Tom Murphy

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Education

2012 - 2016 **B.A. Integrated Computer Science**, Trinity College, Dublin.
Graduated with first class honors. The course covered a broad range of areas including assembly language, CPU design, advanced OOP, machine learning, computer vision, computer graphics, software development methodologies.

Work Experience

2019 - Present **Demonware - Software Engineer (Networks)**
Worked on networking code for the video game Call Of Duty. Helped develop and maintain a low latency protocol for sharing game state, as well as client and server side networking libraries in C++ for player ranking and matchmaking.
Ported client side networking libraries to iOS and Android. Developed continuous integration and testing infrastructure for iOS, Android, Playstation and Xbox platforms, including working with custom hardware development kits.
Technologies: C, C++, Python, Perforce, Git, Github Enterprise, Network Programming.

2017 - 2019 **Arista Networks - Kernel Developer**
Helped maintain, upgrade and add features to a customer branch of the Linux kernel used for network switches in big data centres. I worked locally with 2 kernel developers and remotely with developers in San Francisco using an agile scrum methodology. Duties included maintaining existing kernel patches, backporting fixes, upgrading the kernel to later versions and adding features using kernel patches and modules.
Rewrote AMD, Intel and ARM IOMMU drivers to use common code for their IO virtual address handling while handling quirks of each driver without causing any major changes in behaviour. These changes are currently being upstreamed to the mainline kernel:
(`https://lkml.org/lkml/2019/4/11/736`)
Wrote a kernel module to allow multiple PCI devices to share their IO virtual address space while still using the IOMMU to protect the integrity of the system by forbidding arbitrary writes to memory. This changed allowed various optimisations based around using one IO virtual address for multiple devices.
Technologies: C, C++, Python, Git, Perforce, MySQL, Linux, Network Programming.

2016 - 2017 **Murex Financial Technology - Software Developer**
Developed financial software in C, C++ and Java. Worked with teams of different sizes using an agile scrum methodology. Worked with developers, product managers, quality assurance teams, and clients directly. Handled defects raised by clients, debugged issues on remove servers in production environments and refactored legacy code.
Worked on a database layer to persist the state of trades during a reset and cache common static data requests. Used Redis as a persistent in-memory database and Liquibase to abstract away differences between Oracle and Sybase databases.
Technologies: C, C++, Java, Python, Perforce, Redis, MySQL.

Projects

Transformation-Invariant Reverse Image Search
Developed a reverse image search algorithm which performs 2D affine transformation-invariant partial image-matching in sublinear time. It outperforms industry leaders in matching images which have undergone 2D affine transformations. This project was featured on the popular technology forum ycombinator's hacker news.
Hacker News link: `https://news.ycombinator.com/item?id=14973741`
Demo and source code: `https://pippy360.github.io/transformationInvariantImageSearch/`
Technologies: C, C++, Python, Javascript/HTML/CSS, Git, Computer Vision.

HTTP Parser
A fully compliant HTTP request and response parser written in C. It doesn't allocate any dynamic memory or make any syscalls to avoid expensive context switches. It has no global state, is reentrant and can safely handle erroneous data. Source code: `https://github.com/pippy360/httpParser`
Technologies: C, C++, Network Programming.