

Introduction to Programming



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Contact Details

- Francesco Ricci
 - Room 2.17 (POS)
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- **Availability Hours:**
 - Tuesday: 14:00 – 18:00
 - **by prior arrangement via e-mail**
- **Course web site**
 - <http://www.inf.unibz.it/~ricci/IP/>

Course Structure

- **Lectures: 48 hours**
- **Labs: 24 hours**
- **Timetable:**
 - Lectures: **Tuesday** and **Thursday** 10:30 – 12:30
 - Labs on **Wednesday**:
 - Mehdi Elahi (14:00-16:00 B and 16:00-18:00 A) -
Marko Gasparic (16:00-18:00 C)
- **Assessment:**
 - final exam, written, 60% of the mark (16 points)
 - project (1 student per project !) 40% (14 points)
 - Assignments in the labs (2 points bonus).

Goals

- Teach the fundamental principles of **programming**
 - the process of **designing, writing, testing, debugging, and maintaining** the source code of computer programs
- **Source code** is written in a **programming language**
- The purpose of programming is to create a **program that exhibits a certain desired behavior**
- We will use **an object-oriented** approach: you will learn how objects "speak" and "cooperate" to solve a problem
- You will learn how to **solve problems with good programs** - not only how to write programs but also how to design and implement effective solutions.

How?

- The learning will be based on **examples**, from very simple ones to more complex
 - Build new solutions by **reusing** previously applied solutions (Case-Based Reasoning)
- We will use the **Java** programming language
- We will use an **IDE** Integrated Development Environment (Eclipse): a software application that provides comprehensive facilities to computer programmers for software development
- This is a **self contained introduction** to motivate further study and provide **prerequisite material** for more advanced courses on:
 - Advanced Programming (sem. 2), Distributed Systems (sem. 4), Internet and Mobile Services (sem. 5)

What you should learn

- ❑ The fundamental principles of **object-oriented** programming,
- ❑ The use of control structures, functional abstraction, classes and methods, and basic data structures, ...
- ❑ Be able to put them into practice, by writing **good** programs in Java that solve “simple” applicative problems:
 - EX1: an application for drawing and painting
 - Ex2: an application for managing your CDs collection.

Syllabus

- Introduction to computer systems
- Data types and expressions
- Classes and objects
- Conditionals and loops
- Object-oriented design
- Arrays and collections
- Inheritance and polymorphism
- Recursion
- Building graphical user interfaces in Java.

Course Format

- ❑ **12 Lectures** on various topics in Programming
- ❑ **12 Labs**
 - Run yourself the examples (software) shown during the lectures
 - Solve some new exercises/assignments
 - Build your own applications
 - Prepare yourself for your final exam **project** (based on the assignments)
- ❑ **Books**
 - John Lewis and William Loftus, Java Software Solutions, Pearson, 2012 (*new version ed. 8, 2014*)
 - Java Tutorials – *optional and more advanced - online (you can download it and read it on your computer)*
<http://download.oracle.com/javase/tutorial/>

Exam Project



- The exam project is conducted **individually**
- The objective is developing **a java based application**:
 - With a graphical user interface
 - That can manage **items** (music tracks, dvds, trekking paths, soccer matches, cameras, ...)
- *We will assign the precise task at a certain point in time and you will deliver the solution before a deadline (e.g. in two weeks)*
- We will evaluate the **quality** of the solution: **easy** to use, **meaningfulness** of the implemented functions, **quality of the code** (according to the principles that will be illustrated during the lectures).

What a student must do to pass



- ❑ **Read** the book chapters (JSS) and additional material that will be suggested for each lecture
- ❑ Complete the “self-review questions” at the end of each section of the book (JSS)
- ❑ The slides should be enough **only for a general understanding of the topic**
- ❑ If something is not clear during a lecture you must take a note and **rise a question** (especially in the labs)
- ❑ **Try what you see! Active Learning**
- ❑ Develop and test the programming assignments
- ❑ Deliver the assignments and the project on time!

Exam



- ❑ **Written exam:** questions and exercises on the topic illustrated in the lectures (e.g. *self-review questions*)
- ❑ The final project package must be sent to me 2 weeks before the written exam (*exact timing will be indicated*)
- ❑ **You cannot attend the written exam if you have not passed the project part**
- ❑ You will have two grades: P (project), max 14 points, and W (written exam), max 16 points
- ❑ The final grade is $F = W + \min(P+B, 14)$
- ❑ $B \leq 2$ and is obtained if and only if you deliver on time the (correct) assignments (it is optional)
- ❑ P and W must be greater or equal than 8 and 10 respectively.

The Best Ways to Study

- ❑ Based on a review of more than 700 scientific articles on 10 commonly used learning techniques
- ❑ **Self-Testing: Quizzing Yourself Gets High Marks**
 - Practice tests are done by students on their own, outside of class. Methods might include using flashcards (physical or digital) to test recall or answering the sample questions at the end of a textbook chapter
- ❑ **Distributed Practice: For Best Results, Spread Your Study over Time**
 - To remember something for one week, learning episodes should be 12 to 24 hours apart; to remember something for five years, they should be spaced six to 12 months apart.

