Software Requirements Specification

for

Summer Camp Class Ranking and Sort System

Version 1.0 approved

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Revision History

Name	Date	Reason For Changes	Version
CRRS	9/21/19	Initial Creation	Alpha 0.1

1.   Introduction

1.1   Purpose

The purpose of this document is to describe, in detail, the Class Rank & Sort System (CRSS) intended for use by Camp Voyager. This document will cover features, limitations, interfaces, constraints, and expected behavior. This document is meant to guide both users and developers through the intended use and modification of the software.

1.2   Document Conventions

This Document was created based on the IEEE template for System Requirement Specification Documents.

1.3   Intended Audience and Reading Suggestions

- Initial and maintenance software engineers, who will use this document to guide the building and upkeep of the system
- Camp Administration, who will be able to reference this document to understand the scope and limitations of the system, and to assist in how changes can be made, if necessary

1.4   Product Scope

Class Rank & Sort System is a tool for camp administrators and campers to seamlessly enroll campers in classes based on their preferences. A web interface for the system will be created, and access will only be granted to those who have been authorized. It will allow campers to view classes and rank their preferences, and it will allow instructors to view the schedule and add classes to the database. The system will take the information provided by the campers and instructors to create a Class Schedule. After the schedule is produced, the campers, instructors, and administrators will be able to view the schedule. Administrators will also be able to change the schedule manually as needed.

1.5   References

IEEE. IEEE Std 830-1998 IEEE Recommended Practice for Software Requirements Specifications. IEEE Computer Society, 1998.

2.   Overall Description

2.1   Product Perspective

The Summer Camp Class Ranking and Sort System was developed for Camp Voyager to aid its stakeholders in the processes of generating rankings, sorting and scheduling course enrollments, and producing attendance documentation necessary for the camp's preseason registration. The CRSS acts as a sub-component of Camp Voyager's existing web-based interface, seamlessly integrated to best allow system users, with appropriate privileges, to view and modify registrations and schedules as needed.
The CRSS is an open source project hosted for public viewing and branching through github.

2.2   Product Functions

Universal
- Login: Login to an existing user account bringing the user to their account page.
- Logout: Logout of currently logged in user account.

Camper
  Account Page
- Register: Begin or continue class registration.
- View Schedule: View user's class enrollments for camp period (given schedule exists).

  Registration Page
- Add Class: Add a class to a user's registration list.
- Remove Class: Remove a class from a user's registration list.
- Move Up: Increase the ranking of a selected course for a user.
- Move Down: Decrease the ranking of a selected course for a user.
- Save Courses: Save selected courses to a user's registration list.
- Register Courses: Confirm registration for a user's registration list.
- Help: Display help and descriptions of UI elements available to the camper.

  Schedule Page
- Print: Convert camper schedule to printable format and open OS print dialogue.
- Back: Return user to account page.

Instructor
  Account Page
- View Classes: View courses taught by logged user.
- Edit Classes: Navigate the user to their class list.
- View Camper Schedule: Navigate user to the camper list to view camper schedules.

  Instructor Course Schedule Page
- Print: Convert instructor schedule to printable format and open OS print dialogue.
- Return: Return user to account page.

  Instructor Edit Course Page
- Add Course: Add course to course list using values from Class_Name and Time_Block dialogue box.
- Remove Course: Remove a selected course from the course list.

Camper Schedule Page
- View Schedule: View schedule of selected camper.
- Back: Return user to account page.

Administrator

Account Page
- Generate Schedules: compile camper schedules based on their registration rankings.
- Edit Classes: Navigate user to global course list.
- Analyze Class Enrollment: Display full status for all classes and current enrollments for camp.
- Analyze Student Needs: Display any conflicts or anomalies in class enrollments that require manual attention from system administrator.

Global Course List Page
- Add Course: Add course to course list using values from Class_Name, Time_Block, and Instructor dialogue box.
- Remove Course: Remove a selected course from the course list.
- Print: Convert camper schedule to printable format and open OS print dialogue.
- Back: Return user to account page.

