Sports Center Management System – Software Design Document

1. Revision History

Version	Date	Author	Change Description
1.0	19/04/2018	Ali Şahin Balıkçı	SDD template is created.
1.1	22/04/2018	Ali Şahin Balıkçı İhsan Baran Sönmez Merve Gül Kantarcı Ömer Faruk Çifci Sena Berre Ceylan	Sequence diagrams added.
1.2	24/04/2018	Ali Şahin Balıkçı İhsan Baran Sönmez Merve Gül Kantarcı Ömer Faruk Çifci Sena Berre Ceylan	Interfaces added

2. Introduction

2.1 Purpose and Scope

This document's purpose is to explain details of software design. General views and behaviors of the system explicitly explained. Interactions between interfaces and other components of the system will be explained. Also, design constraints will be explained in this document.
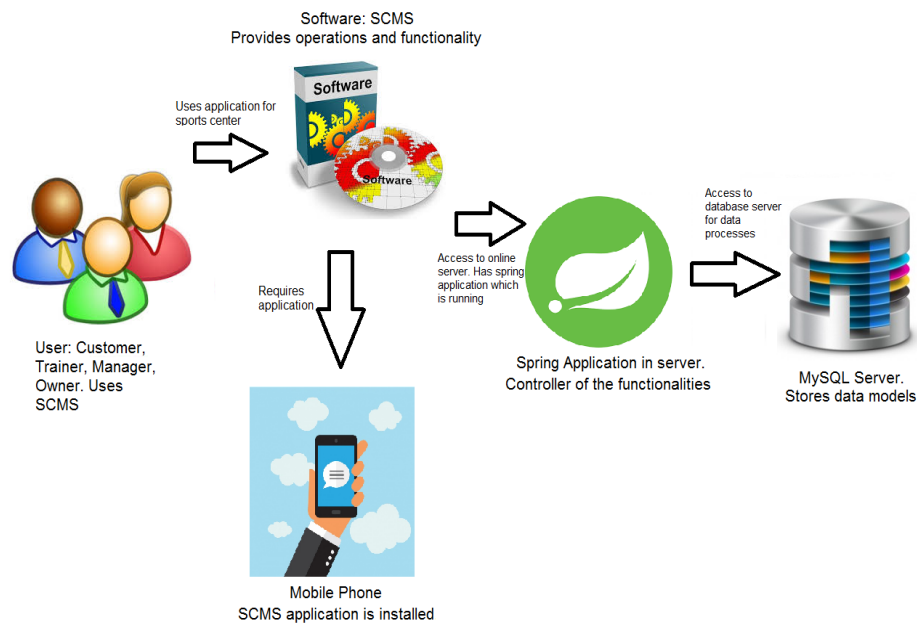
2.2 Document Overview

In design constraints part of this document, hardware and development constraints will be explained. General descriptions and the impacts of the all limitations will be described.

In design details part of this document, architecture of the software will be explicitly described. Entity-Relations, interfaces, views, controllers and models of the system, interactions between them and other components of the system will be specifically revealed.

2.3 System Overview

2.4 Definitions Acronyms, and Abbreviations

Term/Acronym	Definition
SRS	System Requirements Specifications
SDD	Software Design Description
SQL	Structured Query Language
JVM	Java Virtual Machine
SCMS	Sports Center Management System

3. Design Constraints and Decisions

- The system should be developed in accordance with Object Oriented Design. OO design is important for future development and it is suitable to team work.

- The system's official language is Java. In mobile application, we should use Java for Android. Java has great support in server side and it required for Android mobile application development.

- Model-View-Controller is the system's architectural pattern. In this way, we can separate critical system parts easily. It decreases cost of maintenance.

- The system's database management system is MySQL. It is preferred since it is open source and has enough documentation.

- In mobile side, the application supports 4.2 and newer versions of Android. With this property, application is able to run on approximately 96% of devices as Android Studio says.

- The server should be available continuously. In this manner, a cloud server is required. In this case, we rent a server from Digital Ocean.

- In front end development, we use bootstrap 4 for better and modern view.

- The development environments are: Android Studio IDE for mobile application, and STS tool for back-end development in REST service. In order to decrease inconsistency in a team work, we preferred REST service and GitHub plug-in in Android Studio.

