Open Source Textile Design Software

Joint work with UMASS Lowell Fabric Discovery Center

Christine H. Flood
chf@redhat.com
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Who?

Me

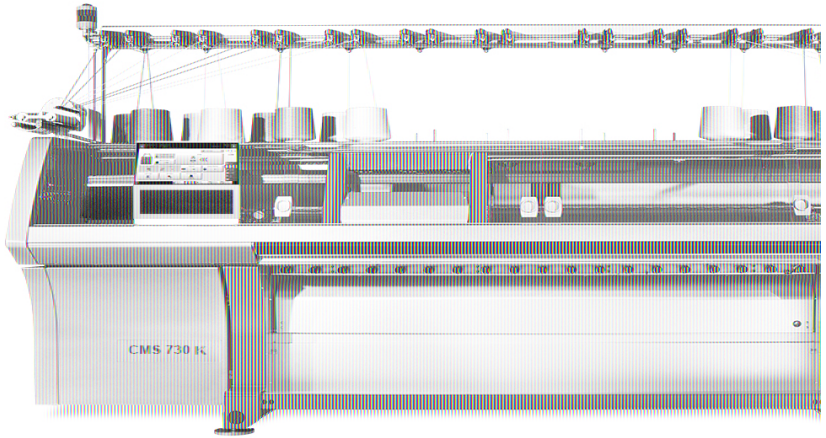
Senior Principal Staff Engineer with over 20 years of experience in programming language design and implementation and longtime knitter/spinner/weaver.

Two UMASS Lowell interns to be named later.

What?

Grand Vision

Open software for designing textiles which can be realized on industrial knitting/weaving machines or by crafters at home.



What?

Humble Vision:

Use industrial software to design and knit 3 socks on UMASS Stoll Knitting Machine and then use our software to design and knit a new sock pattern.

Why?

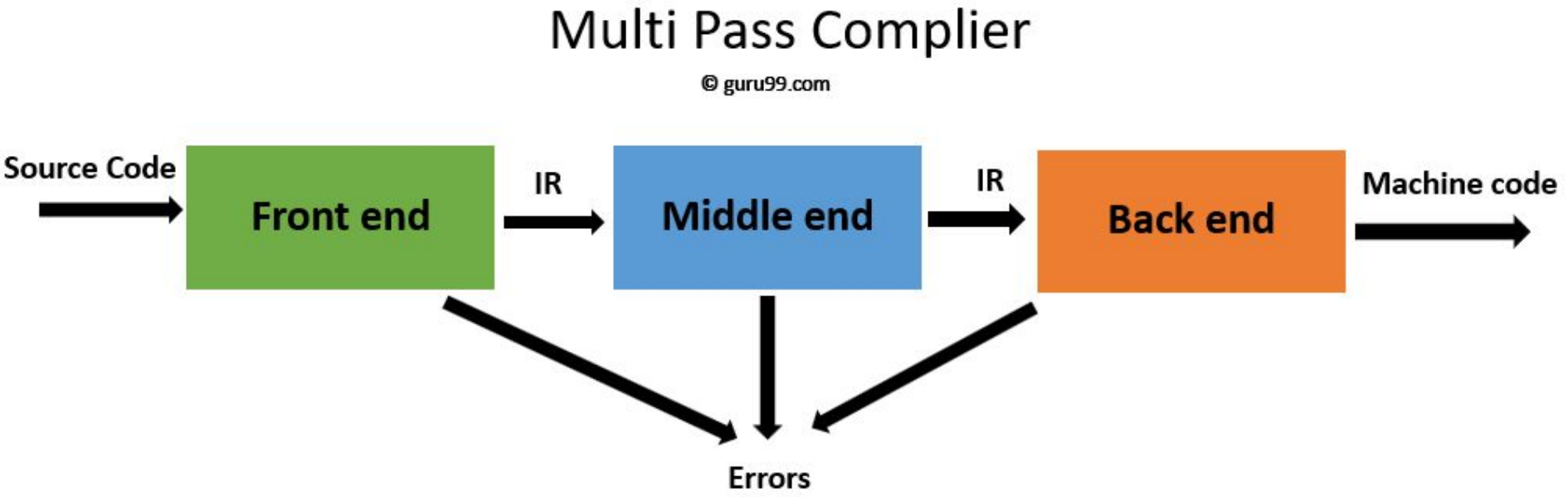
Local Fashion

Fast fashion has many issues:

