ISEP INSTITUTO SUPERIOR DE ENGENHARIA DO PORTO

Licenciatura em Engenharia Informática
Arquitetura de Computadores (ARQCP)
2025/2026

Individual Exercise	**Duration:** 1h:50m	**Version:** A

Number:_____ **Name:**_____

The exercise resolution has to be into account the topics covered in the course and consider the Linux operating system and RV32IM architecture. To solve this exercise, create the **ex1_XXXXXXXX** folder, where **XXXXXXXX** is your student number, and places all created files into it. Write your identification (student number, name, and class) as well as the exercise version as a comment in all source code files.

```
/*
1234567: Joaquim das Couves: 2DX : version A
*/
```

At the end the exercise, you must clean your exercise folder (removing all binary files), create the zip **XXXXXXX.zip** file (containing ONLY source code and Makefile files) and submit it to your class submission link available at course webpage on Moodle.

First C Function

Create the **func1.c** file and implement the function **int low_pressure(unsigned int * x)** using pointers. This function receives a pointer of a unsigned integer (**x**). This pointer points to a variable that models the pressure of car tires, one byte for each tire. Whenever a tire is with a low pressure (less than 0xFE) it has to be filled. In such case this function returns **1** and **0**, otherwise (if there is no tire with low pressure).

Second C Function

Create the **func2.c** file and Implement the function **int check_tires(unsigned int * cars, int n, unsigned int **fill)** using pointers. This function receives the address of an array of integers (**cars**), the number of elements into array (**n**) and an array of integer pointers (**fill**). Each element of the **cars** array models the pressure of car tires, one byte for each tire. Whenever a tire is with a low pressure (less than 0xFE) it has to be filled. The function should save the into **fill** the addresses of cars that have at least one tire with low pressure. More, function should return the number of cars into **fill** array.

Main C Function

Create the **main.c** file, copy the following code to it and add the required code to call the "Second C Function" and to present (output) the number of cars that need to fill the tires. If required you can also add variables.

```
#define NCARS 5
int main(void){
  unsigned int cars[NCARS]={0xFFFFFFFF,0xFFFAFFFA,0x00000000,0xFCFDEFAB,0xFFFFFFFF};
  unsigned int *fill[NCARS];
  //////////////////
  //Add the code here


  return 0;
}
```

Makefile

Create the **Makefile** file for compiling specifically your code.