

Distributed Programming

General Course Information

Edirlei Soares de Lima

<edirlei.lima@universidadeeuropeia.pt>

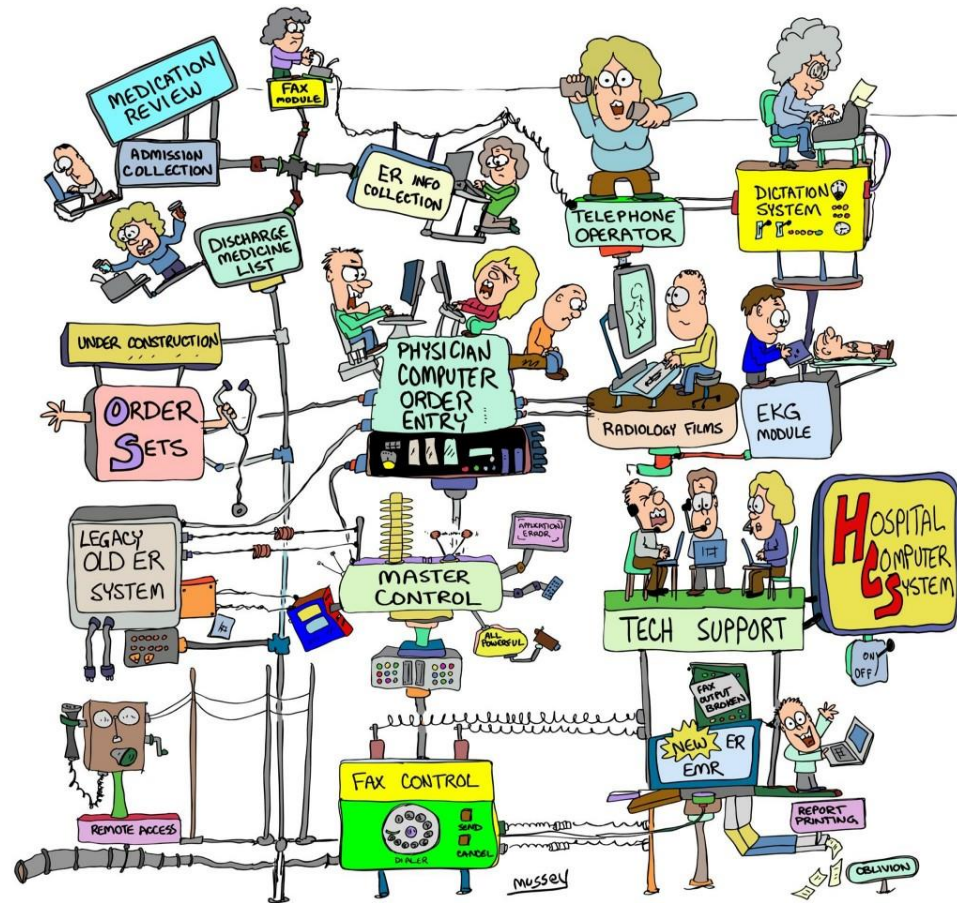
A decorative graphic in the bottom right corner consisting of overlapping yellow and orange shapes, including a grid-like pattern and a circular motif.

Distributed Programming

- Professor: Edirlei Soares de Lima
 - Education:
 - B.Sc. in Computer Science – UnC
 - M.Sc. in Computer Science – UFSM
 - Ph.D. in Computer Science – PUC-Rio
 - Teaching Experience: PUC-Rio, UNIRIO, UERJ, IADE-UE
 - Game Experience:
 - Game Engines: RPG Builder, 3D Game Builder (<http://www.3dgamebuilder.com.br/>);
 - Research Projects: most are related with Logtell (<http://www.icad.puc-rio.br/~logtell/>);
 - Games: Krimson (Best Game Award at SBGames 2010 – Indie Game Development Festival), and several other prototype games.
 - More Information: <http://www.inf.puc-rio.br/~elima/>

What is Distributed Programming?

