Introduction to Quantum Computing
Coursework – Decoded Quantum Interferometry

Due: Friday, 13 November 2026 by 12:00

This assignment counts for **25% of the course**. All questions are available in the Jupyter notebook (`iqc26-cw.ipynb` file) shared together with this document. The notebook consists of coding exercises where you are required to fill in missing Python code, as well as analytical questions to be answered in designated Markdown blocks. Detailed instructions are available in the notebook. The weights of each question are given (amount of marks), but note that this is **not** indicative of their difficulty. You can get a total of **100 marks**.

Overview: The coursework will guide you through the implementation of Decoded Quantum Interferometry (DQI), a recent quantum algorithm for classical optimization problems. DQI can be viewed as a quantum reduction from classical optimization to error correction, offering improvements over known classical algorithms for certain structured problems. The notebook begins with necessary preliminaries on optimization and error correction, then provides a high-level overview of DQI. You will be asked to implement this algorithm for a small teaching example.

Setup: The Jupyter notebook file has instructions on how to set up the Python environment. Make sure to use a clean environment, as this is what your code will be run on. The Python version used to design the exercises was `3.14.10`. The packages used are `matplotlib`, `numpy`, and `pennylane`. Please do not import any other packages.

Submission: Submit the Jupyter notebook file with the filename `iqc26-cw-<your-exam-number>.ipynb`. The deadline, late policy, and guidelines for generative AI usage for this assignment are specified on Learn in the "Coursework Planner". Guidance on late submissions is at `https://informatics.ed.ac.uk/taught-students/all-students/your-studies/late-coursework-extension-requests`.

Important message: Please remember the good scholarly practice requirements of the University regarding work for credit. You can find guidance at the School page, `https://informatics.ed.ac.uk/taught-students/all-students/your-studies/academic-misconduct`. This also has links to the relevant University pages.