Project of Software Development

Lesson 1 - 28Jan25
Course presentation

# Summary

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Syllabus: Course aims

What does it take to create real-world software? What challenges do software developers face? This course is designed to provide real-world experience in web development and software engineering.

The aim of this course is to enable students to experience the joy and creativity involved in software development, and to **develop the skills to manage the inherent challenges: human, technological, and legal**. This will provide students with the **skills to communicate with and manage software developers, and to understand the complexities, uncertainties and difficulties** inherent in software development.

Students will learn computational thinking, using state-of-the-art programming tools and methods. Through a hands-on project implemented in OutSystems, students will develop and apply computational methods to create a Web App.
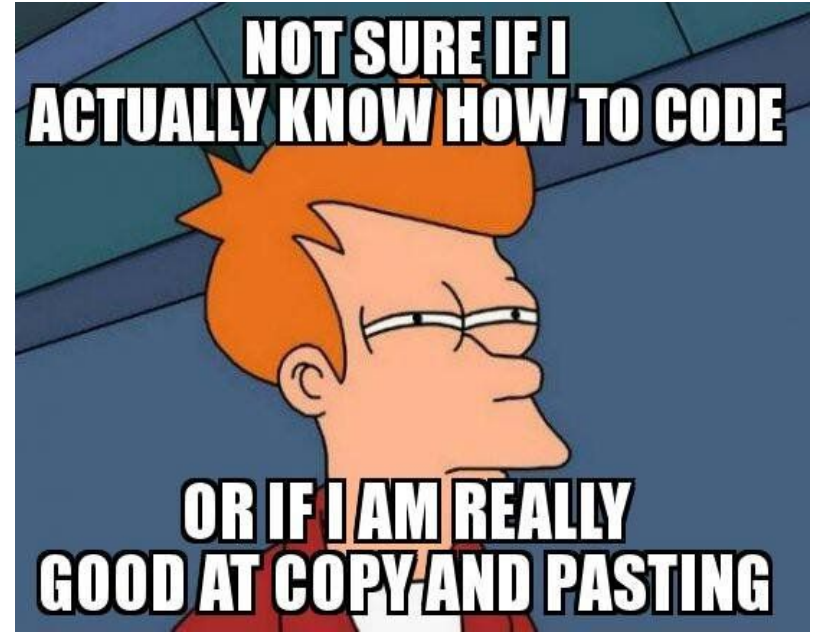
Syllabus: Course main topics

- **Software engineering** as an engineering discipline: Software Engineering Layers and Processes, Software Architecture, Architecture Styles.

- **Web Applications**: the World Wide Web (Web 3.0), Client-server architecture, Web Development, Website Architecture and Design.

