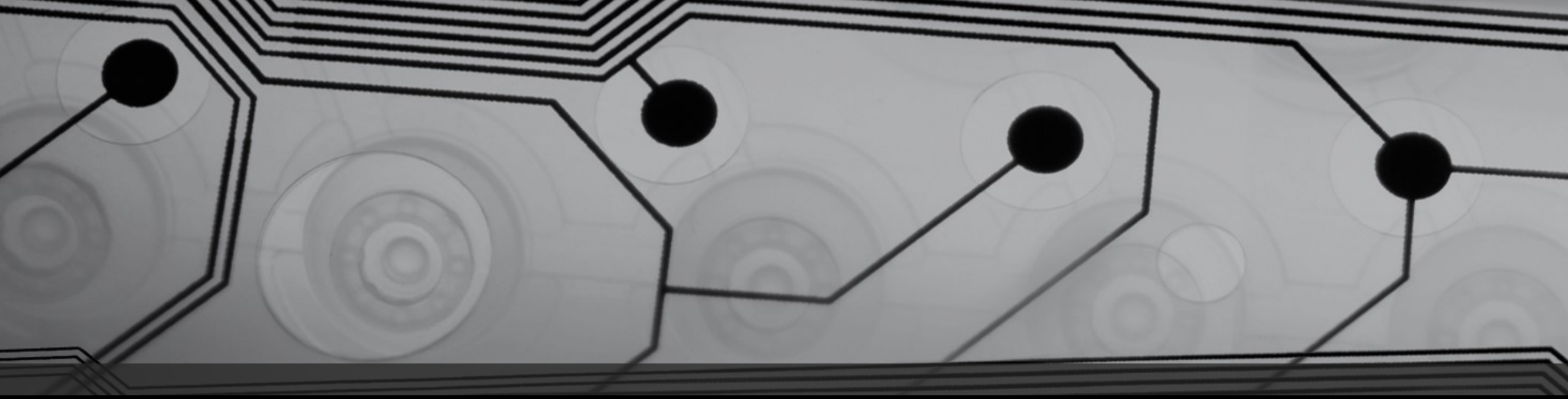


ArrayLab: Building a 3D APL Game with raylibAPL

Holden R. Hoover (holdenhoover@bkaw.ca)

DYNA Fall 2025

Who am I?

- First year Computer Engineering Student @ UWaterloo
- Using APL since 2020
  - Summer of 2021, worked on APEX compiler
  - 2024 APL Forge winner
  - Many other various projects…
- Summer work with Dyalog

Overview

- Intro
- Intro to project
- What is raylibAPL
- Getting Started: in 2D
- ArrayLab: the 3D game
- The 3D game making process: APL edition (Challenges)
- Conclusion

So, what is this year's project?

- Testing raylibAPL
- Making a game in APL
  - Planning the game
  - Being an artist
  - Writing the game in APL

