First Committee Meeting

Progress Report

Jason Balaci

McMaster University

Oct. 21st, 2021

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Who am I?

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- I am **Jason Balaci**

Me, Fall 2019

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- I am **Jason Balaci**
- Graduate of *McMaster University*, holding...
  - Hons. Actuarial and Financial Mathematics (B.Sc.)
  - Minor in Computer Science
- Currently pursuing a thesis-based Master's of Computer Science (M.Sc) at *McMaster University*, under the supervision of **Dr. Jacques Carette**

Me, Fall 2019

Overview of Progression Towards C.S. M.Sc.

Course-related progression

- I'm required to complete[1]:

[1] https://academiccalendars.romcmaster.ca/preview_program.php?catoid=45&poid=23470&returnto=9166

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  - CAS 761 "Generative Programming" - Software course, Fall 2020
  - CAS 763 "Certified Programming with Dependent Types" - Theory & Software course, Winter 2021
  - COMPSCI 6TB3 "Syntax-Based Tools and Compilers" - Systems course, Winter 2021

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- Together, the courses completed satisfies the "Courses Requirement" as mentioned in the academic calendar[1] and the "Regulations for the Computer Science M.Sc. Program" document[2].

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- Conducted "full-time" research for at least 1 full semester (Spring/Summer 2021), and "part-time" research during courses.

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Thesis/research-related Progression

- Conducted "full-time" research for at least 1 full semester (Spring/Summer 2021), and "part-time" research during courses.
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- Attended a thesis defence to learn about what to expect from a thesis defence meeting (and learn about their research).

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- Supervisory committee is formed, and we're currently having our first supervisory committee.
  - *Supervisor*: Dr. Jacques Carette
  - Dr. Spencer Smith
  - Dr. Wolfram Kahl

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Drasil...

- is managed by Dr. Carette & Dr. Smith.

Drasil's Logo
[Carette et al., 2021][Yggdrasil - Wikipedia, 2021]

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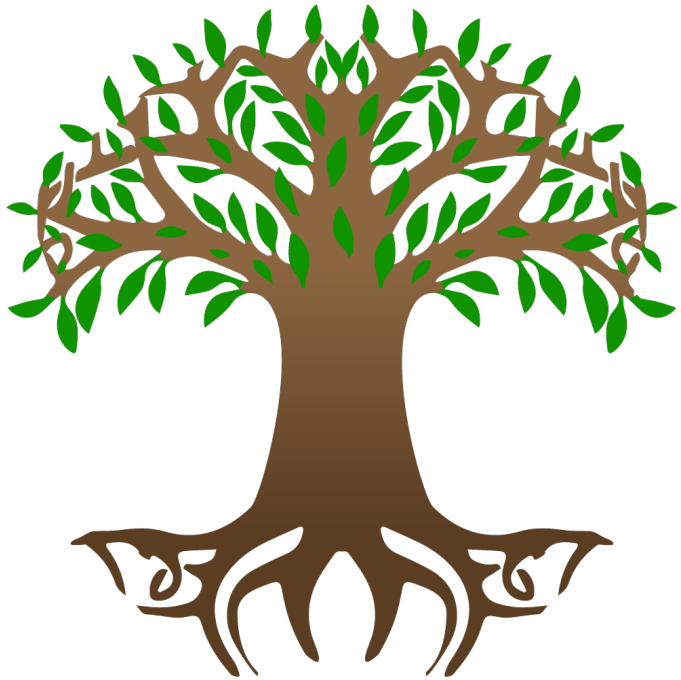

