

Expected delivery of lab_07.zip must include:

- zipped project folder of the exercises 1 and 2
- this document compiled possibly in pdf format.



Exercise 1)

A tennis player is following a strict food diet, in which she must count the number of calories taken in from the food eaten and the sport performed. Write a program in **ARM assembly** language that counts the **number of total daily calories**, subtracting from those taken in through food, those consumed through sports.

```
Days                DCB 0x01, 0x02, 0x03, 0x04, 0x05, 0x06, 0x07

Calories_food       DCD 0x06, 1300, 0x03, 1700, 0x02, 1200, 0x04, 1900,
                    DCD 0x05, 1110, 0x01, 1670, 0x07, 1000

Calories_sport       DCD 0x02, 500, 0x05, 800, 0x06, 400

Num_days             DCB 7
Num_days_sport       DCB 3
```

Days is a table where each entry consists of a day of the week (e.g., 0x01 is Monday, 0x02 Tuesday, ..)
Calories_food is a table where each entry consists of two integer values: the ID of the day (4 bytes) and the quantity of calories assumed with food (4 bytes).

Calories_sport is a table where each entry consists of two integer values: the ID of the day (4 bytes) and the quantity of calories consumed with sport activities (4 bytes). Notice that not all days she plays sport.

Num_days is a 1-byte constant and indicates the number of days in a week.

Num_days_sport is a 1-byte constant and indicates the number of days she plays tennis.

Compute the **total number of days** she takes in less than 500 calories per day and store it in register R11.

Note: The constant data section must be defined in the code section, with 4096 boundary zero bytes.

Example:

```
...
// BOUNDARY (SPACE ....)
MY DATA
..
```

Exercise 2)

Save in two separate vectors `Calories_food_ordered` and `Calories_sport_ordered`, the ID of the days in descending order by calories assumed or consumed, respectively.

The output will be, for example:

`Calories_food_ordered` DCD 0x04,0x03,0x01,0x06,0x02,0x05,0x07

`Calories_sport_ordered` DCD 0x05,0x02,0x06

Then, save in R11 the ID of the least “caloric” day.

Compute the needed bytes for the above vectors.

Vector	Size [bytes]
<code>Calories_food_ordered</code>	28
<code>Calories_sport_ordered</code>	12

Report the following program characteristics (Hint: See the build output window in Keil).

	Size [bytes]
Program Size	4540
Read Only data	764
Read Write data	136
Zero Initialized data	512

And provide a brief explanation about which directives can influence the previous program characteristics.

Una caratteristica che potrebbe ottimizzare lo spazio potrebbe essere il salvataggio dell'array ordinato sotto forma di byte, invece che di word, ciò ridurrebbe lo spazio tra i vari ID. Questa constatazione si può fare e rimane valida fino a che tali id saranno compresi in un valore di 255 (senza segno), nel caso in cui si decidesse di tenere traccia delle calorie consumate anche solo in un anno risulterebbe fondamentale aumentare tale valore ad una half-word se non addirittura ritornare a valori di word.