The C++ programming language (exercises)

— P.03 —

Summary:

- How to compile a C++ program (linux)
- The "Hello World" program
- Program to print some numbers
- Program that uses function overloading
- Program that uses a class
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- Program that uses a class template
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How to compile a C++ program (linux)

A C++ program is composed by one or more `.cpp` source files and by zero or more `.h` files (included by the `.cpp` source files). To compile the program under GNU/linux, the following command should be used:

```
c++ -Wall -O2 source_files... -o executable_name -lm
```

Replace `source_files...` by the list of the `.cpp` source files, and replace `executable_name` by the name you desire to give to the executable file. All that was said about compiling C programs also holds for compiling C++ programs (except that now the compiler program is called `c++` and not `cc`).

The "Hello World" program

Extract the file `hello.cpp` from the archive `P03.tgz`. Study, compile, and run the program. Compare it with the `hello.c` given in the P.02 class (you can find it in the `P02.tgz` archive). Modify the program to print the numbers $\mathbf{1, 2, 3, \ldots, 10}$.

Program to print some numbers

Extract the file `table.cpp` from the archive `P03.tgz`. Study, compile, and run the program. Compare it with the C program given in the P.02 practical class. Modify the program to print in another column the cubic roots of the numbers of the second column. (Hint: the function `cbrt` computes a cubic root.)

Program that uses function overloading

Extract the file `overload.cpp` from the archive `P03.tgz`. Study, compile, and run the program. Add two other `show` functions to it, to print i) a char, and ii) an array of **3** integers (fixed array size). For example,

```
show('a');
```

should print

```
char: a
```

and

```
int a[3] = { 2,7,-1 };
show(a);
```

should print

```
array: [2,7,-1]
```

Test your new program.

Programs that uses a class

Extract the file `person.cpp` from the archive `P03.tgz`. Study, compile, and run the program. Set `debug` to **1** and recompile and rerun the program. Is the output the same as before? Why? Change the program so that the class `person` also stores the phone number of a person. The program `dot.cpp` also uses a class. Study it.

Program that uses a function template

Extract the file `f_template.cpp` from the archive `P03.tgz`. Study, compile, and run the program. Add another function to the program than computes the mean of the elements of the array. The return type of that new function should be `double`.

Program that uses a class template

Extract the file `c_template.cpp` from the archive `P03.tgz`. Study, compile, and run the program.

Program that uses an exception handler

Extract the file `exception.cpp` from the archive `P03.tgz`. Study, compile, and run the program. Modify the value of the `special_value` constant so that the exception of type `int` is triggered before the exception of type `double` has a change to be triggered.

Homework

Add exceptions to the `c_template` program. (**Hint:** create an enumerated type with values `stack_full` and `stack_empty` and use them as the exception values.)