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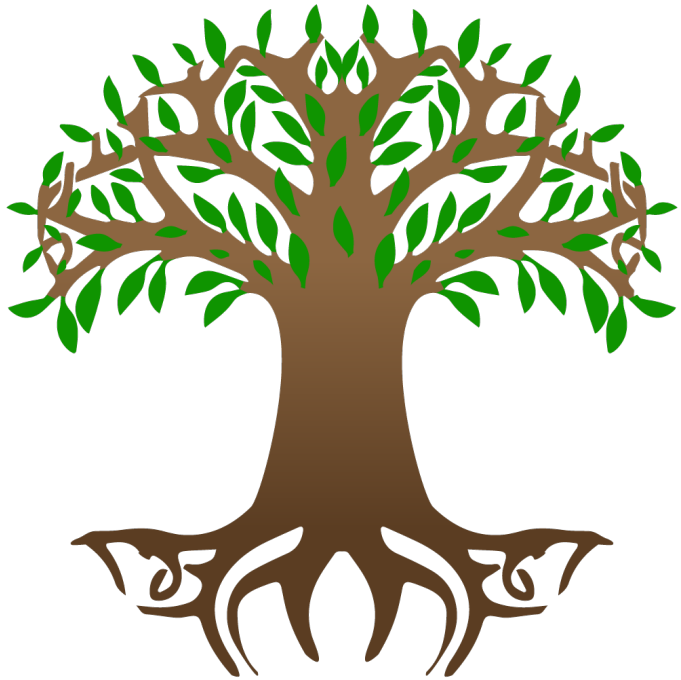

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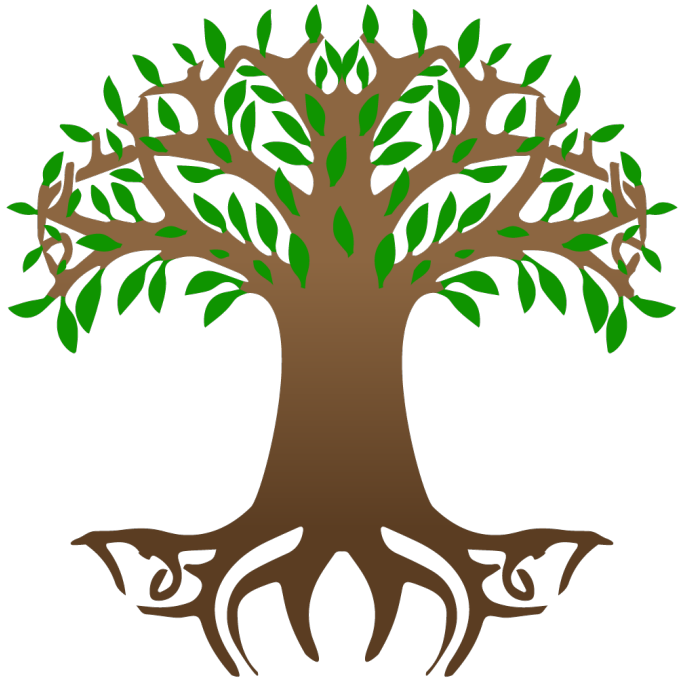

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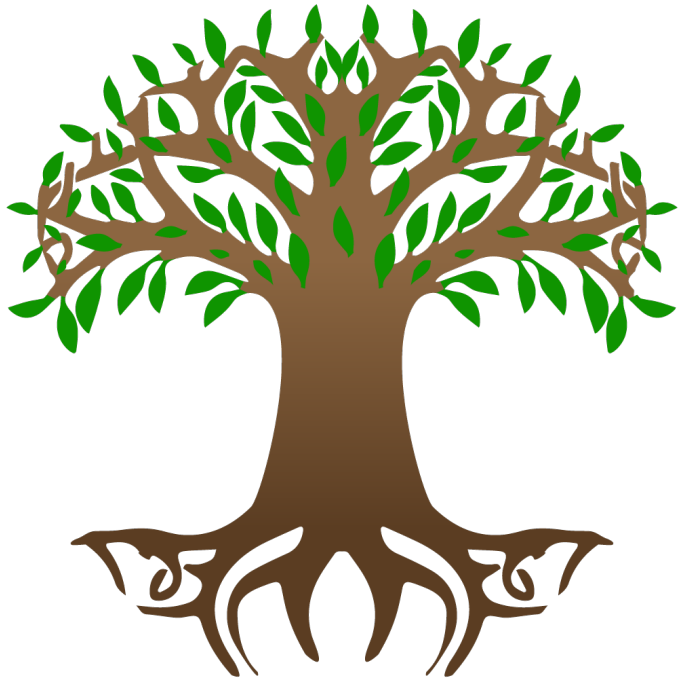

