Software Design Document

Group 3 : BookMyPass

Contents

1 Introduction

1.1 Design Overview

This project will help to digitize and automate the process of applying for railway concession. The current system requires any person to first avail a form from the college, fill it and then again stand in long queues to verify the same at the college and then issue the pass at the pass issue counter at the railway station. The user initially will have to create an account during which the user will have to fill all the details including a unique college code/verification ID. Now, the user needs to apply for the concession by filling in other details such as starting point of the journey, destination, duration of the pass, class of travel, etc. Now, these details entered by the user will be verified with the college database. Once the student data is verified by the college, the request is sent to the railways system for granting concession. The railways would enable the payment service for user to pay the charges for the pass. Once the payment is done, digital pass is generated and sent to the user on the app. If the current pass is about to expire in a few days, a reminder is sent to the user to reapply for the pass. The product will be designed using Bottom-up Object Oriented Design approach. All these separate modules will be generated first and then these sub-systems will be clubbed to form our main system.

1.2 Requirements Traceability Matrix

	Student	*Authentication*	*Database*	*System*
Authentication & User Details	X	X	X	X
Pass Application & Institute Level Authentication	X	X	X	X
Pass generation and retention			X	X
Renewal notification and status of pass application			X	X

2 System Architectural Design

2.1 Chosen System Architecture

The chosen system architecture for this project is Data-flow architecture. Data-flow architecture is for android based projects. It is suitable for applications that involve a well-defined series of independent data transformations or computations on orderly defined input and output such as compilers and business data processing applications.

2.2 Discussion of Alternative Designs

The alternative options were Layered Architecture, Client Server Architecture and Data-centred architecture.
Layered architecture is used at system level. It is used in any type of editors like Notepad, etc.
Because of being more vulnerable to failure and data replication or duplication Data-centred architecture was not preferred.
In client server architecture, if any part of the network fails a lot of disruption can occur. Also, the server can get too expensive to purchase. Therefore even this architecture was not chosen for the project.

2.3 System Interface Description

2.3.1 User Interfaces

BookMyPass is a convenient mobile application that can be easily operated by any user.
The first screen of the mobile application is the registration/login page where the user can give in his/her email id,college name, full name,college assigned code,region of institute, transportation route, departure and arrival station and class of travel. Also it also registers your password for this account. On clicking on the submit button , user sends in request for account verification
Once logged in, the user is taken to the home page/dashboard. The student dashboard is where the account info and the essential credentials regarding the pass is displayed. Here on clicking on the EDIT PROFILE button,the user gets access to a details modification page where he/she can edit, add or remove information on your account.
On the homepage screen:
1.The Profile button redirects the user to the user dashboard where he/she can access the user details and even modify it. Its new modifications will be reflected in the next pass.
2.The View Current Pass button takes the user to the pass display page where complete pass is shown at user disposal. Its appropriately located at the home page so that he user can access it anytime during hassle swell with utmost ease.

3.View pass Status button shows a pop up where current/ordered pass status is shown with details like issue time,amount paid,and other basic details
On the pass history screen: On this page , the user can see his history of passes issued under his account . Account info as well as live pass indication is depicted on this page
The detailed user interface is explained in chapter 4.

2.3.2 Hardware Interfaces

Any mobile device that has at least 512 MB of RAM. A mobile device with has sufficient amount of unused non-volatile memory.

2.3.3 Software Interfaces

Operating System: The application would be first made available on the Android operating system for its best support and user-friendliness.
Database: For storing user data we have chosen Firebase.

2.3.4 Communications Protocols

For uploading of files to the database and retrieving the data from the database over the internet, the relevant TCP protocols will be used.

3 Detailed Description Of Components

3.1 Component-1: Student

Responsibilities	1.Register if not registered 2.Login
Constraints	Pass will only be generated if student details match with institute database.
Composition	Frontend/Backend - Firebase Realtime Database & Android(Java)
Interaction	Student log into their accounts and can apply for pass. If not yet applied, they can also edit their profile first. Once applied, they can do payment and pass gets generated on successful payment..
Resources	Developer

3.2 Component-2: Authentication User Details

Responsibilities	The responsibilities of user details and authentication component is to provide an authentication layer that will check and verify the basic user details provided by the student and upon verification, it will create an entry in the database along with the details provided as its attributes
Constraints	The user needs to be a student of a registered college. To view the pass, he has to to install the app in his smartphone that needs to be above Android version 5.
Composition	Data provided by the user is verified by the college database upon which a verification tag is given to that specific account which enables him to generate a pass with the help of that account
Interaction	The student installs the app for the first time and he/she performs registration as a new user. The student will enter details regarding personal details and travel details. In case of user login, the user downloading the app will sign in using his username and password and after verification from the database user will be allowed access to his/ her dashboard.
Resources	User should have a valid Institute ID and a smartphone with Android version more than 5.

