



DESIGN OF TELEMEDICINE SYSTEMS

Enrollment year	2017/2018
Academic year	2017/2018
Regulations	DM270
Academic discipline	ING-INF/06 (ELECTRONIC AND INFORMATION BIOENGINEERING)
Department	DEPARTMENT OF ELECTRICAL, COMPUTER AND BIOMEDICAL ENGINEERING
Course	BIOENGINEERING
Curriculum	Tecnologie per la salute
Year of study	1°
Period	2nd semester (05/03/2018 - 15/06/2018)
ECTS	6
Lesson hours	52 lesson hours
Language	Italian
Activity type	WRITTEN AND ORAL TEST
Teacher	LANZOLA GIORDANO (titolare) - 6 ECTS
Prerequisites	<p>The course requires a basic (but solid) knowledge relative to the fundamental concepts of computer programming (i.e. variables, statements, functions / methods and control structures) combined with the students' ability to code simple algorithms. Additional requirements concern knowledge of methodologies/technologies for the design of relational databases and the ability to write simple queries in SQL. All those prerequisites are acquired attending previous courses. The profile is completed by a basic knowledge on the use of the PC and Web browsing, as well as by the mix of design skills, logic ability, and critical acumen, that represent a prerequisite for every School of Engineering.</p>
Learning outcomes	<p>The course provides a general introduction of methodologies, technologies and architectures for the development of distributed applications for information processing, with particular concern to Telemedicine systems.</p>

Part B) Design of Telemedicine Systems:

It provides an introduction to a distributed applications development environment and some simple applications are supplied as example of integration of different software modules. The class also requires that students team up in small groups for designing and implementing an application prototype.

Course contents

The course, scheduled during the first year of the Laurea Magistrale in Bioengineering, combines methodological and technological topics. The lectures will first introduce new methodological topics of interest for the implementation of telemedicine systems (i.e. Object Orientation, Team Work, Design Patterns, UML Modeling, Concurrent Programming, Distributed Systems, Agents, etc). Those will be investigated through short coding sessions where code chunks will be delivered to the class.

Part B: Versioning Systems and Support to Team Work

Lectures will provide a short introduction on the functionality of Versioning Systems and the support provided by those for Team Work. Then GIT will be analyzed to a greater extent due to its widespread diffusion and because it will be used as the tool for distributing code chunks and whole projects to the class. GIT will also be used throughout the semester as a means of supporting team work among the students participating to the development of group projects.

Part B: Developing Environment

Some lectures will be devoted to the illustration of the development environment supporting message passing among the Multi Agent System prototypes to be developed by the students. Some insights on Object Oriented programming will also be provided with specific reference to the Java Language that will be exploited implementing group projects.

Part B: Concurrent Programming

A key issue of every ICT project involves concurrent programming. Projects and Threads will be introduced and analyzed with several coding examples in the Java context. Those lectures will also encompass a discussion of the basic primitives provided by the Java Language for coordinating the execution of code in an application involving multiple threads.

Part B: Class Work

Throughout the semester a lot of projects will be distributed through the server GIT hosted by the laboratory with the twofold aim of learning how to implement and master distributed programming techniques and better understand how the message passing platform that will be used as a broker actually works.

Teaching methods

Lectures (hours/year in lecture theatre): 90

Practical class (hours/year in lecture theatre): 0

Practicals / Workshops (hours/year in lecture theatre): 0

Reccomended or required readings

During the course the students will be provided with slides, lecture notes and all the code used in the projects discussed. However, to increment

their level of expertise it is advisable to acquire some textbooks either as generic references as well as for further insights. Here is a possible list.

Cay Horstmann & Gary Cornell. Core Java, Volume I - Fundamentals (8th edition). Prentice-Hall. ISBN: 978-0132354769.

Cay Horstmann. Object-Oriented Design & Patterns. John Wiley & Sons , Inc. ISBN: 978-0-471-74487-0 (450 Pagine, 2006) .

Martin Fowler. UML Distilled Third Edition. Addison Wesley. ISBN: 0-321-19368-7 (192 Pagine, Settembre 2003).

Craig Larman. Applying UML and Patterns: An Introduction to Object-Oriented Analysis and Design and Iterative Development (3rd Edition). Prentice Hall. ISBN: 978-0131489066 (736 Pagine).

James Gosling, Bill Joy, Guy Steele, Gilad Bracha. The Java Language Specification (Third Edition). Addison Wesley. ISBN 0321246780 (688 Pagine, Giugno 2005).

Assessment methods

Part B: "Progetto di Sistemi di Telemedicina"

Students will team up in groups during the course semester for implementing some projects. Those projects will exploit methodologies and technologies already learned during the part A "Fundamentals of Telemedicine Systems" that will be complemented with specific additional topics illustrated in Part B. The Teams will first prepare a written specification illustrating the features of their projects using technical diagrams based on UML. Then they will proceed to the actual implementation of the prototype partitioning the work among them. During the examination all the members of a group will be asked to perform some minor functional changes to their project to assess the level of proficiency reached.

Outcome

The final outcome of the class will take into account the results achieved in both Part A: Fundamentals of Telemedicine Systems and Part B: Design of Telemedicine Systems and will be given through a single score computed as the arithmetical mean of the two partial outcomes. Il voto viene assegnato al termine della prova a progetto e consiste in una valutazione complessiva dei risultati ottenuti dal candidato su tutte le prove previste dai due moduli.

Further information

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