Sistemas Distribuídos: Class Information

3º MIEIC

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Staff

Lectures

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Context

Distributed Application(Def.) An application with two or more processes:

1. executing on different computers
2. communicating via messages
   - with a no negligible delay (wrt computation)

- Most applications nowadays are distributed
- Virtually any **intellectually interesting** application nowadays is **distributed**.
  - Example of an interesting **non-**distributed application?

Objectives

1. Understand the foundations of distributed computing;
2. Be able to:
   - design and implement simple distributed applications;
   - analyse distributed solutions and evaluate their fitness to the problem at hand.

Caveat Actually, we'll focus on the concepts related to "cloud-based computing", not so much to the "Internet-of-Things"

Prerequisites

- Operating Systems – concurrency
- Computer Networks
- Programming in C/C++/**Java**

Syllabus: Part 1/3 - Communication and Processing

Introduction

Networking (Review)

Communication Paradigms

- Messages
- Remote invocation

Processing

Syllabus: Part 2/3 - Foundations

Names and Localization

Security

Sinchronization

Replication and Consistency

Fault Tolerance

Syllabus: Part 3/3 - Applications(?)

Distributed Filesystems

Data Intensive Computing

Web-based Applications

Peer-to-peer Systems

Supporting Material

Textbook

Tanenbaum, A. e van Steen, M.

Distributed Systems: Principles and Paradigms, 3rd Ed. (2017)
(available for free upon request)

Small fun "book" focused on the data center

Distributed Systems: for fun and profit.

Java Documentation E.g.:

Java 8.0 API

(Mini-)Projects

1. Simple distributed storage application
   - Groups of 2 students
   - Due date: April 3 @ 08:00 (Tuesday)
   - Demo: on first lab class after due date (i.e. on April 4)
2. Your own project
   - Possibly using a mobile (Android/iOS/Windows) client
   - Groups of 4 students
   - Proposal: April 9 @ 08:00 (Monday)
   - Due date: May 22 @ 08:00 (Tuesday)
   - Demo: on first lab class after due date (i.e. last week)

Note 1 Both projects and their reports must be submitted via SVN/Redmine

Note 2 Both projects have the same weight.

(Mini-)Projects: Grading

- Grading is individual
- We grade each project assuming the expected number of group members (2 and 4 respectively)
- To that grade we apply a **contribution factor** computed from the contribution using a piecewise linear function:

  First project

  - "Breaking points": 33%, 50%
  - Factor: 0 at 0%, .85 at 33%, 1 at 50% and 1.10 at 100%

  Second project

  - "Breaking point": 25%
  - Factor: 0 at 0%, 1 at 25%, 1.15 at 100%

  A ceiling based on the complexity will also be applied

Do you want to keep your previous year's project grade?

Fill this form no later than **February 10th** (i.e. by the end of this week)

Exam and Class Participation

Exam

- 2 hours
- Closed books **with cheat sheet**
  - A4 (both sides)
  - **Handwritten by yourself**

  Failure to comply means your exam will be **nullified**.
- Study by the book, not by the transparencies (at least mine)

Class Participation

- Including participation Moodle's forum

Final Grade

Ordinary students

$$G = min(min(F, P) + 3, 0.45P + 0.1C + 0.45F)$$

where:

- G course final grade
- P average of the grades in both projects ($P \geq 8$)
- C class participation
- F final exam grade ($F \geq 8$)

The final grade cannot exceed in more than 3 points (in 20) the minimum of the grades in the final exam and in the project

Special status students

$$G = min(min(F, P) + 3, 0.5P + 0.5F)$$

Academic Integrity

- UP, FEUP and we take academic integrity very seriously
  - Check out the Declaração de Princípios sobre a Integridade Académica na UP
  - We believe that the majority of you follow the rules
- You are allowed to discuss the projects
  - For each project, there will be a discussion forum on Moodle
- **But** all code submitted should be either:
  - Developed by the group members
  - Or authorized by me, **and** due credit should be given both in the report and in the source file.
- We will use tools to automatically detect common code
  - **All** groups with similar code will be penalized
  - You may still help your colleagues, but you **cannot share code nor read the code of someonelse's project**

  That the projects are identical to those of last year is no excuse
- The penalty may range:

  From a zero in that project

  To failing the course

Thank you!
Questions?

Announcements

Classes start 10 minutes after the hour

- 8:40 on Wednesdays
- 8:40 on Fridays

Labs start next week

Course material available on Moodle's course page

Important dates:

	Due date
1st project	April 3 @ 08:00 (Tuesday)
Proposal of 2nd project	April 9 @ 08:00 (Monday)
2nd project	May 22 @ 08:00 (Tuesday)

Demos in the first lab class after due dates.