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| Mercer University |
| Project 3 |
| SSE 656 - Object Oriented Project Methods |
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# Introduction

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# Commonality and Variability Analysis

# Features and Requirements

# Domain Analysis

# Use Cases and Use Case Diagrams

To ensure that our team has a more complete understanding of how the system should work, use cases were derived for the major interactions that users can have with the system. These interactions include:

* Submitting problems
* Judging problems
* Creating contests
* Creating problems
* Creating users

Our design team has determined that there will be three types of users for this system: Admins, Teams, and Judges. A use case of the main path was created for each of these types of users.

An Admin will be the user that sets up the competitions as well as creating user accounts for the Teams and Judges. The Admins will be able to specify all of the aspects of a competition such as: the Problems used in the competition, the Users participating in the competition, and the Languages that the Users will be able to submit their source code in. The Admin will also decide the start and end times of each competition.

Teams will be the main users of the system. They will be the users who are solving and submitting answers to the problems posted by the Admins. They will be able to decide which problem they want to solve and in what language they want from the lists provided by the Admin. After they have submitted their solutions, they will be able to review the judging of their solution and resubmit if necessary.

The final user group is the Judges. The Judges will be responsible for reviewing the Teams' submissions. To review these submissions, they will be proved the submitted source code as well as judging inputs and outputs. The judge will run the source code with the provided inputs and then compare the produced output to the provided output. Based on this comparison, the Judge will select the most appropriate response (i.e. "Correct Solution" or "Wrong Output").

The following subsections contain these use cases as well as the use case diagram that shows all possible interactions that a user can have.

## Problem Submission Use Case

1. The user navigates to the web URL associated with the judge application
2. The user logs in to the judge application with a team's credentials
3. The user views the scoreboard and selects a problem to solve
4. The user clicks the "Team" link
5. The user selects the solved problem from the drop down, selects the language used, and uploads the source file
6. The user waits for the problem to be judged
7. Once the problem is judged, the user returns to the Team page and views the judged problem to see the judge's comments

## Problem Judging Use Case

1. The user navigates to the web URL associated with the judge application
2. The user logs in to the judge application with a judge's credentials
3. The user clicks the "Judge" link
4. The user claims a submitted problem
5. The user downloads the zip file that contains the submitted source code, the input file, and the output file
6. The user runs the source code with the input file as the input to the system
7. The user compares the given output to the generated output
8. Based on this comparison, the user selects a judging option for the claimed problem

## Creating a Competition Use Case

1. The user navigates to the web URL associated with the judge application
2. The user logs in to the judge application with an Admin's credentials
3. The user clicks the "Admin" link
4. The user clicks the "Users" link
5. The user clicks the "New User" button
6. The user enters information for the new team and clicks the "Create" button
7. The user clicks the "Problems" link
8. The user clicks the "New Problem" link
9. The user enters a Problem name and provides the judge input and output and clicks the "Create" button
10. The user clicks the "Languages" button
11. The user clicks the "New Language" button
12. The user enters the language of their choosing and clicks the "Create" button
13. The user clicks the "Contests" link
14. The user clicks the "New Contest" button
15. The user selects the added team and problem, and selects start and end times
16. The user click the "Create" button

## Use Case Diagram



Figure 1: Use Case Diagram

# Technologies Used

# Architectural Analysis

## The Three Q's of Architecture

## Risk Analysis and Reduction

# Additional Discussion with the Customer

# Test Cases Used

# Development of the System

## Development of the Admin Portal Feature

## Development of the Problem Submission Use Case

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# Test Results and Quality Analysis

# Conclusion