- Distributed computing is a field of computer science that studies distributed systems.
- A distributed system is a system whose components are located on different networked computers, which then communicate and coordinate their actions by passing messages to each other.
- Distributed programming involves the implementation of distributed systems.




Distributed Programming

- Games & Apps Development:
 - Study of the paradigm of distributed programming, distributed systems, and data communication solutions;
 - Study of the C++ programming language, and its use in the Unreal Engine.
- Learning Outcomes:
 1. Implement games and general applications using the paradigm of distributed programming.
 2. Understand the main models for distributed programming and distributed systems.
 3. Implement client-server and peer-to-peer games using C++ and Unreal Engine.
 4. Assess aspects related with the performance of distributed systems, their advantages, and their shortcomings.

Distributed Programming

- Module Content:

1. Introduction to distributed systems and distributed programming;
 2. Processes, threads and synchronization;
 3. Distributed systems architectures;
 4. Unreal Engine and network communication;
 5. REST web services and HTTP communication in C++ on Unreal Engine;
 6. TCP and UDP communication in C++ on Unreal Engine;
 7. Evaluation of distributed systems.
- 


Method

- Active and experiential learning:
 - Theoretical concepts;
 - Practical examples;
 - Implementation exercises;
- Game framework: Unreal Engine
- Semester's PBL team project:
 - Implementation of the game using the methods learned during the course (architecture, communication, and performance).

Evaluation

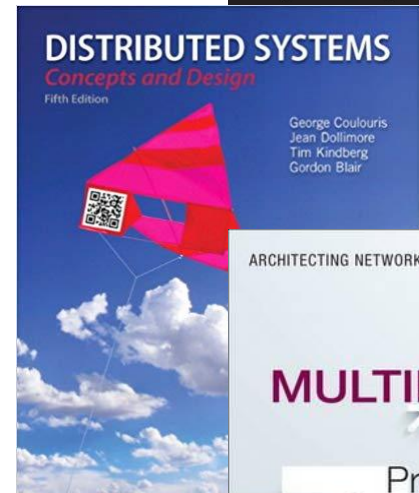
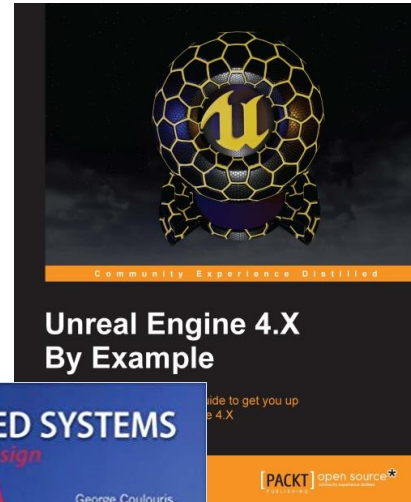
- Continuous Assessment (bipartite):
 - [60%] Intermediate assessment:
 - [50%] Individual exercises on the concepts learned;
 - [50%] Two intermediate deliveries of the team project (within the semester's PBL team project).
 - [40%] End of term assessment:
 - [100%] Final delivery of the team project (within the semester's PBL team project) with individual discussion.
- Final Assessment:
 - [100%] Individual project development, delivery, and discussion.

Evaluation

- Project Deliveries:
 - **1st delivery:** identification of the communication necessities;
 - **2nd delivery:** working prototype with basic network communication;
 - **3th delivery:** final version with performance and scalability analysis.
- 

Bibliography

- Carnall, B. (2016). **Unreal Engine 4.X By Example**. Packt Publishing. ISBN: 978-1785885532.
- Coulouris, G., Dollimore, J., Kindberg, T., Blair, G. (2004). **Distributed Systems: Concepts and Design** (5th edition), Pearson. ISBN: 978-0132143011.
- Glazer, J., Madhav, S. (2015). **Multiplayer Game Programming: Architecting Networked Games**. Addison-Wesley Professional. ISBN: 978-0134034300.



Distributed Programming

- Blackboard: Distributed Programming
- Course webpage:
 - <http://www.inf.puc-rio.br/~elima/dp/>
- Contact:
 - edirlei.lima@universidadeeuropeia.pt
 - edirlei.slima@gmail.com