Course Summary

COMP 520: Compiler Design (4 credits)

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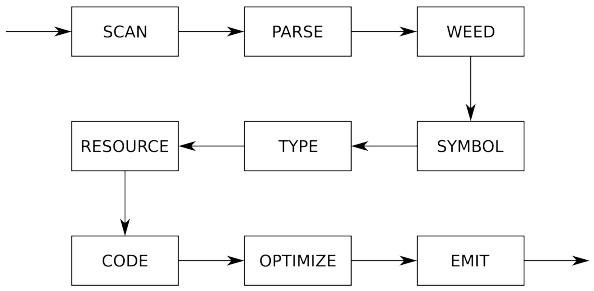
MWF 10:30-11:30, TR 1100

http://www.cs.mcgill.ca/~cs520/2020/



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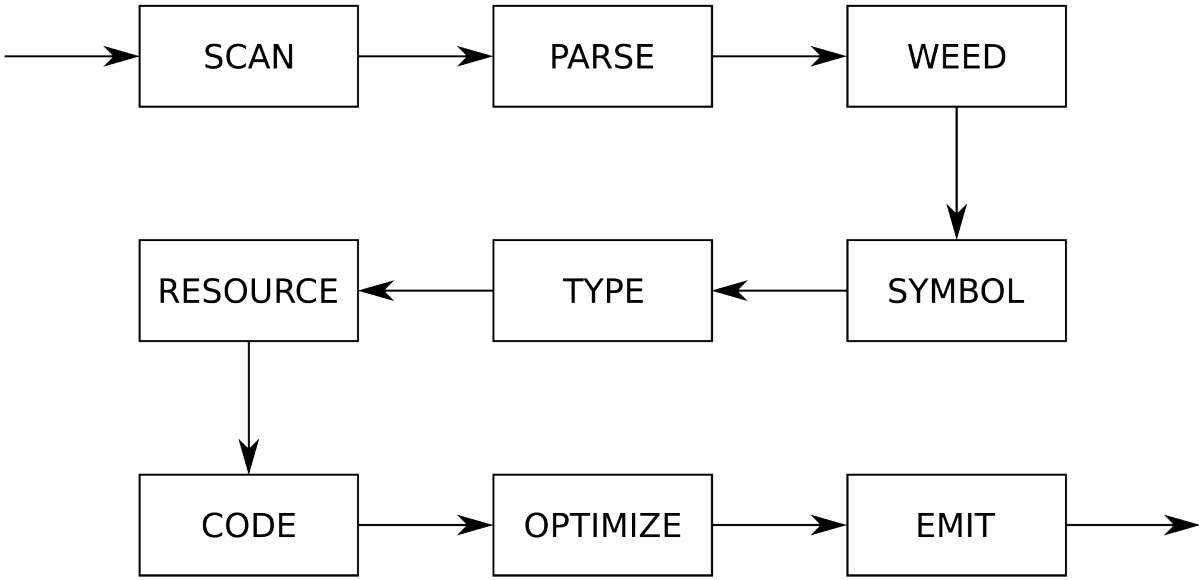
Contents

Topics covered in class

- **Deterministic parsing:** Scanners, LL/LR parsers, `flex`/`bison` tools
- **Semantic analysis:** Abstract syntax trees, symbol tables, type checking
- **Virtual machines and run-time environments:** JVM (stack machines), virtual register machines, garbage collection
- **Code generation:** Resources, templates, optimizations
- **Special topics:** GPUs



Why did we learn about Compilers?

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Language design

Look under-the-hood at how code is transformed for execution

Connect theory (automata/CFG) to practice

CS credits, need to graduate

How does learning about compilers change your view of Programming Language Usage/Design/Implementation?

How does learning about compilers change your view of Programming Language Usage/Design/Implementation?

Behaviour is well (usually) specified

Languages have a theoretical base

Type and semantics rules are quirky, but essential to compilers

Funky features are hard to support (Go is weird!)

Be careful! Unintended consequences are easy!

For your next compiler, what advice would you give yourself?

For your next compiler, what advice would you give yourself?

*The AST is **essential***

Modularity: Decouple passes and phases as much as possible

Test, test, test! (automation is key)

Start early!

Don't be afraid of refactoring

*Your work is **never** perfect*

Classes can be fun!

My Thoughts

- Language design is a curious topic, where seemingly innocuous changes suddenly create this...

https://xkcd.com/292/

- Language design is more subtle and complex than the high-level view known to most programmers
- Semantics are fun! (but hard)
- Compilers are fun! (but a lot of work)
- Hopefully this comes in handy one day!
- *One day, reflect on how your view of programming changed*

Thanks

- To **Adrian** & **Jason**, who worked hard as your TAs
- To **Clark** & **Giulia**, for help and support all semester
- To McGill
  - To **Mike** & **Bettina**, for guidance and support in the past weeks
  - To our admin office, **Ann**, **Adina**, **Tricia**, **Kamini**, **Liette** & **Sheryl**
- To my lab, **David**, **Hanfeng**, **Prabhjot**, **Erick**, **Akshay**, and more . . .
- To **Alex**, **Lei**, **Vince**, **Dom**, **Kamil**, **Antonio** and more . . . for encouragement and ideas
- To **you**! This class is a ton of work and you worked hard all semester

In Memory of Professor Laurie Hendren

Thank you for your trust, support, and care. We miss you <3

“Don’t let the language get in the way of your logic”