raylibAPL

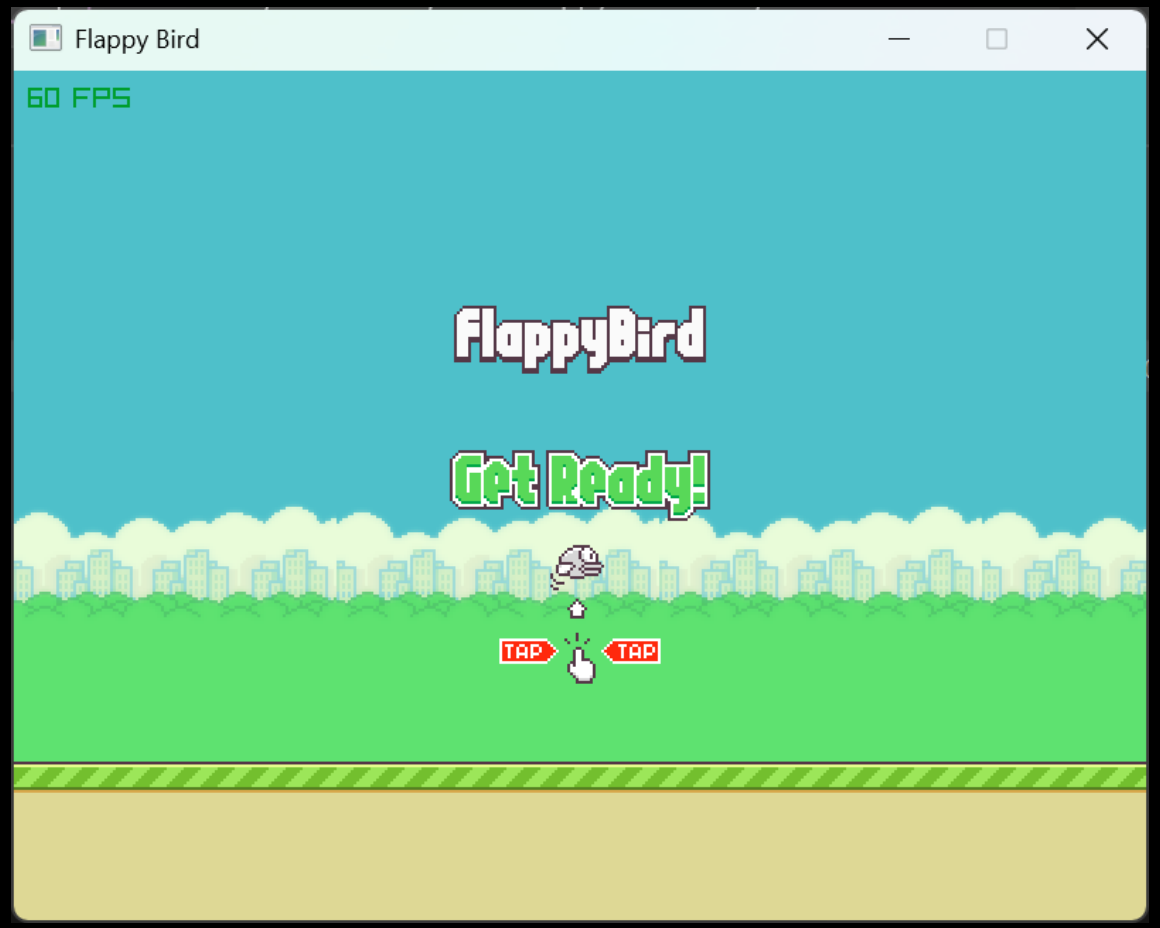
raylibAPL is a library made to write cross-platform graphical applications using the Dyalog APL programming language.

Features

- Supports platforms Windows, Linux, and MacOS.
- Input-methods: Keyboard, Mouse, Controler, and Touchscreen.
- Graphics: 2D, 3D, Sound, Text, Vector graphics, Images/Textures, and shaders.
- Multiple Fonts formats supported (TTF, OTF, Image fonts, AngelCode fonts).
- Multiple texture formats supported, including compressed formats (DXT, ETC, ASTC).
- Full 3D support, including 3D Shapes, Models, Billboards, Heightmaps, and more!
- Flexible Materials system, supporting classic maps and PBR maps.
- Animated 3D models supported (skeletal bones animation) (IQM, M3D, glTF).
- Shaders support, including model shaders and postprocessing shaders.
- Powerful math module for Vector, Matrix, and Quaternion operations: raymath.
- Audio loading and playing with streaming support (WAV, QOA, OGG, MP3, FLAC, XM, MOD).
- VR stereo rendering support with configurable HMD device parameters.

Getting Started (2D)

- Started with a 2D game
- Took around 6 hours
- Quick demo



ArrayLab

- Project: Create a fully fledged game in APL
- Idea: “The story of APL, but funny”
- Reality: Bugs
- Modules implemented
- Demo

My 3D Game Process (in APL)

