Sistemas Distribuídos

General Description

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Bolonha Model

- It promotes a student-centred teaching by
  - stimulating an autonomous learning
  - proposing the *problem solving* paradigm as the main methodological strategy for teaching
  - stressing the development of specific skills vs. a more or less automatic building up of general knowledge.
- It establishes very precise metrics on the work being carried out
  - the academic week is defined to be 40 hours of effective work, meaning a total of 30 ECTS credits
    - 1 ECTS = 4/3 h of weekly study
  - each course of the curriculum is assigned a very definite work load
    - SD: 6 ECTS $\Rightarrow$ 8 h of weekly study (attending classes + home work).

Main Objectives

- to acquaint the students to the principles and the underlying practice of the design of distributed systems through the presentation of the most important concepts about their implementation
- to introduce the most important paradigms of process communication and synchronization in a distributed fashion.

Learning Outcomes

- to gain a good understanding on the main issues related to the conception of distributed systems
- to develop skills for the design and the implementation of simple distributed applications
- to acquaint the students with the functionality of Java distributed programming environment.

Prerequisites

- basic knowledge about operating systems and multiprogrammed environments
- working knowledge of the application of the object oriented paradigm to the design of solutions
- working knowledge of sequential programming and some knowledge of the principles of concurrent programming.

Syllabus

- Introduction to Java
- Distributed Systems
- System models
- Interprocess communication and synchronization
- Client-server models
- Group communication models
- Consistency and replication
- Security

Main bibliography

- *Distributed Systems – Principles and Paradigms*, Tanenbaum A.S. e Steen M.v., Pearson Education International / Prentice Hall, 2006
- *Distributed Systems – Concepts and Design*, Dollimore J., Kindberg T. e Coulouris G., Addison Wesley / Pearson Education Ltd, 2005
- *Distributed Systems – An Algorithmic Approach*, Ghosh S., Chapman & Hall / CRC Computer and Information Science Series, 2007

Important note – One of these books should be really read!

Lectures

Lectures present specific topics of the syllabus. The adopted approach tries to entice the students to participate actively in the discussion and to help them to develop skills of critical reasoning and to learn general techniques of problem solving.

Lab classes

Labs follow the motto "*you learn by doing*" and are mostly devoted to discuss implementation issues about the solution of a general problem.

***Work assignment* 1 – Concurrency**

Pure concurrent implementation of the problem running in a single platform.

***Work assignment* 2 – Message passing**

Distributed implementation of the problem, based on message passing, running in multiple platforms.

***Work assignment* 3 – Remote method of invocation**

Distributed implementation of the problem, based on method invocation on remote objects, running in multiple platforms.

Students are organized in working groups composed of two elements. Each group must present and defend its approach to the solution and its implementation during a query session.

Tutorials

They will have an expositive character and aim to help the students to overcome deficiencies in background knowledge as well as to provide a space for the discussion of particular aspects of the course.

Grading - 1

$$course\ grade = \frac{5 \times theoretical\ mark + 5 \times lab\ mark}{10}$$

- rounding is always carried out *half up* to unities, except when the lab mark is higher than the theoretical mark by more than three units; in this case, rounding is carried out *half down*
- *theoretical grading*
  - written examination (época normal ou época de recurso)
  - challenge placed during lectures (optional)
  - *minimum mark* equal to 8,5 units (always rounded to unities)
- *lab grading*
  - composed of *work assignments* 1 through 3, each having equal weight
  - *minimum mark* equal to 8,5 units (always rounded to unities)

Grading - 2

- *Pass*
  - both theoretical and lab marks higher or equal to 8,5 units ***and*** course grade higher or equal to 10 units
- *Fail*
  - theoretical mark lower than minimum mark ***or*** lab mark lower than minimum mark ***or*** final grade lower than 10 units
- *Fail by minimum mark*
  - lab mark lower than minimum mark
- *Fail by absence (regular student)*
  - missing more than seven lab classes

Final remarks

- the lab mark is limited to 16 units
  - a higher grade requires an additional assignment
- special dates
  - deadline for delivering work assignment 1: 23 de Abril de 2022
  - deadline for delivering work assignment 2: 28 de Maio de 2022
  - deadline for delivering work assignment 3: 25 de Junho de 2022
- all documentation about the course can be found in the *elearning* site (moodle)
- any further questions may be answered by the course operational document or by myself.

elearning site