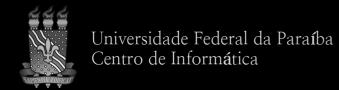
# Hacking the C and C++ Programming Languages

Lecture 1

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## Top 5 Programming Languages

- According to IEEE Spectrum:
  - 1. Java.
  - 2. C.
  - 3. C++.
  - 4. Python.
  - 5. C#.





These languagens are in **high demand** by the **industry**!











Given a programming lang. you know, how do you describe your programming skills?

- · Expert.
- · Proficient.
- · Good.
- · Regular.
- If it does not compile in the first try,
   I start procrastinating...

#### Assuming the Clang., answer...

- You have found a bug in your program. How do you usually debug code?
- What does "undefined reference to" means?
- What does "external" do to functions and variables?
- · What do the following **qualifiers** mean:
  - · const.
  - · inline.

#### With respect to C++, answer...

· What is this? When it should (n't) be used in code?

```
class Dummy {
    ...
    int x;
public:
    Dummy(int &x) : x(x) {...}
    ...
```

```
class Dummy2 {
     ...
public:
     virtual void Test( int z );
     ...
```

```
template < class T > class Dummy3 {
public:
    T Test( T z );
    ...
```

#### Basic vs. Advanced Knowledge

- The **basic knowledge** of a language **allows** for the development of a **large number** of programs.
- However, solely the basic knowledge very frequently prevents one from:
  - Exploring advanced capabilities available in the language and the platform.
  - · Understanding the advantages or limitations of a language with respect to others.
  - · Understanding sophisticated code developed by skilled developers.
  - · Among others.

#### This Course

- This course aims at dissecting the C / C++
  programming languages, allowing for the
  conscious use of some of their advanced
  features.
- Despite the fact that we will use C/C++, the main concepts and practices discussed along this course certainly can be applied to whatever programming language you choose to learn or to work with!

#### Course Outline

- The C programming language.
- Memory management.
- · Compilation and linking.
- The C++ programming language.
- Classes and objects.
- · Inheritance.
- Memory management.
- · Templates.
- Meta programming.

## Background

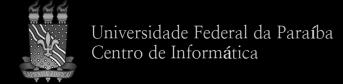
- · Computer architecture basics.
- · Algorithms.
- · C Programming Language basics.
- · Data structures.

#### To pass this course...

- · Attend classes regularly and participate.
- · Understand the concepts.
- · Do the assignments.
- Participate.

#### To fail this course...

- · Do not attend classes regularly and participate.
- Do not understand the concepts.
- Don't do the assignments.
- Don't participate.



# **Grading Policy**

 Student's will be evaluated individually according to the following formula:

$$FG = \left(\frac{(A\ 1 + A\ 2 + \dots + An)}{n} \times 40\ \%\right) + (P \times 15\ \%) + (FA \times 45\ \%)$$

#### Where:

- $An = assignment n (1 \le n < \infty)$ .
- P = participation.
- FA = final assignment.
- FG = final grade.

# Bibliography

- The Art of Debugging with GDB, DDD, and Eclipse. Norman Matloff and Peter Jay Salzman.
- Expert C Programming: Deep Secrets. Peter van der Linden.
- Effective C++: 55 Specific Ways to Improve Your Programs and Designs. Scott Meyers.
- Modern C++ Design: Generic Programming and Design Patterns Applied. Andrei Alexandrescu.
- Selected papers and articles.

#### **Useful Tools**

- · Text editor:
  - · vi, vim, gedit, etc.
- · C / C++ compiler:
  - · GCC.
- · IDE:
  - Eclipse CDT + GCC.
  - · Etc.
- · Misc tools:
  - · Binutils.

#### Our Website

 All relevant stuff will be available on the Virtual Classroom on SIGAA!

The student is responsible for keeping his contact info up to date on SIGAA!