- Security of user logins will be provided by AES-256 (Advanced Encryption System).

4. Design Details
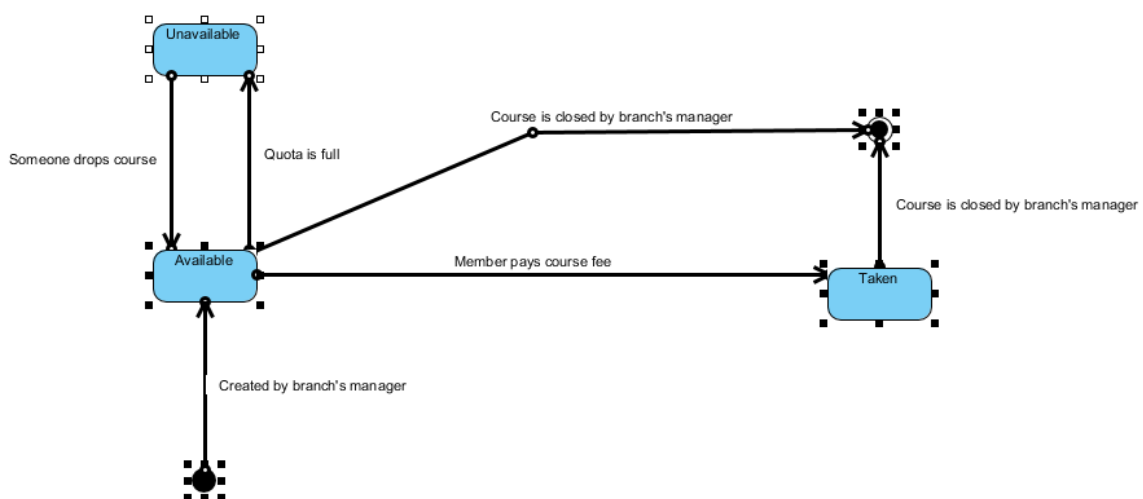
4.1 Software Components

Please check SSD – Appendix A for to see class diagram.

Note about class diagram: We have built a REST service, via Spring Boot, to reach our remote database, since it is a more secure and elegant way. All data transfers will be done through this REST service and related classes are associated with it in Class Diagram.

4.2 Software Behavior

Please check SSD – Appendix B for to see sequence diagrams.

State Diagram of "Course" Class:

4.3 Data Model (E-R Diagram)

Please check SSD – Appendix C for to see E-R diagram.

4.4 User Interface Design

For more detailed illustration of the interfaces, you can check Appendix – E. For all of the dialog screen messages please check Dialog Screen Design subject.

In the design, we encountered firstly "WelcomeScreen" it includes two buttons, one of the them is for sign up other is for sign in. If user clicks sign up button, system redirects us to "SignUpScreen". In the sign-up screen, a form is showed to user. User must enter information to all necessary fields for sign up. If user leaves missing fields in the form, system do not move on other pages and displays an error message. If username is already taken, again system do not move on and shows a message for issue. Otherwise user enters all necessary information and system successfully register the user, system shows a successful operation message to user and redirects user to "FragmentMyProfile".

In "WelcomeScreen", another button is for sign in. If user clicks this button, system redirects us to SignInScreen. In the screen, four check-boxes and two fields are shows up. User must select type for himself/herself and enter necessary information to fields. Otherwise system shows a message for missing fields and do not move on other pages.

If user successfully login or successfully registered and user type is member, system redirects the user to "FragmentMyProfile". In this menu three buttons show up. One of them is for member's schedule, another of them is for joined courses and last is for upgrading membership or becoming full(paid) member of the sports center. And side menu for navigation is called "CustomerNavigationMenu".

If user clicks "My Schedule" button in the "FragmentMyProfile", system redirects user to "MyScheduleScreen". This interface shows activity plan of user. This activity plan is assigned and can be changed by trainer.

If user clicks "My Courses" button, system redirects user to "MyCoursesScreen". This screen shows list of joined courses of a user.

