Group 2 Design Specification

SWE 6623: Software Engineering

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March 27, 2016

1 Introduction

1.1 Purpose

This document has been prepared to explain the architecture of the system and show how the requirements are fulfilled by the system's design.

Developers should use this document to determine how to implement components in a way that is consistent with the design and also to determine which responsibilities each component has.

Other stakeholders may use this document to appraise the quality of the design and/or verify that the intended design will meet all requirements.

1.2 Scope

The architectural structure of the software system should be evident from the information in this document. Likewise, the major responsibilities of each program component are clearly delineated. Fine implementation details such as specific methods, files, and user interface cosmetics are left for the team to define during the development phase.

1.3 Definitions and Abbreviations

Abbreviation	Meaning
HTML	Hyper Text Markup Language
CSS	Cascading Style Sheet
SQL	Structured Query Language

1.4 Reference Material

The specific requirements mentioned in this document were originally defined in the Requirements Specification for the project.

2 General Description

2.1 Component Categories

The core functionality of the software system is divided into four main component categories: views, logic modules, data accessors, and database tables.

2.1.1 Views

The views describe the structure of the user interface presentation. They are implemented as PHP files, primarily composed of HTML and supported by separate CSS files. Application data is inserted into a view from a specialized array that contains exactly what the view needs. Each view

corresponds to a single screen presented to the user. For instance the Login Screen is defined a Login View that lays out its structure.

2.1.2 Logic Modules

The logic modules are designed to prepare the data arrays needed by the views, and also handle the user input originating from the views. Each logic module is implemented as a separate PHP class that corresponds to a specific view. For instance the Login View has a Login Module that is specifically designed to process the input from the Login Screen.

2.1.3 Data Accessors

The data accessors perform necessary communication with the system database to retrieve and save application data. They are implemented as PHP classes with methods needed by the logic modules. Unlike the modules they serve, however, the data accessors do not correspond to user interface screens but rather application entities. For instance, there is not a Login Data Accessor, but instead a User Data Accessor.

The data accessors are implemented with the help of Medoo, a database access framework that prevents SQL injection and allows more readable syntax than manual queries.

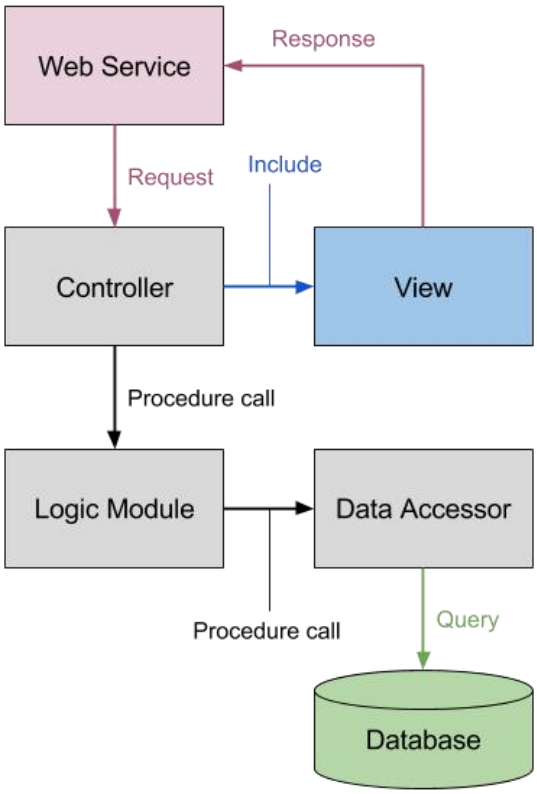
2.1.4 Database Tables

The system uses a MySQL database. Individual tables are described in Section 3.4. Like the data accessors, each table corresponds to an application entity.

