



UNIVERSITEIT VAN PRETORIA  
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# COS301 GROUP TASK 1

## REQUIREMENTS SPECIFICATION FOR THE NAVUP SYSTEM

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Date:  
February 23, 2017

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# **1 Introduction**

This section gives a scope description and overview of everything included in this Software Requirements Specification document. Also, the purpose of this document is described and a list of abbreviations and definitions is provided.

## **1.1 Purpose**

The purpose of this document is to describe the detailed requirements for the NavUP application which are precise and testable. It illustrates the purpose and complete declaration for the development of the application and the development methodology that will be used is agile within which the application functionality is developed iteratively. It also explains application constraints, interface and interactions to the external applications. This document is primarily intended to be proposed to a client for its approval and a reference for developing the first version of the application for the development team.

## **1.2 Scope**

The NavUP is a mobile application that uses the campus WiFi to deliver an information service to users on their smart devices. It helps students, visitors and university employees to locate venues and to determine the best route to the venues on the Hatfield Campus of the University of Pretoria depending on the users current location and restrictions around the location. The application should be free to download from either a mobile phone application store or similar services. The NavUP application main purpose is to provide navigation on the Hatfield Campus and will provide navigation to any other Campus or any other location outside the University of Pretoria.

University can provide information about venues, events and public services such as shops, restaurants and ablution facilities using the web-portal. This information will act as the bases for the search results displayed to the user. An administrator also uses the web portal in order to administer the application and keep the information accurate.

Furthermore, the application needs both WiFi and GPS connection to fetch and display results. All application information is maintained in a database, which is located on a web server. The application also interacts with the

GPS-Navigator software which is required to be an already installed application on the users mobile phone. By using the GPS-Navigator, users can view desired interest points on a map and be navigated to them. The application also has the capability of providing visualised information related to pedestrian traffic, and can be trained to push new information to users according to their preferences and interests.

Student, staff and guest of the University of Pretoria will benefit from NavUP, since it will alleviate congestion on the Hatfield Campus and provide a medium for a more connected and informed Campus community.

### 1.3 Definitions, Acronyms, and Abbreviations

Term	Description
User	Someone who interacts with the mobile application.
Administrator/Admin	System administrator who is given specific permission for managing and controlling the application
Web-portal	A web application which present special facilities for admin.
GPS	Global Positioning System
GPS-Navigator	Installed software on a mobile phone which could provide GPS connection and data, show locations on map and find paths from current position to defined destination.
Application Store	An installed application on a mobile phone which helps users to find new compatible applications with the mobile phone platform and download them from Internet.
API	Application Programming Interface
UI	User Interface

### 1.4 References

- D. Kung, Object-oriented software engineering, 1st ed. New York: McGraw-Hill, a buss unit of the McGraw-Hill Companies, 2014, pp. 80-98.
- IEEE Software Engineering Standards Committee, IEEE Std 830-1998, IEEE Recommended Practice for Software Requirements Specifications, October 20, 1998.

## 1.5 Overview

The remainder of this document includes two chapters. The second chapter provides an overview of the application functionality and application interaction with other systems. This chapter also introduces different types of stakeholders and their interaction with the application. Further, the chapter also mentions the system constraints and assumptions about the product.

The third chapter provides the requirements specification in detailed terms and a description of the different system interfaces. Different specification techniques are used in order to specify the requirements more precisely for different audiences.

## 2 Overall Description

NavUP's main function will be to provide navigation to the user on the Hatfield Campus of the University of Pretoria. The navigation application will be accompanied with functions like, optimised route calculations based on shortest route and least congested route. NavUP will also allow the user to share location with a friend and provide navigation to a friend location on Campus.

NavUP provides other functions with the intent of informing the user of all that the Campus can offer, NavUP will provide functionality to the user which will allow the user to view detailed information about the location the user is currently at or any location the user searched for. Furthermore, the user will be able to save frequent or favourite location to easily navigate to frequented locations NavUP also focuses on entertainment and social side of the University of Pretoria by allowing the user to discover or create events that may occur at the many locations on Hatfield Campus.

Crowd-sourcing will play a pivotal role in the NavUP application. Users will be able to review buildings, restaurants or other services on Hatfield campuses. Furthermore, the user will be able to report any problem on the campus which in turn will improve navigation for other users. The continued usage of the application by the users will allow the system to create heat maps of busy location or slow moving locations thus allowing even further optimisation to the navigation experience.

The user will also be rewarded for their contribution to the application.

NavUP will allow the user to play treasure hunt games or travel games, further an achievement system will allow the user to show off or compare between friends their level of contribution to the application.

## **2.1 Product Perspective**

NavUp is a product that is the first of its kind. No system has yet been developed like NavUP. The navigation system will be built from the ground up to adapt to the specific needs of the student, staff, and guest of the University of Pretoria. However, NavUP will be making use of GIS technologies and databases to map Hatfield Campus grounds. These technologies will also be used to map the interiors of the buildings on Campus.

### **2.1.1 User Interfaces**

NavUP will provide a simplistic, easy-to-use interface, with additional accessibility features for those with disabilities. The register and login interfaces will be minimalistic, yet descriptive, and will be easy to use. Once logged in the user will encounter a map interface which will serve as the home interface for NavUP.