If user clicks "Become Member" button, system redirects user to "MembershipOptionsScreen". User chooses one of them and selects branch that he/she wants to register. There is a default selection of branch and it can be changed by user with help of the spinner list at top of the options screen. Then user clicks "Go to Payment" button. Then system redirects user to "PaymentScreen". In the view, four fields, one checkbox and one button come up. User must fill all the fields and s/he can use 3D payment, then user clicks pay button. And user must confirm the process in the dialog box summarizing the payment process. If an error like missing fields occurs during filling the form or in payment system shows a message for issue.

In "CustomerNavigationMenu", "My profile", "Courses", "Special Offers" and "Show Branch Fullness" buttons come up. If user clicks "My Profile", system redirect user to "FragmentMyProfile" which is explained in detail above. If user clicks "Courses" button, system redirects user to "FragmentAllCourses". In this view, all opened courses are listed. User may select one of them. If user select one of the courses, system redirects user to "FragmentCourse". In this view details of course is displayed and an "Enroll" button comes up. If user clicks "Enroll" button, system redirects user to "PaymentScreen". Again, user must fill necessary fields and if no error occurred during payment user successfully enrolls to course and system shows a success message. If user clicks "Special Offers" button, system redirects user to "FragmentSpecialOffer". In this view special offers are listed, user may select one of them and clicks "Apply" button. If user pass required conditions of special offer, offer is successfully applied and system gives a feedback, otherwise system shows a message for issue.

In "FragmentMyProfile", on right top corner of the screen, an "overflow menu", which might be referred as "settings menu" in most of the applications, is available. This little menu shows three buttons: "Update Profile", "Cancel Membership" and "Logout". If user clicks "Update Profile" button, system redirects user to "UpdateProfileScreen". In this view user's information is displayed to user and user gets chance to change any information then in confirmation part, user must enter her/his username and password correctly then s/he can make changes through "Update" button. If no error occurred during update process, system shows a success message.

If user clicks "Cancel Membership" button, system redirects user to "CancelMemberShip" screen. In this view user must enter his/her username and password correctly for cancellation of his/her full membership of the sports center, then clicks "Cancel My Membership" button. If no error occurred during cancellation process, system shows a successfully-cancelled message, otherwise system shows an error message.

If user clicks "Logout" button, system shows "Are You Sure?" screen, then if user clicks "Yes", user successfully exits from system.

In "SignInScreen" if user selects a user type except "Member", system redirects user to "FragmentManagementPanel". Again, system controls username and password likewise "Member" type, login processes are the same except redirection of the system. In the "FragmentManagementPanel" seven buttons are avaliable but some of them are deactivated with respect to user type.

If user type is "Manager", "User Management", "Trainer Management", "Courses Management" and "Special Offers Management" buttons are available. If manager clicks "User Management" button, system redirects manager to "UserManagementScreen". In this view member list is showed to manager. "Add", "Ban", "Update" buttons come up. "Ban" and "Update" buttons are created for all members in their part in list view and there is only one "Add" button in screen for creating new member. If manager clicks "Add" button, system opens a form for member information same as sign up operation. All success and error dialogs are the same as sign up operation which is described above. Then manager clicks "Add" button. System shows "Are You Sure?" screen. If manager confirms the process, user is created, and system shows successfully-added message. If manager clicks "Update" button, system opens a form that includes user information, manager can change information then clicks "Update" button. System shows "Are You Sure?" screen. If manager applies the process, user profile is updated. If manager clicks "Ban" button, system shows "Are You Sure?" screen. If manager confirms the process, member is banned from sports center.

If manager clicks "Trainer Management" button in the "FragmentManagementPanel", system redirects manager to "TrainerManagementScreen", In this view member list is displayed to manager. "Add", "Delete", "Update" buttons come up. "Delete" and "Update" buttons created for all trainers in their own field in list view, but there is only one "Add" button in screen. If manager clicks "Add" button, system opens a form for trainer information same as sign up operation. All success and error dialogs are the same as sign up operation as described above. When manager clicks "Add" button, and system shows "Are You Sure?" screen. If manager confirms the process, trainer is created, system shows successfully-added message. If manager clicks "Update" button, system opens a form that includes user information, manager can change information then clicks "Update" button. System shows "Are You Sure?" screen. If manager confirms the process, trainer profile is updated, system shows a successfully-updated message. If manager clicks "Delete" button, system shows "Are You Sure?" screen. If manager confirms the process, trainer is deleted, and system shows successfully deleted message.

