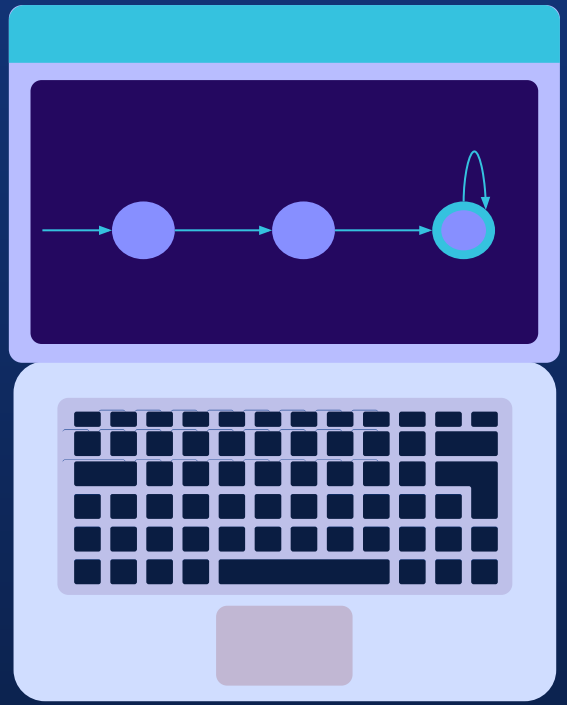
Improved Visualization for Formal Language



https://kmcnear2022.github.io/

Group Members: Chris Pinto-Font, Vincent Borrelli, Andrew Bastien, Keegan McNear

Who is involved?

Faculty Advisor: Dr. Luginbuhl

Serves the role of academic advisor for the project; overseeing product needs and design goals. Providing guidance in the progression of our project while keeping us on track and focused on our goals.

Client: Dr. Luginbuhl

The genesis for project was based on the needs and preferences of Dr. Luginbuhl, specifically his experiences with other graphing software. His close involvement with this project will allow us to quickly address his user needs as he tests our program regularly.

Goals and Motivations

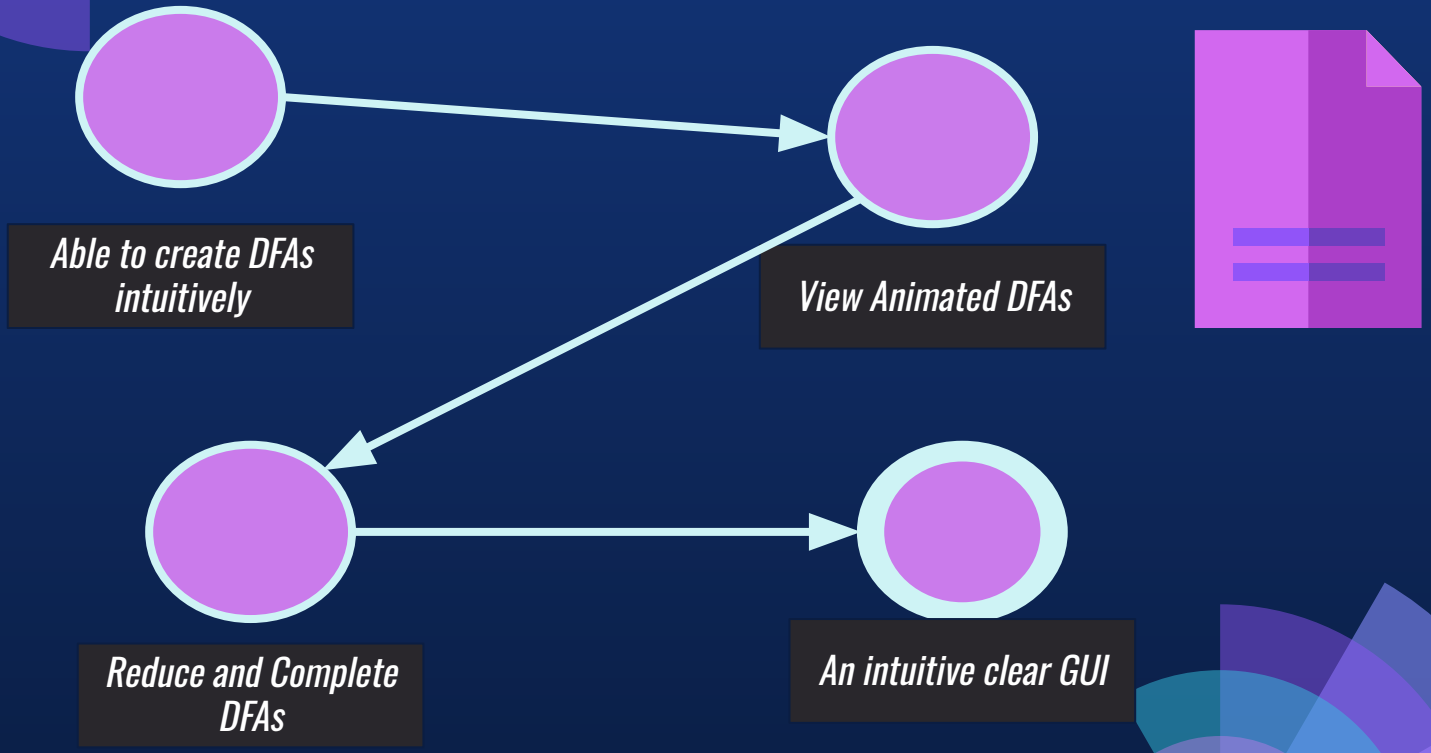
Goals

- Build a Computer Program for both teachers and students
- User Friendly and legible
- Engaging and intuitive animations

