

**MySTEMGrowth**

# MySTEMGrowth Program Survey

sdmay25-24

# Team Introductions



Alex Moeller

PM/Frontend



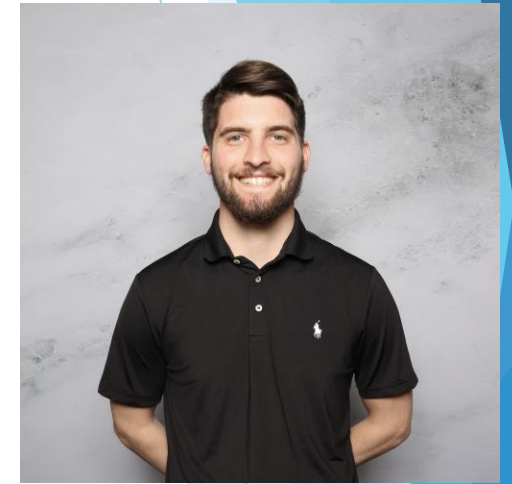
Matthew Bennett

Cloud/Infra



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Cloud/Infra



Nick Pinnello

Backend

# Team Introductions



Isabelle Raghavan

Frontend



Charlie Moreland

Backend



Max Strater

Frontend

# Agenda

- ▶ Project Background
- ▶ Project Vision
- ▶ Multi-Tenant Design
- ▶ Visual Aid
- ▶ Problem Statement
- ▶ User Requirements
- ▶ Overview of New Design
- ▶ Frontend Design
- ▶ Backend Design
- ▶ Cloud Design
- ▶ Project Plan
- ▶ Project Schedule
- ▶ Final Summary

# Project Background

- National Science Foundation program
- Surveys/programs across many large Universities (U of Iowa)
- Goal: Help students visualize their growth over time:
  - o Community Engagement
  - o STEM Interest
  - o STEM Self-Efficacy
  - o STEM Career Expectations
  - o Research Self-Efficacy
  - o Research Outcome Expectations

The logo for MySTEMGrowth is displayed on a dark blue rectangular background. The text "MySTEMGrowth" is written in a white, serif font. A small green sprout with two leaves is positioned between the "S" and "E" of "STEM", acting as a visual separator and symbolizing growth.

