Homework #1

The questions in this homework assignment guide you through the process of implementing a function that converts an entire string into upper-case letters, integrated in an execution environment that allows you to test its correct behavior.

Question 1 (2 pt.)

Write a header file that declares a function named `upper_case`, which returns no value, and takes a C string as its first and only argument. The string is represented as a null-terminated sequence of characters. Don't forget the include guards in the header file. Upload this file on Blackboard as attachment named `UpperCase.h`.

Question 2 (2 pt.)

Write a C source file that contains an implementation of function `upper_case` written in C. Next to each line of code that may start a new basic block, write a comment where you assign a label to that basic block, which you will later match in the LLVM implementation of Question 4. It may be useful to use curly braces in all blocks of code, even for those with one single statement. For example:

```
if (x > 10)     // Label 'cond'
{
    a++;        // Label 'then'
}               // Label 'endif'
```

Attach this file as `UpperCase.c` on Blackboard.

Question 3 (2 pt.)

Write a main program that takes one argument from the command line, converts it to upper-case characters by invoking function `upper_case`, and prints the resulting string. Attach this file as `main.c`.

Assuming that files `UpperCase.c`, `UpperCase.h`, and `main.c` are located in the same directory, your source code should compile and run without any kind of modifications by invoking the following commands:

```
$ gcc main.c UpperCase.c -o main
$ ./main Hello123
HELLO123
```

Question 4 (4 pt.)

Write an LLVM version of function `upper_case`, and upload it in a file named `UpperCase.ll`. Your program should compile correctly without any modifications, and should provide the same exact output as Question 3 by running the following commands:

```
$ llc UpperCase.ll
$ gcc UpperCase.s main.c -o main
$ ./main Hello123
HELLO123
```