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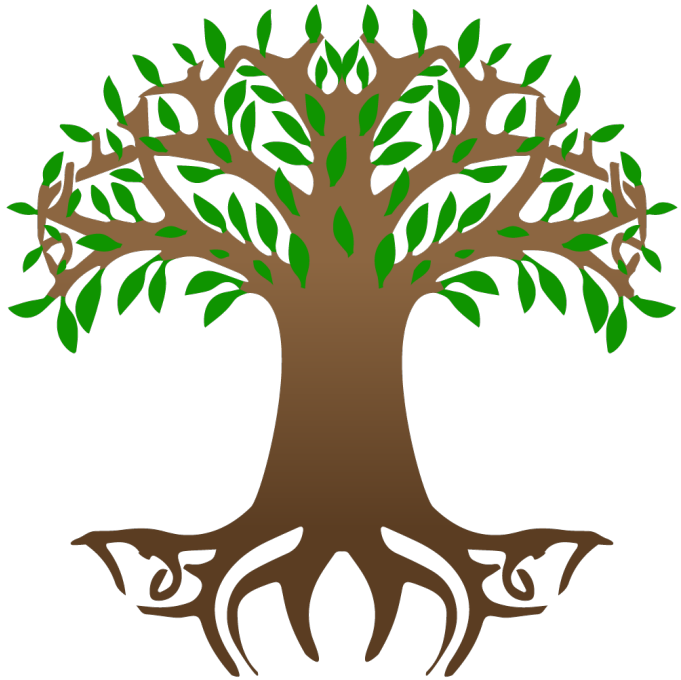

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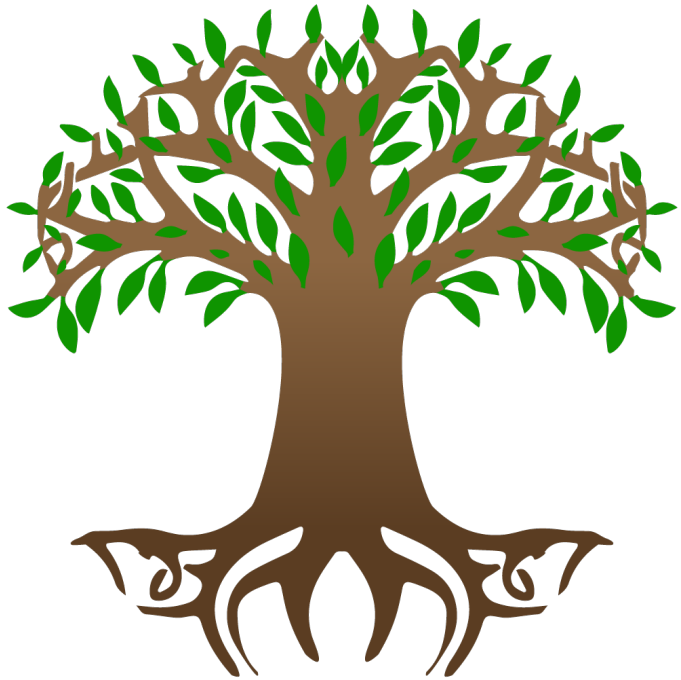
- has a website[1]!



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Drasil

"Generate All The Things!"

- TODO: here!

Drasil Case Studies

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What does Drasil currently support?

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  - **SWHS without Phase Change Material (NoPCM)** - Modelling of a solar water heating system without phase change material, predicting temperatures and change in heat energy of water and the PCM over time.

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  - **Slope Stability Analysis (SSP)** - Assessment of the safety of a slope (composed of rock and soil) subject to gravity, identifying the surface most likely to experience slip and an index of its relative stability (factor of safety).

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The Drasil website is also generated by Drasil!