# Project Vision



# Multi-Tenant Design



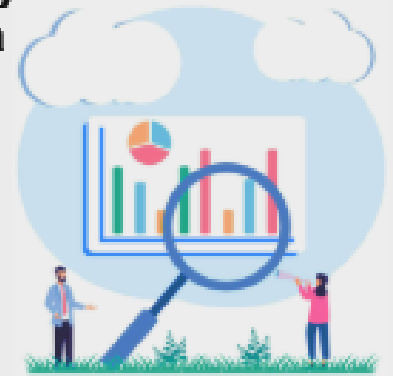
IOWA STATE  
UNIVERSITY

Administer  
the Survey  
Across  
Different  
Universities

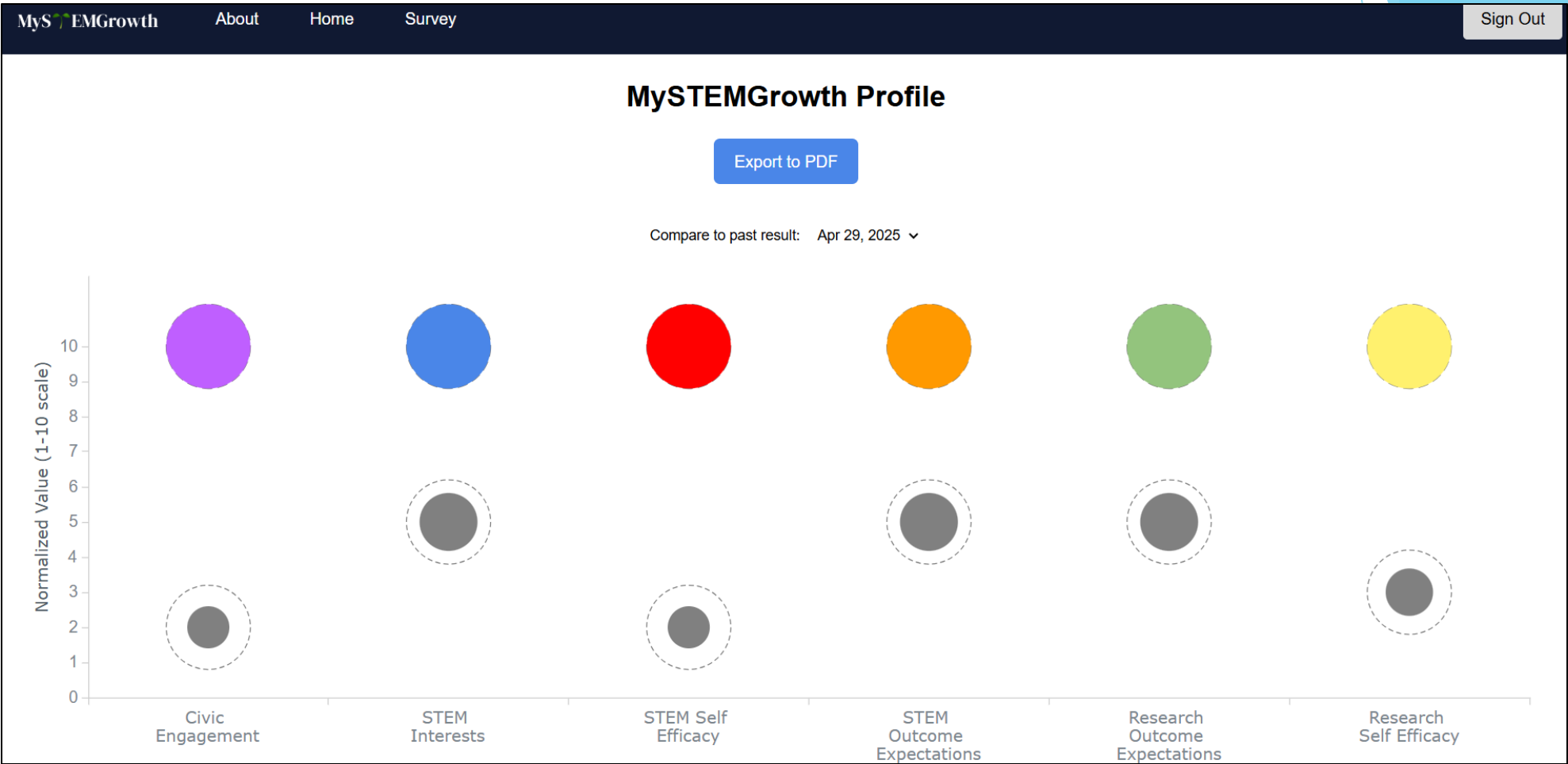
MyS<sup>EM</sup>Growth

My Stem Growth  
Web Tool

Store Survey  
Result Data  
for Review



# Visual Aid



Survey results

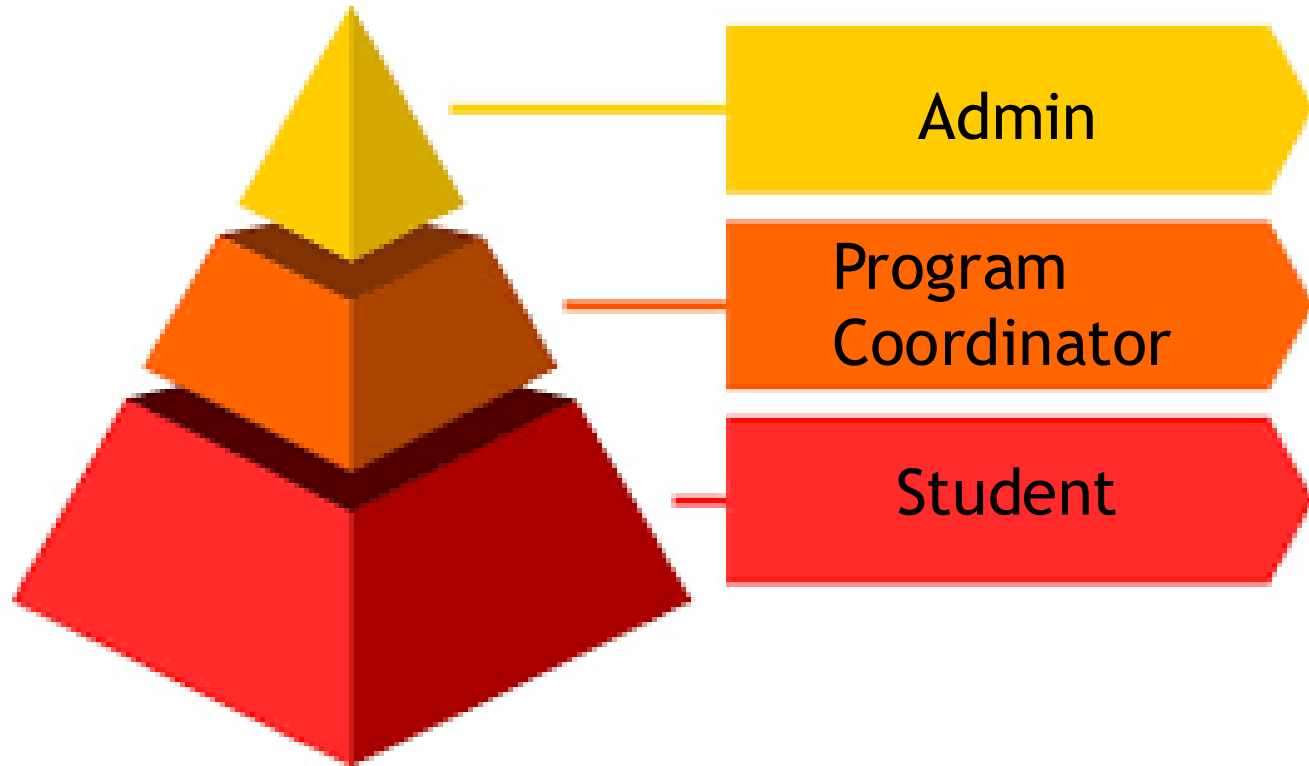


# Problem Statement

- ▶ Visualize STEM growth
- ▶ Engage with survey data
- ▶ Participate in STEM activities
- ▶ Enable simple program management

