Employee Management System

Project Report #2

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INFO C451 SP21

System Implementation

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IX. References

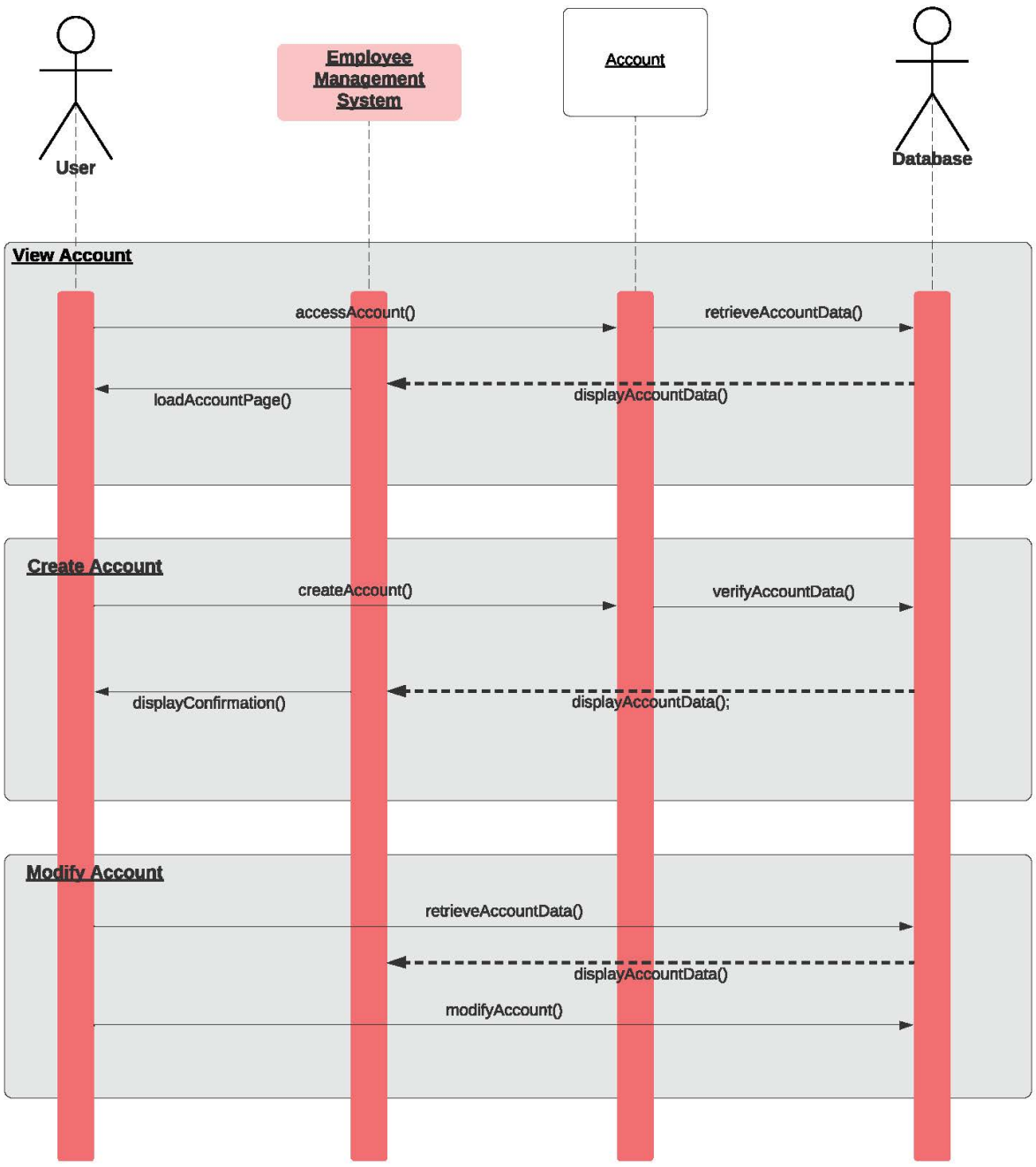
INTERACTIVE DIAGRAMS

DESIGN PRINCIPLES

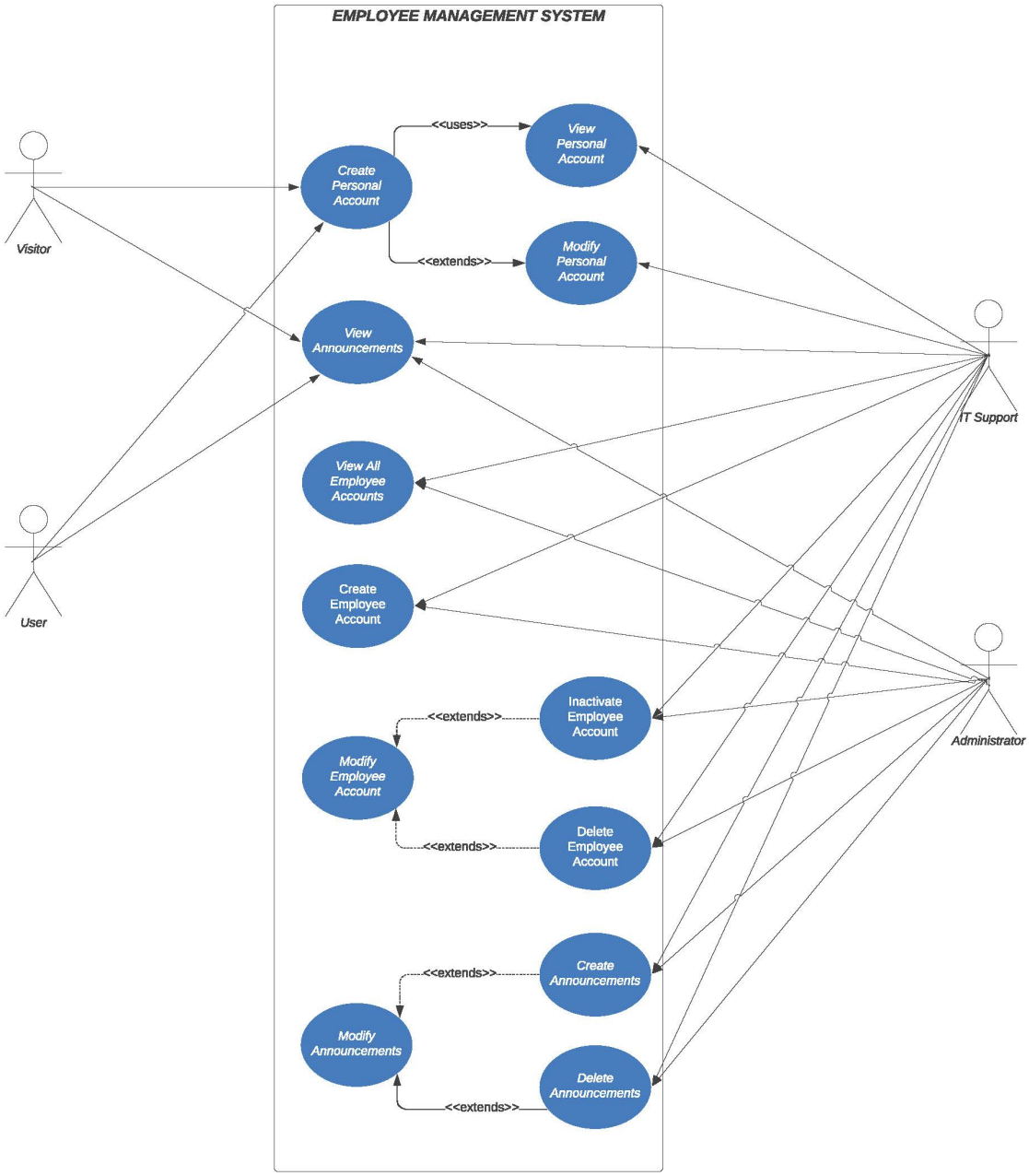
Per request of Best Hairsylists Inc, the system design and layout has been kept as simple and straight-forward as possible to help reduce costs of technical support. The use cases requested in the project plan will be able to be implemented without the use of advanced mathematical functions or algorithms; as a result, AB Consulting believes that they can implement all required features with a considerably simple back-end design. The final product produced at project completion will be a minimum viable product (MVP), which will contain enough features to be utilized by early users with the expectation that feedback will be provided, and future enhancements and additions will be made through an SLDC process (Wikipedia).

