Assessment

Emerging Technologies, Winter 2023/24
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These are the instructions for the assessment of Emerging Technologies in Winter 2023/24. They cover the full 100% of the module marks. The deadline for submission of all components within the repository is **Friday 22 December 2023**.

Purpose

The main purpose of this assessment is to ensure students can demonstrate they can do the following.

1. Detect new and emerging technologies in computing through reputable sources.

2. Contextualize an emerging technology by identifying its origins and proponents.

3. Research an emerging technology in order to use it.

4. Implement a solution to a computing problem using an emerging technology.

The assessment is then used to determine a mark out of 100% based on the details in this document.

Instructions

- There are three components to this assessment.

    - Tasks throughout the semester (40%).
    - A project (40%).
    - A repository containing all above work (20%).

- All your work should be in a single GitHub repository.

- Use the form on the module page to submit your repository[1].

- Commits in GitHub on or before the deadline will be considered[2].

- You start immediately, spreading the work throughout the semester. This will ensure you make an regular commits to your repository.

- Your repository should contain the following.

    - A `README.md` giving an executive summary of the purpose and contents of the repository, and instructions for a competent person to clone and run any code or notebooks in it.

    - A `.gitignore` file to ignore any temporary files and folders that should not normally be committed to a repository.

[1] You should set up the repository and submit the URL immediately.

[2] Once you have submitted your URL, you do not need to do anything other than commit to your repository and push the changes to GitHub.

- A notebook[3] called `tasks.ipynb` containing work as detailed in the Tasks section below.

- A notebook called `project.ipynb` containing work as detailed in the Project section below.

- Any supporting data, image, or other files that form part of your submission. These should be neatly arranged, using sub-folders as appropriate.

- Once completed, your repository should be readily presentable in job interviews. A technically competent person should be able to understand what is in your repository and how to interact with it without any extra information. This criterion will be decisive in determining your repository mark (20%).

Tasks

- Each topic covered in lectures will have tasks associated with it.

- The tasks will be listed in an accompanying document which will be updated as we cover each topic.

- All tasks for all topics should be completed in a single notebook called `tasks.ipynb`.

- There will be five topics, about one every two weeks throughout the semester.

- The first will cover getting you set up with the technology used in the module.

- Each topic will have between one and five tasks.

- The tasks should be largely completed and committed to your repository as they are covered or soon after.

Project

- The project is to create a notebook exploring Deutsch's Algorithm.[4]

- Explain the problem in your notebook.

- Explain Deutsch's algorithm to solve the problem using a combination of MarkDown, Latex notation, tables, and plots as appropriate.

- Build a quantum circuit using Qiskit[5] to implement the algorithm, including any required oracle circuits to demonstrate the algorithm.

- Simulate the circuit to demonstrate the efficacy of the algorithm.

[3] All uses of the term notebook in this document refer to Jupyter notebooks, as used in lectures.

[4] *Quantum query algorithms | IBM Quantum Learning*. Aug. 20, 2023. URL: `https://learning.quantum-computing.ibm.com/course/fundamentals-of-quantum-algorithms/quantum-query-algorithms#deutschs-algorithm` (visited on 08/20/2023).

[5] *Qiskit*. Aug. 20, 2023. URL: `https://qiskit.org/` (visited on 08/20/2023).

Marking Scheme

Each of the three components of your submission will be marked using the four categories below. To receive a good mark in a category, your submission needs to provide evidence of meeting each of the criteria listed under it[6].

Research (25%)*:* evidence of research on topics; appropriate referencing; building on work of others; comparison to similar work.

Development (25%)*:* clear, concise, and correct code; appropriate tests; demonstrable knowledge of different approaches and algorithms; clean architecture.

Documentation (25%)*:* clear explanations of concepts in notebooks; concise comments in code and elsewhere; appropriate, standard README for a GitHub repository.

Consistency (25%)*:* tens of commits, each representing a reasonable amount of work; literature, documentation, and code evidencing work on the assessment; evidence of reviewing and refactoring.

Policies

- Please remember that you are bound by ATU policies and regulations.[7] You should familiarize yourself with these on the Student Hub.[8]

- Pay particular attention to the Policy on Plagiarism and the Student Code of Conduct.

- If you have any doubts about what is permissible, email me to ask[9].

Advice

- Students sometimes struggle with the freedom given in an open-style assessment.

- You must decide where and how to start, what is relevant content for your submission, how much is enough, and how to make the submission your own.

- This is by design — we assume you have a reasonable knowledge of programming and an ability to source your own information.

- Companies tell us they want graduates who can (within reason) take initiative, work independently, source information, and make design decisions without needing to ask for help.

- You need a plan, you cannot just start coding straight away.

[6] In line with ATU policy, the examiners' overall impression of the submission may affect marks in each category.

[7] Atlantic Technological University. *Policies and Regulations*. See `https://studenthub.atu.ie` for more. 2023.
[8] *ATU Student Hub.* Aug. 9, 2023. URL: `https://studenthub.atu.ie/` (visited on 08/20/2023).

[9] `ian.mcloughlin@atu.ie`