<http://archive-e.blogspot.it/2013/08/psychologists-identify-best-ways-to.html>

Calibration Questions

□ **I am 90% confident that:**

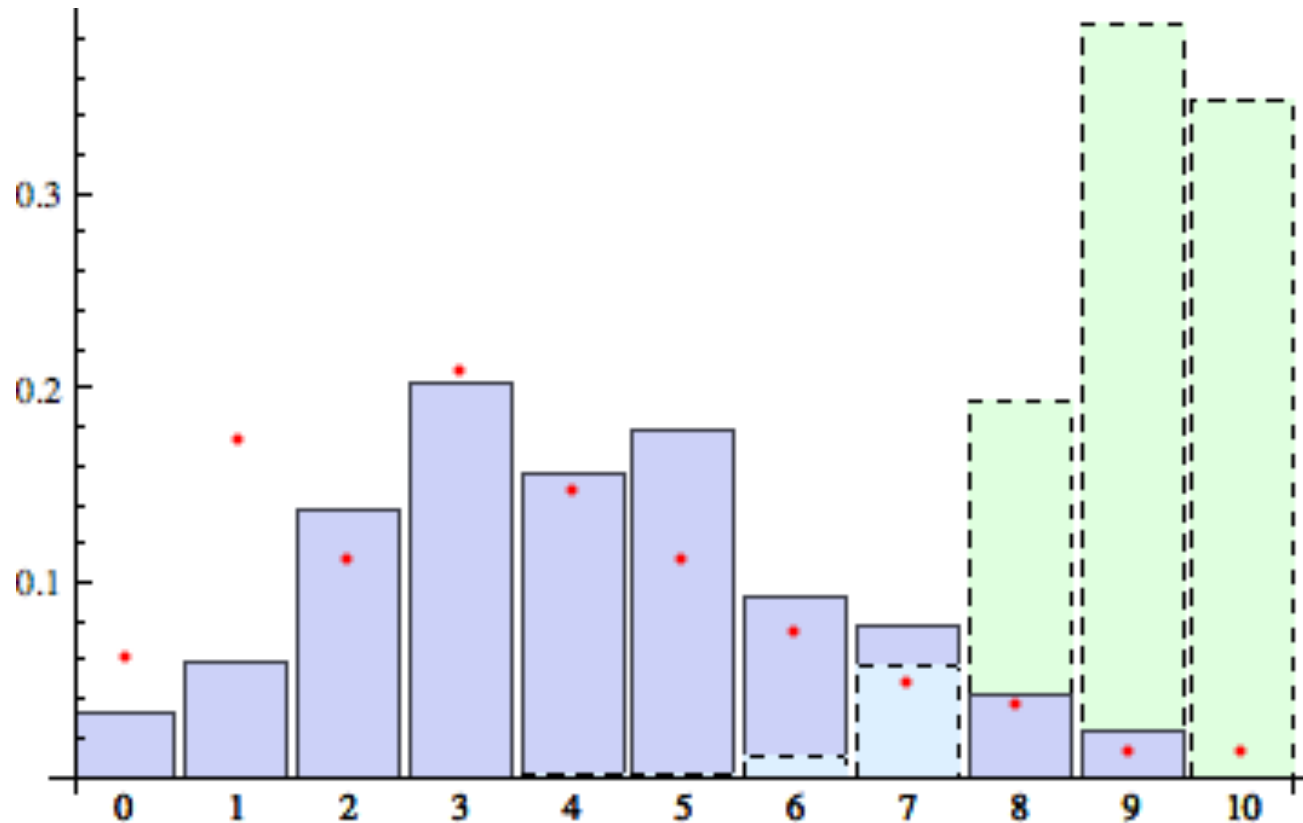
1. Martin Luther King, Jr.'s age at death is between xxx and yyy.
2. The length of the Nile River, in km is between xxx and yyy.
3. Between xxx and yyy countries belong to OPEC.
4. There are between xxx and yyy books in the Old Testament.
5. The diameter of the moon, in km is between xxx and yyy.
6. The weight of an empty Boeing 747, in kg is between xxx and yyy.
7. Mozart was born between year xxx and yyy.
8. The gestation period of an Asian elephant, in days is between xxx and yyy
9. The air distance from London to Tokyo, in km is between xxx and yyy.
10. The deepest known point in the ocean, in meters is between xxx and yyy.

Calibration Questions Answers

□ **I am 90% confident that:**

1. Martin Luther King, Jr.'s age at death is between xxx and yyy. **39**
2. The length of the Nile River, in km is between xxx and yyy. **6650**
3. Between xxx and yyy countries belong to OPEC. **12**
4. There are between xxx and yyy books in the Old Testament. **39**
5. The diameter of the moon, in km is between xxx and yyy. **3474**
6. The weight of an empty Boeing 747, in kg is between xxx and yyy. **176,901**
7. Mozart was born between year xxx and yyy. **1756**
8. The gestation period of an Asian elephant, in days is between xxx and yyy. **645**
9. The air distance from London to Tokyo, in km is between xxx and yyy. **9,590**
10. The deepest known point in the ocean, in meters is between xxx and yyy. **10,970**

Results



- Blue distribution of correct replies is a typical observed one.
- Green distribution is what it would look like if it were really the case that every interval people gave had a 90% chance of containing the true answer.

<http://messymatters.com/calibration/>