# User Overview

- ▶ Tier 1 User
  - Admin
- ▶ Tier 2 User
  - Program Coordinator
- ▶ Tier 3 User
  - Participant (Student)



# Tier 1 User: Admin

- ▶ User Management
  - Access to manage user permissions and activity
- ▶ Data Access and Security
  - Download survey results
  - Export survey questions

# Tier 2 User: Program Coordinator

## Program Coordinator:

- View program-specific information (number of students, resources, etc.)
- Create and delete programs
- Share a “Join Code” to invite students to the program
- Add and remove program resources (unique to each program)

The screenshot shows the 'Programs' page for a Program Coordinator on the MySTEMGrowth website. The page has a dark blue header with the logo, navigation links, and a 'Sign Out' button. The main content area has a light blue background with the title 'Programs' and a message stating 'You currently have: 3 Programs'. Below this is a button to 'Create New Program'. A table lists the existing programs with columns for Program Name, Program Code, # Students, # Resources, and Action.

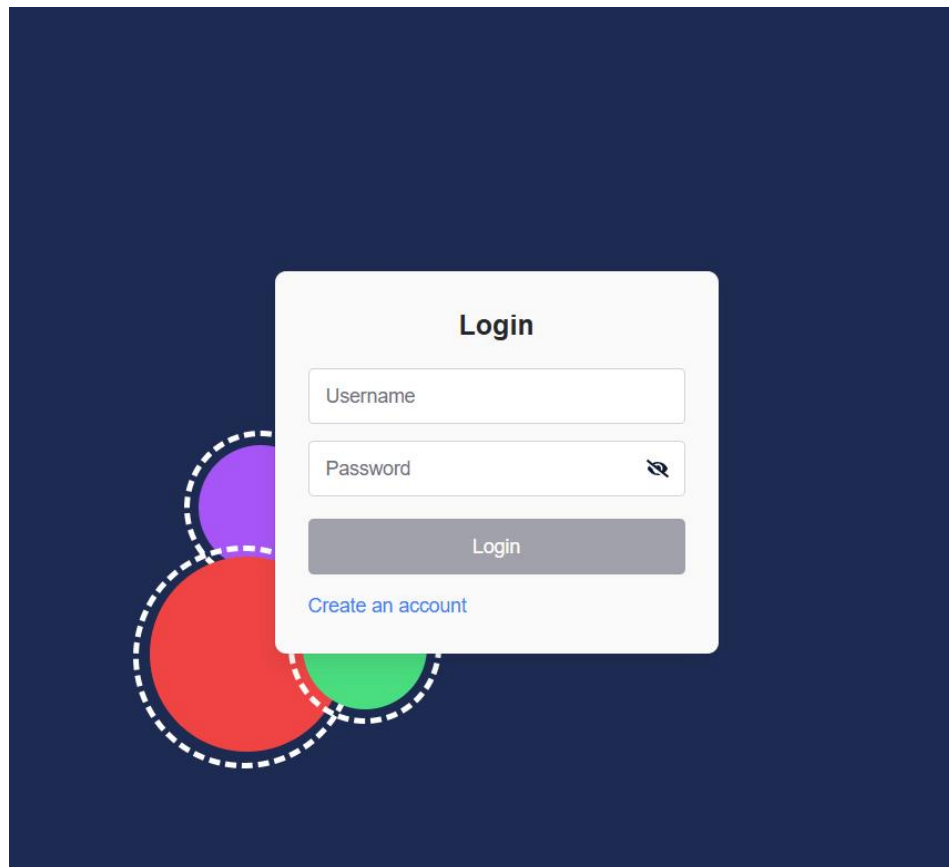
Program Name	Program Code	# Students	# Resources	Action
Test Program 3	UkSZ87	9	3	
Test Program 4	nemUbT	1	0	
isu2025	W8FXZG	2	1	

# Tier 3 User: Student

- ▶ Take survey
- ▶ View survey results
- ▶ View program-specific resources


# Frontend Design

Log in and Sign Up

A login form titled "Login" is centered on a dark blue background. The form is white with rounded corners. It contains two input fields: "Username" and "Password". The "Password" field has a toggle icon (an eye with a slash) on its right side. Below the input fields is a grey "Login" button. At the bottom of the form, there is a link that says "Create an account". To the left of the form, there are three overlapping circles in purple, red, and green, each with a dashed white outline.