Analyze Class Enrollments Page
- Back: Return user to account page.

Analyze Student Needs Page
- Edit Schedule: Navigate user to camper schedule page.
- Back: Return user to account page.

Camper Schedule Page
- Add Class: Add a class to a selected camper's registration list.
- Remove Class: Remove a class from a selected camper's registration list.
- Accept: Accept and apply changes to camper's active enrollments.
- Back: Return user to account page.

2.3   User Classes and Characteristics

- Typical Users, such as campers, who utilize the CRSS for preseason registration with Camp Voyager.
- Teaching Staff/Camp Instructors, who utilize the CRSS for class creation and management for the camp season.
- Camp Administration Staff/System managers, who use the CRSS for camp enrollment and management.
- Initial and maintenance software engineers, who maintain and update the CRSS system for continued use and development.

2.4   Operating Environment

The CRSS software will be a C++11 browser app integrated within the Camp Voyager web-interface with intended support for the following operating systems:
- Windows 7
- Windows 8
- Windows 10
- Mac OS X

- Linux

2.5   Design and Implementation Constraints

The CRSS is developed in C++11 and was designed to interface with the Camp Voyager web-interface. OpenGL is utilized for GUI visualization. Through the Camp Voyager web-interface, the system utilizes remote and web APIs to manipulate and maintain camp information while allowing updates and access to multiple remote users.

2.6   User Documentation

A simple user tutorial is available within the program by selecting the "Help?" option. This includes a FAQ along with instructions for common use and navigation.

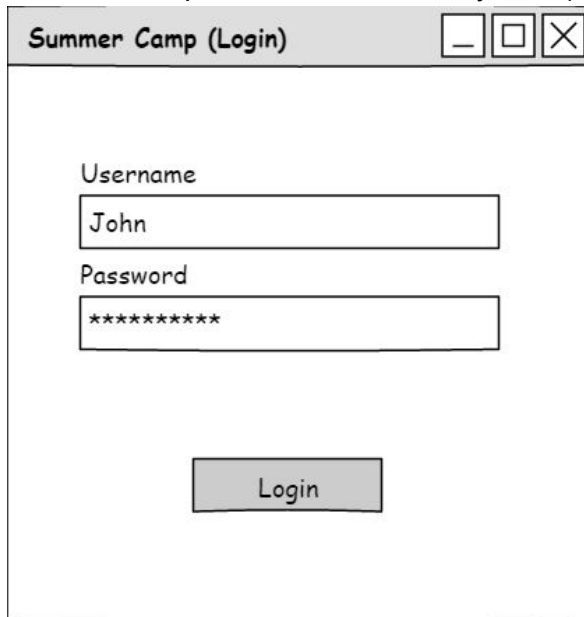Advance function and program structure specifications can be found on the project page: https://github.umn.edu/umn-csci-5801-f19/repo-Team24/tutorials

2.7   Assumptions and Dependencies

The CRSS software is developed with C++11 and requires C++11 to be installed on the user's computer. The software also requires an internet connection and script capable browser.
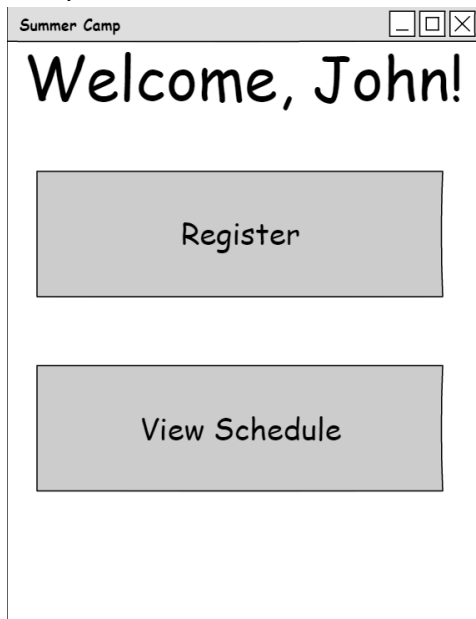
3.   External Interface Requirements

