Engineer Engineer Engineer Cincinnati, OH Work Experience Engineer Belcan Engineering, Heavy Equipment Division - Peoria, IL 2014 to 2015 Autonomous vehicle R&D team at the Caterpillar Tech Center   Designed the master motion planning module using a state machine approach.   Did research to become the subject matter expert in Harel State Charts for the team.   Using C++ in a Linux environment, implemented machine motion heuristics using the Harel State Chart module within the Boost library.   Made several trips to customer site (coal mine) in support of the team's mission.   Received extensive training in Agile methods. Software Engineer II Stryker - MAKO Surgical - Fort Lauderdale, FL 2013 to 2014   Taught myself TCL in order to complete the programming challenge in the interview process.   Studied the anatomy of the human knee and hip. Learned to operate the surgical robot.   Using TCL/TK in a Linux environment, fixed bugs and tested the UI for the surgical robot for knee and hip implants. Associate (Tenured) Professor of Mathematics and Computer Science Monmouth College - Monmouth, IL 2000 to 2013 Restructured and taught Introduction to Programming when the Department decided to switch from Pascal to C++ for the course, and to include topics in objected oriented design within the course. Taught a wide variety of mathematics courses, including vector calculus, artificial intelligence, logic, linear algebra, complex analysis, and numerical methods.   Acted as student advisor and mentor to students from a wide variety of majors.   Presented at regional and national mathematics conferences of the MAA. Consultant, Algorithm Development Optimal Yield Solutions - Cincinnati, OH 2011 to 2012   Developed, in collaboration with the company owner, a nesting algorithm for a NC panel saw which was delivered ahead of deadline and exceeded the customer's requirements. Contributed to the company's research into applications of 3D depth imaging using C# in Visual Studio and the SDK for the depth camera. Software Developer, Sr. Software Developer SigmaTEK Corporation - Cincinnati, OH 1998 to 2000 Sheet Metal Assembly Flat Pattern Development Visited several customer sites to collect requirements and become familiar with shop practices. Developed algorithms for flat pattern creation based on parametric models of assemblies. Designed data structures and implemented the algorithms using object-oriented design, in Delphi. Using OpenGl, created the GUI to allow interactive 3D design of sheet metal assemblies.

Returned to customer sites to demonstrate the product and gather suggestions for refinements.

Geometric Contour Simplification of Parts Defined by Imported Scanned Data   Input data consisting of tens of thousands of tiny line segments cannot be handled by cutting machine controllers - it must be converted into a manageable number of geometric entities while preserving shapes within a specified tolerance.   Researched the contour simplification and arc recognition problems. Combined a well-known line simplification heuristic with an arc recognition technique used in GIS software to create an algorithm for processing the input data into a greatly-reduced number of arcs and lines.   Implemented the algorithm as a DLL using C++ in Visual Studio, using STL containers.   Exceptional performance of the resulting module may have prevented loss of a multi-million client. Rectangular Part Nesting   Many customers cut orders consisting entirely of rectangular parts. Even small gains in yield can represent tremendous savings.   Surveyed the extensive literature on rectangle packing, selected several heuristics for testing.   Documented and refactored a large block of legacy code to allow new functionality to mesh with existing structure.

Implemented and tested an algorithm combining several heuristics, in Delphi using STL.   Created several variations at customer request to produce patterns which can be cut by a shear and by "sheet dragging" cutting tables. Recent Professional Experience Continued: Education PhD. in Applied Mathematics Northern Illinois University - DeKalb, IL M.A. in Mathematics in Mathematics University of California - Davis, CA B.S. in Mechanical Engineering in Mechanical Engineering University of Illinois - Urbana, IL B.A. in Liberal Arts in Mathematics University of Illinois - Urbana, IL Links http://www.linkedin.com/in/howard-i-dwyer

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