The home interface will provide a large search bar on the top of the screen to search for location on the Hatfield Campus. This search bar will also provide voice search functionality to accommodate for disability needs. When the search bar is selected two separate buttons will emerge. One will allow the user to display where the user is now on the Hatfield Campus. The other will provide the options to read the location information. The Map will form part of two separate interfaces.

A separate heat map button will be placed in the lower right-hand corner of the screen. If heat map is active a legend will appear where the search bar was and the colour of the map will change depending on the map congestion. The colour displayed on the heat map will also take into consideration people who suffer from colour blindness.

A separate button will be in the lower left-hand corner of the screen. This button will lead to a different interface which will provide options to separate functionality like Account, Announcements, Events and Games.

The Account interface will consist of radio buttons and check boxes which will provide the user with a list preferences. The Announcements interface will be in a blog-like form and will display NavUP latest announcements. Games interface will indicate the user achievements in an upper banner, the reset of the interface will provide options to different games.

Notification will make use of the device operating system to provide push notification to the user. The interface will remain the same across all devices whilst adapting the resolution to different screen sizes.

### **2.1.2 Hardware Interfaces**

NavUP will be able to run on any Android and IOS device which support Wi-fi connectivity. Other Recommend Hardware that can improve the NavUp experience but not necessary would be built in GPS functionality. NavUP will also make use of the Wi-fi routers and signal extender on Hatfield campus to improve navigation capabilities.

### **2.1.3 Software Interfaces**

NavUP will make use of GIS technologies and databases which will be provided by the University of Pretoria. NavUP will make use of the same database technologies that are being used by the University of Pretoria Library and admin system to ensure continuity between different systems of the University.

### **2.1.4 Communications Interfaces**

NavUP will make use of HTTPS to communicate between device and server. Communication between devices and Wi-Fi connectors will makes user of the IEE 802.11 standard. Furthermore, communication medium like email will be used for system announcement. The main mode of communication will be the NavUP UI.

### **2.1.5 Memory**

The application will not use more than 5 MB of memory for installation and not more than 10 MB for execution. It will therefore be required for the mobile device to have secondary memory that is greater than 50 MB for optimal performance of the application. It will require a system of preferably 1 GB of memory to perform optimally. Due to the processing that the application may do it will most likely take about +- 50 Mb of the mobile



device's main memory. The user profiles will be backed up on the system side to enable recovery in an event something goes wrong. The profiles will also be stored in the users mobile devices cache to enable faster loading of the application.

## **2.2 Product Functions**

NavUP will be designed to provide directions from the users current location to the desired destination. There will be options for the route calculation based on the users needs; fastest route, least-congested route, and a route that best accommodates for those with disability. The system will also store information of the plentiful landmarks and points of interest that are present on campus, users will be able to view this information when visiting each one of these locations. Activities will also be integrated into the system that makes use of geolocation, activities that tracks walking data of a user and rewards them for it, as well as activities like treasure hunts that will make use of Geocaching. NavUP will provide statistical data, by storing routes and locations of users, it will facilitate heatmap displays and potentially most/least used routes. NavUP will also notify users about entertainment and social events on the UP Campus. The system should be able to deal with varying strengths of WiFi signal as there are distances between access points, in cases where signal is lost completely, NavUP will need to extrapolate from the known walks to draw the complete path the user has travelled.

## **2.3 User Characteristics**

While NavUP will be mainly targeted for visitors and new students, it will have functionality to attract many more users including staff and even students that are nearing the completion of their degrees. The typical user will be a matriculant that is not familiar with the Hatfield campus, they will not necessarily be very technologically-savvy but will have the basic knowledge to work with straightforward apps that they download on their smart device. They will also be very curious about the various buildings histories of the campus such that they use NavUP to walk around campus and learn about the landmarks and points of interest, as well as take part in the various activities that make use of the geolocation. The other user will be more experienced with the campus, students that have been there for a longer period of time, and even the staff themselves. Some of these users will have privileges such as the day house leaders and events coordinators, they will fall under the trusted user category which will afford them administrative privileges

such as event creation or even to trigger an evacuation in an emergency that may endanger student safety; such as protest action or in the case of a fire.

## **2.4 Constraints**

- C-1: NavUP will have to accommodate a system with lesser hardware capabilities.
- C-2: NavUP should not affect the Bandwidth usage of the University's Wi-Fi routers.
- C-3: User location may only be accessed if permissions have been given.
- C-4: NavUP will only be functional inside the bounds of the University of Pretoria Hatfield Campus.
- C-5: NavUP interface should provide accessibility improvement for those with disabilities.
- C-6: Routes that are being calculated should always be the most optimal route.
- C-7: NavUP should be designed by making use of non-proprietary software and technologies.
- C-8: NavUP must be able to operate on the campus Wi-Fi alone if mobile data or GPS functionality is not available.
- C-9: User interface must maximise the features the user is able to access but be minimalistic in design so that the user is not overwhelmed by a complex interface.
- C-10: NavUP should be able to adapt to different devices with different hardware component and sizes.
- C-11: NavUP should be functional on Android and IOS.
- C-12: Only Wifi routers and signal extender on the Hatfield Campus can be used to aid the navigational system.
- C-13: NavUP should be able to cache map data to minimise network traffic.
- C-14: NavUP should be able to detect the location of the user to such an extent that it can detect a user in different rooms in a building.