3.1   User Interfaces

1. Summer Camp Class Rank & Sort System (SC-CRSS) login screen:

2. Camper home screen:

3. Camper ranking screen:


The camper will have the option to select any class from a dropdown menu. Once a class is selected, the camper may add the class using the "Add Class" button. The class will then appear in the list to the left. The camper may select the class from this list and remove it with the "Remove Class" button. The camper may change the rank of a class by first selecting the class, then clicking the "Move Up" or "Move Down" button to increase or decrease the ranking. The camper may click the "Save" button at any point, saving the rankings without submitting the list to the camp. Once the camper clicks the "Register" button, the rankings will be locked in and sent to the camp. If the camper needs any help, the "Help" button will display a dialogue box with the above information.

To avoid schedule conflicts, the drop down menu will automatically update to gray out classes that conflict with classes in the selected class menu. When the user tries to select the grayed out class, the conflicting classes in the class menu will be highlighted red.

4. Camper class list:

Summer Camp (Instructor)   _ □ ✕

Swimming 1

Swimming 2

Swimming 3

Back   Print
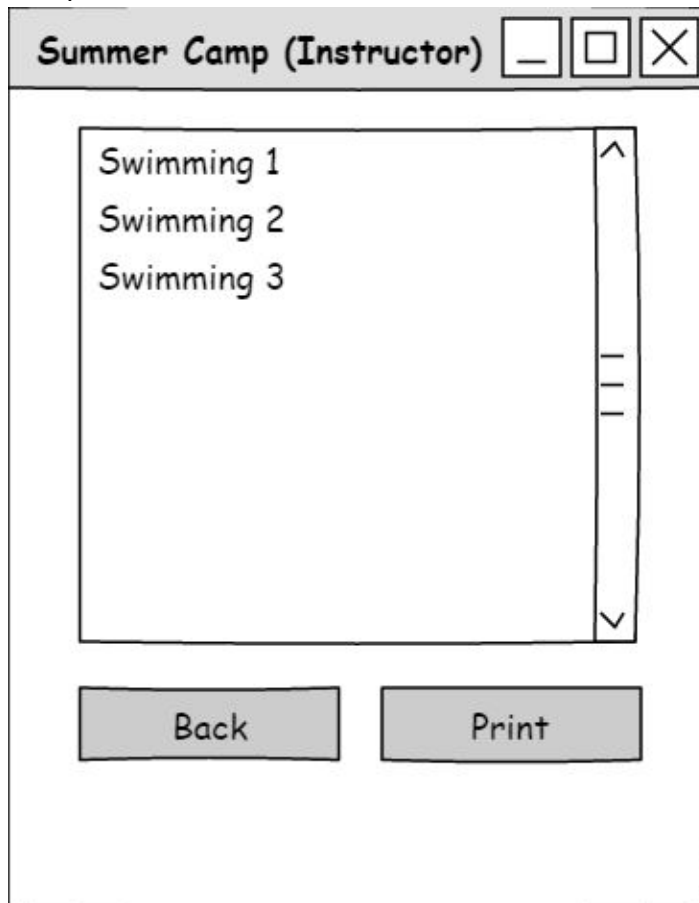
The camper class list view will give the camper the option to view all classes they are enrolled in and print their schedule using the "Print" button.

5. Instructor home screen:

Instructors will be able to select the current section with the drop down menu. All options will show data that pertains to the selected section. The "My Classes" button links to the instructor class list screen, where the instructor can view and print out their current schedule. The "Edit Class List" button will take the instructor to a screen where they can add or remove classes from their schedule. The "Camper schedule" button will take the instructor to a screen where they may view a camper's schedule.