The proposed software solution has three core areas: announcements, employee profiles, and booths. All three areas need to be modifiable by front-end users who do not have direct database access. The data from each of these areas live within their own tables and communicate with one another when needed. Employees are assigned specific booths to work in, but they can modify their assigned booth whenever needed. On the contrary, announcements are not tied to a specific user or a specific booth and therefore communicate only with the interface where users can view, edit, or create announcements when needed. Announcements have been included in this report but will be implemented in phase two of the implementation.

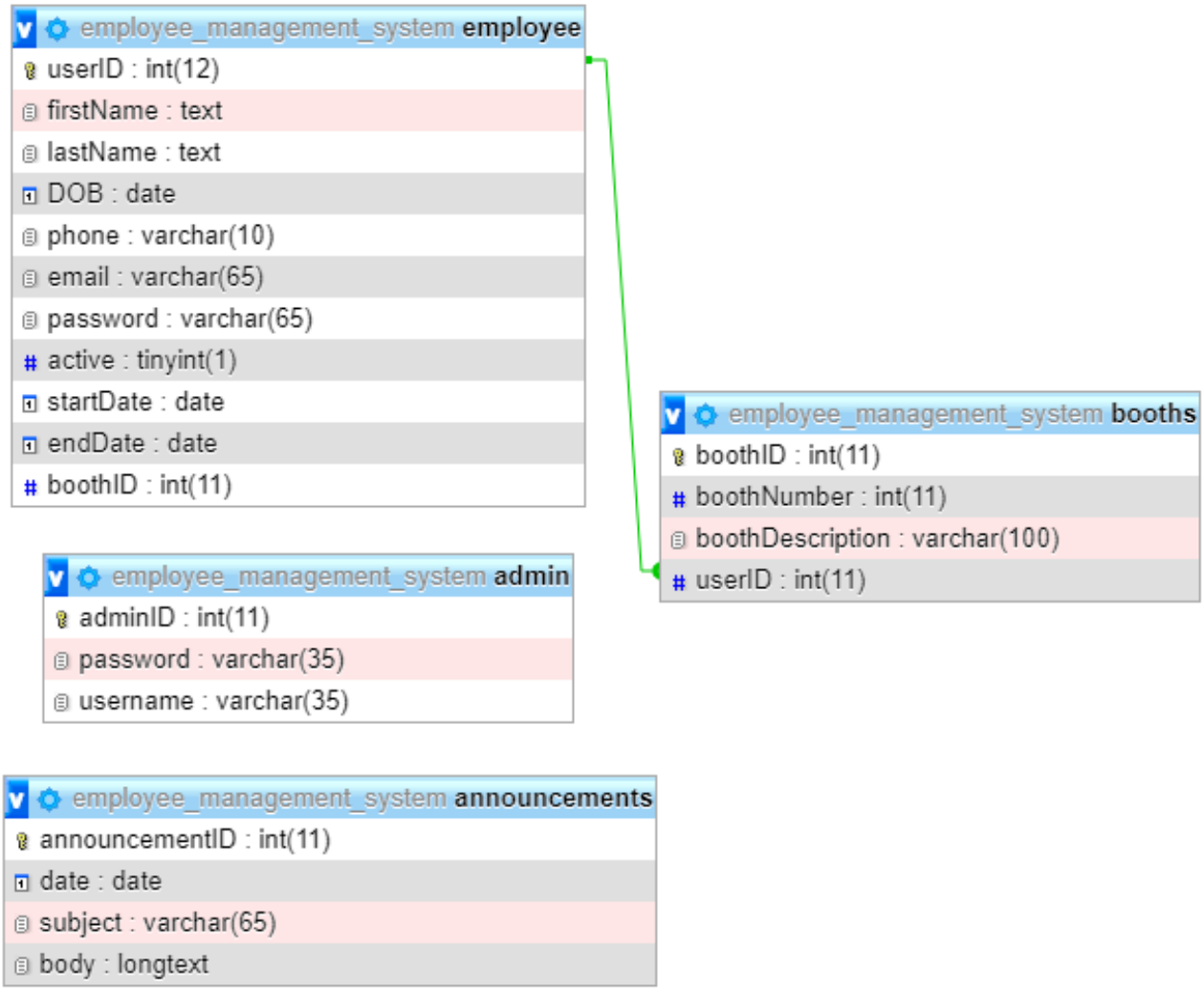
SEQUENCE DIAGRAMS



ADDITIONAL UML DIAGRAMS

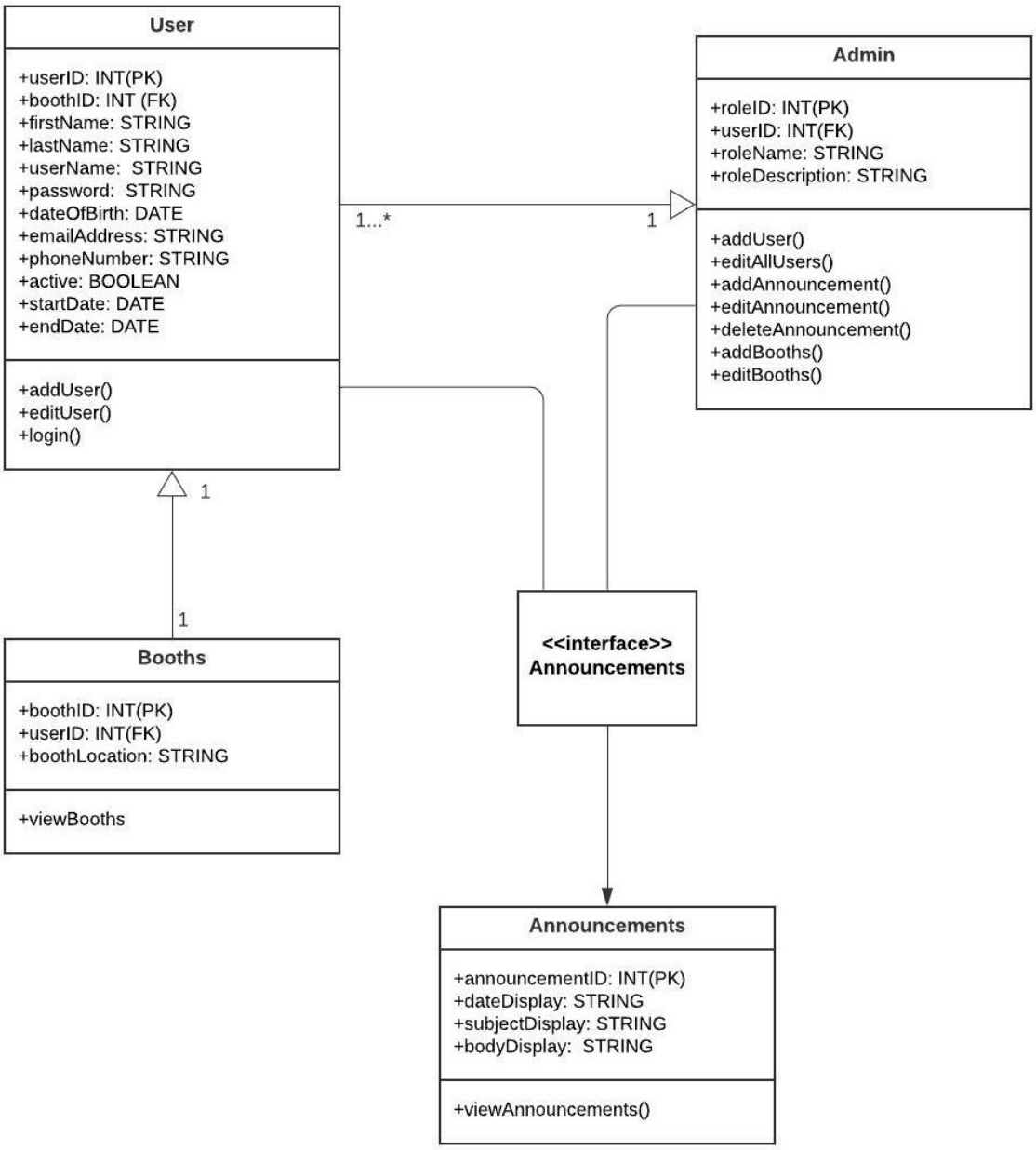


DATABASE TABLE DESIGN



CLASS DIAGRAM AND INTERFACE SPECIFICATION

CLASS DIAGRAM



employee_management_system

admin

Column	Type	Null	Default	Links to	Comments	Media (MIME) type
adminID *(Primary)*	int(11)	No				
password	varchar(35)	No	123			
username	varchar(35)	No				

Indexes

Keyname	Type	Unique	Packed	Column	Cardinality	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	adminID	2	A	No	

announcements

Column	Type	Null	Default	Links to	Comments	Media (MIME) type
announcementID *(Primary)*	int(11)	No				
date	date	No	current_timestamp()			
subject	varchar(65)	No				
body	longtext	No				

Indexes

Keyname	Type	Unique	Packed	Column	Cardinality	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	announcementID	2	A	No	

booths

Column	Type	Null	Default	Links to	Comments	Media (MIME) type
boothID *(Primary)*	int(11)	No				
boothNumber	int(11)	No				
boothDescription	varchar(100)	Yes	*NULL*			
userID	int(11)	Yes	*NULL*	employee -> userID		

Indexes

Keyname	Type	Unique	Packed	Column	Cardinality	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	boothID	6	A	No	
userID_FK_employeeID	BTREE	No	No	userID	2	A	Yes	

employee

Column	Type	Null	Default	Links to	Comments	Media (MIME) type
