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Sean Purcell

Summary of Qualifications

- 4 years of experience with each of C, C++, Java, Python in projects and work experience.
- Familiar with ASM, Javascript, LaTeX, MATLAB through school and self teaching.
- Award-winning use and understanding of algorithms and data structures at the CCO and ICPC.
- Advanced understanding of cryptographic algorithms and principles through personal projects.
- Adept at rapid prototyping and experimentation from hackathon experience.

Work Experience

2015 **Software Engineering Intern**, *Sunnybrook Research Institute*, Toronto, ON.

Created, improved, and optimized software used in Medical Biophysics Research.

- Optimized differential equation-solving simulator to operate twice as fast as original.
  - Worked with C++, using OpenMP and MPI for parallelization.
- Installed job scheduler on cluster to manage allocation of memory and compute nodes.
- Created GUI using Python to operate simulator for use by Medical Doctors.
- Managed compute cluster system administration and backups.

Projects

2014–2015 **ibchat/ibcrypt**, *https://github.com/iburinoc/ibchat*.

Built an end-to-end encrypted messaging program from scratch in POSIX C.

- Implemented algorithms such as AES, RSA, Diffie-Hellman, SHA256, CHACHA, and scrypt.
- Constructed custom network protocol for secure communication with perfect forward secrecy.

2015 **AnonymEyes**, *Winning Team, Hack the North*, http://anonymeyes.co.

Built a location-based video streaming app for emergency response and evidence collection.

- Designed and implemented custom video stream from Android to receiving server over UDP.
- Built a web app showing streamed videos, interfacing the Google Maps API to show position.

2015 **Resistora**, *2nd Place Team, Tech Retreat*.

Created a mobile app to read the resistance value of a resistor using the phone camera.

- Developed custom computer vision algorithms to recognize band locations and colours.
- Integrated Android Camera API, utilized Mathematica for data analysis.

2015 **Flightsim**, *https://github.com/iburinoc/flightsim*.

Wrote a 3D flight simulator in C++, interfacing OpenGL directly for rendering.

- Featured coherent random noise generation for interesting infinite terrain
- Used the TI Launchpad board to implement a physical joystick for use with the simulator.

Awards and Achievements

2015 **3rd Place Team, ACM International Collegiate Programming Contest, ECNA Regional**, Windsor, ON.

International algorithm and datastructure programming competition written by 130 collegiate teams.

2015 **Gold Medalist, Canadian Computing Olympiad**, *CEMC*, Waterloo, ON.

National algorithms programming contest written by over 3,500 secondary students.

2015 **Honorable Mention, Beamline for Schools, CERN**.

International contest to submit an experiment proposal for CERN, placed within top 15 teams of 119.

Education

2015–2020 **Candidate for Bachelor of Software Engineering**, *University of Waterloo*.

2014 **Student in Compilers and Algorithms Courses**, *Stanford University*.