- **Becoming a Reactive Web Developer** using OutSystems: OutSystems Development, Modeling and Handling Data, Reactive UI Development, Actions and Flows, Web Screens
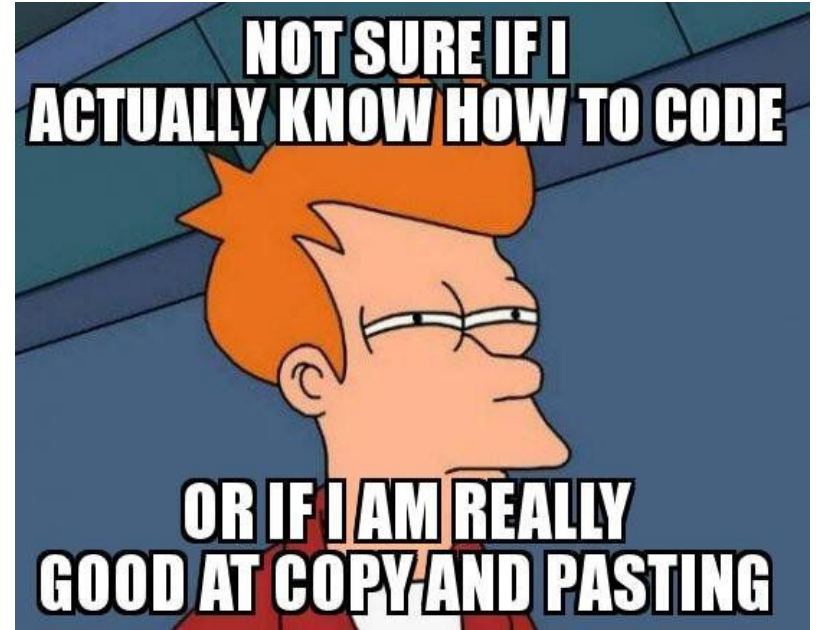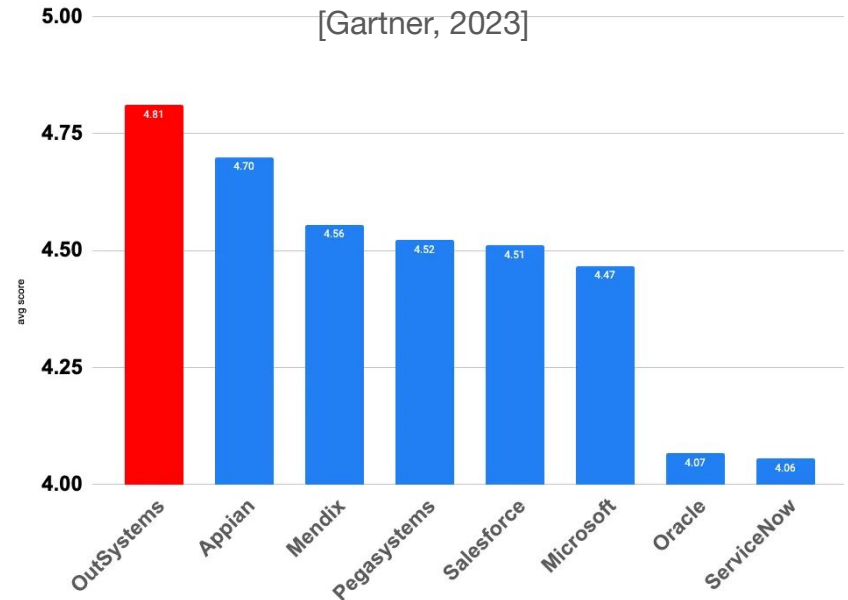
![outsystems logo]

Why OutSystems?

- OutSystems is a leader in the 2024 Gartner® Magic Quadrant™ for Enterprise Low-Code Application Platforms, for the 8th consecutive year [OutSystems, 2024]
- OutSystems is one of Portugal's unicorns[1] [Forbes, 2018], [OutSystems, 2018] and [SIC Notícias 2024]
- Global reach: customers in 87 countries, 22 different industries, 350 partners, community with 435.000 members
- Job opportunities: hundreds of open positions worldwide

[1] In business, a unicorn is a privately held startup company valued at over US$1 billion

MQ23 Leaders for Enterprise Low-Code Application Platforms: Product Scores (average of 9 capabilities) [Gartner, 2023]

Platform	avg score
OutSystems	4.81
Appian	4.70
Mendix	4.56
Pegasystems	4.52
Salesforce	4.51
Microsoft	4.47
Oracle	4.07
ServiceNow	4.06

Professor

- Olivier Carneiro | olivier.carneiro@iseg.ulisboa.pt | @Teams
- https://www.iseg.ulisboa.pt/faculty/olivier-pacheco-carneiro | https://www.linkedin.com/in/oliviercarneiro/
- **Office Hours**: by appointment

Education:

- **Computer Science and Engineering** at Instituto Superior Técnico / University of Lisbon (1998)
- **MBA** (The Lisbon MBA) at Católica | Nova SBE (2012)

Teaching:

- Since 2023: **Visiting Assistant Professor at ISEG** / Universidade de Lisboa

Professor background

Current Professional Activity:

- Since 2023: **Visiting Assistant Professor at ISEG** / Universidade de Lisboa
- Since 2012: **IT Expert (Perito Informático)** for the Ordem dos Engenheiros (Portuguese regulatory and licensing body for the engineering profession), carrying out software inspections in the context of legal proceedings for the civil courts.
- Since 2011: **Founder and marketeer** of [Olivier Apartments](#), a company that manages short-term rental apartments
- Since 2006: **OutSystems freelance developer**. I implemented many custom enterprise Web Applications in various sectors

Past Professional Experience:

- From 2008 to 2017: **IT Project Manager** at [TAP Air Portugal](#): managed IT projects with 100+ members, 10+ external and internal suppliers, a budget €5M, using technologies such as OutSystems, Tibco, DataStage, Cobol, MicroStrategy, Java and PHP.
- From 2004 to 2008, **IT Project Manager** at [OutSystems](#): managed the implementation of custom enterprise IT projects in the Netherlands, Portugal, France, and UK using the OutSystems technology

Schedule

Tuesdays from 11h30 to 13h00, Thursdays from 9h30 to 11h00, Except 15Apr and 17Apr (Easter)

Effort:

- 6 ECTS = 168 hours of expected total student work[1]
- 24 lessons * 1.5h = 36 hours, from 28Jan to 29Abr: 3 months ~ 12 full weeks
- All lessons will have homework (individual and group work)
  - 168 total hours - 36 total lesson hours = 132 hours ~ **9 hours of additional individual work per week**
  - If you fail to do the assignments, you will most certainly fail to keep up with the pace of the lessons. This might imply you will not be able to implement this course's assignments and therefore fail this course
- Online Training interpolated with lessons
  - OutSystems Self-Training: Becoming a Reactive Web Developer
  - Youtubers: Léo Andrade and CodeWithPraveen
- If you're ill or out of Lisbon at class time, let me know in advance and I'll broadcast the lesson via Teams

[1] According to the ECTS and Evaluation Systems at Universidade de Lisboa: "the legal framework that establishes the implementation of ECTS is set out in Portugal by the Decree Law No. 42/2005 [...] Each ECTS represents 28 hours of student work"
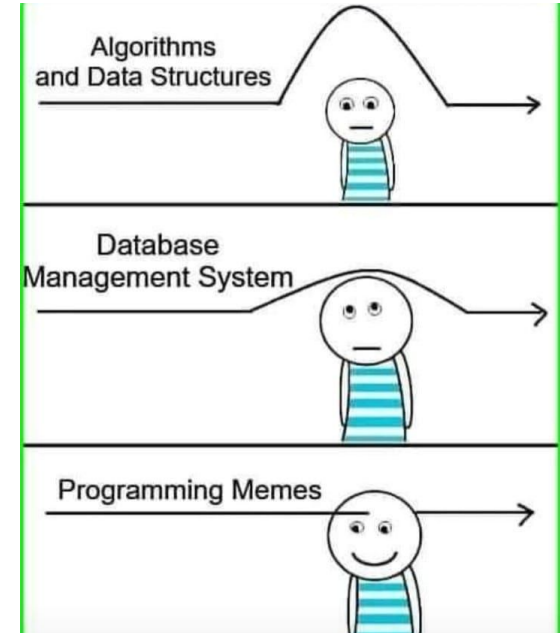
Assessment

- **Grade** = 10% homeworks + 15% midterm test + 20% live coding challenge + 55% project
- **Homeworks (10%):** lessons nr.2 and onwards will have homeworks with a required effort ranging from 1.5h to 2.5h for each one.
    - Will be graded as "Done = 100%/Not done or wrong = 0%"
- **Midterm test (15%):** test about lectures content (theory only, no exercises or programming)
- **Live coding challenge (20%):** implement a small Web Application using the OutSystems platform in 90 minutes
- **Project (55%):** implementation of a full Web Application in OutSystems:
    - Scope: implement (part of) your e-business idea from the course "e-Business Technologies and Models" (EBUSI) [1]
    - Fully working Web Application, live and accessible on the internet and any device (Desktop, Tablet & Smartphone)
    - Milestones:
        - Groups setup: deadline defined by EBUSI course.
        - e-business idea: deadline defined by EBUSI course
        - User stories implementation: 1 sprint every other week, starting after the e-business idea definition
        - Final submission: 12May (to be confirmed)

[1] We can discuss alternative project ideas in case you don't want to implement your e-business idea in this course. In any case, the group members must be the same.

Hard skills

Students will learn and practise:

- **Programming**:
  - Solve Problems and basic Algorithms
  - Fundamentals of Programming: Programming language Context, Variables, Data Structures, Control Structures, Deployment
- **Database**:
  - To understand the Relational Data Model;
  - Be able to elaborate a conceptual data model and transpose it to the Relational Model
  - Be able to use the Structured Query Language (SQL) to define, manipulate and search data in a Relational Database Management System
- **Analysis**:
  - Understand the requirements to be incorporated in software development
  - Apply Agile methods in business analysis with a focus on user stories
  - Understand the basics of software usability and accessibility

Students

Informal (not graded) individual assessment of each student current knowledge about IT hard skills prior to this course

https://forms.office.com/e/zN1k9Z3DcZ

The purpose is to assess the student's prior knowledge and for your professor to adapt the course content if needed.