3.3 Component-3: Database

Responsibilities	Database stores basic user information like username, password, date of birth, institute name, ID number, details about the past like pass number, type of pass, type of class, travel destination and travel origin. It will also keep details of payment.
Constraints	Erroneous data must not be filled in by the user.
Composition	Firebase Realtime Database by Google.
Interaction	It interacts with the authentication and the payment page where it provides details for user verification and verification before payment. Once the pass is issued, it adds on to the database of passes issued by that particular user and upon request is shown in the past history section in the app.
Resources	Firebase Realtime Database

3.4 Component-4: Pass Generation

Responsibilities	1.Approval of pass. 2.Generation of pass
Constraints	All the details entered by the student must be correct.
Composition	User & Pass details stored in the database are used for generating the pass.
Interaction	Once the user details have been successfully verified by the institute, the user and the pass details are further sent to the Railway Authorities who thereby send a payment link, which once done successfully will generate the pass.
Resources	Developer

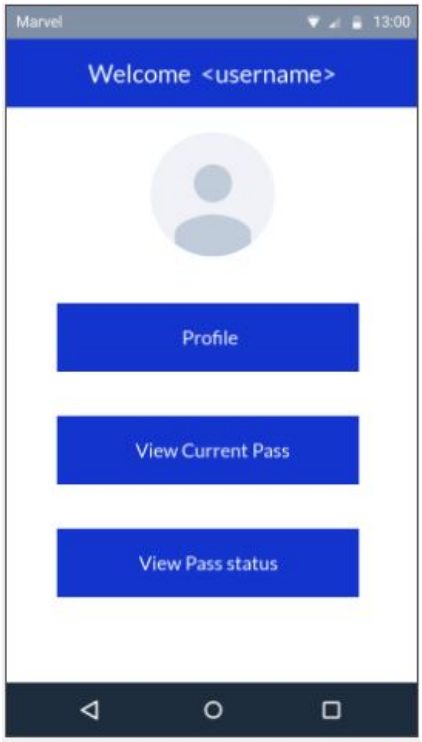
4 User Interface Design

4.1 Description of the User Interface

4.1.1 Screen Images

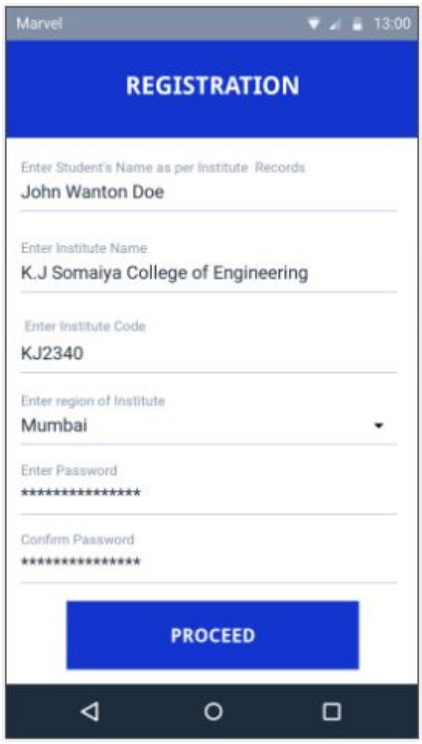
•Login/Registration Screen Layout:

•**Homepage Screen Layout:**

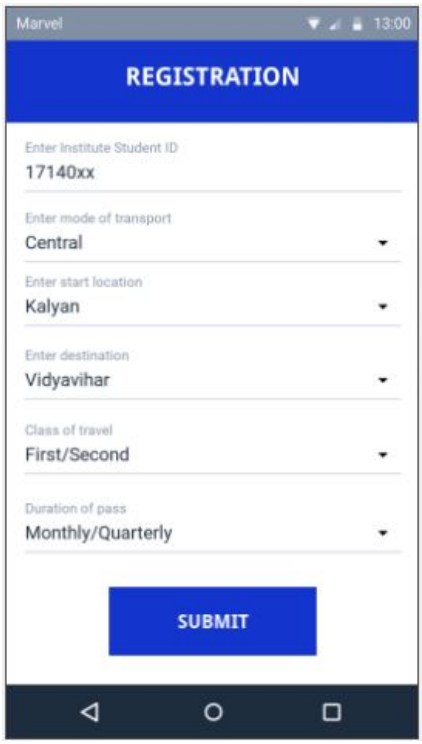


•**Profile View Screen Layout:**

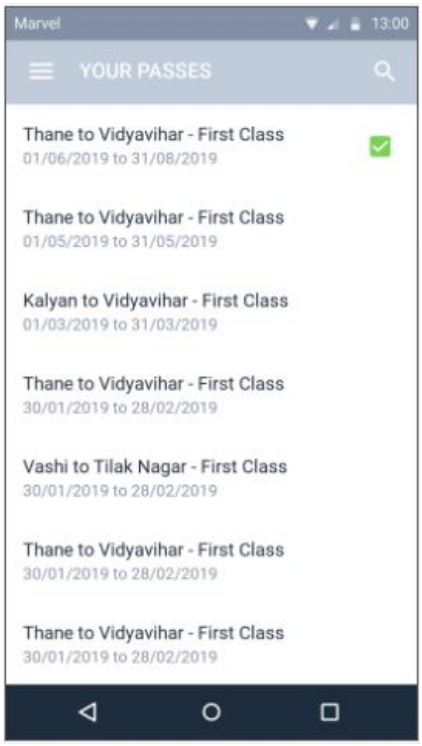
•Registration Screen Layout 1:



•Registration Screen Layout 2:



•Pass History Screen Layout:



4.1.2 Objects and Actions

•Registration Screen 1 and 2

On the registration page , user can give in his/her email id,college name, full name,college assigned code,region of institute, transportation route, departure and arrival station and class of travel. Also it also registers your password for this account. On clicking on the submit button , user sends in request for account verification.

•Profile View Screen:

The student dashboard is where the account info and the essential credentials regarding the pass is displayed. Here on clicking on the EDIT PROFILE button,the user gets access to a details modification page where he/she can edit, add or remove information on your account.

•Homepage Screen:

1.The Profile button redirects the user to the user dashboard where he/she can access the user details and even modify it. Its new modifications will be reflected in the next pass.
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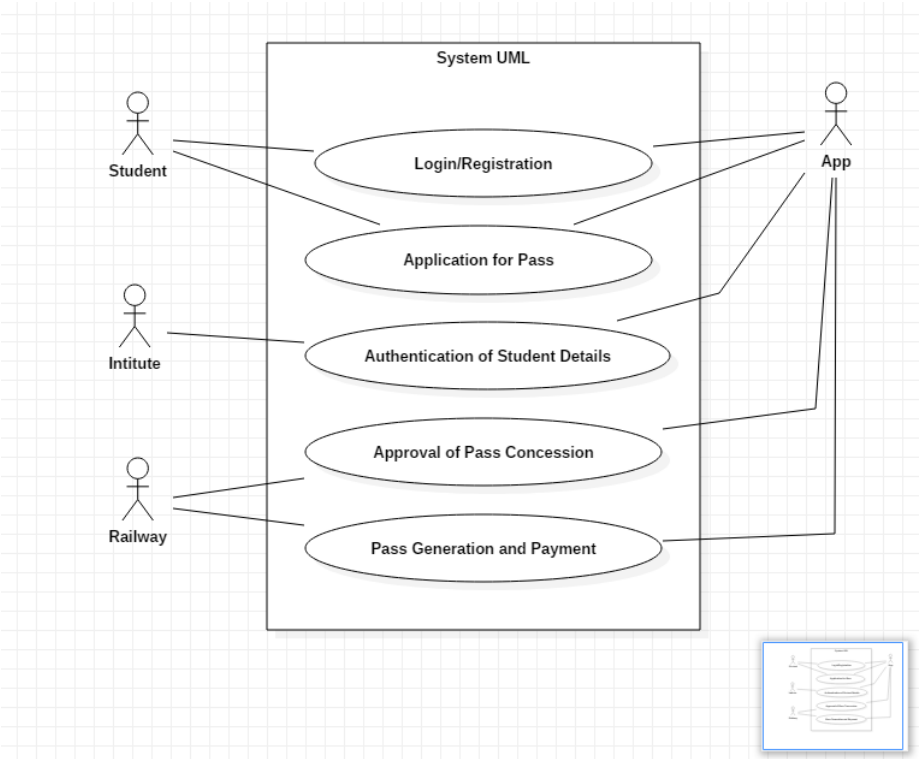
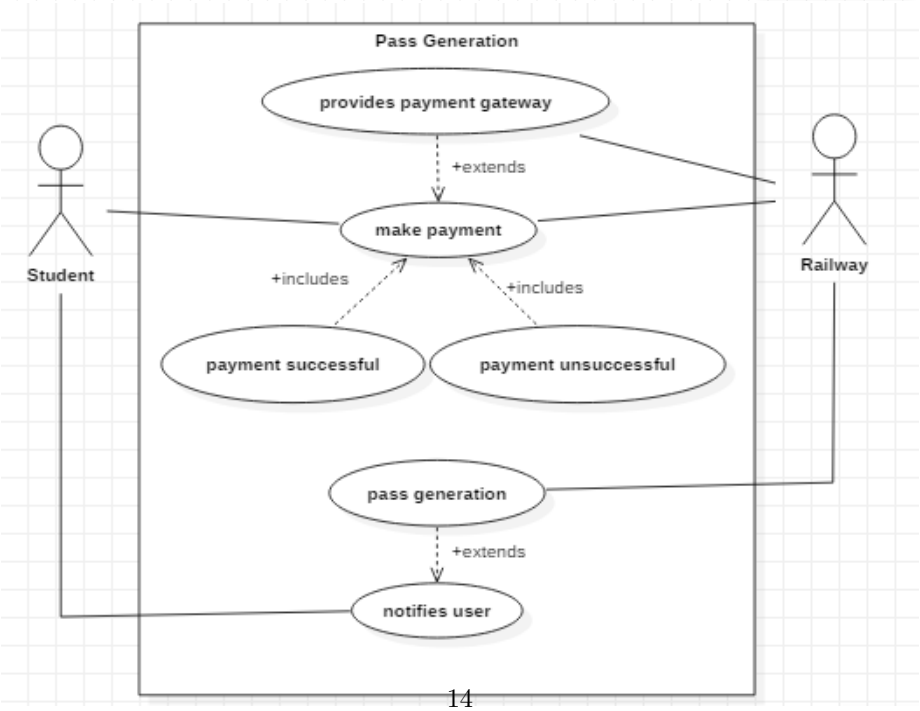
- **Pass History Screen:**

On this page , the user can see his history of passes issued under his account . Account info as well as live pass indication is depicted on this page

5 System Architecture





Use Case ID:	1
Use Case Name:	System Use Case

Created By:	Pratik Merchant	Last Updated By:	Pratik Merchant
Date Created:	03/11/19	Date Last Updated:	03/11/19

Primary Actors	Student
Secondary Actors	Institute, Railway, Application
Description	System Use Case
Trigger	Student completes all the registration steps on the portal
Preconditions	User must be authenticated successfully
Postconditions	Successful registration confirmation will be sent to the user after verification by the institute is successful and also once the payment gateway arrives.
Normal Flow	1.The user registers and creates his account. 2.User logs on using the above credentials. 3.The user then enters the pass application details. 4.The basic user details are then sent to the institute for verification. 5.Once the institute confirms successful verification of details, the pass details are forwarded to the railway authorities. 6.The railway authorities then generate a payment gateway which in turn is notified to the user via the application. 7.The user then makes payment. 8.If the payment is successful, the pass gets generated.
Alternative Flows	1.If the authentication at the institute level fails, then user has to recheck his details and reply. 2.If the payment is done within the stipulated time, then the application would be discarded.
Exceptions	1.Server is down 2.Payment gateway errors.
Includes	Provides payment gateway
Priority	High
Frequency Of Use	High
Business Rules	The pass must not be sent to the student unless and until the payment is done.
Special Requirements	Payment gateway
Open Issues	None
Assumptions	Students details are verified by the institute
Notes and Issues	Payment gateway used must be reliable and secure.

