UNIVERSITA' DEGLI STUDI DI TRIESTE
DIPARTIMENTO DI INGEGNERIA E ARCHITETTURA
LAUREA MAGISTRALE IN INGEGNERIA INFORMATICA

440MI - DATA-DRIVEN SYSTEMS ENGINEERING
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Exam

The exam consists of an **oral discussion** and a **report** regarding a project prepared **individually** by the student regarding a team development project regarding a data-driven software. The project can be developed with a maximum of **four** members, it is possible to observe recommendations of team organizations:

- Team with 3 members:
  - Software Engineer;
  - Data Engineer;
  - Software Developer;
- Team with 2 members:
  - Data Engineer/Software Developer;
  - Software Engineer/Software Developer;
- Team with 2 members:
  - Data Engineer/Software Engineer;
  - Software Developer;
- Single member:
  - Data Engineer/Software Engineer/Software Developer;

The **project** is a data-driven web application, regarding a information system based on a web application with a machine learning kernel. The problem domain and application are chosen by the team. It is encouraged to address new problems, but open datasets available in repositories such as Kaggle and UCI are allowed. It is expected the project provide the following products/features using:

1. Problem Definition;
2. Clear definition of a software development method and software process model;
3. Identification of:
   a. Software Requirements;
   b. Software Development Methods (strategies, versioning control);
   c. Software Test (plan and strategy);
4. Dataset Information (KPI, data exploration and statistical analysis);
5. Proposed Pipeline (overview, discussion, performance evaluation, and justification);
6. Software organization (UML component and class diagram);
7. Software functionalities (UML use case, activity diagra,m or sequence diagram);
8. MLOps approaches and Issues
9. Proposal limitations;

Considering the three main roles and the individual evaluation, each report needs to comprise (regarding the aforementioned items):

- Software Engineer (1, 2, 3, 8 and 9);
- Data Engineer (1, 4, 5 and 8);

- Software Developer (1, 6, 7 and 8);

Report Structure

The report should be prepared using the format posted on the ACM Website[1], limited to 3 pages (without images). Even though the project follows a team development structure, each report can be submitted individually. The submission needs to follow the exam calendar and the presentation will be held following the formal exam dates. The professor will return the final grade regarding the report, presentation, and oral discussion. Students that do not achieve a desirable grade, may subscribe for another evaluation following the formal exam dates. Just like the project report, each presentation should address the previously mentioned topics:

Title
Project title and student role, for example: "Message app: Software Engineer"

Introduction & Problem Statement
Provide a brief overview/need/motivation of your project and address the project's motivation, goals, and objectives. **(Item 1)**

Background
Provide a brief overview of any necessary background material. Use this section to expose any specifics they will need to know to understand the technical details of your project component. **(Item 2, Item 4)**

Methodology/Approach
Describe briefly how you went about addressing your problem. Analysis, simulation, design, and pseudocode examples should be presented in this section. Also, an overview diagram is expected to support the discussion of the proposed pipeline or UML diagrams. **(Item 3, Item 5, Item 6, Item 7 , Item 8)**

Results
Summarize the major findings and results of your work. Comparisons with baselines, metrics, charts, and shreds of evidence of the success of the proposed method. **(Item 5, Item 6, Item 7, Item 8 and Item 9)**

Discussion & Conclusion
Discuss what worked and what didn't work. If something was unsuccessful, explain why it was unsuccessful and what (if anything) needs to be addressed/improved/corrected to make it successful. If you had success, explain how your success fits into the broader context of the problem you are addressing.

[1] https://www.acm.org/binaries/content/assets/publications/article-templates/pubform.docx