If manager clicks "Courses Management" button in the "FragmentManagementPanel", system redirects manager to "CourseManagementScreen". In this view courses are listed and "Add" and "Delete" buttons come up. "Delete" button is created for every course in their own field in list view, and there is only one "Add" button in the screen. If manager clicks "Delete" button, system shows "Are You Sure?" screen. If manager confirms the process, course is deleted, and system shows successfully-deleted message. Otherwise system shows a message for issue. If manager clicks "Add" button, system opens a form for course information, manager must fill all necessary fields then clicks "Add" button, system shows "Are You Sure?" screen. If manager confirms the process, new course is created, and system shows successfully-added message. Otherwise system shows a message for issue.

If manager clicks "Special Offers Management" button in the "FragmentManagementPanel", system redirects manager to "OfferManagementScreen". In this view a form comes up for creating new special offer. All fields are necessary, and manager must fill them, otherwise system shows an error message for missing fields. If manager fills all fields then clicks "Create New Special Offer" button, system shows "Are You Sure?" screen. If manager confirms the process, new course special offer is created, and system shows successfully-added message. Otherwise system shows a message for issue.

When user type is "Trainer" and login is successful, "Trainee Management" button will be active for trainer. If trainer clicks "Trainee Management" button, system redirects trainer to "TraineeManagementScreen". In this view, trainee list showed to trainer with two buttons. One of them is "Update Schedule", other one is "About trainee". If trainer clicks "Update Schedule" button, system opens a form for activities, trainer can change activity plans. Then clicks "Update" button, system shows "Are You Sure?" screen. If trainer confirms the process, schedule is updated and system shows a successfully-updated message. Otherwise system shows a message for issue. If trainer clicks "About Trainee" button, system opens trainee's plan and displays it for trainer.

When user type is "Owner" and login is successful, "Manager Management" and "Branch Management" buttons will be active. If owner clicks "Manager Management" button, system redirects owner to "ManagerManagementScreen". In this view list of managers is showed to owner with "Add", "Delete" and "Update" buttons. "Delete" and "Update" buttons created for all managers in their own field in list view, but there is only one "Add" button for creating new manager in the screen. If owner clicks "Add" button, system opens a form for manager information same as sign up operation. All success and error dialogs are the same as sign up operation as described above. When owner clicks "Add" button, system shows "Are You Sure?" screen. If owner confirms the process, manager is added, system shows a successfully-added message. Otherwise system shows a message for issue. If owner clicks "Update" button, system opens a form that includes manager information, owner can change information then clicks "Update" button, system shows "Are You Sure?" screen. If owner confirms the process, manager profile is updated, and system shows a successfully-updated message. Otherwise system shows a message for issue. If owner clicks "Delete" button, system shows "Are You Sure?" screen. If owner confirms the process, manager is deleted, and system shows a successfully-deleted message. Otherwise system shows a message for issue.

If owner clicks "Branch Management" button, system redirects owner to "BranchManagementScreen". In this view list of branches is showed to owner with "Show All Stats", "Show Stats" and "Add" buttons. If owner clicks "Show All Stats" button, system shows stats of all branches to owner. If owner clicks "Show Stats", system opens a specific branch's stats. Statistics of a branch is its membership counts with respect to membership types, etc. If owner clicks "Add" button, system opens a form for branch information, all fields are required, and owner must fill them. If all fields are filled and owner clicks "Add" button, system shows "Are You Sure?" screen. If owner confirms the process, new branch is added to system. Otherwise system shows a message for issue.

4.5 Dialog Screen Design

Please Check SSD – Appendix F for to see dialog screens.

5. Requirements Traceability

Please check SSD – Appendix D for to see traceability matrix.

6. Appendices

- SDD – Appendix A – Class Diagram

- SDD – Appendix B – Sequence Diagrams

- SDD – Appendix C – E-R Diagram

- SDD – Appendix D – Traceability Matrix

- SSD – Appendix E – Interfaces

- SSD – Appendix F – Dialog Screens