6. Instructor class list:

Summer Camp (Instructor)   —   □   ✕

Swimming 1

Swimming 2

Swimming 3

Back	Print

The instructor may use this page to view all classes that they are currently assigned to teach under the previously selected camp section.

7.   Instructor edit class list:
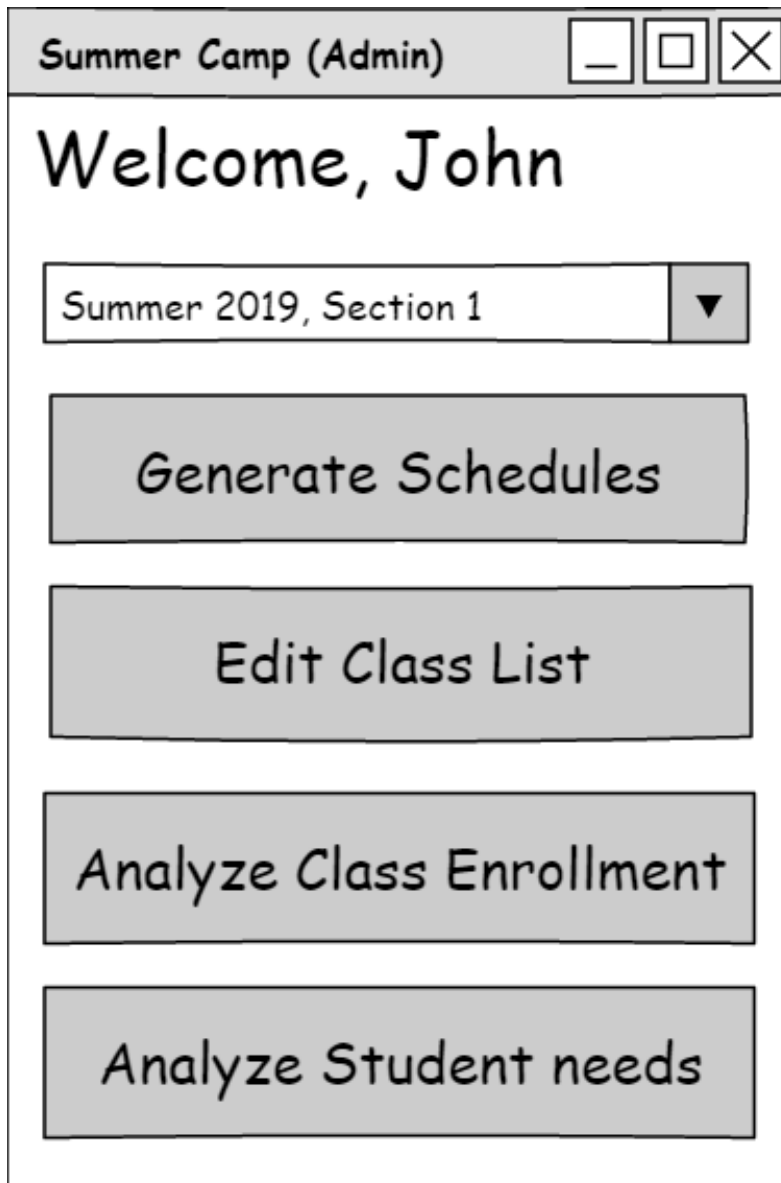
The Instructor may type a class name into the "Class Name" box, select a time block from the drop down menu, and click the "Add Class" button to create a new class. The instructor may select any class form the list of their classes and click the "Remove" button to remove the offering.