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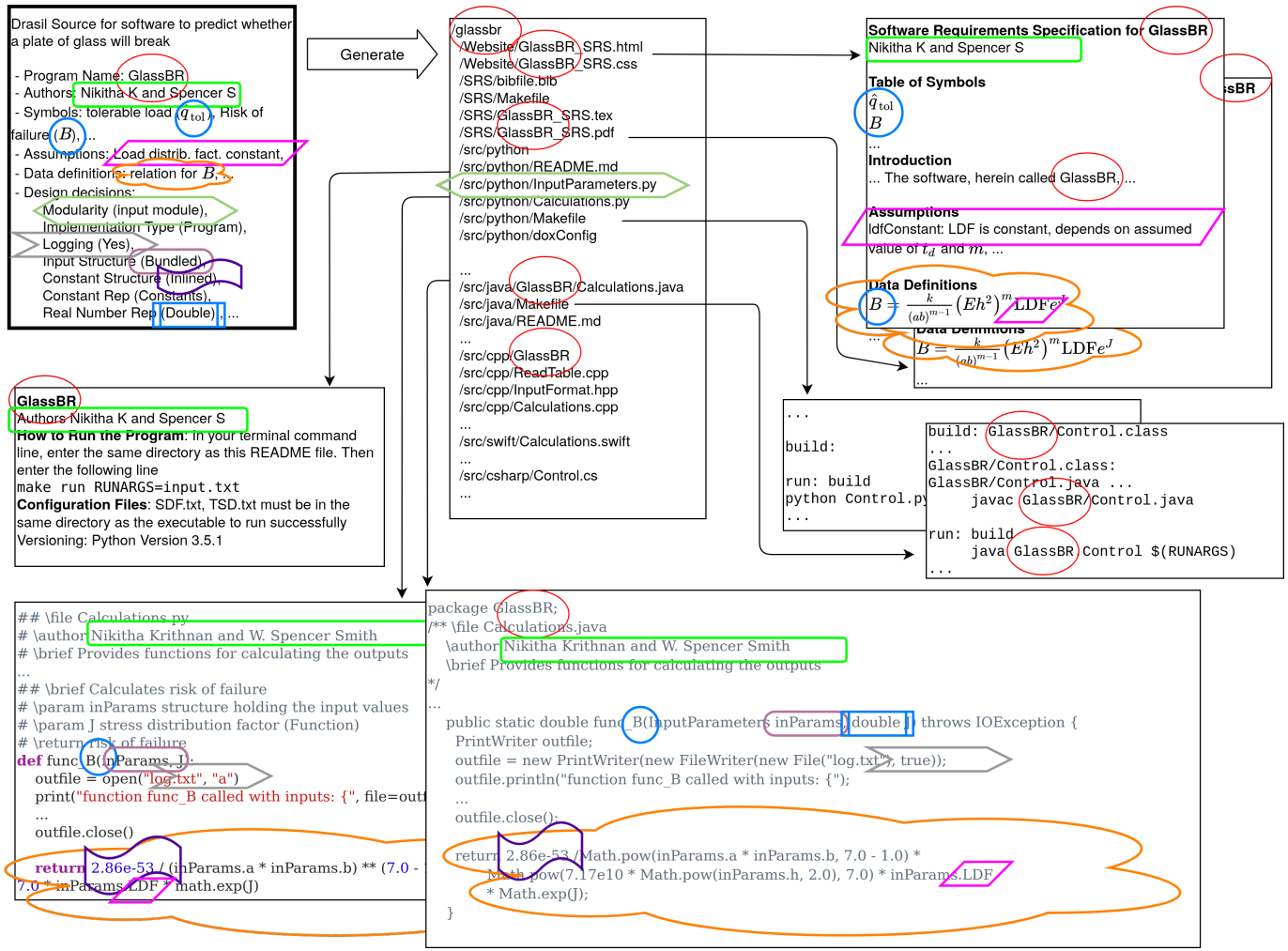
Taking a closer look at one of the examples: GlassBR

GlassBR Generates Code!



Knowledge flow from "knowledge-base"/source to artifacts, by Dr. Spencer Smith

Which case studies currently generate code?

- **GlassBR** - Predicting whether or not a glass slab is likely to resist a specified blast.

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A few, notable, blocking problems:

- Confidently generating usable software artifacts without strong type information places significant stress on developers, resulting in a higher likelihood of bugs in artifacts.
- Existing "theories"/"*Models"[1] don't expose enough information. They must be enriched.

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Acknowledgements

Fin.

Thank you!

Table of Contents

References I


Carette, J., Smith, S., Balaci, J., Hunt, A., Wu, T.-Y., Crawford, S., Chen, D., Szymczak, D., MacLachlan, B., Scime, D., and Niazi, M. (2021).
Drasil.


Yggdrasil - Wikipedia (2021).
Yggdrasil.