- Clothes don’t last
- Manufacture is imprecise (culottes didn’t sell as well as anticipated)
- Sizing isn’t inclusive
- Transportation costs (yarn from England, Manufacture in China, Sold in US)
- Child/impoverished labor

3D printing for clothing

How?


Multi Pass Complier
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Source Code
Front end
IR
Middle end
IR
Back end
Machine code
Errors

How?

Textile Design Compiler

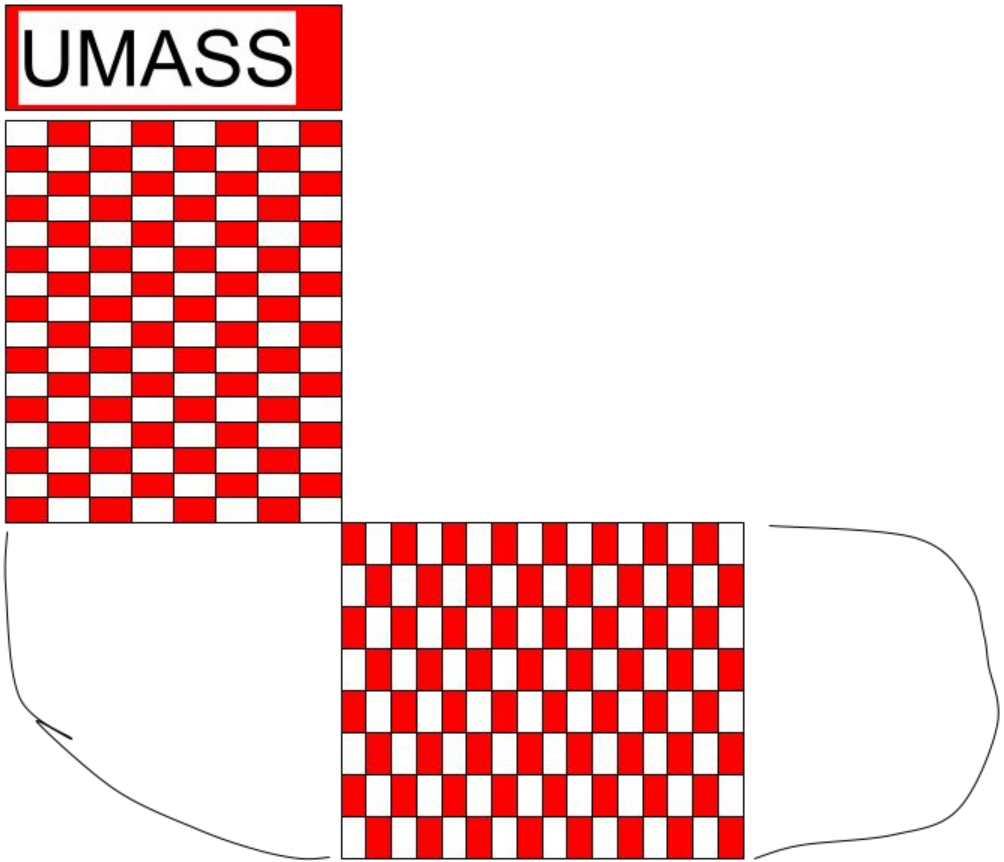
Front End => Pattern visualizer

Middle End => 3D shapes

