



Programming Contest Platform

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Key Personnel

- **Project Champion:** Dr. Wing Ning Li, CSCE Professor and Researcher
- **Secondary Advisor:** George Holmes, CSCE Systems Administrator and Lab Technician



Problem

- Other code evaluation services:
 - Are incredibly outdated
 - Lack features making it easy to host programming competitions
 - Don't allow group creation or customized feedback
 - Clunky and has trouble with university email accounts



Objective

- Create a modern programming contest app to put outdated ones to rest
 - Will focus on intuitive user experience, consulting UI/UX experts
 - Will focus on securing user data with Auth0 being used to handle access
- Docker containers will compile and run submissions and tell users degree of success



Background

- Key concepts
 - Docker
 - PostgreSQL
 - Java Spring Boot
 - Typescript
 - React
- Related work
 - PC²
 - Online Judge
 - Leetcode
 - Binarysearch.io



Requirements

- Creation of an online web page that allows users to:
 - Create new competitions
 - Name the competition
 - Manage a list of teams
 - Set up scoring methods and other individually specific parameters
 - Join existing competitions
 - Access participating competitions via list of competitions on website
 - Join via unique link, distributable via QR code



Requirements (Continued)

- Provide an infrastructure that can efficiently evaluate code uploaded by users
 - Code needs to have input checked while also being secure
 - Docker will be used to implement this section of our architecture
 - Evaluation should focus on sandboxing user code
 - Code results will be returned to the API to be stored and shown to users



Use Cases

- Programming Competitions
 - University of Arkansas High School Programming Challenge
- Programming Challenges class
- Anyone wanting to create a private programming contest



Design Goals

- Frontend
 - Use react to create a modern frontend
 - Design should be clean and responsive
 - It should be easy to join a competition and start programming
- Backend
 - Use Java Spring Boot for built-in ease of type conversion
 - Access database quickly and cleanly
 - Use PostGreSQL in database to appeal to third normal form
- Code evaluator
 - Use Docker to easily and quickly scale
 - Sandbox code to keep our infrastructure secure
 - Guarantee integrity of results