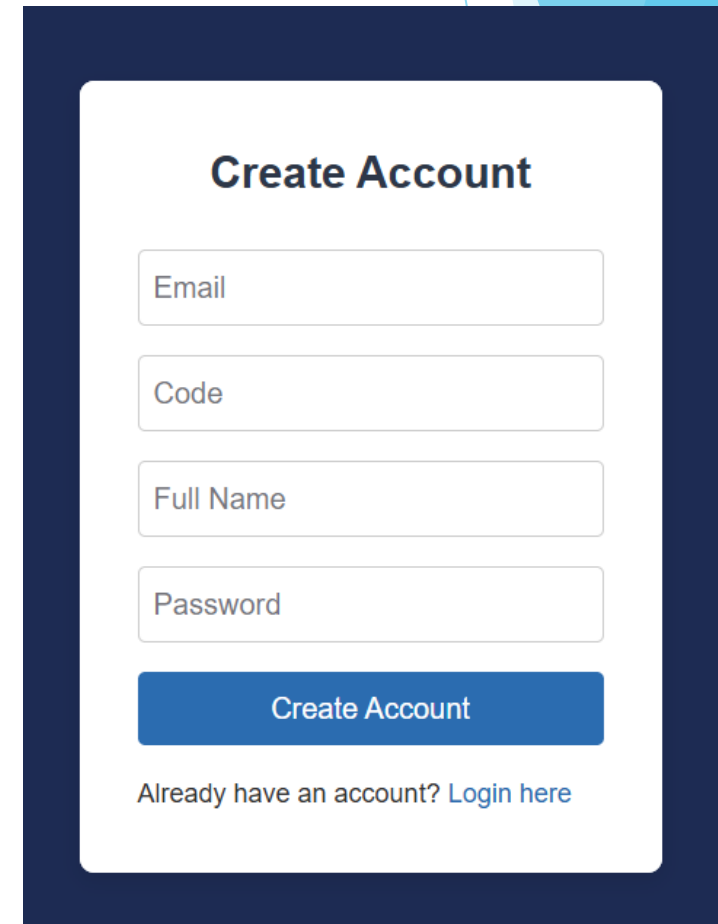
**Login**

Username

Password 

Login

[Create an account](#)

A "Create Account" form is shown on a dark blue background. The form is white with rounded corners. It has a title "Create Account" at the top. Below the title are four input fields: "Email", "Code", "Full Name", and "Password". At the bottom of the form is a blue "Create Account" button. Below the button, there is a link that says "Already have an account? Login here".

**Create Account**

Email

Code

Full Name

Password

Create Account

Already have an account? [Login here](#)

# Frontend Design

## Admin Dashboard

MySTEMGrowth

About

Home

Sign Out





### MySTEMGrowth Admin Dashboard

#### Generate Access Code

Select Role:

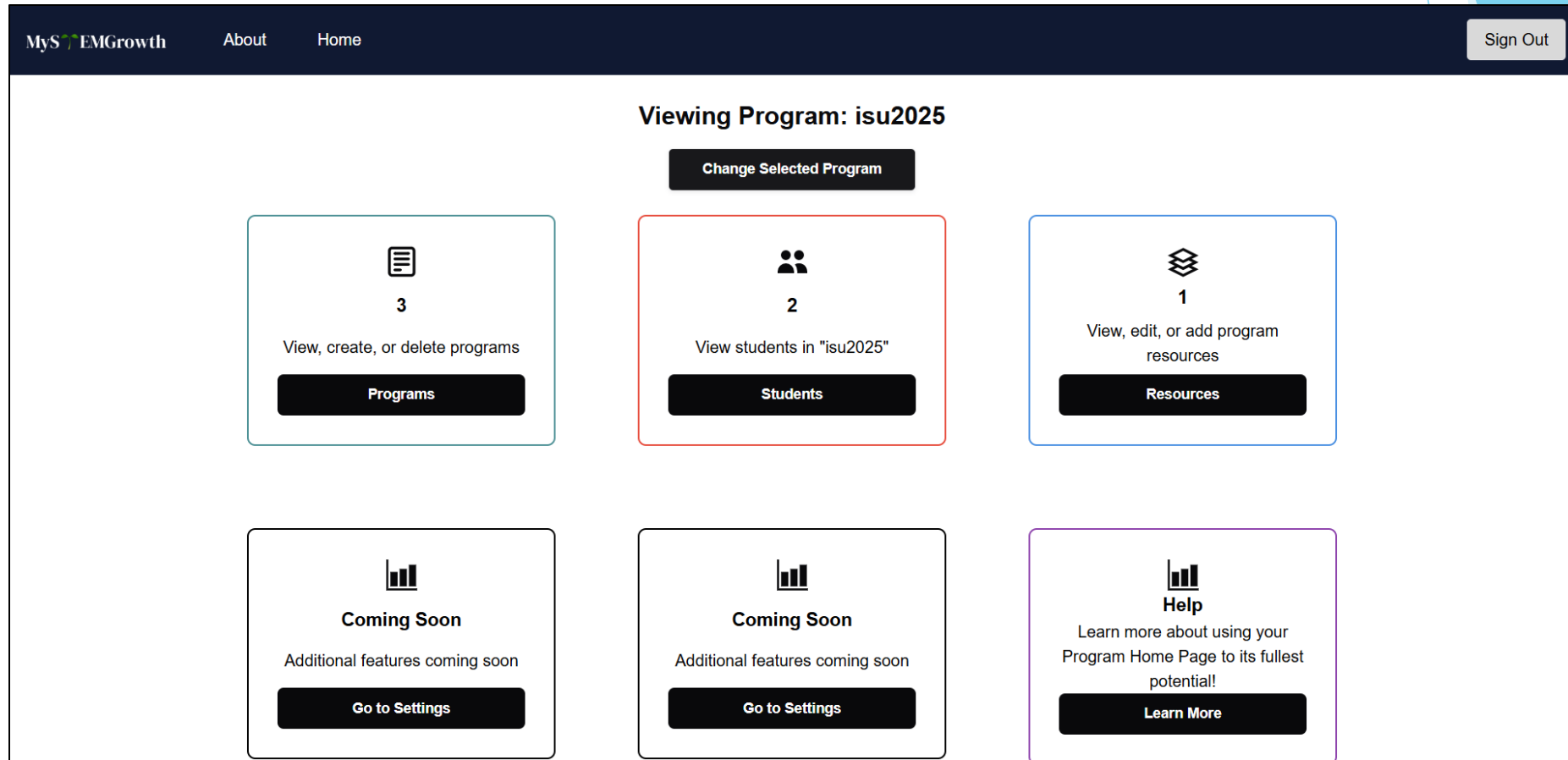
Admin

Generate Code

Program Name	PC	# Submissions	Download Results	Download Questions	Action
iinspire Spring 25	Diane Rover	1	Download Results	Download Questions	
hawkeye	Diane Rover	0	Download Results	Download Questions	
Test	Diane Rover	0	Download Results	Download Questions	
Test2	Diane Rover	0	Download Results	Download Questions	

# Frontend Design

## Program Coordinator Home Page





# Frontend Design

## Student Home Page

MySTEMGrowth

About

Home

Survey

Sign Out

## Welcome to your MySTEMGrowth Student Dashboard!

Within this dashboard, you can access surveys, view results, and find resources to support your STEM journey.

### Take Survey

Share your experiences and help improve STEM education.

Take Survey



# Frontend Design

Student Home Page cont.



## View Results

See how your responses compare to others in your program and track your progress over time.

[View Results](#)

## View Resources

Explore external resources like tutoring, mental health counseling, and other services

[View Resources](#)



# Frontend Design

## New Survey Designs

MyS7EMGrowth

AboutHomeSurvey

Sign Out

Step 1 of 813%

### Survey: 1

Please indicate the level to which you agree or disagree with each statement

I feel responsible for my community

Disagree

Agree

0%

20%

40%

60%

80%

100%

I believe I should make a difference in my community

Disagree

Agree

0%

20%

40%

60%

80%

100%

I believe that I have a responsibility to help the poor and hungry

Disagree

Agree

0%

20%

40%

60%

80%

100%

I am committed to serve in my community

Disagree

Agree

0%

20%

40%

60%

80%

100%

# Frontend Design

## New Survey Designs cont.


Working on a project involving engineering principles	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Strongly Dislike	Dislike	Indifferent	Like	Strongly Like
Solving complicated technical problems	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Strongly Dislike	Dislike	Indifferent	Like	Strongly Like
Learning new computer applications	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Strongly Dislike	Dislike	Indifferent	Like	Strongly Like
Working on a project involving scientific concepts	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Strongly Dislike	Dislike	Indifferent	Like	Strongly Like

[Previous](#)[Next](#)

# Backend Design - Automated User Provisioning

- New Users must enter a Signup Code
- Codes are 6 digits and uniquely generated
- Codes are attached to a User Role
- Admin Users can generate codes for the Roles of Admin and Program Coordinator
- Program Coordinators automatically receive a Student Sign Up Code upon new Program Creation

## MySTEMGrowth Admin Dashboard



### Generate Access Code

Select Role:

Program Coordinator

Generate Code

9h0YEI

# Backend Design - Survey Data CSV File Export

- Excel File Export - Generated by Backend
- Program-Level Data Separation
- Condensed Program Coordinator Report
- Comprehensive Admin Report



	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	Email	Fullname	Institution	Date	civicEngagement	stemInterest	stemEfficacy	stemOutco	researchOu	researchE	Q1	Q2	Q3	Q4
2	johnsmith@gn	John Smith	Iowa State	4/28/2025	5	8	6	7	7	8	2.5	2.5	3	2.5
3	TestStudent@i	Test Student	Hawkeye Commur	4/21/2025	7	3	6	8	9	4	2.5	2.5	3	2.5