Students

Please upload (or update) your photo at Fenix

Resources

- Hardware & Software requirements:
  - Please check at Fenix ([course page/Downloads and IT requirements](#))
- At ISEG
  - Classroom F2 101: you can use any of the computers
  - Students' computers room (on this floor, on opposite side of our classroom): computers SI21, SI22, SI23, SI24
- Webgraphy
  - **OutSystems Self-Training** (https://learn.outsystems.com/training/journeys/web-developer-662): Guided Path / Becoming a Reactive Web Developer
  - **Youtubers**: [Léo Andrade](#) and [CodeWithPraveen](#)
  - **W3Schools** (https://www.w3schools.com): tutorials for SQL, CSS (and much more)
  - **OutSystems Developer Community** (https://www.outsystems.com/community/): community to learn, ask questions, access reusable apps, share ideas, and connect with other OutSystems developers around the world
- Bibliography
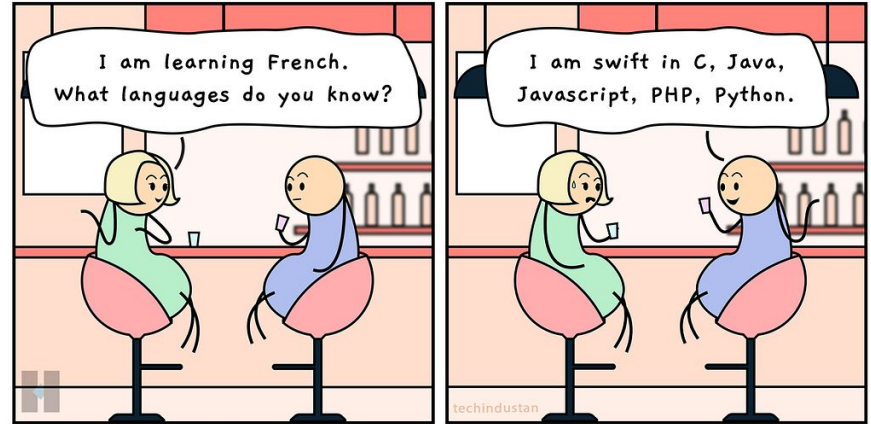 - Will be provided on each lesson (slides at [Fenix/Course page](#)/Lessons Material)

Your action is required: now create a personal account at OutSystems using your personal email. Along with the account creation, **one** free individual Web Server is created for you in the OutSystems cloud.

Go to https://www.outsystems.com/ and select "Start free". Do not use your ISEG email on your new account (your ISEG email will be used for another account at ISEG's OutSystems platform)

Service Studio is the development environment and must to be installed **on each computer** you wish to use for programming. Install on Windows or Mac using: Service Studio download

I have now sent you an email (from oliviercarneiro@gmail.com), please follow up on that and set a photo if you haven't on Fenix.

> I am learning French. What languages do you know?

> I am swift in C, Java, Javascript, PHP, Python.

techindustan

My course companion

The Course Companion will be the WebApp where your homework, exercises, and projects will be managed.

You will implement your homework and exercises in your OutSystems Personal Environment (the account you created in the previous slide) and register them in this Course Companion, according to each homework and exercise schedule that the professor will announce in each lesson.

Project of Software Development

- **Project?** of Software Development
  - Will be detailed in the course IT Project Management: "a temporary endeavor undertaken to create a unique project service or result." [PMBOK]
- Project of **Software?** Development
  - (1) instructions (computer programs) that when executed provide desired features, function, and performance
  - (2) data structures that enable the programs to adequately manipulate information
  - (3) descriptive information in both hard copy and virtual forms that describes the operation and use of the programs [Pressman]
- Project of Software **Development?**
  - Part of **Software Engineering**: The application of a systematic, disciplined, quantifiable approach to the development, operation, and maintenance of software; that is, the application of engineering to software [SWEBOK]