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# Motivation

- Create a general purpose programming language that is specialized for graphics
  - Patterns, Fractals
- Fractals are hard to draw by hand, why shouldn't the computer draw them for us?!
- Drawing shapes is fun!

# Project Timeline

Date	Milestone
September 19	Proposal Due
October 1	Revised Proposal
October 12	First commit in Project Repo
October 15	LRM, Parser
October 22	AST
October 30	SAST, Started Semant
November 6	Started Codegen
November 14	Hello World
December 3	External Library Linked
December 18	Tuples, Arrays Completed
December 19	Final Report Completed

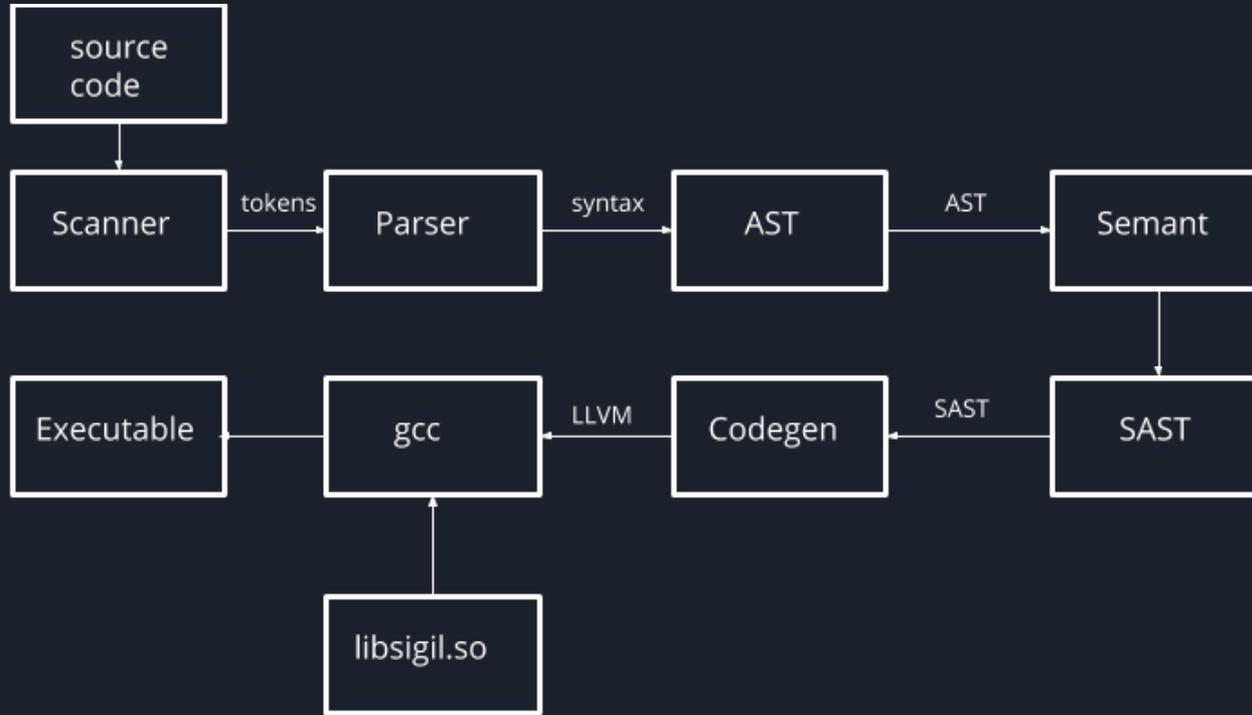




# Features

- **Modulo**
  - Useful for patterns
- **Arrays**
  - Mutable
  - Useful for iteratively creating similar shapes
- **Tuples**
  - Immutable
  - Useful for coordinates
- **Strings**
  - Useful for debugging and logging messages
- **SIGIL**
  - Circles, Rectangles, Triangles, Lines, Points

# System Architecture





# Testing

## Methodology

- `test.sh testfile.zen`
  - Runs `testfile.zen`, writes to `testfile.out`
- `Testall.sh`
  - Runs all `tests.zen`, compares output to expected `test.out` or `test.err`

## Challenges

- Sigil windows can't be saved and compared
- Can only check that graphical programs execute, not that they produce the desired output



# Development Challenges

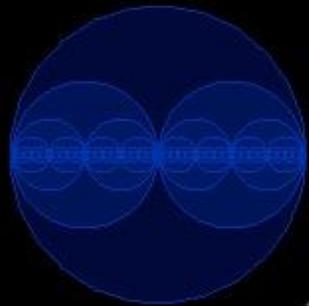
- Graphical Libraries
  - Picking the best one
  - Docker cannot support!!
  - Testing
- Library Linking
  - Adding multiple built-in library functions with different arguments
- Aggregate Types
  - Creating and accessing them in codegen

# Contributions and Lessons Learned

Name	Contribution	Lessons Learned
Zoë Gordin	Arrays, Library Linking	Adding to an existing codebase is <i>hard</i> , the power of Git, TAs are your friends!
Eleanor Murguia	Tuples, Demo	Fixes are a less complicated than you think they will be (thanks OCaml!)
Nadia Saleh	Tests	Every change will probably break an existing test. Run them all, often!



Demo!



ZEN