# Cloud/Infra Re-Design

## Cloud Re-design:

Replaces existing infrastructure, future teams will not need to work on cloud

Deployed and managed from a university owned GitLab

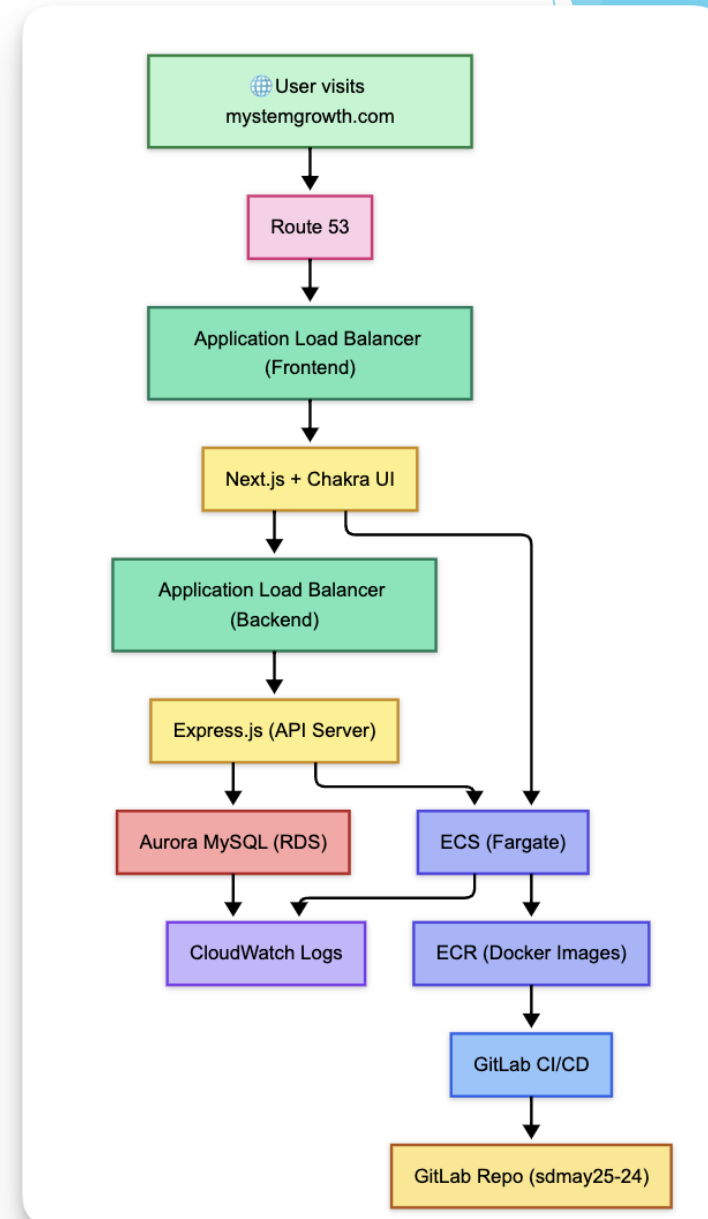
## Goals:

**Operational Goals:** Increase Security, Support long-term development, Lower Costs

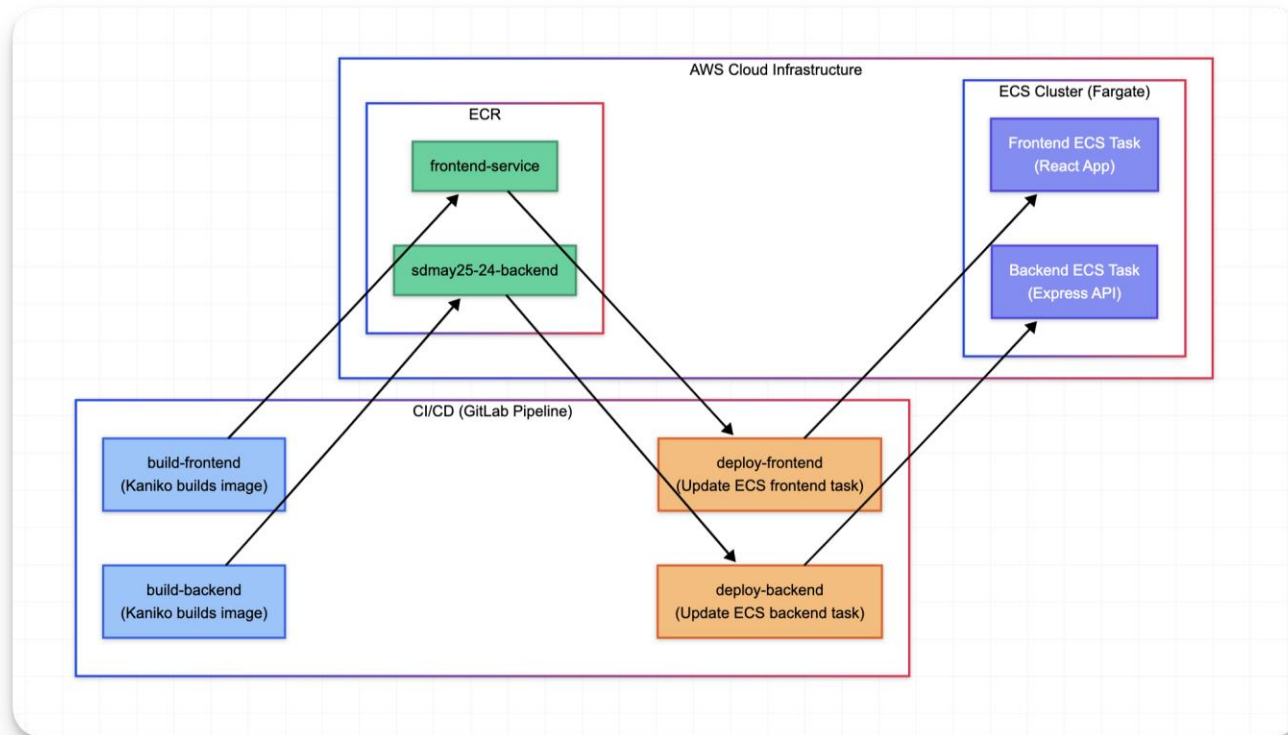
**User Experience Goals:** Reduce User Friction, Simplify Development Process, Making data more accessible