2.2 Component Interaction

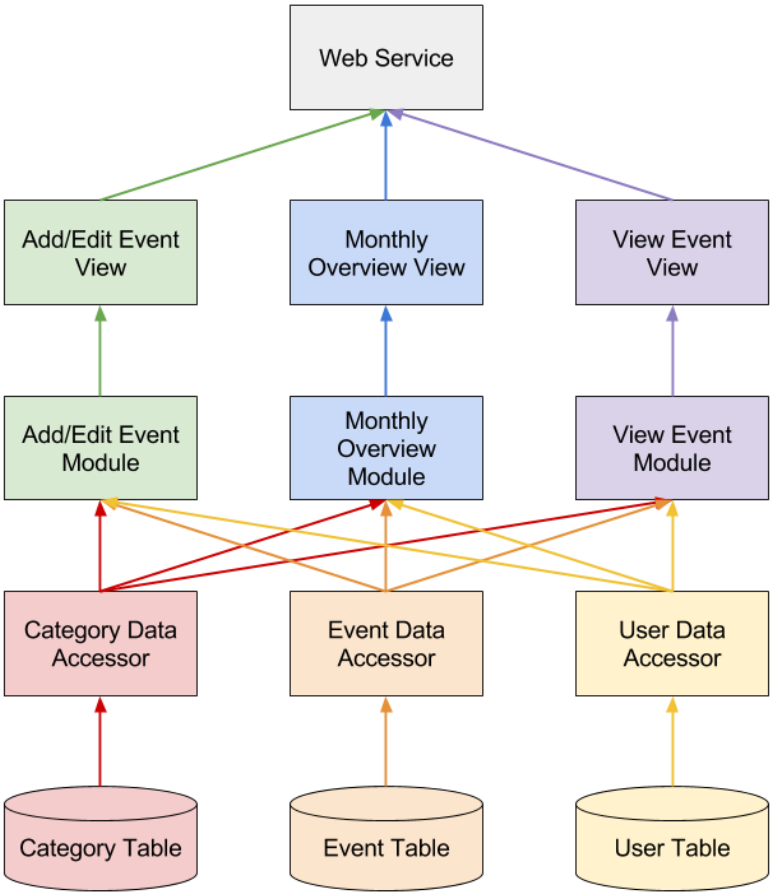
2.2.1 Control Flow

All requests to the application are made through a single PHP file called the Controller. Based on the request inputs the Controller calls the correct logic module method and then returns the corresponding view to the web service. When the logic module is called, it further processes the user input and calls the appropriate data accessor methods. The diagram below shows the high-level control flow of requests.



2.2.2 Data Flow

As described in the component categories, the front end is organized around application functions, and the data storage is organized around application entities. The resolution of this transition is handled by the logic modules so that data flows up as shown in the diagram below. The color coding shows how the data is associated and organized in the two segments of the application.



Note that the diagram does not show all of the views in the application but only a representative set to illustrate the organization.

3 Decomposition Description

3.1 Views

3.1.1 Login

The Login View allows the user to perform the following actions, fulfilling the associated requirements.

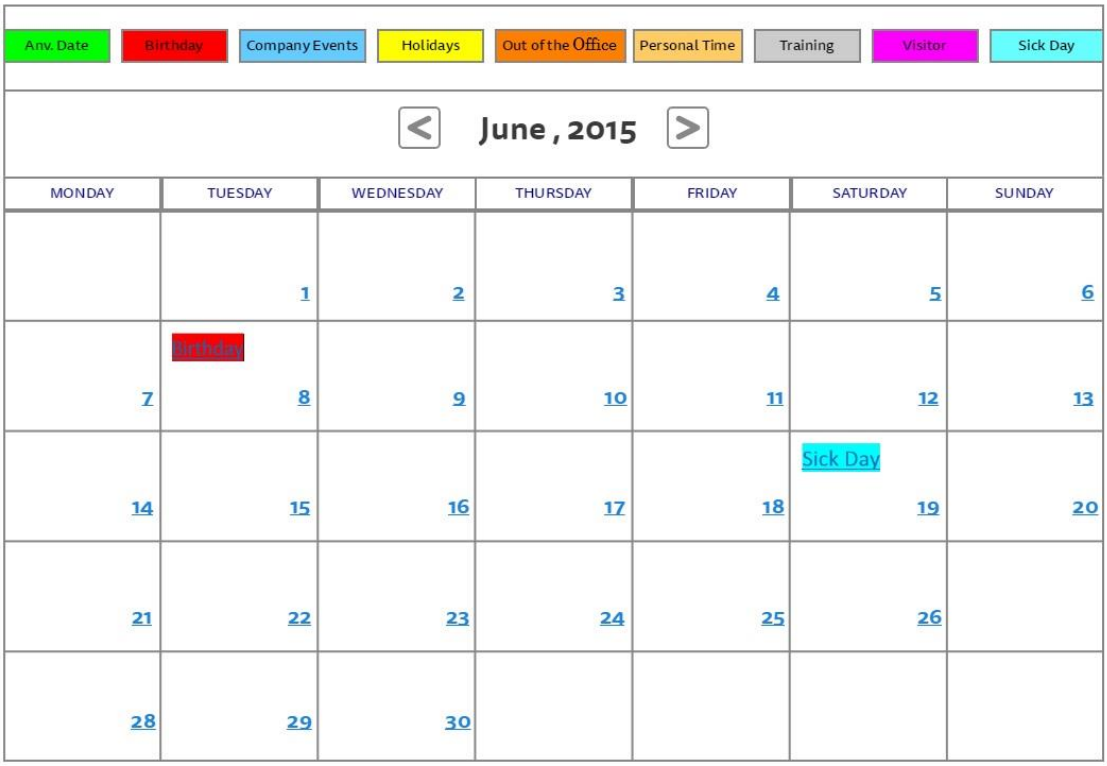
Login View Requirements	
LUI01	Enter username and password
LUI02	Submit credentials for login

