

The objective of this assignment is to prepare yourself to the kind of questions you may face in an IT interview. Some of the questions are related to the slides seen in class, but for most of them **you have to do your own research**. Most of the concepts hereunder are complex and require extensive experience in computer science to understand them properly. The idea for you is to explore them superficially, so you have a basic idea of what they are, and will not be lost in case you hear of them. We strongly encourage you to deepen your knowledge in those areas, as they often appear in interviews for positions that require some programming experience.

Interview procedure

- This is an individual assignment. You will be asked one question from the list. You will get a zero credit for a question you are asked, if you are not ready to answer it (you are not allowed to choose another question from this list). You will have to answer **without** any documents.
- For some questions no unique answer exists, as there are many ways of implementing a software. Therefore, be sure that your answers are supported by facts.
- There is no possibility to reschedule the interview. If you do not participate in the seminar, you will get a zero credit for the activity.

Questions

- a) Explain the *decorator* concept in Python. Provide an example of decorator.
- b) Explain the difference between interpreted and compiled languages in your own words, as if you were explaining it to somebody who does not know much about IT. State the advantages and weaknesses of both approaches. State two languages for each family.
- c) Explain what debugging means in the context of a software development. What are the general tools provided by high-level languages in order to debug an application? Also explain what is unit testing and why it is primordial to implement this methodology in large projects.
- d) Explain versioning and the main software used for this purpose. What is Agile Software Development? Develop one of the following methods: Lean software development, Agile modeling or Scrum.
- e) What is procedural programming? Explain what is Object Oriented Programming (OOP) and what advantages it brings in software engineering. State three languages that do support OOP and three languages that don't.

- f) Explain High Performance Computing (HPC). What are the main differences with Distributed Computing? Give an example where usage of one of them makes sense in the context of financial modeling.
- g) We ask you to construct from scratch a new software for risk management purpose. Explain in details each step from data collection to release of the software. Which programming language would you use for each step? Why?
- h) What are the main advantages of C++ compared to other languages such as Python and Julia? Explain simply concepts of classes and inheritance in the context of OOP.
- i) Explain briefly how you can use Matlab's functions in Excel. What are the benefits of doing so?