## Major Changes:

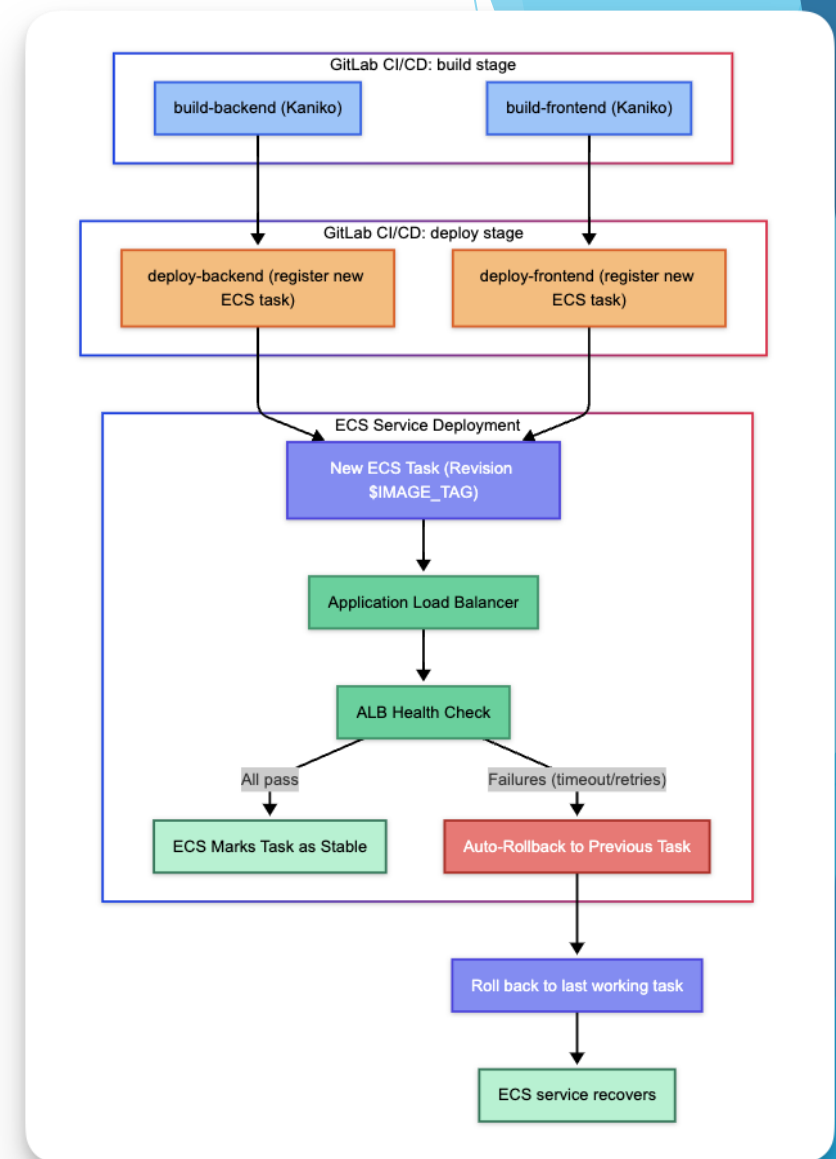
- EC2 containers replaced with ECS
- ECR to store previous versions of the app
- CI/CD through GitHub Actions
- ALB for backend and frontend