userID *(Primary)*	int(12)	No				
firstName	text	No				
lastName	text	No				
DOB	date	No				
phone	varchar(10)	No				
email	varchar(65)	No				
password	varchar(65)	No				
active	tinyint(1)	No	1			
startDate	date	No	current_timestamp()			
endDate	date	Yes	*NULL*			
boothID	int(11)	Yes	*NULL*			

Indexes

Keyname	Type	Unique	Packed	Column	Cardinality	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	userID	1	A	No	
userID	BTREE	Yes	No	userID	1	A	No	

TRACEBILITY MATRIX

TRACEABILITY MATRIX								
Requirements	**PW**	**UC1**	**UC2**	**UC3**	**UC4**	**UC5**	**UC6**	**UC7**
F-REQ-1	**1**	X	X	X	X	X	X	
F-REQ-2	**1**				X	X		X
F-REQ-3	**1**		X	X				
F-REQ-4	**1**		X	X	X	X		
F-REQ-5	**1**		X		X		X	
F-REQ-6	**2**				X	X		
F-REQ-7	**2**				X	X		
F-REQ-8	**2**						X	X

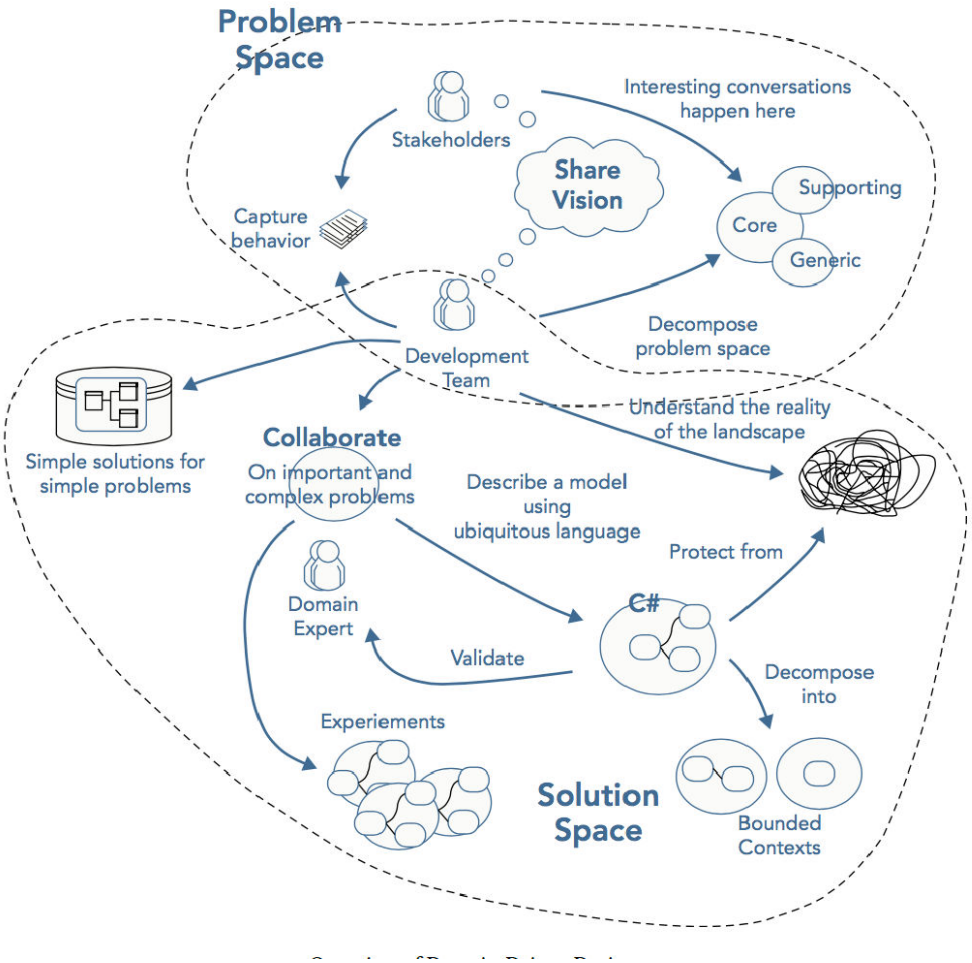
USE CASES			
Use Case	**Description**	**ID**	**PRIORITY WEIGHT**
Create Personal Account	New users and visitors are able to create their user account and enter their personal information into the system.	1	Medium
View Personal Account	Users with accounts can access their personal account information that they set up when they created their account. They can view in real time their employee profile.	2	Low
Modify Personal Account	Users with accounts can modify their personal account information. While viewing their account information, they also will have the ability to edit their information.	3	High
View All Employee Accounts	All employee account information is visible in an area of the application is accessible by administrators and IT support to support employee account maintenance.	4	Low
Modify Employee Accounts	Employee account information is able to be edited by those with access to view all employee accounts.	5	High
View Announcements	Announcements display on the home page, where all users and visitors are able to view them.	6	Low
Modify/Create Announcements	Announcements can be created, edited, and deleted from the announcements area by administrators.	7	Medium