8. Instructor camper schedule view:
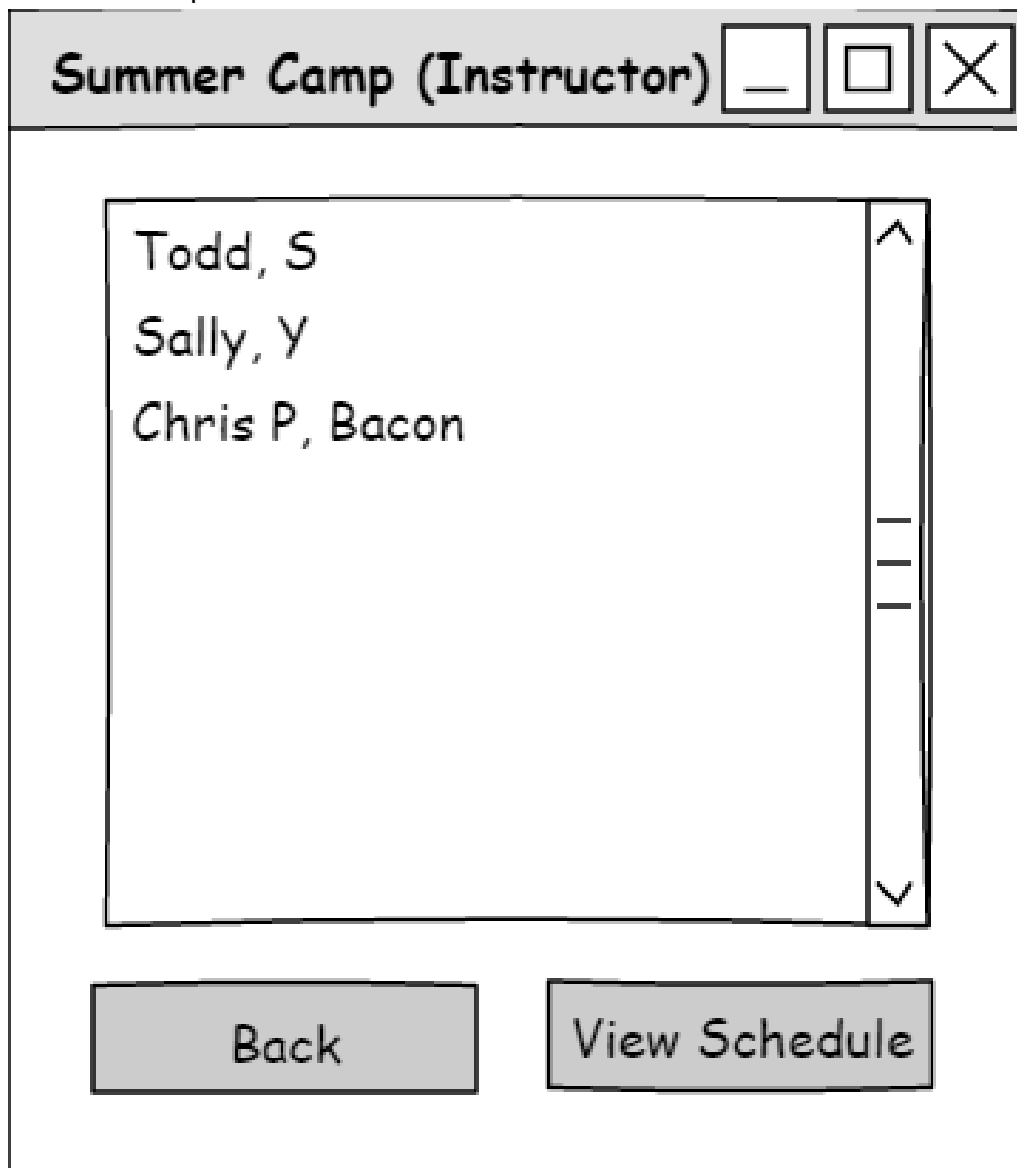
The Instructor may select any camper from the list of campers and click the "View Schedule" button to be brought to the campers schedule screen (3.1.4).

9. Admin home screen:

The admin will have the option to select the current class section with the drop down menu. The admin can generate class schedules with the "Generate Schedules" button, this will take all camper rankings and compile a schedule for each camper. The admin has the option to edit the available class offerings with the "Edit Class List" button. The admin has Analytic features through the "Analyze Class Enrollment" and "Analyze Student needs" buttons.