## **2.5 Assumptions and Dependencies**

- A-1: The user will be assumed to have a basic amount of technological literacy in operating their smart device and new applications.
- A-2: The user will have a smart device capable of downloading and running applications, as well as provide location data.
- A-3: The user will not know where most of the buildings are on campus.
- A-4: The user will not know where the busiest and more congested areas of campus are and how to avoid them.
- A-5: The user will be willing to participate in the integrated activities.
- D-1: The user will have their smart device connected to the campus Wi-Fi.
- D-2: The user will only be using NavUP while inside Hatfield campus.
- D-3: The user must have Location services enabled.
- D-4: The user must meet the minimal hardware requirements on their smart device.
- D-5: The system will use GIS technologies and databases provided by the University in order to proceed with the mapping of the campus.
- D-6: NavUP requires the WiFi routers on the Hatfield campus as well as knowledge of each their respective locations.

## **3 Specific Requirements**

### **3.1 External Interface Requirements**

- R-1: NavUP will be program system on the mobile phone which can be either an Android or an iOS  
Priority: Critical
- R-2: The user interacts with the software by means of a GUI, displayed as a map.  
Priority: Critical
- R-3: - The software gains its information about the WiFi location through data streaming from the internet.  
Priority: Critical

## 3.2 Functional Requirements

- R-4: NavUP will be able to locate the current position of the user.
- Preconditions:
    - \*an active GPS, WiFi, or Data connection
    - \*user must be registered and logged in
  - Postcondition: The current location of the user is returned and displayed on the map.
  - Priority: Critical
- R-4.1: This includes a location anywhere on the UP main campus map.
- R-4.2: This also includes the location, floor, or lecture hall within a specific building.
- R-5: NavUP will be able to find a specified building and room when searched.
- R-5.1: Rooms may be lecture halls.
  - R-5.2: Restroom should also be indicated.
  - R-5.3: This also includes restaurants and other recreational areas.
    - Priority: Important
  - R-5.4: Particular campus societies could also be found.
    - Priority: Important
  - R-5.5: There will also be a list of special locations near me, which is a list of locations close to the users current location.
- R-6: NavUP will give an appropriate error message if some things cannot be accomplished:
- R-6.1: If the user cannot be found. -Priority: Critical
  - R-6.2: If there are no results for a building being searched. -Priority: Critical
  - R-6.3: If connection to wifi and mobile data is lost. -Priority: Important
- R-7: NavUP will allow a user to save a location as favourite and keep track of these places.
  - Priority: Medium importance
- R-8: NavUP will provide an option to see details about a location, whether it is the current location or a location that was searched for.
  - Priority: Medium importance

R-9: NavUP will be able to generate a path based on two locations specified by the user.

R-9.1: This path will be the optimised path with regards to human traffic (congestion) and path length  
-Priority: Important.

R-9.2: Several alternative paths can be generated and listed in order of what is most recommended. -Priority: Important

R-10: NavUP will allow a user to see how much human traffic there is on a certain route or at a certain location.  
-Priority: Medium importance

R-11: NavUP will let a person manage his or her account.

R-11.1: Users can create, manage or delete their profile. -Priority: Critical

R-11.2: A user will be able to log in and out of their account. -Priority: Critical

R-12: There may also be an event calendar which keeps track of events which happen in particular buildings.  
-Priority: Nice to have

### **3.3 Performance Requirements**

R-13: The ideal performance is to give real-time data streaming analysis.

R-13.1: This means the human traffic representation must be accurate.

R-13.2: The current location will be updated in short time intervals and kept relevant.

R-13.3: Notifications are immediate and spread to entire user base if relevant.

R-14: Details about all the buildings will be accurate.

R-15: The generated path will be the optimal path with consideration for all variables.

## 4 Functional Requirements

### 4.1 Core Navigation Sub-System

#### 4.1.1 CA1: Get Current Location

- The system must be aware of the user location at all times for the system to be able to navigate correctly. The user should have the option to view the current location that the system is using. Functionality can only be provided to registered users.
- Pre-Conditions
  - Users device must have an active GPS, Wi-fi or mobile data. connection
  - User must be registered.
  - User must be logged in.
- Post-Condition
  - The device current location is returned.

#### 4.1.2 CA2: Search for Location

- The user should be able to search for any location on campus. Further option about the location should be provided if the search was successful.
- Pre-Conditions
  - User must be registered.
  - User must be logged in.
- Post-Condition
  - Search Location Returned.
  - Suggested Location Returned.
  - More option become available.