FUNCTIONAL REQUIREMENTS		
ID	**Priority Weight**	**Description**
F-REQ-1	1	Self-Sufficient Account Creation and Management
F-REQ-2	1	Admin/User Authorization Levels
F-REQ-3	1	Employee Profile Management
F-REQ-4	1	Booth Assignment Management
F-REQ-5	1	System should be accessible by any desktop PC on any OS
F-REQ-6	2	Differentiation Between Current and Historical Profiles
F-REQ-7	2	View/Filter Employee Profiles by Admins
F-REQ-8	2	Announcement Creation by Admins

SYSTEM ARCHITECTURE AND SYSTEM DESIGN

ARCHITECTURAL STYLE

The architectural style that AB Consulting has implemented for Best Hairstylists Inc. is a Domain-driven model. The structure and naming conventions used in the database and in the application align with the business need, as pictured in the Class Diagram and the Data Operations and Signature sections of this report. For example, the Announcements area of the UI works with the Announcement Class and Announcements table in the database, through the use of methods called viewAnnouncement, editAnnouncement, deleteAnnouncement, etc. This is also demonstrated in the image portrayed below. This required more isolation, but because of the simple nature of the design and development request did not result in an extended amount of additional billable development hours. (Wikipedia)

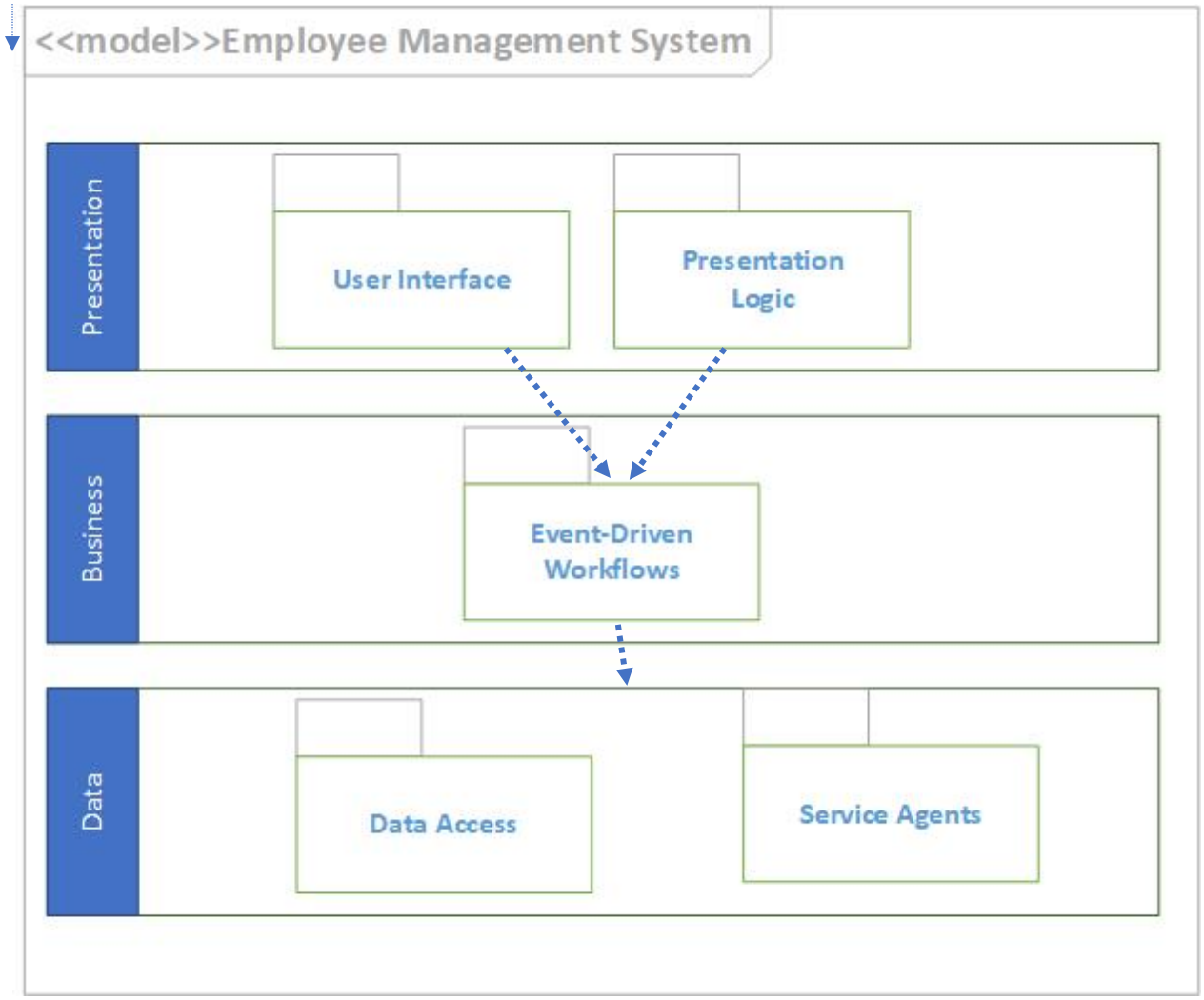


(Source: https://devopedia.org/images/article/233/4722.1581163731.jpg)