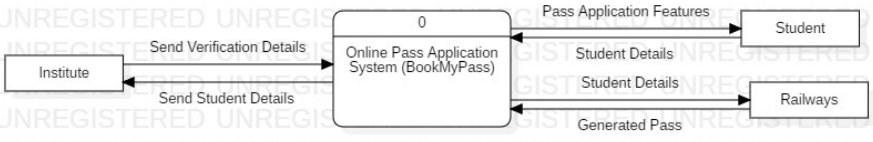
Use Case ID:	2
Use Case Name:	Pass Generation

Created By:	Priya Mane	Last Updated By:	Priya Mane
Date Created:	03/11/19	Date Last Updated:	03/11/19

Primary Actors	Student
Secondary Actors	Railways
Description	Pass generation.
Trigger	Railways provide payment gateway to the student.
Preconditions	Student must be logged in.
Post conditions	Generated pass would be sent to the student.
Normal Flow	1.The railway authorities approve and generate a pass. 2.The authorities generate a payment link and send it to the student. 3.The student completes the payment. 4.After successful payment, the railways send the generated pass to the student.
Alternative Flows	1.The railway authorities may not approve the pass. 2.The authorities generate a payment link and send it to the student. 3.The student may not be able to complete the payment. 4.Even after successful payment, the railways may not send the generated pass to the student.
Exceptions	1.Railway server down. 2.Payment gateway errors
Includes	1.Provides Payment gateway, 2.Payment successful. 3.Payment unsuccessful.
Priority	High
Frequency Of Use	High
Business Rules	Pass must not be sent to the student till payment is done successfully.
Special Requirements	Payment gateway.
Open Issues	None
Assumptions	Student details are verified by his/her respective Institute.
Notes and Issues	Payment Gateway used must be reliable.

6 Data Flow Specifications

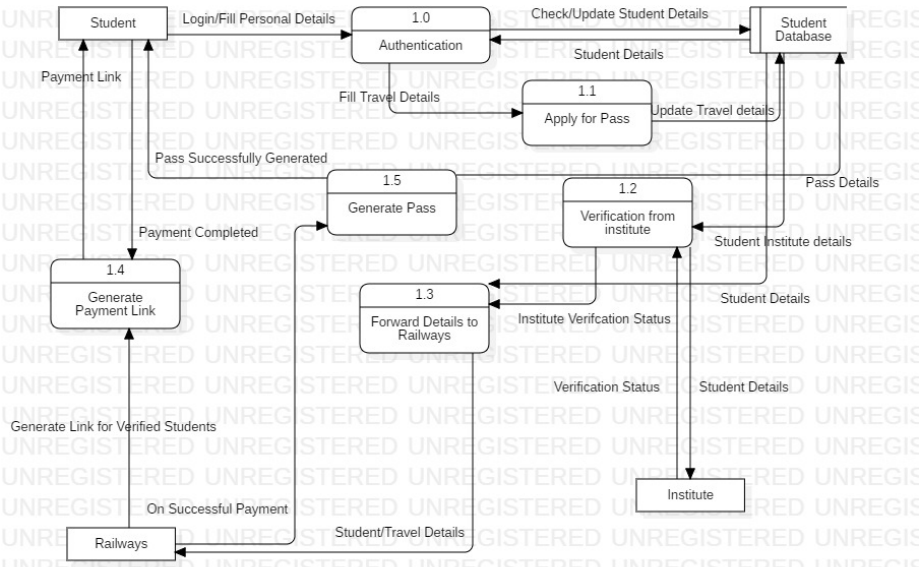
6.1 Level 0 DFD with description



DFD Level 0 is also called a Context Diagram. It's a basic overview of the

whole system or process being analyzed or modeled. For the online pass booking service, BookMyPass, the main process is the application and the actors involved are the student, the institute and the railway authorities.The actors interaction with the system is shown the level 0 DFD.

6.2 Level 1 DFD with description



DFD Level 1 shows the details of the entire system, various processes involved in proper sequence.It also contains the main student database and shows its interaction with other processes. All the entities interact with the datastores using any one of the processes. No datastore is a blackhole or a miracle.There are 5 processes and 3 entities/actors.