10. Admin edit class list:

The admin is able to create a class by filling in the "Class Name", "Time Block", and "Instructor" fields, then clicking the "Add class" button. The admin may remove a class by first selecting it in the class list, then clicking the "Remove Class" button. The class list may then be printed with the "Print" button.

11. Admin analyze class enrollment:

Enrollment	Class
High	Swimming 1
Low	Swimming 2
High	Swimming 3

Summer Camp Class Analytics

Back

The class analytics screen shows all classes and an enrollment status. The enrollment status is either classified as high or low, based on the number of campers taking a class and the maximum class size.

12. Admin analyze student needs:

Status	Camper
Summer Camp (Camper Analytics)	
Status	Camper
Good	Cell Content 1
Duplicate	Cell content 2
Empty Slot	Cell content 3

Back   Edit Schedule

Through the camper (student) needs screen, the admin is able to assess which students need to be placed in additional classes manually. The admin may manually edit the schedule of a camper by clicking the "Edit Schedule" button.

13. Admin manual schedule:

Once selecting a student and clicking "Edit Schedule" (3.1.12), the admin is able to manually edit the selected camper's schedule. To add a class, the admin will select any class from the dropdown menu, then click the "Add Class" button. The admin may select a conflicting class from the class list and click the "Remove" button to remove the class from the camper's schedule. Once the schedule is complete, clicking the "Accept" button will save the camper's schedule and return to the previous screen (3.1.12).

3.2   Hardware Interfaces

The minimum hardware requirements for SC-CRSS are a 500 megahertz CPU and 2 gigabytes of RAM.

3.3   Software Interfaces

SC-CRSS requires C++11 to be installed on the system.

3.4 Communications Interfaces

CRSS and the Camp Voyager web interface as a whole requires internet access and a *script* capable web browser to access and modify elements of a user's account.

4. System Features

This section demonstrates Summer Camp Rank System's prominent features and explains how they can be used and the results they return to the user. The system is a web application and can only be operated in an internet enabled environment. Besides the internet connectivity, the system requires a database service for data storage.

4.1 System Feature

4.1.1 Description and Priority

Feature	Description	Priority	Benefit	Penalty	Cost	Risk
Security	Camper, instructor, and administrator authentication	High	7	5	7	3
Internet Access	User's access to the Internet	High	9	4	1	6
Manual Registration	User group with privileges can directly register without going through the ranking process	Medium	6	7	5	5
Multi-user Rank Classes	Users rank the classes and submit their preference	High	10	8	7	6
Ranking process	The administrator compile all registration information and generate the schedule	Low	10	7	8	5
Database Service	Data storage system	High	7	6	7	5

4.1.2   Stimulus/Response Sequences

For the camper:
St-1: Click "Login" button: Account Login
- The system allows a registered user to log in to their account.
- The system requires a username and password from the user.
- The system will verify the username and password and the user will be considered "logged-in".

St-2: Enter Camper home screen
St-3: Click "View Schedule" Button: View Schedule
- The generated schedule can be found once the camp administrator has finished the ranking process. Otherwise it is empty.

St-4: Click "Register" Button: Register for class
- The camper can select a class from a dropdown menu and then use the "Add Class" button.
- The camper can remove a class with the "Remove Class" button.
- The camper can change the rank of a class using the "Move Up" or "Move Down" button.
- The camper can use the "Save" button at any point to save the current ranking list.

For the instructor:
St-1:Click "Login"button: Account Login
St-2: Enter Instructor home screen
St-3: Click "My Classes: View Schedule
- The instructor can view and print the current schedule.

St-4: Click "Edit Class List": Adjust instructor's schedule
- The instructor can use "Add Class" to add a class to the schedule.
- The instructor can use "Remove Class" to remove a class to the schedule.

St-5: Click"Camper Schedule": View a camper's schedule
- The instructor can enter the identification number of a student and view the schedule.