# CI/CD Pipelines



## CI/CD Pipeline



## ECS Rollback



# Networking

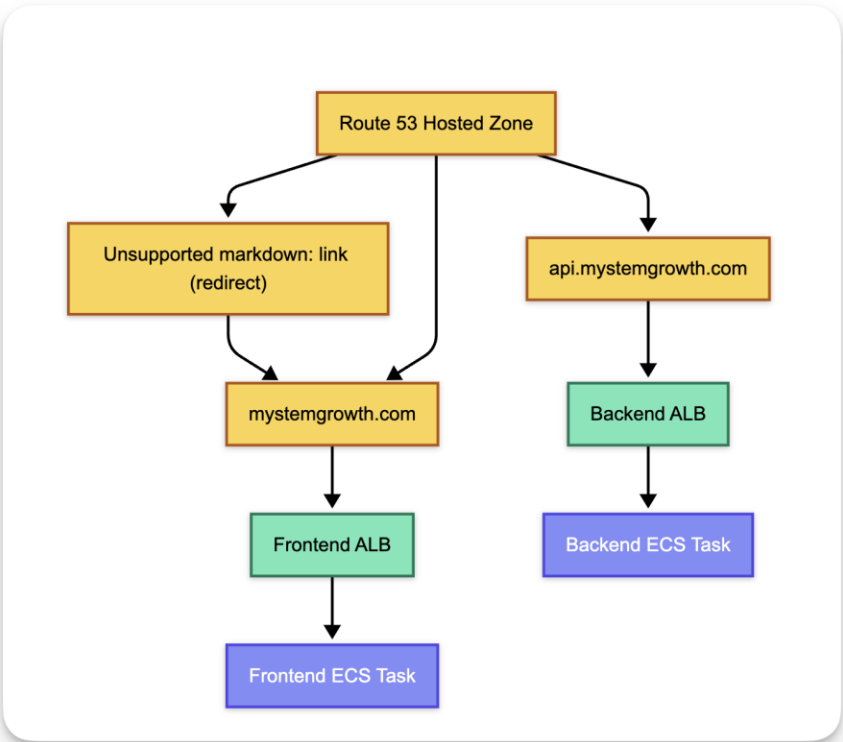


Figure 1

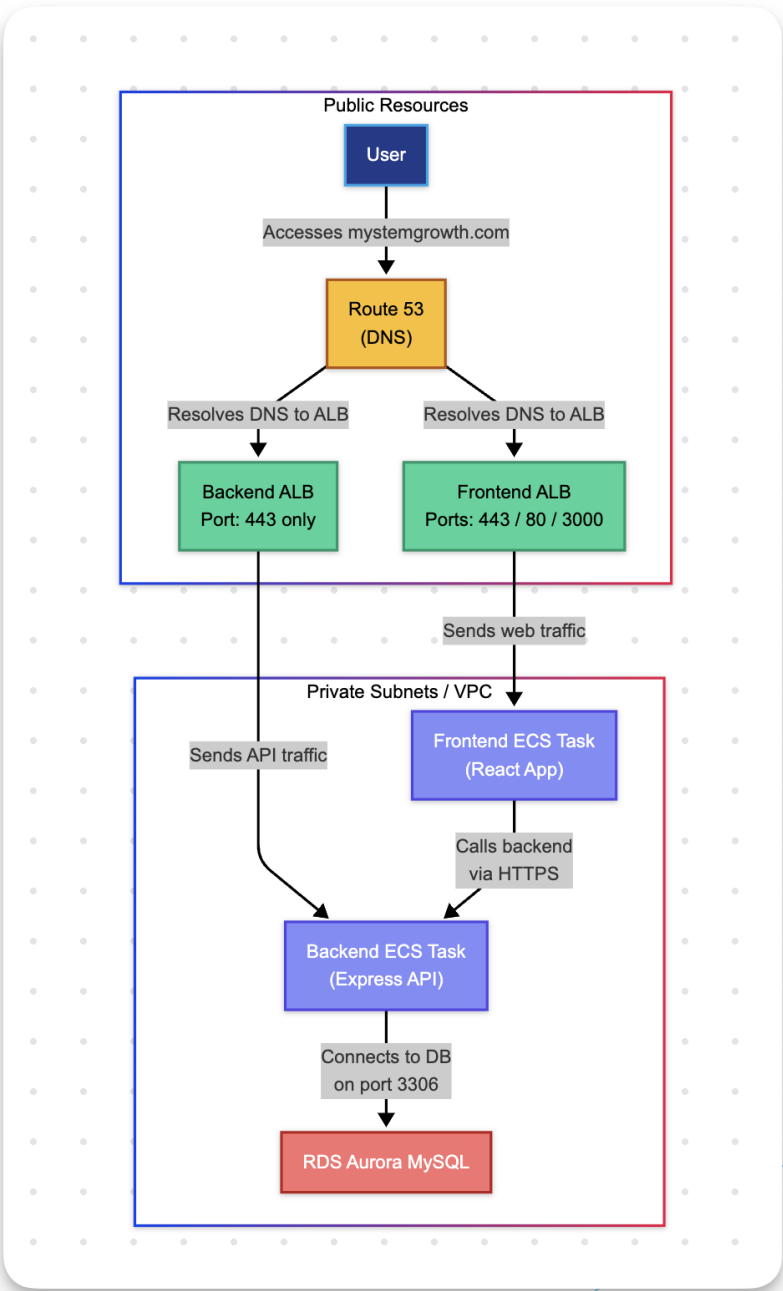
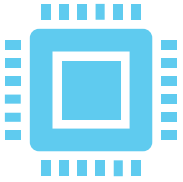


Figure 2

# Cloud Design-User Perspective



## Average User:

**Data Security:** all database traffic is routed through a private subnet

**Automated Scaling:** App will scale based on demand reducing slowdown during high demand times



## Admins:

**Reduced Cost:** ECS charges based on load, reducing wasted costs when not in high demand

**Improved Data Access:** Optimized MySQL queries in our Node.js backend ensures fast, reliable performance without added overhead



## Developer:

**Simple Infrastructure:** Re-design allows for hands off management and data access

**Faster Development:** CI/CD automates testing and deployment for new features

# Vision for Future Teams

## ▶ Stable Production Environment

- Fully containerized app using Docker with clear separation between development and production.
- Environment variables and API endpoints now auto-adjust based on deployment context.
- Streamlined deployment with minimal manual configuration.

## ▶ No Need for Future Cloud Teams

- Infrastructure is now standardized and self-contained:
- AWS ECS + ALB fully handles frontend/backend services.
- CI/CD pipelines automate deployments.
- Future development teams can focus entirely on features, not cloud setup.

## ▶ Next Steps

- Add automated tests to improve deployment confidence.
- Expand role-based access and user analytics.
- Maintain code documentation and onboarding materials to ease team transitions.

The background features abstract, overlapping geometric shapes in various shades of blue, ranging from light sky blue to deep navy blue. These shapes are primarily located on the right side of the frame, creating a modern, layered effect. The rest of the background is a solid, very light blue.

Questions?