Motivation

- Need for tools to better teach and explore DFAs
- Remove undue confusion from the process
- Need to make learning and using DFAs easier

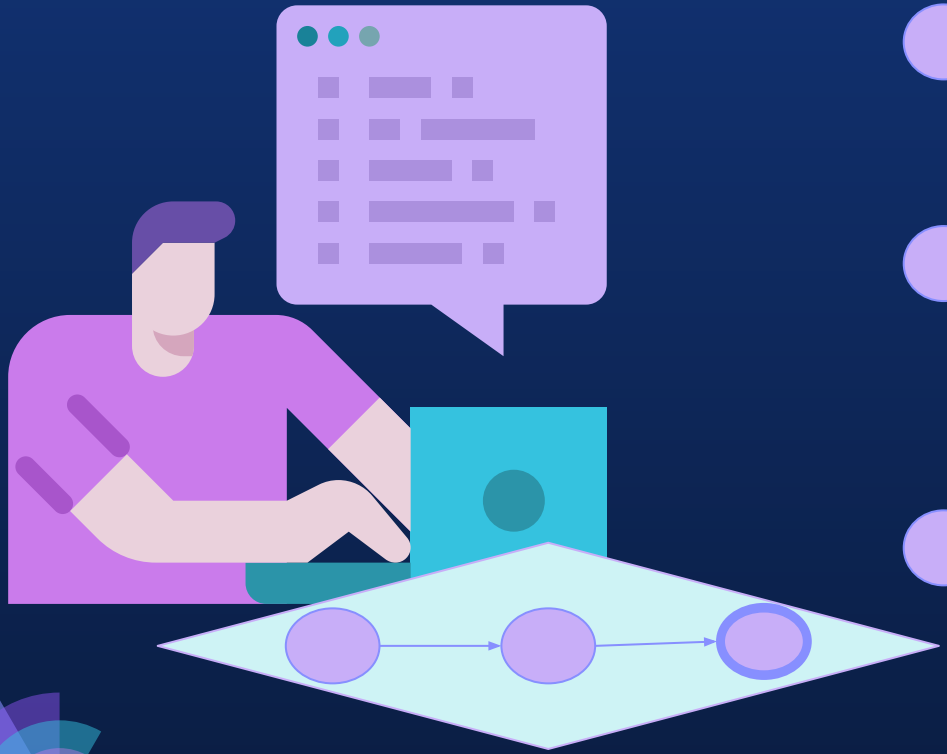
Key Features



Novel Features

- **Multiple symbols on a single transition between arcs:**
  - Interface will let the user make more complex and varied DFAs.
- **Animation of DFAs**
  - DFA building and progression will happen in a step by step animated manner to let the user follow and view the process as it happens.
- **In-Program documentation files**
  - Information for the program will be contained within the app for easy use and navigation.
- **Intuitive structuring to make both teaching and learning DFAs an easier process.**
  - Inspired by DESMOS the creation and tracing of DFAs will be incredibly easy for a new user.

Technical Challenges



Learning Python Library

Building an interactive visual program in Python will require our team to become familiar with what will likely be a complex and unfamiliar python library.

Learning Animation

Application will need to animate DFA building and progression, thus we will need to learn how to properly animate in the GUI space.

Algorithmic Complexity

The process of the program being able to build and complete DFAs based on entered text means the program will need to employ one or more complex algorithms to render out a correct and most ideal DFA.

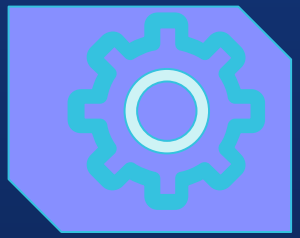
Building a functional and intuitive GUI

The basis for this project being improving the feel and ease of use for a DFA graphing program means we'll need to learn to create a GUI with usable tools and instant graphing capabilities.

Project Milestones

Milestone 1

- Compare and select technical tools for graphing and algorithmic needs
- Provide small ("hello world") demo(s) to evaluate the selected tools
- Resolve technical challenges: need for further DFA knowledge, inexperience with animations and python libraries
- Further refinement of user needs through continued open discussions with Dr L.
- Explore and select collaboration tools for software development
- Create needed documents/presentations, communication format, and task calendar
- Create Requirement Document based on research
- Create Design Document
- Create Test Plan



Milestone 2

- Have a working program which runs and fulfills the user most basic interaction.
- Basic GUI which can graph at least the most basic DFAs by hand.
- DFA logic implementation for testing completeness and correctness.
- DFA formatting

Milestone 3

- DFA animations for construction and walkthroughs.
- Proper logic for a complete and minimal DFA
- Complete and implement onboard documentation/read me files for user reference.

Milestone. . .

Task Matrix

Task	Chris	Vincent	Andrew	Keegan
Compare and select Technical Tools	Research: 25%	Research: 25%	Research: 25%	Research: 25%
“Hello world” demos	Coding: 25%	Coding: 25%	Coding: 25%	Coding: 25%
Resolve Technical Challenges	Research: 25%	Research: 25%	Coding: 25%	Coding: 25%
Compare and select Collaboration Tools	Microsoft Team	Google Drive	Discord	GitHub
Requirements Document	Writing: 30%	Writing: 30%	Writing: 15%	Writing: 15%
Design Document	Writing: 15%	Writing: 25%	Writing: 35%	Writing: 25%
Test Plan	Writing: 20%	Writing: 30%	Writing: 20%	Writing: 30%

Questions?

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