This project implementation will fit the baseline needs for Hairstylists, Inc, with the expectation that those needs may change in the future or that enhancements and new features will need to be implemented. In order to make those modifications easier down the line, the Domain-drivel model was utilized to assist in front-end user and back-end development communication. Due the nature of their small business as well as their line of work, IT support is often contracted, and they have communicated a consistent difficulty with contracted groups not understanding their line of business. By utilizing a Domain-driven model, the domain

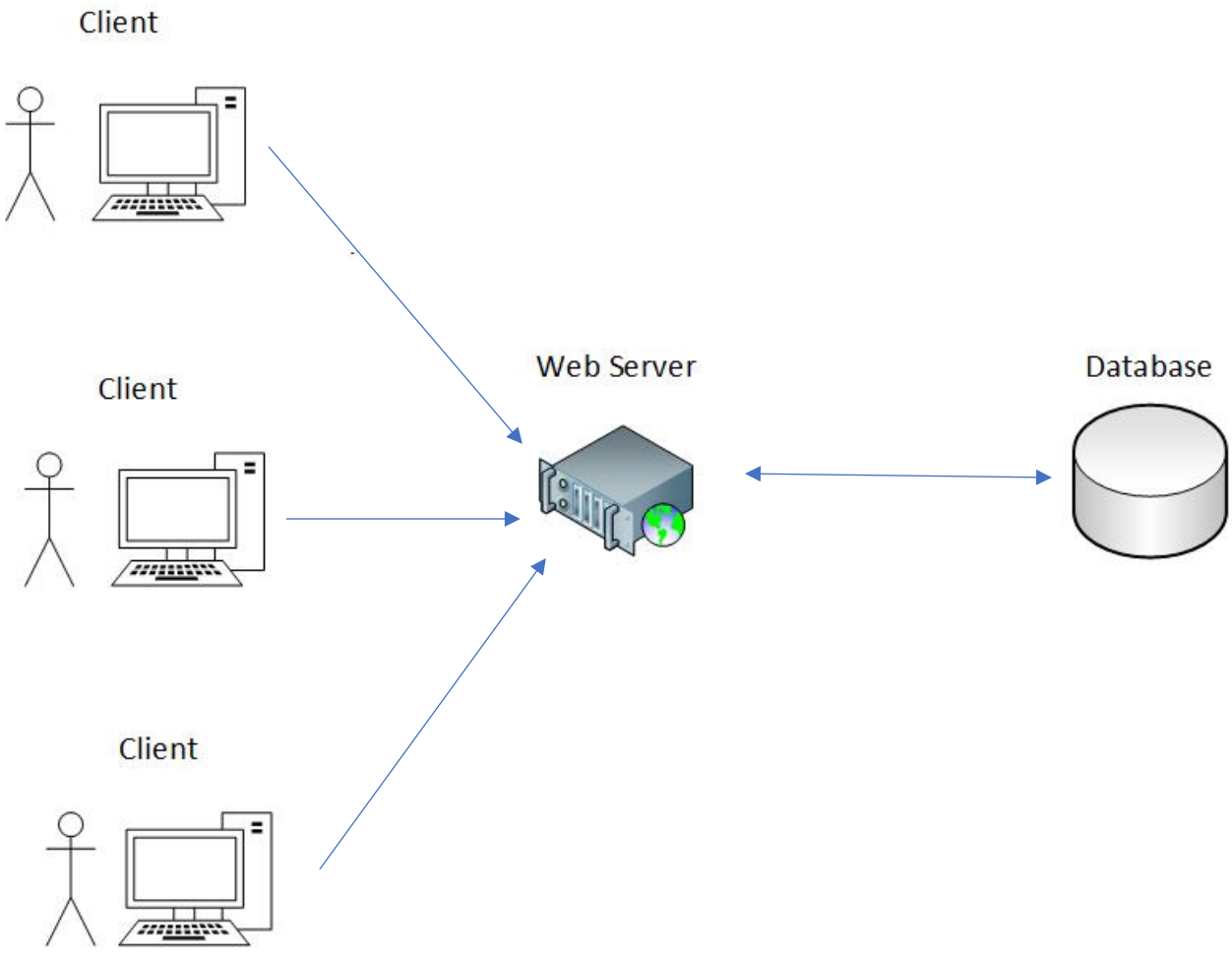
subject matter experts can easily associate the technical build with the use in the system to help guide development in the right direction when needed.

UML PACKAGE DIAGRAM



SUBSYSTEMS TO HARDWARE

Solution is accessed via a standard web browser or client such as Google Chrome, Internet Explorer, Firefox, Internet Edge, etc. Multiple clients can access the webserver at the same time. When triggered, the webserver will select, update, or insert data as necessary when initiated by the user via the client. Through triggers and code within the web application, the web server and database will communicate with each other in both directions; the web server will send the database data when an insert or update action is called and the database will return data to the web server when a select action is called.



PERSISTENT DATA STORAGE

A MySQL relational database is the database management system for this project. Each table of the Employee Management System is designed specifically to meet the use cases outlined in the project proposal but has been implemented in a way that future features and changes can be applied with moderate effort and minimal design modifications of existing functionality. Using various relationships, including one-to-one, one-to-many, and many-to-many as outlined in the Class Diagram section of this report, each database table relates to another as needed to meet client specifications. These tables can be queried to display data to users, with the possibility of more advanced reporting and filtering functionality through additional projects.

GLOBAL CONTROL FLOW

EXUCTION OF ORDERNESS

This Employee Management System is event-driven, meaning every user can generate or initiate actions in any order. The system is designed to wait for initiation of a task/even, then accomodates these events via loops and referencing of other files as needed. For example, to log into the application a user selects the “Log In” button, which calls the webserver to open a particular page that allows the user to enter a username and a password. Upon pressing

"Submit", the application is triggered to verify that the login credentials are correct and either display an error message or the home page depending on the result. However, it is important to note that not all actions can be executed in any order; some design elements require previous actions to have occurred in order for the event to be called. In-Order sequencing was built into the application to allow for security roles that require certain permissions to be able to access certain areas and/or for information to be viewable. (Richards)

TIME DEPENDENCY

This Employee Management System was designed to function in real-time, so that after changes have been made they can be immediately viewable by users with only a minor delay. When an event is triggered, the changes that the event created are immediately placed into the database so that other users can see those changes post-event. Given the small size of the business and that the system is designed primarily to maintain Employee information, lag should be minimal between users but could still exist. To accommodate for lag between page refreshes and events being initiated by other users, pages are refreshed automatically every five minutes for all users. One a page has loaded, the five minute timer begins before the page is automatically refreshed for them.

HARDWARE REQUIREMENTS

Client Requirements

- Web Browser – Latest Version of Google Chrome, Internet Explorer, Internet Edge or Firefox.
- ISP Speed: Minimum of 50 MBPS for performance, Unmetered
- PC CPU: Core i5+
- PC RAM: 4GB+
- PC Storage: 256GB SSD+
- PC Screen: Color, 1920 X 1080 Resolution (1080p)

Servers

Two servers are needed to implement and operationally maintain this application – one server for the database, and another for the application. For security purposes, these will be separated so that if a server became compromised only one will have been exposed.