#### 4.1.3 CA3: View Location Detail

- The user should be able to lookup location details of his/her current location or searched location
- Pre-Conditions
  - User must be registered.
  - User must be logged in.
  - User must have a selected location.
- Post-Condition
  - Returns Details about location.
- **Core-Navigation Sub-System Case Diagram:**

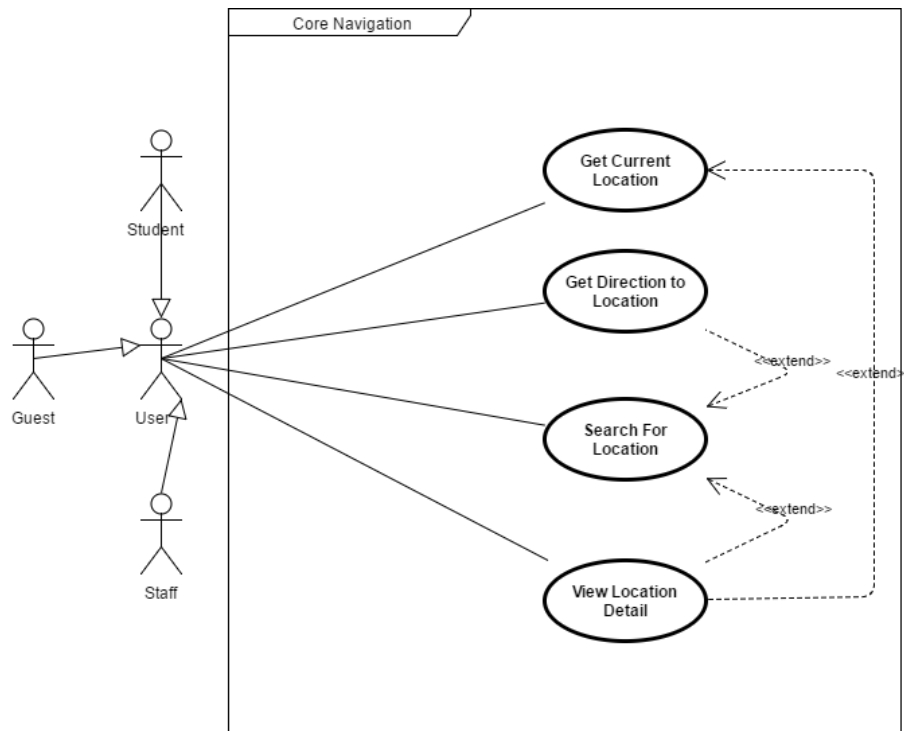


Figure 1: Core-Navigation Sub-System Case Diagram:

## **4.2 Navigation Management Sub-System**

### **4.2.1 CA4: Review Location**

- This Function allow the user to review a location
- Pre-Condition
  - User must be registered.
  - User must be logged in.
  - User must have a selected location.
- Post-Condition
  - User review will successfully be added to location information.

### **4.2.2 CA5: Contribute a picture**

- This function allows user to contribute a picture for a location in order to improve a location information.
- Pre-Condition
  - User must be registered.
  - User must be logged in.
  - User must have a selected location.
  - Must have a valid photo format to upload
- Post-Condition
  - User photo will be successfully added to location information.

### **4.2.3 CA6: Save Event Location**

- User with the right level of permission will be allowed to create a event for a specific location. Only Admin will be allowed to invoke this permission and will be allowed to revoke this permission as well.
- Pre-Condition
  - User must be registered.
  - User must be logged in.
  - User must have a selected location.



- Must have valid permission level.
- Post-Condition
  - Event Created at location

#### 4.2.4 CA7: View Places of Interest near me

- Allow the user to view other places near the user current location.
- Pre-Condition
  - User must be registered.
  - User must be logged in.
  - User must be at a valid location
- Post-Condition
  - A list of location near the user current location
- **Navigation Management Sub-System Case Diagram:**