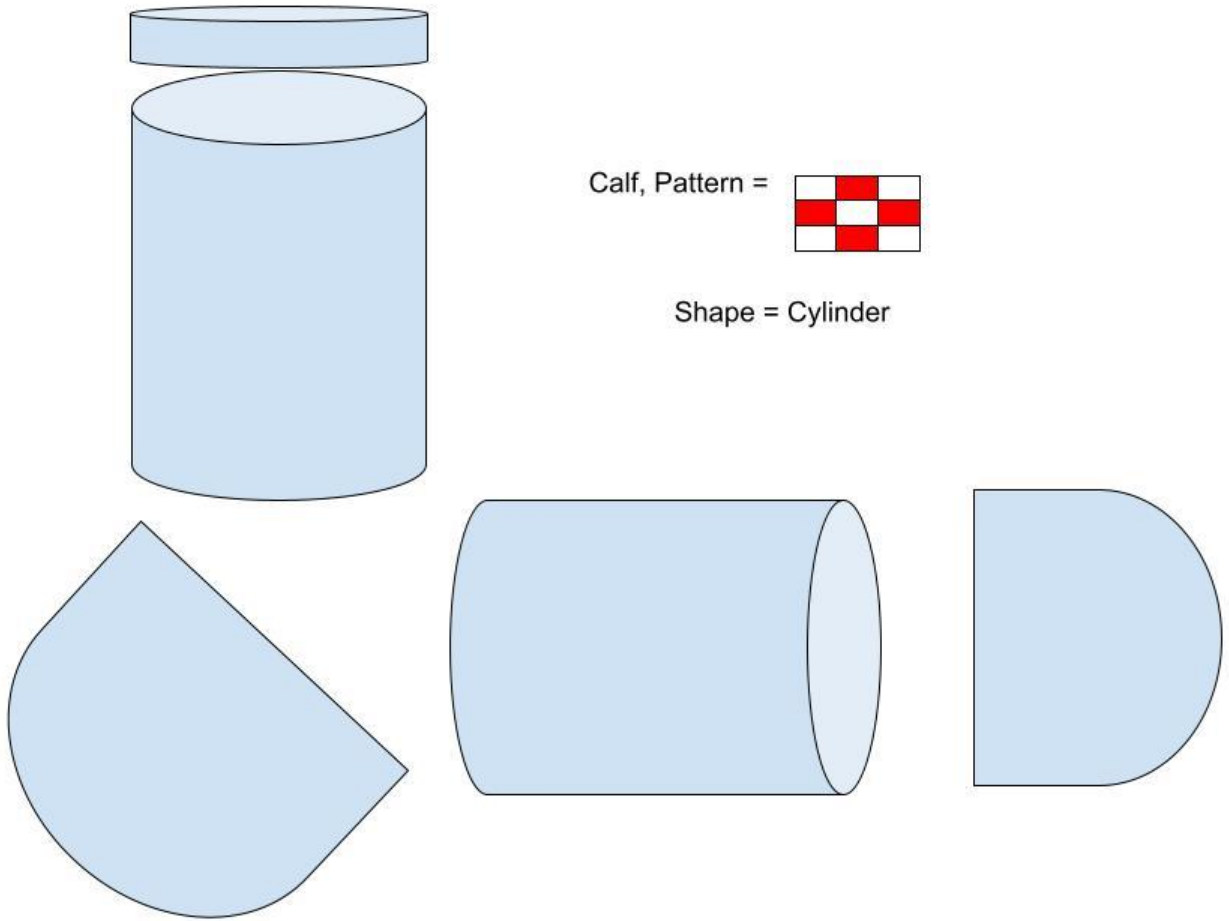
Back End => Sintral (machine language for Stoll knitting machine)

Hand Knitting instructions

Front End



Middle End



Back End (Sintral)

Back End (Hand Knitting)

Knit alternating stitches red/white in the round for 64 stitches and 127 rows

References

CMU/Disney Work

A Compiler for 3D Machine Knitting (McCann et al) Siggraph 2016

Automatic Machine Knitting of 3D Meshes (Narayanan et al) ACM Transactions on Graphics

And more https://textiles-lab.github.io/publications/