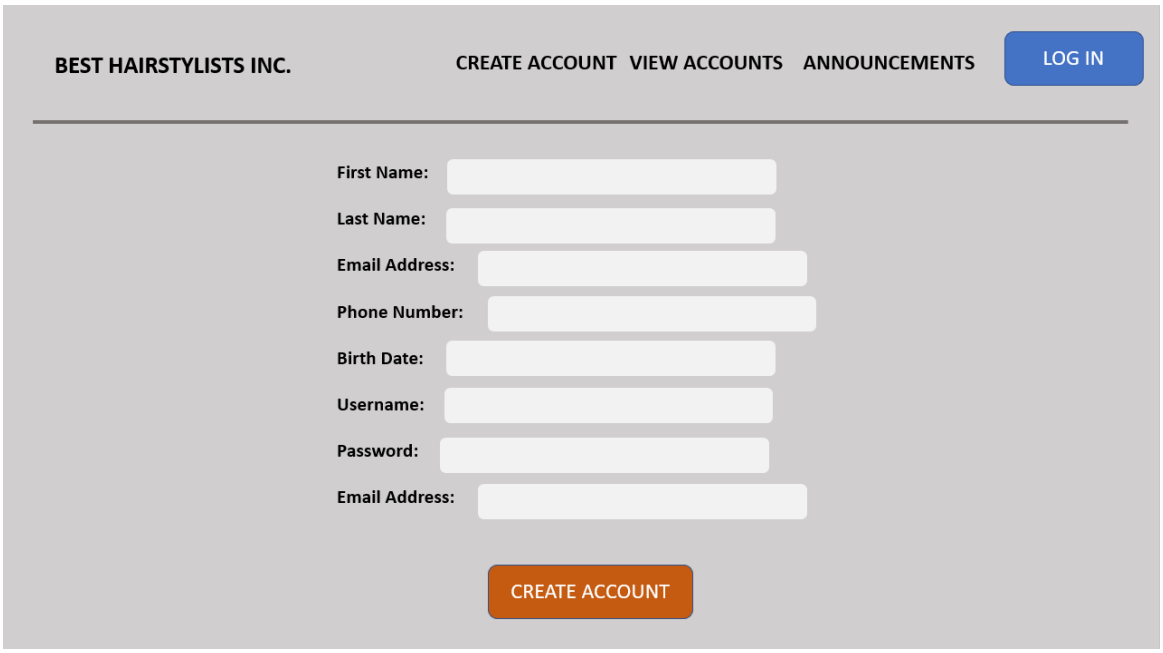
Minimum requirements for each server

- Processor -Dual Core Intel Pentium or Higher
- RAM - 4GB+
- HDD - 40 GB+

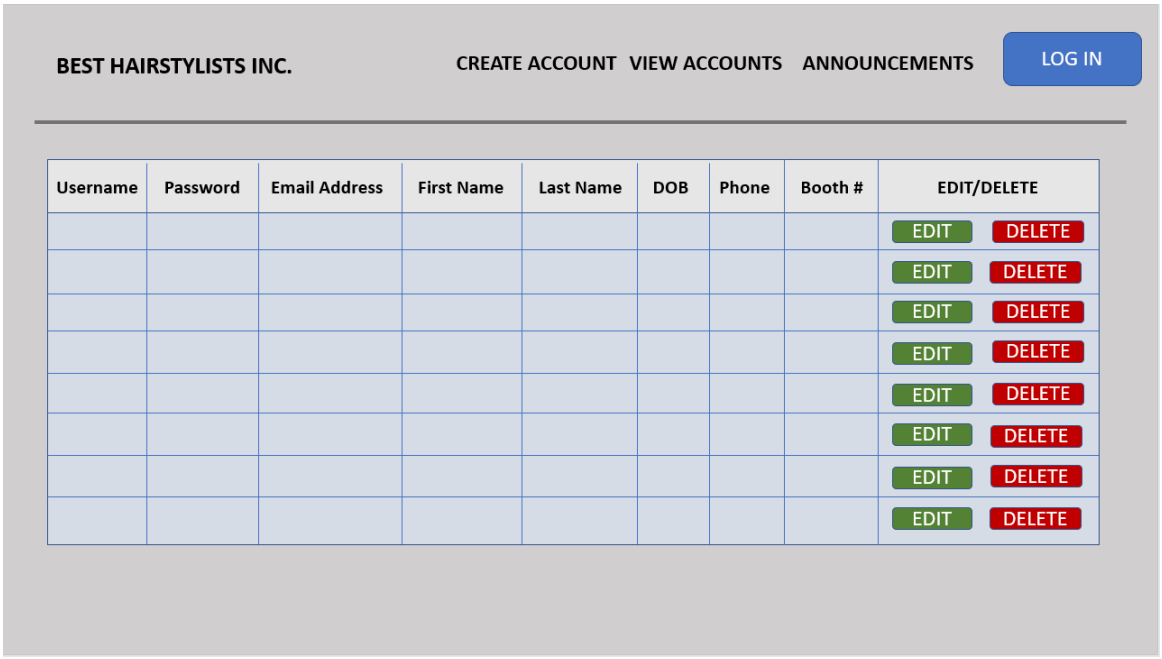
USER INTERFACE DESIGN AND IMPLEMENTATION

SYSTEM MOCKUPS

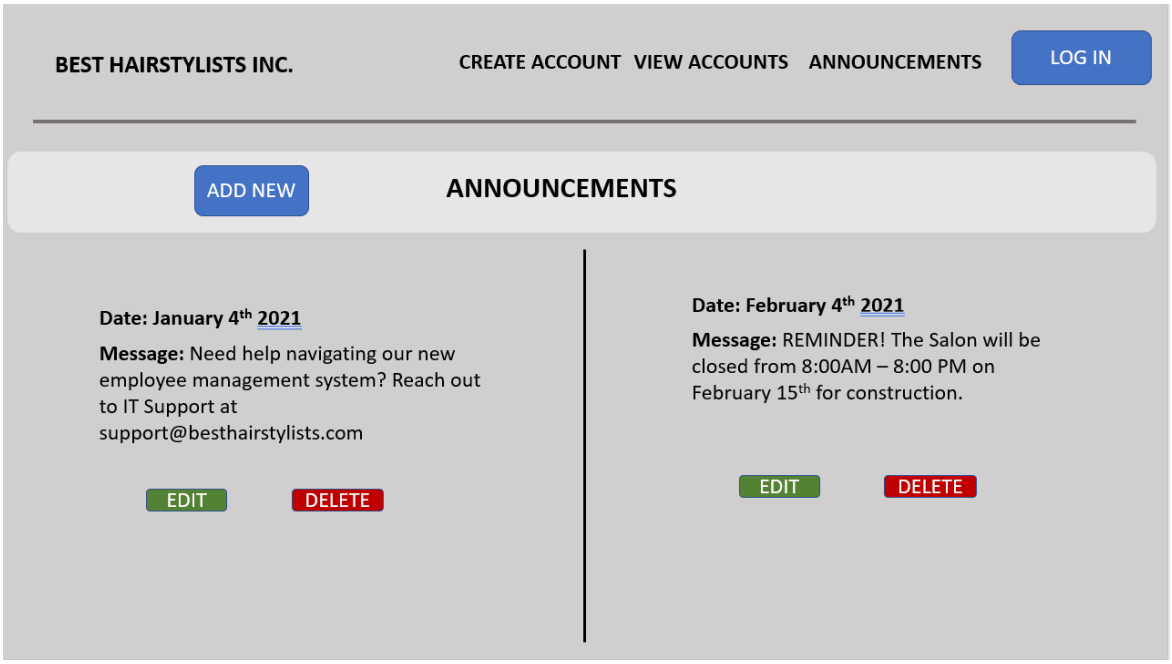
MOCKUP A:



MOCKUP B:



MOCKUP C:

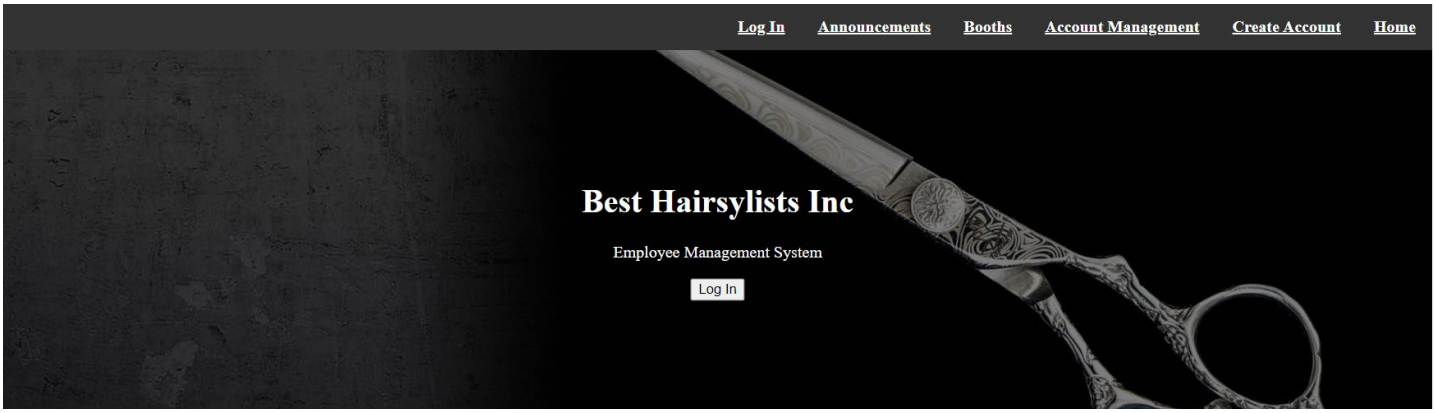


USER INTERFACE CHANGES

No major User Interface changes have been implemented between the original mock-ups and the current system design and implementation. Per request of Best Hairstylists Inc, the system design has been kept simple to help alleviate IT support overhead costs operationally and to reduce training time when onboarding new employees. Given the nature of the business, no advanced reporting is needed at this time, but simple reporting capabilities might be added in the later part of the implementation if development resource time allows.

Logos and images were added throughout the webpage as shown below to create a professional and sleek look, but no drastic location changes have needed to be implemented.

Certain features have been added such as error messages, warnings, etc that were not in the original mock-up plan or specifically requested in the RFP (request for proposal), but do not change the overall layout of the interface.



TESTING

TEST DESIGN AND PLAN

Testing will occur both programmatically and manually to ensure that all technical, non-technical, and user-interface requirements are met and are functioning properly. Throughout the programming of the solution, several tests occur during the coding process through a "check as you go" approach that has allowed developers to check that a function works before moving into the next. Prior to client demonstration, the tests below will be re-ran to ensure the following functionality has been programmed successfully.

Note that all other requirements will be implemented and tested during phase two of the project.

- Web Application connects to the MySQL database successfully
- Existing users can log in appropriately to the application will not be allowed to log-in
- Non-existing users (ie incorrect username/password combinations)
- New accounts can be created via a webform and appear in the database post submission
- Existing accounts can be queried and are viewable on the appropriate page
- Existing accounts can be modified on the webpage and those modifications appear in the database post submission

User Interface ease of use and design functionality will be tested by a third party, who has had no interaction with the programming or designing process. This usability testing will take place using the observation method, where the project team will ask the test participant questions while navigating the pages. This will make sure that what has been designed will work operationally and will make reasonable sense to any future user of the application who was not involved in the original implementation. The participant(s) will be asked questions such as:

- What do you see on this page?
- If you already had an account, how do you think you would log in?
- If you did not already have an account, where do you think you would go?
- When you click on this option, what would you expect to see?

- Now that the page has loaded, does the page contain everything you would have expected? Is anything missing?

After Usability Testing is complete, any issues identified while be modified within the HTML and CSS design of the web page. Programming changes are not a expected result of this part of the testing process, but participants may provide insight into ideas for additional features or future modifications that can be made in phase two prior to final submission to the client.

PROJECT MANAGEMENT AND PLAN OF WORK

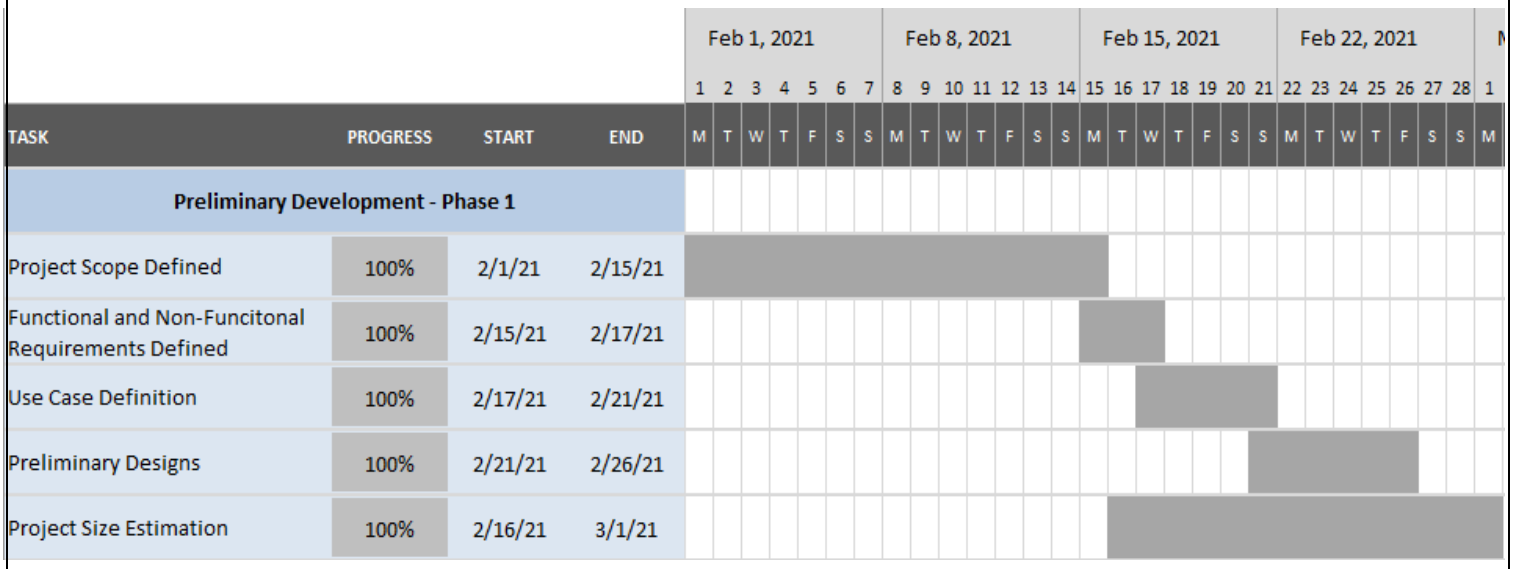
PROJECT COORDINATION & COMMUNICATION PLAN