3.1.2 Monthly Overview

The Monthly Overview View allows the user to perform the following actions, fulfilling the associated requirements.

Monthly Overview View Requirements	
OUI01	View events in monthly calendar style
OUI02	Navigate between months
OUI03	View list of events for each day
OUI04	Observe event categories from colored highlighting
OUI05	Select date to add new event
OUI06	Select event to view details
OUI07	Select event to modify details

The figure below shows a representation of the Monthly Overview screen. This is not intended to describe all the cosmetic details of the UI but rather provide a visualization of the screen's function.

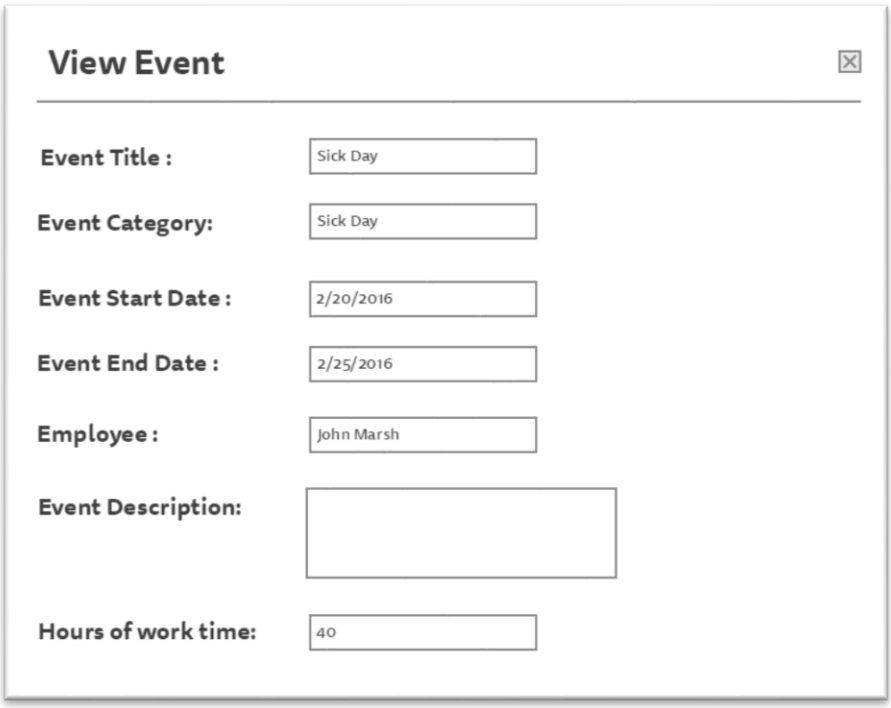


3.1.3 View Event

The View Event View allows the user to perform the following actions, fulfilling the associated requirements.

View Event View Requirements	
VUI01	View event title
VUI02	View event description
VUI03	View associated employee
VUI04	View start and end dates
VUI05	View event category
VUI06	View hours of work time

The figure below shows a representation of the View Event screen. This is not intended to describe all the cosmetic details of the UI but rather provide a visualization of the screen's function.