- Planning
- Making art

- **Loading art**
- **Physics**
- **I/O**

Loading…

- GPU Thread
- Split up the task
- Primary thread issues
- Mac

Physics

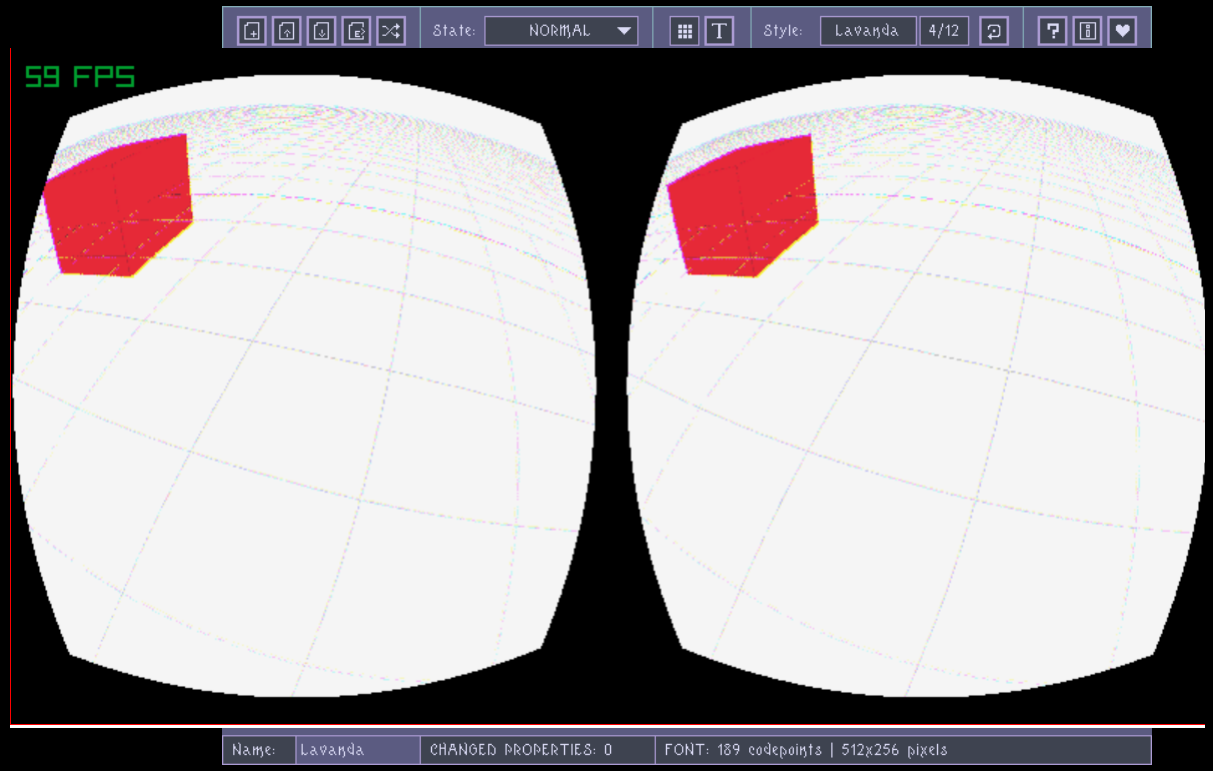
- Collisions:
  - Where?
  - Colliding?
  - What to do?
- Gravity
- Many models

I/O

- APL Dialogue (Unicode)
- Input lag

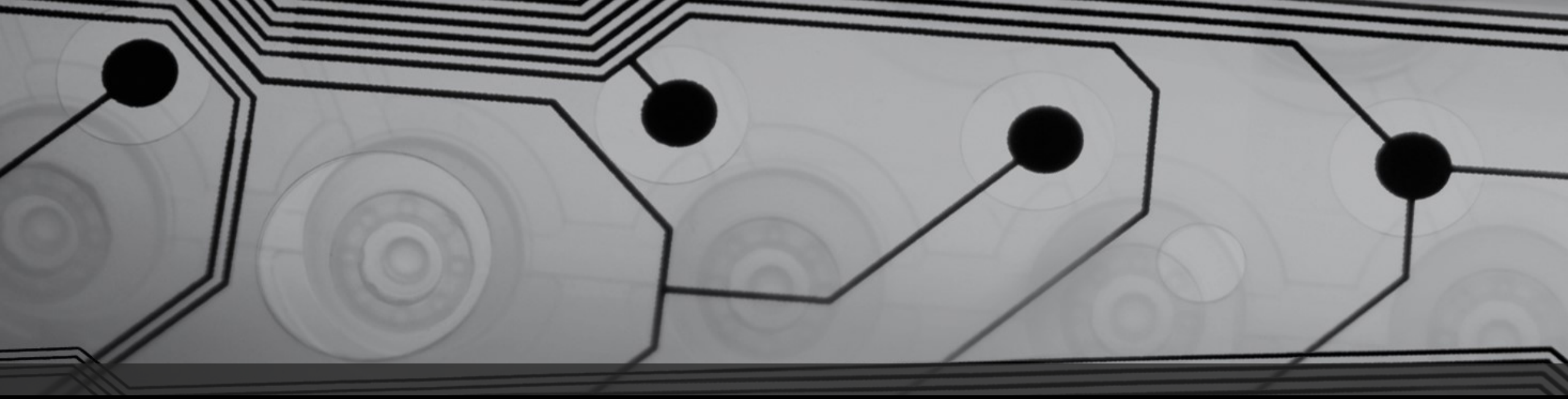
Why should I care?

- Not just games
- GUI possible
- VR possible
- Cross platform games



Conclusion

- raylibAPL can deliver 2D/3D
- Built this summer
- What we learned
- Bugs Squashed
- Whats next?
- Acknowledgements



Questions?

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