Over the course of three months, AB consulting will develop the proposed software to meet the requirements of the scope outlined above. Throughout the development process, AB Consulting will include several demonstrations and consistent communication with Best Hairstylists Inc. to provide proof that project timelines are being met and to ensure satisfaction at completion of the project. After the final demonstration, AB Consulting will provide one full day (8 hrs) of on-site training. We believe that fully understanding the technological tools you use is key to prime productivity and spend this time making sure you are fully trained in all mechanics and features of the software.

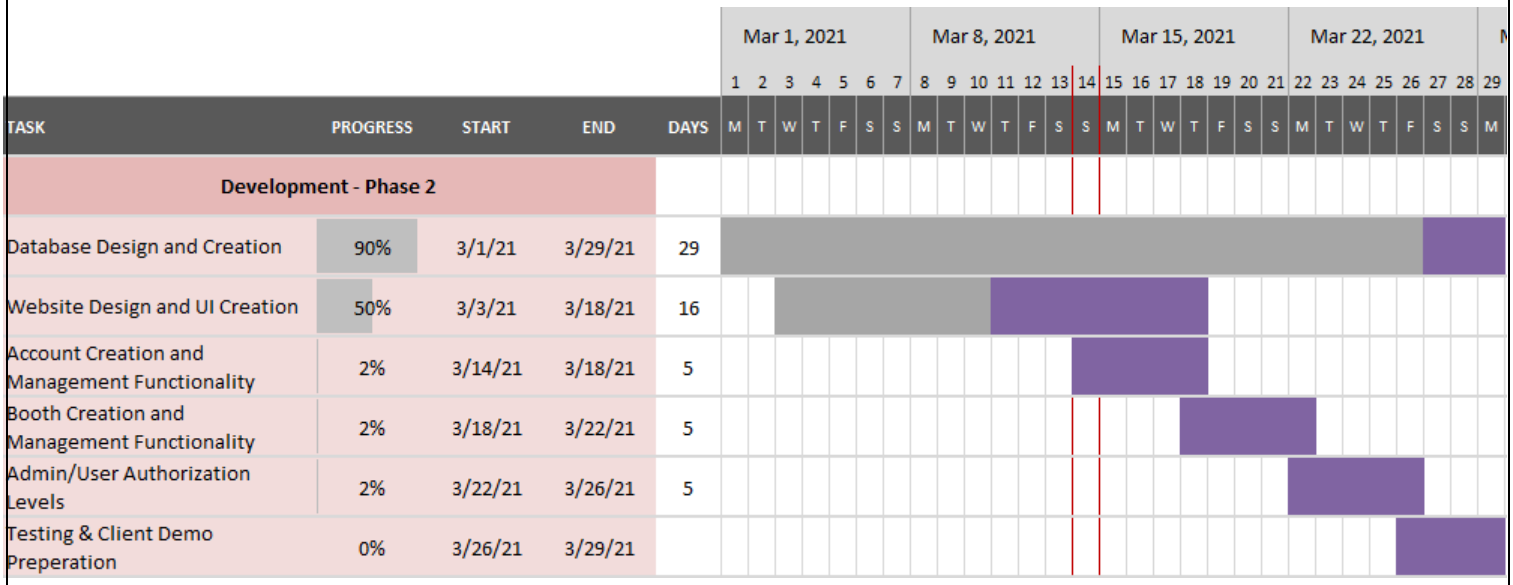
Project due dates are outlined below, but are not inclusive of all communication that will occur between AB Consulting and Best Hairstylists, Inc. Over the course of the project, AB Consulting will maintain constant communication with ad-hoc updates, visuals, etc. Status Reports will include additional project documentation, mock-ups, etc along with a detailed update on development progress.

ACTIVITY	DUE DATE
Project Start	2/1/2021
Status Report #1	3/8/2021
Status Report #2	3/26/2021
Demo #1	3/29/2021
Status Report #3	4/8/2021
Final Demonstration/Implementation Sign-off	5/7/2021
On-Site User Training	5/10/2021
Project End	5/14/2021

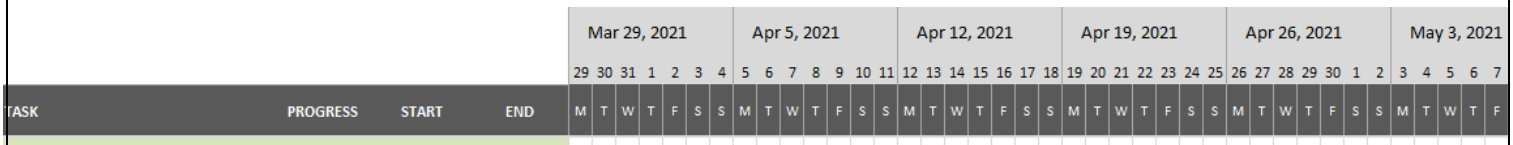
PLAN OF WORK



TASK	PROGRESS	START	END
Preliminary Development - Phase 1			
Project Scope Defined	100%	2/1/21	2/15/21
Functional and Non-Funcitonal Requirements Defined	100%	2/15/21	2/17/21
Use Case Definition	100%	2/17/21	2/21/21
Preliminary Designs	100%	2/21/21	2/26/21
Project Size Estimation	100%	2/16/21	3/1/21



TASK	PROGRESS	START	END	DAYS
Development - Phase 2				
Database Design and Creation	90%	3/1/21	3/29/21	29
Website Design and UI Creation	50%	3/3/21	3/18/21	16
Account Creation and Management Functionality	2%	3/14/21	3/18/21	5
Booth Creation and Management Functionality	2%	3/18/21	3/22/21	5
Admin/User Authorization Levels	2%	3/22/21	3/26/21	5
Testing & Client Demo Preperation	0%	3/26/21	3/29/21	



TASK	PROGRESS	START	END
Development - Phase 3			
Current/Historical Profile Differentiation	0%	3/29/21	4/4/21
Announcement Creation and Management Functionality	0%	4/5/21	4/11/21
Test Cases & Bug Fixes	0%	4/11/21	5/1/21
Client Demo Preperation	0%	5/1/21	5/7/21

REFERENCES

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