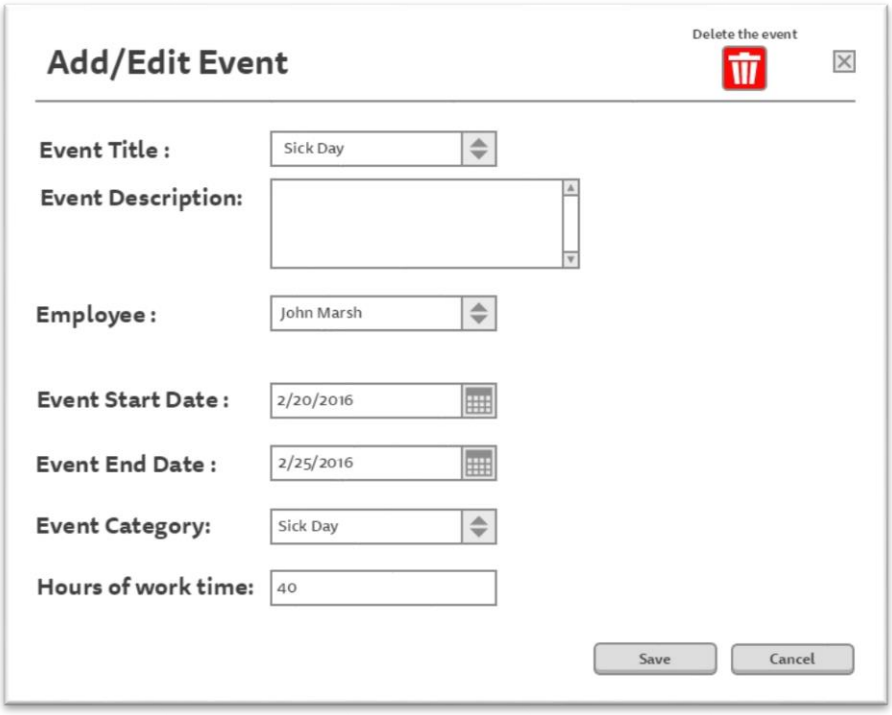


3.1.4 Add/Edit Event

The Add/Edit Event View allows the user to perform the following actions, fulfilling the associated requirements.

Add/Edit Event View Requirements	
EUI01	Enter event title
EUI02	Enter event description
EUI03	Select associated employee
EUI04	Select start and end dates
EUI05	Select event category
EUI06	Enter hours of work time
EUI07	Request deletion of event

The figure below shows a representation of the Add/Edit Event screen. This is not intended to describe all the cosmetic details of the UI but rather provide a visualization of the screen's function.

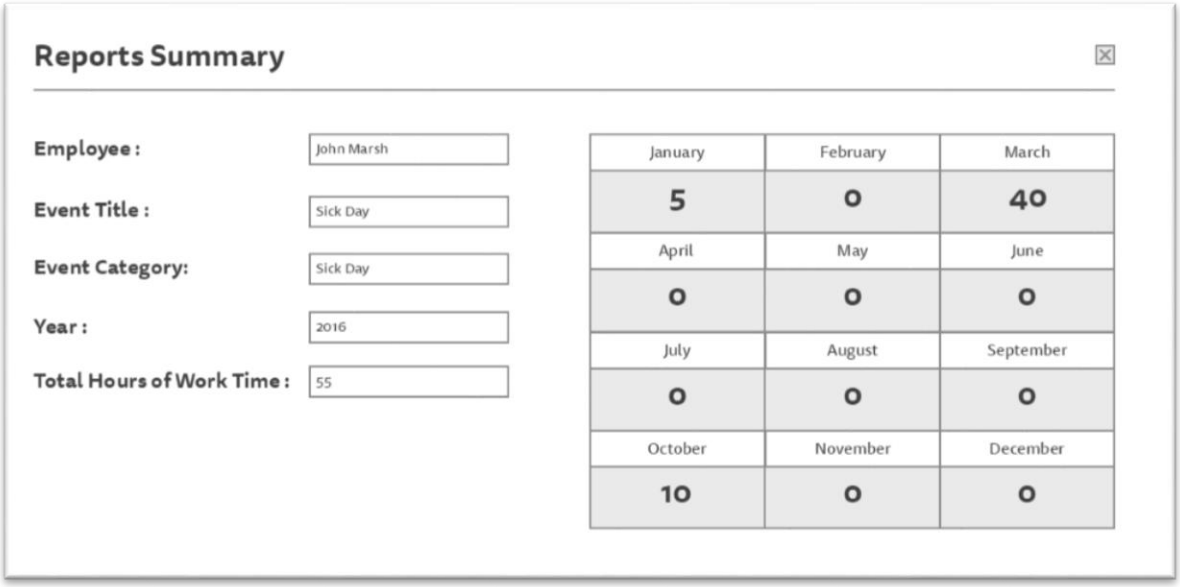


3.1.5 Reports

The Reports View allows the user to perform the following actions, fulfilling the associated requirements.

