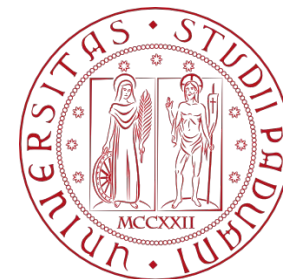
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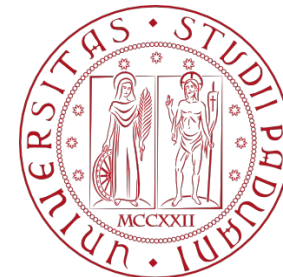
UNIVERSITÀ
DEGLI STUDI
DI PADOVA

A file, (probably?) present on disk, contains a sequence of words, each with a maximum length of 20. The words can contain lowercase and uppercase alphabetic characters, punctuation, apostrophes, brackets and are separated from each other by spaces and/or newline.

Write a C program that takes the name of the file as an argument and returns (via data chosen by the student) the number of occurrences of the lowercase characters making up only words at least 8 characters long.

For example, considering the following file:

this file
contains at least
three significant words
that are sufficiently long

the program shall return to the calling program and in the way chosen by the student the following information

There are 2 occurrences of the character a

There are 3 occurrences of the character c

There are 1 occurrences of the character e

There are 3 occurrences of the character f

There are 1 occurrences of the character g

There are 6 occurrences of the character i

There are 1 occurrences of the character l

There are 5 occurrences of the character n

There are 1 occurrences of the character o

There are 3 occurrences of the character s

There are 3 occurrences of the character t

There are 1 occurrences of the character u

There are 1 occurrences of the character y

<a:2> <c:3> <e:1> <f:3>
<g:1> <i:6> <l:1> <n:5>
<o:1> <s:3> <t:3> <u:1>
<y:1>

- Two pieces are placed on an 8x8 chessboard: the white King and the black Queen.
- Write a program in C language which, having acquired the positions of the King and the Queen, determines whether the Queen is in such a position as to be able to eat the King. The positions of the two pieces are identified by the row and column on which they are located , expressed as integers between 1 and 8.

Some suggestions:
- Define all the situations when the Queen eats the King (same row, same column, ascending diagonals, descending diagonals)
- Solve one subproblem at a time and check the solution before proceeding with the next subproblem.
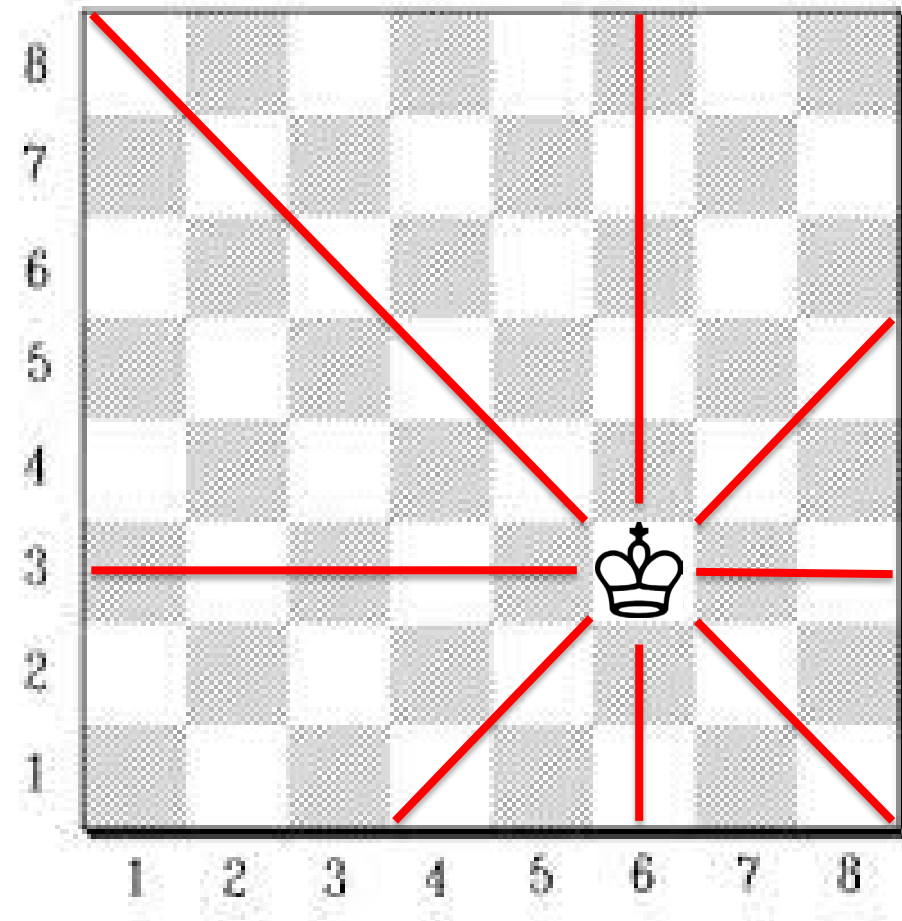
Consider the following declarations of types and variables, which define the data structures to represent meteorological surveys carried out for 100 Italian municipalities throughout the year.

Write a code fragment, defining any additional variables, which finds all the cities that in the month of December recorded at least one survey in which the level of rainfall was higher than that stored in the threshold variable **thresholdF**. For each of these cities, display on a single line the name and the average amount of rainfall calculated over the entire year.

```
typedef struct {
unsigned int day; /* between 1 and 31 */
unsigned int month; /* between 1 and 12 */
float levelF; /* rain fall */} measure;


typedef struct {
municipality char[20]; /*name of municipality*/
measure surveys[365]; /* max 365 findings, it is not certain that surveys take place on a daily
basis */
int nSurveys; /* actual number of data recorded in surveys */} measuresMunicipality; /* data
monitored during the year for a single municipality */
```

typedef measuresMunicipality surveysGlobal[100]; /* data monitored during the year for all 100 municipalities */
surveysGlobal dg;
float thresholdF; /* Assume that the variables thresholdF and dg have been initialized via instructions not shown here */

```
typedef struct {
unsigned int day;
unsigned int month;
float levelF;
} measure;

typedef struct {
municipality char[20];
measure surveys[365];
int nSurveys;
} measuresMunicipality;

typedef measuresMunicipality surveysGlobal[100];
surveysGlobal dg;
float thresholdF;
```