Chapter 3

First Program: Hello World!

Lest start with a classic program: **hello world!** Lest see the code and them lest talk about it. You also will find an equivalent form in other programming language, it could be java or python.

```
# Hello world program, it define a variable and with a string and print it to video.
# fileName: helloworld.asm
.data
   greeting: .asciiz " hello world!"
.text

main:
    li   $v0, 4
    la   $a0, greeting
    syscall

    li $v0,10
    syscall
```

As can you see we **defined** a *variable* called **greeting** of type **.asciiz** and we have assigned the value **hello world**. The : are mandatory to defined a variable.
This lines have the same value of : *String greeting = hello world!* in Java.

To be able to print something we need to **setup** the system into ***print an string mode*** so we assign to the register $v0$ the value 4.

Until now we dont talk about register, dont worry if you never hear about them, i'll explain it later just for now you can see this $v0$ as a particular variable *exclusive* to the MIPS system

After this we need to **load the address** where the system will find the variable **(1)**. In this case the variable address is indicated by the label *greeting*. The register $a0$, was not chosen randomly keep in mind.

The **syscall** is a very important command in mips because with this you will be able to execute the code previously defined. Try to deleted this word from the previously code and see what happen. Every time you write *syscall* you are saying to da system: **do it now!** . MIPS need this command to be able to execute every group of code otherwise it wont show you nothing.
The note **(1)** needs some clarification, what the heck means **load the address**?? later you will find also store the address, anyway... this opertaion is equivalent of **calling** or passing a variable in a high-level programming language, a low level language needs the exact address of the variable to be able to find it **and** and that Address needs to be stored in a specific register.

Lest see the **Java** version : This type of program you can write it in anyway you like.

```
package helloworld;

public class HelloWorld {

   public static void main(String[] args) {
      String greeting = "hello world!";
      System.out.print(greeting);
   }
}
```

We started by defining a variable named *greeting* of type **String** and assigned it the value **hello world!**. So them to be able to print something we call the method *System.out.print ()* and and we passed them the variable to be printed.

This is the **python** version: i think that it don't need any comment.

```
>>> print("hello world!")
hello world!
>>>
```

Or if you like

```
>>> greeting = "hello world!"
print(greeting)
hello world!
>>>
```