TU Delft Delft University of Technology

FACULTY OF TECHNOLOGY, POLICY AND MANAGEMENT
ENGINEERING SYSTEM AND SERVICES SECTION
ICT TRACK

TB141 – ICT System Engineering and Rapid Prototyping Formative Assignment - Programming Languages

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Learning Objectives

- Recall the most common programming languages category
- Recall the most common programming paradigms
- Establish the most appropriate programming language and paradigm for the example case based on the available information

Introduction

IT-Formativo, a company specialized in software development, has recently accepted two new development projects. However, as all their consultants are overwhelmed with work, they requested some assistance from TUDelft, in order to determine the most appropriate programming language for the problem at hand.

Project Alpha

The first project (codename Alpha) requires the development of the code for an embedded system, to be installed on a portable device to monitor the air quality of a city. (example CurieusNeus). After a discussion with the clients, our consultants have established that the solution to be implemented will be a small scale program, where efficiency has a paramount importance (as they want to maximize the lifetime of the monitoring station and limit the required maintenance).

Project Bravo

The second project (codename Bravo) requires the development of a budgeting application integrating the financial data of the end-users living in the European Union. As such, the application needs to comply with strict regulations from both the EU and the different countries in which the application will be launched. Our consultants have realized a thorough design of the application through the UML formalism, resulting in a well-detailed specification of entities and relationships. Moreover, they have determined that the solution will consist of a large scale program, requiring several months to be developed, with strict requirements in terms of documentation. In addition, once developed, the system should remain operative for several years, so a specific focus needs to be made on the maintainability of the system.

Project Charlie

The third project (codename Charlie) is developed in collaboration with an academic research group working on theoretical computer science and mathematical problems. The application should support the researchers of the group in providing an experimental framework for their hypothesis. As such, the application should be able to manipulate mathematical functions and offer a support for first order logic. After

a first meeting with the research group, our consultants have established that proposed solution would be a small scale application, where the focus should be in providing to the researcher a program which is as close as possible to the formalisms that they are already employing in their research (i.e. mathematical calculus and logic). As it will be only for internal use, less focus is required on maintainablity and efficiency.

Assignment

We ask you to analyze the considered situations and determine the most appropriate software development process for the problem at hand among those presented during class.

Make sure to include in your solution:

- A table summarizing the programming language categories presented during the lectures. Make sure to include at least 2 examples of programming languages for each category.
- A table summarizing the programming paradigms presented during the lectures. Make sure to include at least 2 examples of programming languages for each category.
- **For each of the cases**, a brief text (1-2 paragraphs maximum) motivating what is the most appropriate programming language category and paradigm for the considered problem.

Self-evaluation grading rubric - 10 pts

Criterion	0 pts	1 pts	2 pts
Recall the most common programming language categories	Missing/wrong programming language categories	Partial description of the programming language categories	Complete description of the programming language categories
Recall the most common programming paradigms	Missing/wrong programming paradigms	Partial description of the programming paradigms	Complete description of the programming paradigms
Establish the most appropriate programming language and paradigm for the example case based on the available information	Missing/wrong programming paradigms	Partial description of the programming paradigms	Complete description of the programming paradigms

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Rules for the assignment delivery

To be read carefully !

1. The assignment must be developed in groups of 2 students.
2. The assignment must include **your name** and **student id**.
3. The assignment must be submitted in **Brightspace** as a **PDF report**.
4. You have to follow the:
   - Upload of a file `FamilyName1_StudentID1_FamilyName2_StudentID2.pdf` on the course Brightspace.
   - Date: **Wednesday 16 February 2022**
   - Time: **Before 23:59**

   After these deadline the assignment will be considered as late and **will not be corrected**.
5. **Knock-off criteria:**
   - Missing names and id on the document/document name.
   - Document exceeding the number of requested pages.

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