Paolo Mura

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EDUCATION

MEng Computer Science *2019 – 2023*
- First-class honours
- 80 thesis mark

The Royal Grammar School High Wycombe *2017 – 2019*
- A Levels: A*A*A*A in Maths, Computing, Physics, Further Maths

Home Educated *2007 – 2017*
- GCSEs: 11 A*s, 2 As (including Maths, Computer Science, Japanese and Italian)
- AS Levels: Law and Economics

TECHNICAL SKILLS

Programming Languages: (In decreasing proficiency) Python, C#, Java, C++, C, JavaScript, Go, Prolog, Haskell

Technologies: Android, ARCore, Autodesk Maya, AWS, Cytoscape.js, Docker, Flask, Git, Handlebars.js, HTML & CSS, Linux, OpenCV, React.js, SDL, Spring Boot, SQLite, Unity, Qt

WORK EXPERIENCE

Associate Software Engineer at Sky UK Ltd *July 2023 – Present*
- Currently working on an internal tool for the Sky Go team.

Outreach Ambassador at the University of Bristol *July 2022 – July 2023*
- Designed a Python course with accompanying package for after-school coding clubs in Bristol.
- Led the weekly sessions at Cotham School with four other outreach ambassadors.

Head of Web Development at Epigram *May 2022 – May 2023*
- Helped redesign the website according to a schema provided by the editorial team in time for the welcome fair event.
- Onboarded and managed new team members, doubling our web dev team in size.
- Our website was nominated for the best website award at the Student Publication Association National Awards 2023.

Internship at StreamSets Inc. *Jul – Aug 2021*
- Took on Jira tickets to fix bugs in the StreamSets DataCollector.
- Wrote the unit tests for the Couchbase stage in DataCollector and Redshift Destination stage in Transformer.
- These identified several small bugs in the code which we were able to patch quickly.

Web Design Placement at TheImageWorks Ltd, Oxford *Aug 2018*
- Learnt new skills in HTML, CSS and JavaScript during a week of training.
- Documented a snag list for the CSS elements of an existing client website requiring an update.
- Used WordPress to update the image structure of another client's website.

PROJECTS

Framework for Generating Graph Theory Practice Questions with Python and React.js *Jan – May 2023*
Python package | Flask backend | React.js frontend | Cytoscape.js for graph visualisations
- Created a website that allows teachers to define questions as Python code, then takes care of the front-end visualisation for the students.

HPC (High Performance Computing) fluid dynamics simulation *Jan – May 2023*
C | OpenMP | MPI | Blue Crystal supercomputer
- Parallelised a serial version of the Lattice Boltzmann simulation across all 28 cores of a node in Blue Crystal with OpenMP.
- Refactored to be distributed across 4 separate nodes using MPI, allowing it to use 112 total cores.
- Compared to the original unoptimised serial version, the parallel version showed a 97X speedup.
- Compared to my optimised serial version, the distributed version showed a 443X speedup.

Cloud Rendering Farm *Nov 2022*
AWS (Lambda, SQS, S3, EKS, DynamoDB) | Python | Docker | Blender
- Configured a cloud render farm, which allows a user to upload a Blender file, then renders it, storing the resulting MP4 file in S3 for download.
- The render farm was both scalable and fault tolerant.

Analysis of Automated Traders *Nov 2022*
Python | BSE (Bristol Stock Exchange)
- Analysed the effectiveness of a new (2022) automated trader called PRDE.
- Extended PRDE's functionality to create a new trader which I called PRAD.
- PRAD showed a 1.2X increase in PPS (profit per second) and 1.1X increase in average profit, while displaying much less variance with respect to time.

3D Multiplayer Time-Travel Game *Jan – May 2022*
Unity | C#
- Led the ideation stage to create a unique, multiplayer time-travel game, which allows players to "time-travel" independent of one another, at any point within the game.
- Designed and programmed the backend data structures for the time-travel mechanic.
- Wrote an extensive test framework, which helped us fix and reason about the time-travel backend.
- Responsible for project maintenance (including documentation and refactoring).

"No Entry" Sign Detection using Image Processing *Nov 2021*
C++ | OpenCV
- Trained a Viola-Jones classifier and analysed its performance.
- Built my own implementation of a circle-detector using the Hough transform.
- Integrated these techniques with my own colour ratio detector.
- Result was ~70% F1-Score final performance.

3D Graphics Rendering Engine *Oct – Nov 2021*
C++ | SDL
- Built a small rendering engine from the ground up, only using SDL's pixel drawing functionality.
- Capable of parsing OBJ & MTL files, raytracing, lighting, shading, reflective surfaces and camera movement.
- Used it to produce an animated ident.

AR Android App for Visualising a 3D Voronoi Pattern *Oct 2020 – May 2021*
Java | Google ARCore | Android
- Self-taught the fundamentals of Android development and ARCore.
- Used an agile approach in a small team to develop the solution.
- The project involved 3D tracking and displaying a virtual Voronoi structure in the Fry Building.
- Successfully met all the client's requirements and deployed to the Google Play Store.

Concurrent and Distributed Game of Life Simulation *Nov – Dec 2020*
Go | AWS (EC2)
- Designed a multi-thread program in Go that could be run locally or on an AWS instance.
- Produced a report on the design and performance, measured using benchmark tests.
- The parallelised version ran 2.75X faster than the serial version when using 16 worker threads on a 4 core EC2 instance.

Swimming School Booking System *Jan – Jun 2019*

Python | SQLite database | Qt frontend

- Implemented a relational database using SQLite to store customer details and class information.
- Built a multi-window GUI using Qt for customers to interact with the database via queries.

FLL Robotics Competition (Regional Champions) *Sep 2016 – Feb 2017*

- Built a modular system for robot attachments.
- Programmed sequences of instructions for the robot to complete given tasks.

SKILLS

Communication

- Got fully involved in all team discussions, listening and encouraging everyone to express their views on our time-travel game. This allowed us to foster a unique and achievable concept, which scored us a first-class grade.
- Regularly engaged with our Android project client through emails and scheduled Zoom calls.
- Explained and demonstrated the final design of our FLL robot to a panel of both technical and non-technical judges.
- Tutored GCSE and A Level Computer Science students in weekly lessons, explaining concepts and leading them through examples.
- One of my students achieved an A (highest grade) in his AS level in 2021 and I've received fifteen 5-star reviews since starting in 2020.

Teamwork

- Immersed myself in all aspects of our game project (from assets to code). This allowed me to help my other teammates when their workload increased and onboard them when they switched to an unfamiliar part of the project.
- Coordinated a team of five using GitHub and Microsoft Teams to design an Android app.
- Used paired programming techniques to develop the Scotland Yard Java university project, passing all essential tests weeks before the deadline.
- Refined coordination between five team members during the FLL robotics competition ensured a victory at regionals, qualifying for nationals.

INTERESTS

Animation

- Self-taught skills in stop motion, visual effects using Adobe After Effects, sound design and editing.
- Won first place in competitions run by Cambridge Faculty of Classics and Wolsey Hall Oxford.
- Created a trilogy of short films between 2018 and 2021.
- Over 18,000 views on YouTube.

Swimming

- Qualified for Buckinghamshire County Championships 2016 and 2017.
- Trained four times a week with the university swimming society UBSWPC.
- Elected Fitness Secretary for UBSWPC in 2021-22, where I regularly organised events and represented over 230 Fitness Swim members on our committee.
- Re-elected as general Secretary for UBSWPC in 2022-23, where I managed the club's emails, booked referees for water polo fixtures and posted events on our SU page.