Reports View Requirements	
RUI01	Select associated employee
RUI02	Select event category
RUI03	Select calendar year
RUI04	View title and date of every event of selected category associated with selected employee
RUI05	View summation of time for selected category associated with selected employee for each month
RUI06	View summation of time for selected category associated with selected employee for entire year

The figures below show a representation of the Reports screen. These are not intended to describe all the cosmetic details of the UI but rather provide a visualization of the screen's function.



3.2 Logic Modules

3.2.1 Login

The Login Logic Module provides the following functionality, fulfilling the associated requirements.

Login Logic Module Requirements	
LLG01	Distinguish between HR and regular users from credentials
LLG02	Authenticate user credentials
LLG03	Setup user session

3.2.2 Monthly Overview

The Monthly Overview Logic Module provides the following functionality, fulfilling the associated requirements.

Monthly Overview Logic Module Requirements	
OLG01	Allow editing when HR users select events, but only display details to regular users
OLG02	Only allow HR users to add new events

3.2.3 View Event

The View Event Logic Module does not fulfill any explicit requirements, but exists to provide consistency to the application design.

3.2.4 Add/Edit Event

The Add/Edit Event Logic Module provides the following functionality, fulfilling the associated requirements.

Add/Edit Event Logic Module Requirements	
ELG01	Only allow hours of work time to be entered for certain categories

3.2.5 Reports

The Reports Logic Module provides the following functionality, fulfilling the associated requirements.

Reports Logic Module Requirements	
RLG02	Calculate summation of time for selected category associated with selected employee for each month
RLG03	Calculate summation of time for selected category associated with selected employee for entire year

3.3 Data Accessors

3.3.1 User

The User Data Accessor provides the following functionality, fulfilling the associated requirements.

User Data Accessor Requirements	
ELG02	Retrieve list of employees for selection
VLG03	Retrieve employee associated with event

3.3.2 Event

The Event Data Accessor provides the following functionality, fulfilling the associated requirements.

Event Data Accessor Requirements	
OLG03	Retrieve title of every event for each day of a month
VLG01	Retrieve event title
VLG02	Retrieve event description
VLG04	Retrieve start and end dates of event
VLG06	Retrieve hours of work time for event
ELG04	Save event title
ELG05	Save event description
ELG06	Save employee associated with event
ELG07	Save start and end dates of event
ELG08	Save event category
ELG09	Save hours of work time for event
ELG10	Delete event
RLG01	Retrieve title and date of every event of selected category associated with selected employee

3.3.3 Event Category

The Event Data Accessor provides the following functionality, fulfilling the associated requirements.

Event Data Accessor Requirements	
OLG04	Retrieve category color code of each event retrieved
VLG05	Retrieve event category
ELG03	Retrieve list of event categories for selection

3.4 Database Tables

3.4.1 User

The User Table will store the following information, fulfilling the associated requirements.

User Database Table Requirements	
LST01	User credentials
LST02	Whether users are HR or not

In order to accommodate these requirements the User Table will contain the following columns.

- Username (unique)
- Password (encrypted)
- User Description (full name)
- Human Resources (flag)

3.4.2 Event

The Event Table will store the following information, fulfilling the associated requirements.

Event Database Table Requirements	
OST03	Title of each event
OST04	Category of each event
OST05	Start and end dates of each event
VST01	Description of each event
VST02	Associated employee of each event
VST03	Hours of work time for each event

In order to accommodate these requirements the Event Table will contain the following columns.

- Event ID (unique)
- Event Title
- Description
- Start Date
- End Date
- Category (foreign key to Event Category Table)
- Employee (foreign key to User Table)
- Work Time (hours)

3.4.3 Event Category

The Event Category Database Table will store the following information, fulfilling the associated requirements.

Event Category Database Table Requirements	
OST01	Title of each event category
OST02	Whether categories include hours of work time
OST06	Color code of each event category

In order to accommodate these requirements the Event Category Table will contain the following columns.

- Category ID (unique)
- Category Title
- Work Time (flag)
- Color Code