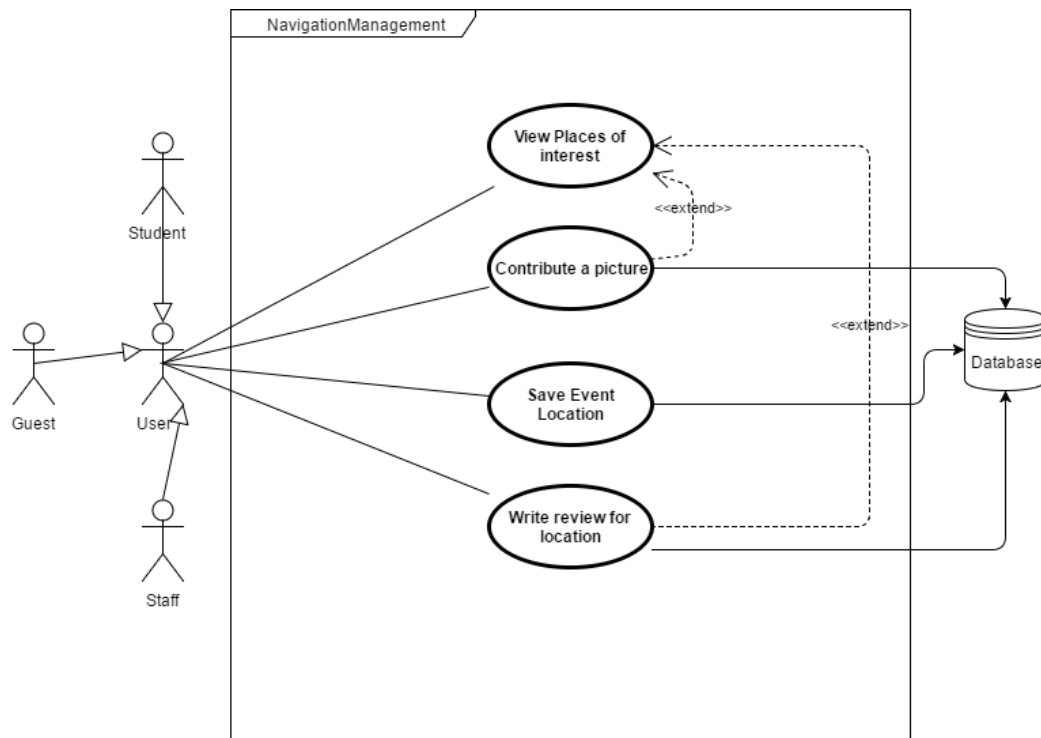


Figure 2: Navigation Management Sub-System Case Diagram:

## **4.3 User Activity Sub-System**

### **4.3.1 CA8: View Saved Location**

- Allow the user to view his/her saved location.
- Pre-Condition
  - User must be registered.
  - User must be logged in.
  - Must have at least one saved location
- Post-Condition
  - Returns a list of saved locations.

### **4.3.2 CA9: Save My Location**

- Allow the user to save current location or selected location that has been searched for.
- Pre-Condition
  - User must be registered.
  - User must be logged in.
  - Must select a valid location.
- Post-Condition
  - Save location to user personal profile.

### **4.3.3 CA10: View History**

- Allow the user to view search history as well as this history of location visited and events attended.
- Pre-Condition
  - User must be registered.
  - User must be logged in.
- Post-Condition
  - A details activity history of the user

#### **4.3.4 CA11: Share Location with friend**

- Allow the user to share his/her current location with a friend who is on the user contact list and also has NavUp installed on their device.
- Pre-Condition
  - User must be registered.
  - User must be logged in.
  - User must have a valid location.
  - User must send location to friend that on user contact list.
  - Recipient must have NavUP installed on their device.
- Post-Condition
  - Location is send to friend.

#### **4.3.5 CA12: Find Friend**

- User will be able to navigate to a friend if a friend has send his/her location.
- Pre-Condition
  - User must be registered.
  - User must be logged in.
  - Valid Location must be sent from friend.
- Post-Condition
  - Optimise navigation route to get to friend.
- **User Activity Sub-System Case Diagram:**

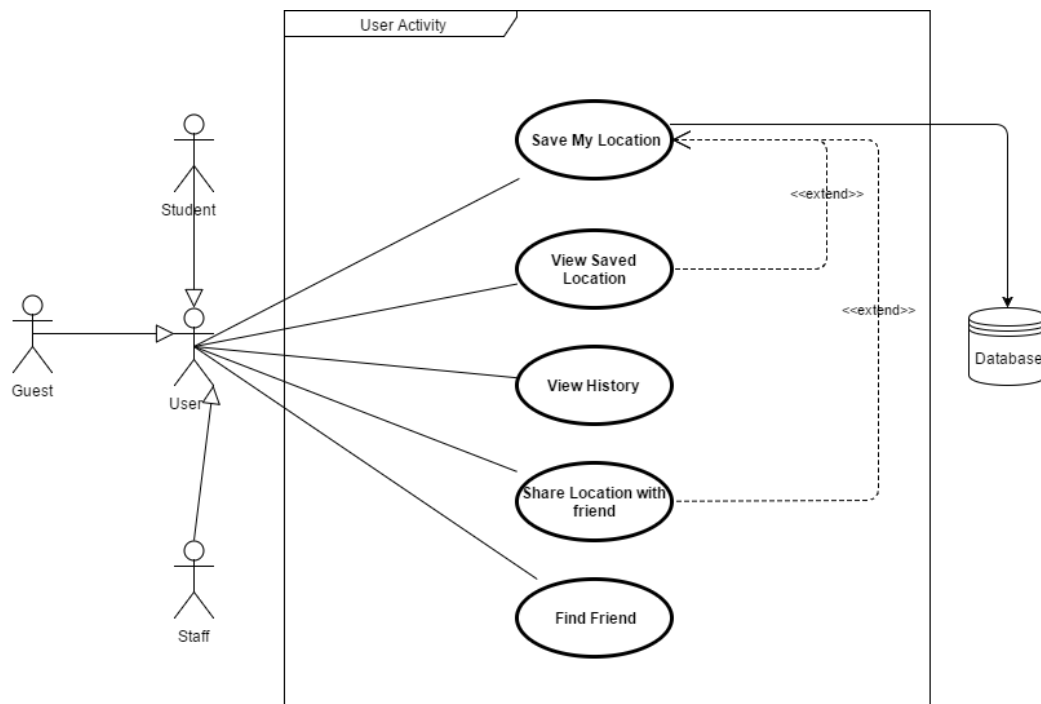


Figure 3: User Activity Sub-System Case Diagram:

## 4.4 Crowdsourcing Sub-System

### 4.4.1 CA13: Report a Problem

- User has the ability to report a problem on any of the routes or building on campus.
- Pre-Condition
  - User must be registered.
  - User must be logged in.
- Post-Condition
  - Problem is reported to the system.
- Crowdsourcing Sub-System Case Diagram:

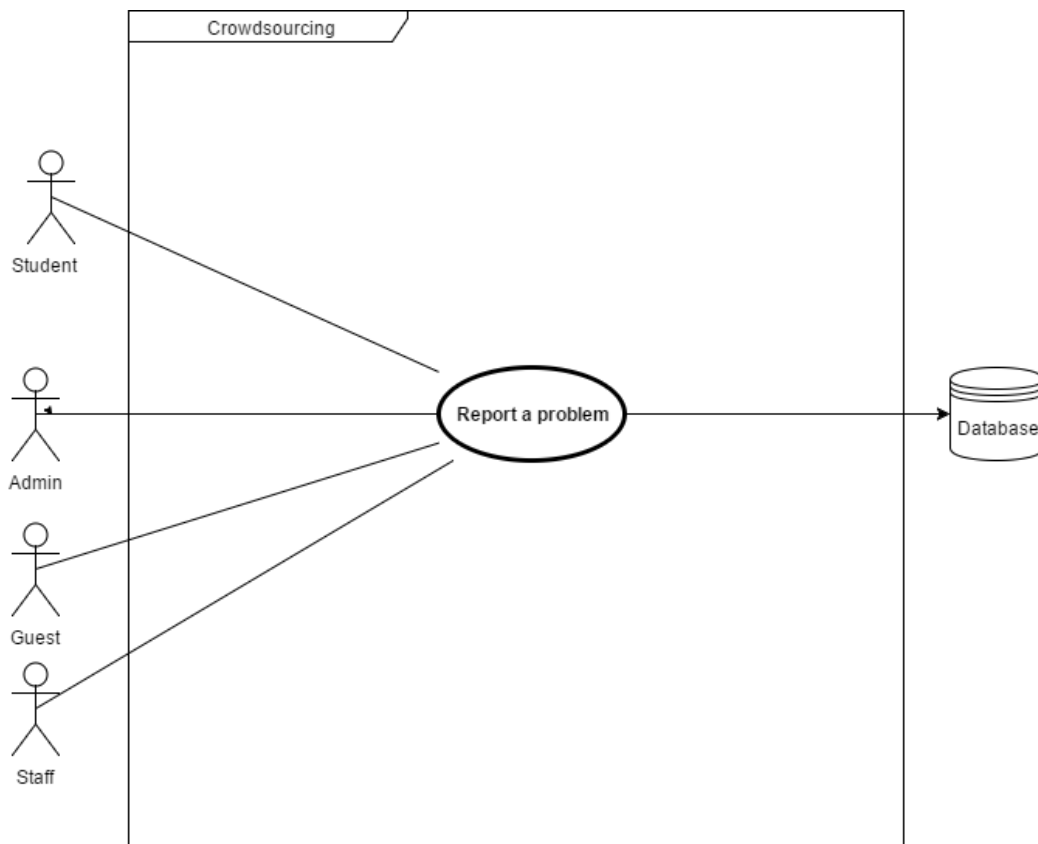


Figure 4: Crowdsourcing Sub-System Case Diagram:

## 4.5 Game Sub-System

### 4.5.1 CA14: Treasure Hunt

- Game functionality will be built in that will allow user to challenge friends in treasure hunts.
- Pre-Condition
  - User must be registered.
  - User must be logged in.
- Post-Condition
  - A treasure hunt game will be created on screen and will make use of NavUp navigation functionality.

#### 4.5.2 CA15: Wearable Tracking

- The user will be able to sync data from smart wearables to NavUp to improve game play experience.
- Pre-Condition
  - User must be registered.
  - User must be logged in.
  - A wearable that is compatible with NavUP.
- Post-Condition
  - Step count from wearable added to user profile.
  - Distance by user added to user profile.
  - User average speed added to user profile.
- **Game Sub-System Case Diagram:**

