University of Windsor
School of Computer Science
https://cs.uwindsor.ca

Master of Applied Computing
COMP-8117 – Summer 2023
Advanced Software Engineering Topics

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Project Outline

Marks = 20%

During this project, you are to develop a medium-sized application in groups of 7 students by implementing some professional software engineering techniques and principles. As you will develop the project in parallel with your lectures, we are not expecting that you will perfectly follow the existing methodology. We will evaluate you based on your abilities/skills to:

- Organize and use a scientific and a managed approach to develop your application (including different stages of Software Development Lifecycle)
- Determine and document the processes, procedures, methodologies, and steps for development and production.
- Justify the approach with evidence and proof.
- Manage the pipeline (using version control, JIRA, and GIT)
- Discuss with people who have few or no knowledge in Computer Science
- Communicate with your team, your project director (the instructor), and your customer (the GA – Graduate Assistant)
- Identify and manage the risks and different constraints inherent to development and production.
- Understand and answer viva questions from the code.
- Usage of testing and design patterns

Especially, the marks will reflect both your methodology and the end product.

Project Scenario

Consider you are a group of software engineers working in a small software development company 'TechPros'. Recently, your CEO referred to an article published in "New York Times" which states:

Tech evangelists have long predicted that computers would transform education. The future of learning, many promised, involved apps powered by artificial intelligence that would adjust lessons to children's abilities faster and more precisely than their human teachers ever could.

Source: https://www.nytimes.com/2021/03/17/technology/learning-apps-students.html

Thus, your top management mandates you to propose new innovative projects related to "Online Educational Learning".

Minimal Project Requirements

1. You should develop an application or 'app' based on "Online Educational Learning". This should **not** be a website.
2. Examples of such apps can be found on https://www.verywellfamily.com/best-educational-apps-4842094
3. You can freely choose the technology for coding and development. However, you must justify the choice of tools and technologies in your proposal.
4. Your company 'TechPros' plans to allocate 1 million CAD per project. The final budget is subject to approval after submission of a proposal to the management of the company.
5. TechPros uses a salary grid to pay the engineers. At your level, the total cost of an engineer for the company is 160,000 CAD per month.
6. There should be a testing strategy (the choice is on you) and the usage of design patterns is also mandatory.
7. Groups must use a version control system with proper continuous integration system, software testing, and verification methods deployed; Git is **mandatory**. https://git-scm.com/book/en/v2/Getting-Started-About-Version-Control
8. Groups **must** use **JIRA** to follow up their project. Especially, we will check JIRA to make sure that the reported backlog corresponds to the elements provided in JIRA. University of Windsor provides institutional access to JIRA. Further details on how to use Institutional JIRA will be provided on Brightspace.

Project Description

The 11-week project (including final presentation) involves a team of 7 students, working together using an iterative project development lifecycle to design, develop, test, and produce a medium size software project. The choice of methodology is left to the discretion of the teams. Teams may work on different aspects of the product. Students are encouraged to present their own ideas for software products (the only requirement is that the product fulfills initial client needs), however, in this case approval must be taken from the instructor. Iteration length must be set at the beginning of the project. Each iteration gives rise to delivered intermediate artifacts. A project manager (the instructor) and a customer (the GA) will be assigned to each project. The team can request a meeting with the customer whenever required.

Important Deadlines

- **Group Creation** = By the end of Week 2 (May 21) – You must join one of the groups on Brightspace. You also need to send your group details to the assigned GAs.
- **Idea Selection** = By the end of Week 2 (May 21) – You must convey your project idea to instructor and GA during office hours, however, any out of the scope ideas will be rejected.
- **Milestone Presentation/Meeting*** = Week 5 (June 5-9) – The GA (the customer) will schedule a 10-minute session with you during the mentioned week. In this session, you should present your project progress to the customer. This includes your current code, documents, design, choice of SE model (ex. Agile), initial usage of JIRA and GIT, and other related material. Any additional requirements specified by the customer during this meeting should also be incorporated in the project.

