Computer Architecture 2022/23

Homework 4

A. Motivation

In the class' CLIP page there is an executable Linux file called *bomba*. The program contained in this file asks the user to guess a secret phrase that's defined inside the program. If the user guesses the phrase correctly they are congratulated, but if they fail the program writes "BOOM!!!!" and terminates. If they faile too many times, the program sends an e-mail to the teacher of the class, lowering the student's grade.

Obviously a future computer scientist and engineer, instead of trying to guess the phrase, will create a program to discover it. This program will copy the content of the file *bomba* to RAM and search for the chain of secret characters in the data area of the program.

B. Work to be done

This homework must be implemented using C and assembler in the Linux operating system. The program in C, which is provided for you, uses functions in the *stdio* library to read the file into memory and the program in assembler, which you must implement, must use the *write* system call to write characters to the terminal.

The program contains two components:

- **A file *main.c*, which is provided in its entirety.** This program opens the executable file *bomba* with read permissions and copies its contents into RAM. Afterwards, it calls a function in assembler with the function prototype *void strings(void *base, size_t fileSize)*; and
- **A file *searchStrings.s* which contains the code of the functions** *searchStrings* **and** *myPutChar* **that you must complete.** For this homework, the executable file *bomba* can be considered a sequence of bytes of length L; your program should go through the file's L bytes from byte 0 to byte L-1. It should consider a character printable if the character is grater than or equal to 0x20 (32 in decimal, the space ' ' character), and less than or equal to 0x7E (126 in decimal, or the tilde character '~'). When the program encounters a sequence of printable characters it must write them to the screen. The sequences should be printed in separate lines.

With the lines appearing on the screen, it should be easy to discover the secret phrase.

C. Turning in the work

The deadline for this homework is at 23h59m on Monday the 29th of May. The homework must be done in groups of at most 2 students. It should be submitted via email to the teacher of the practical class in which you are enrolled.

The email must have the following subject: *TPC4: alunos XXX (nºAAA) e YYY(nº BBB)* and must contain only the file *searchStrings.s*.