For the administrator:
St-1: Click "Login" button: Account Login
St-2: Enter Administrator home screen
St-3: Click "Generate Schedules": Run the ranking process for all students
- This button will take all registration information and generate a schedule for each camper. It can only be performed once for each camp term.

St-4: Click "Edit Class List": Edit schedule
- The administrator can create a class by filling in "Class Name", "Time Block" and "Instructor" fields, then clicking the "Add Class" button.
- The director can remove a class by clicking the "Remove Class" button.
- The director can print the class list by clicking the "Print" button.

St-5: Click " Analyze Class Enrollment": Analyze the registration data
- The screen shows the enrollment status identified as high or low to give an insight of the registration.

St-6: Click "Analyze Student needs": Analyze student's needs
- The administrator can assess students' needs to be placed in additional classes manually by clicking the "Edit Schedule" button.

4.1.3   Functional Requirements

REQ-1: The system needs internet connectivity and requires an online server.
- The ranking process should be done online with the user requesting HTML documents through a browser using TCP/IP and the server should use SQL to store the data.
- The server should request responses from the user for data saving and data requesting.

REQ-2: The system needs to save the user's data to a remote database service.
- The user is allowed to enter account details which will be saved in a remote database server.

REQ-3: The system needs to allow users to log in to a user account, the username and passwords are generated by the system and given to the users. Access to different activities based on user type.
- The system has three levels of users: camp administrator level, instructor level, camper level.

REQ-4: The system needs to allow users to rank courses following the given rules.
- At least 5 different classes are ranked.
- No two classes can have the same ranking.
- No class has more than one ranking.

REQ-5: The system should automatically generate the schedule once the ranking process has finished.
- Users get preference on class enrollment based on the timing of the submission.
- Allow camp director to lock ranking.
- Generate a unique identifier.
- Users can't be enrolled in the same class twice.
- User's can't be enrolled in more than one class in any given block of time.
- Administrator can set certain enrollment caps.
- The schedule contains the time block, the class enrolled in that block, the location of the class, any special instructions for that class and the instructor(s) names.
- The schedule is printable.

REQ-6: The system should allow users with privileges to manually edit courses.

- An instructor or camp administrator can manually enter the camper's information into a specific class.
- The camp administrator can remove a camper from one course and add a camper to another class at any time.

REQ-7: Each class has a unique identifier.
- Each class can be offered multiple times during a session by different instructors.

REQ-8: Only user groups with privileges can run the ranking process.
- Only the camp administrator can perform the ranking process.
- The ranking process should be only performed once after the registration closes.

5. Other Nonfunctional Requirements

5.1 Performance Requirements

The class placement algorithm must run in a reasonable time. The system running it should have no less than a 500 megahertz CPU and 2 gigabytes of available RAM.

5.2 Safety Requirements

User data will be stored on a remote database, and access will only be available to authorized users to secure the data. Class identifiers will not specify the time and location the class is to be taught. Maintenance engineers will fix any bugs in the system that are reported.

5.3 Security Requirements

The system shall have three different authorization levels: camp administrator, instructor and camper level. Each level has particular sets of rights. Users without authorization are not allowed to enter the system. The system shall confirm all registrations with the camper's web browser. The user's web browser shall never display a password. The password shall be hidden as asterisks.

5.4 Software Quality Attributes

The CRSS will be easy to use and straightforward. The users will not require any previous training or certifications to be able to perform the tasks required of them. The interface will be self explanatory, and, when necessary, provide the basic instructions on how to complete a task. The web interface will be usable on any current version of popular web browsers.

5.5 Business Rules

Administrators will have access to the system to perform all tasks only when logged into the system from specified locations. This limits the ability to access the information contained on the system and the ability to perform the tasks specific to administrators such as manually changing class registration.

Appendix A: Glossary

SC-CRSS: Summer Camp Class Ranking and Sorting System
CRSS: Class Ranking and Sorting System