***Attending the milestone meeting is mandatory for each group member.**

Project Proposal

Each group must submit the project proposal on Brightspace. This proposal must be brief and concise and contain:

- **A market study**: This study must detail and justify why the proposed project is suitable and how the project satisfies the minimal requirements. The students will also provide a study of existing applications, explain why these applications do not answer the identified needs, and compare their proposal with the existing applications in terms of new features, pros and cons, and so on. Your project proposal must mention who (faculties, experts..) you contacted to get your idea and must compile some elements of your exchange and discussion.

- **Initial SRS (Software Requirement Specifications)**: List of requirements (functional and non-functional) and customer needs

- **A description of the Tools and Technologies**: Here you should list all the tools and technologies to be used with a justification of their usage. Also, the type of software development methodology (ex. **SCRUM, Water SCRUM Fall, UP and XP**) should be mentioned and justified here.

- **A Provisional Project Planning**: You may include figures and charts with their description here to depict your project's planning. Each team member's role should also be defined here. All team members should make equal contributions to the project. All team members should participate in coding (can be testing), design/architecture, and design patterns.

- **An Initial Design/Architecture**: You may include UML and class diagrams here with explanation.

- **Initial Analysis**: Cost analysis estimates the development cost in time, money, and resources for the software organization. It also estimates the cost of operations for each stakeholder once the final product is deployed. Make sure that the budget is less than the maximum budget allowed by the company. The methodology used for cost analysis must be described and justified. Make sure that you document the prices with evidence.

- **Due Date =** By the end of Week 4 (June 04) only via Brighspace.

  The proposal should be single column, 1 line spacing, and Times New Roman Font Size "12". There should be a title page with UoW logo, Names and IDs of group members, Instructor Name, and Project title. Only MS Word files are accepted. No PDFs or other file types are allowed. A sample template will be provided on Brightspace.

Final Report + Other Submissions

Due Date = End of Week 10 (July 24, by Midnight) only via BB

The final report* should contain:

- Your project proposal (updated with a Quality Plan and a Risk Plan)

- Your sprint reports with your provisional planning and effective planning for each sprint (this can be adapted according to the model you choose)
- The differences between the initial and current SRS
- The final design/architecture with highlighted differences from the initial design
- Differences between the initial cost analysis and the final budget spent.
- A testing section highlighting approaches used for testing with testing scenarios, input/output and so on
- A section highlighting the usage of design patterns with code (C++, Java, or Python).
- A section highlighting the pros and cons of your solution and the difficulties you faced during the project.
- A user manual highlighting the steps to run your application.
- Future scope of your work
- Any other related sections

*All the above should be submitted as one document entitled as "Final Project Report 8117-Name of the Project". The report should be single column, 1 line spacing, and Times New Roman Font Size "12" using the provided template. The report should contain a table of contents, list of figures, list of tables (if possible), acronyms, and any appendices (if possible). All the figures and tables should have proper numbers with captions. The figures should also be explained in the report. Any figure without explanation will result in marks deduction. Only MS Word files are accepted. No PDFs or other file types are allowed.

Any unnecessary details/theories will result in marks deduction, thus, be precise, accurate, and to the point.

Other than the final report:

- You should send a link of your Git repository to your GA to download your source code. Also, include the link to files in your report.
- Your JIRA will be continuously checked to see your progress.
- Each student should have enough number of commits on GIT and JIRA. Any student with less or 0 commits will get '0' marks.
- **Your submissions will be checked for plagiarism and copied work will get '0'.**
- **Usage of ChatGPT will also result in '0'. This applies to coding as well.**

Group Presentation*

Submission date on Brightspace = End of Week 10 by Midnight

Will be held during = Lecture 11

*Any doubts on a student's performance will result in an "Individual Viva" during Week 12

Groups will present their project and work during the second last week of the term. Presentations will last for 15-20 minutes followed by a 05-10 minutes questions/answers session. Each member should talk during the presentation and try to answer the questions as well. Attending other groups presentations is **mandatory**. Bonus marks can be awarded if a student asks valid questions from other groups. Your presentation should contain a

demonstration video showing the working of your application. All presentations will be in class (face to face). Note that the presentation duration is subject to change.