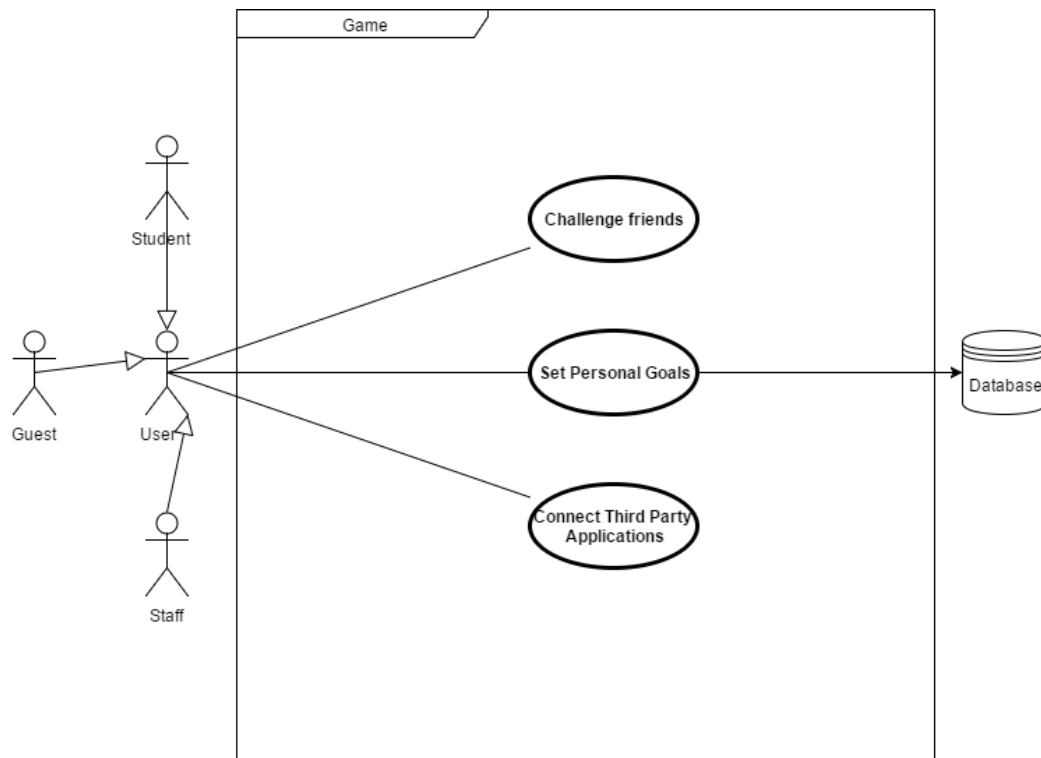


Figure 5: Game Sub-System Case Diagram:

## **4.6 Administration Sub-System**

### **4.6.1 CA16: Manage User**

- User with Admin privileges will be allowed to manage user privileges for event creation. User management will also include banning or suspension of accounts that abuse the NavUP system.
- Pre-Condition
  - User must be registered.
  - User must be logged in.
  - Must have admin privileges.
- Post-Condition
  - Change user privileges
  - Suspend User

### **4.6.2 CA17: Manage Location**

- User with Admin privileges will be able to edit location or add new location to the NavUP map.
- Pre-Condition
  - User must be registered.
  - User must be logged in.
  - Must have admin privileges.
  - Must have a valid NavUP location when editing.
- Post-Condition
  - Add Location.
  - Delete Location.
  - Change Location Detail.

#### **4.6.3 CA18: Manage Events**

- User with Admin or Creator Privileges will be able to create and edit Events bound to location on the UP campus.
- Pre-Condition
  - User must be registered.
  - User must be logged in.
  - Must have admin privileges or Creator privileges.
  - Event must be a valid NavUP location.
- Post-Condition
  - Event added to NavUP system.
  - Event removed on the NavUP system.
  - Event edited on NavUP system.

#### **4.6.4 CA19: Add Notification**

- User with Admin Privileges will have the ability to send push notification to all NavUP users.
- Pre-Condition
  - User must be registered.
  - User must be logged in.
  - Must have admin privileges privileges.
- Post-Condition
  - Notification is sent to all NavUP users.
- **Administration Sub-System Case Diagram:**



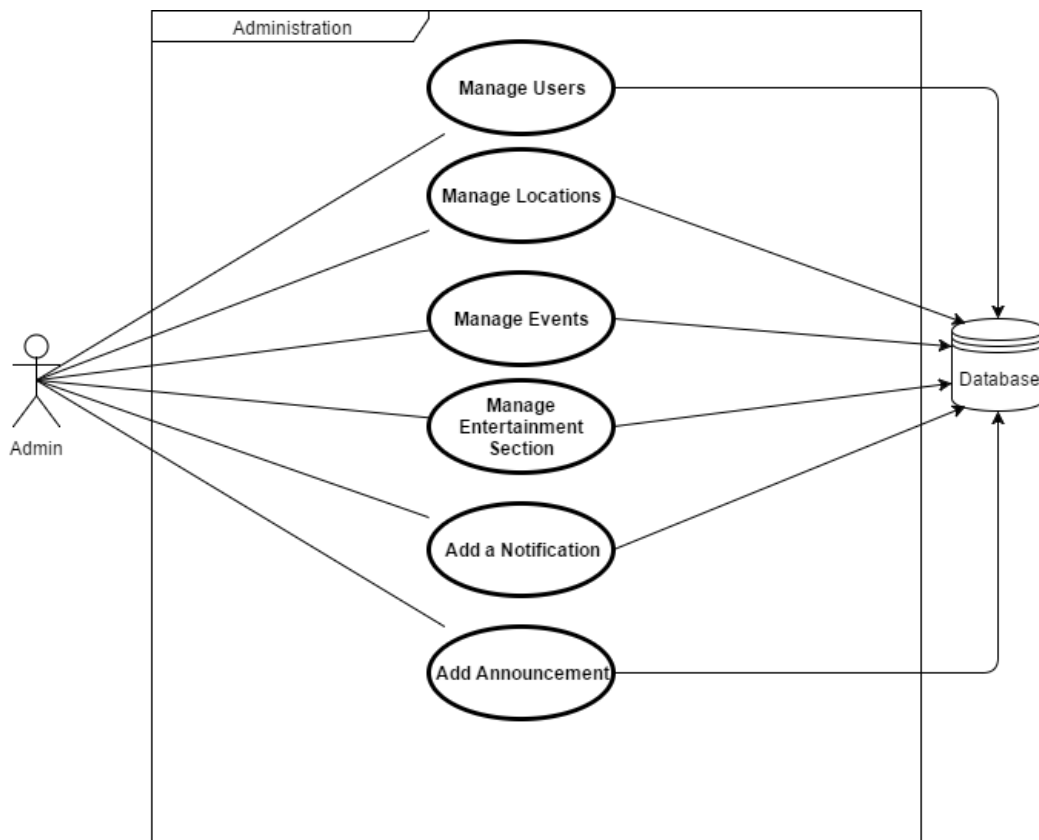


Figure 6: Administration Sub-System Case Diagram:

## 4.7 Announcement Sub-System

### 4.7.1 CA20: Push Notification

- All NavUP will receive a push notification.
- Pre-Condition
  - User must be registered.
  - User must be logged in.
- Post-Condition
  - Push Notification sent.

#### 4.7.2 CA21: Post General Announcement

- The function has similar functionality than that of notification however, general announcement will not be push notification but rather viewable on announcement board.
- Pre-Condition
  - User must be registered.
  - User must be logged in.
- Post-Condition
  - General Announcement on announcement board.
- **Announcement Sub-System Case Diagram:**

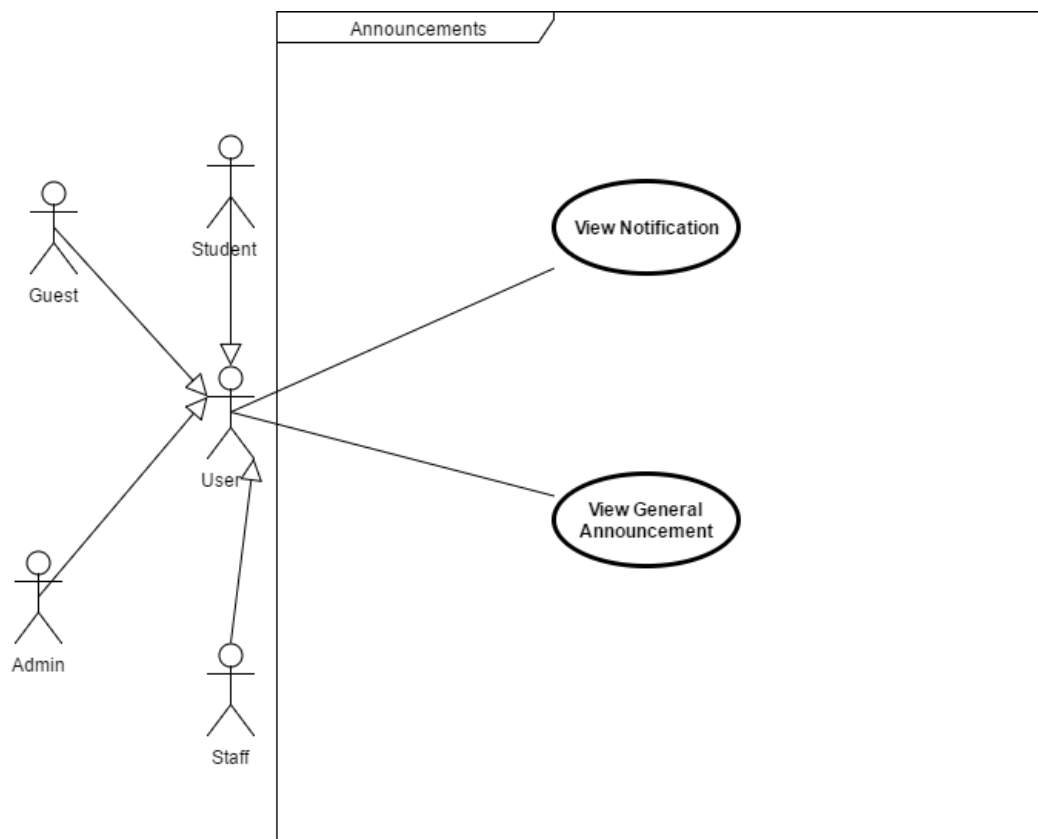


Figure 7: Announcement Sub-System Case Diagram:

## **4.8 Account Management Sub-System**

### **4.8.1 CA22: Create Profile**

- Allow the user to create a profile so that the user can use NavUp.
- Pre-Condition
  - Must Provide valid registration information.
- Post-Condition
  - New User Profile created.

### **4.8.2 CA23: Delete Profile**

- The User has the ability to delete his/her account.
- Pre-Condition
  - User must be registered.
  - User must be logged in.
- Post-Condition
  - Account is removed from the NavUp systems.

### **4.8.3 CA24: Login**

- Any user with an already existing NavUP account must be able to login.
- Pre-Condition
  - User must be registered.
- Post-Condition
  - User is logged in.

#### 4.8.4 CA25: Manage Profile

- The user is capable of managing his/her profile.
- Pre-Condition
  - User must be registered.
  - User must be logged in.
- Post-Condition
  - Update User Details.
- **Account Management Sub-System Case Diagram:**

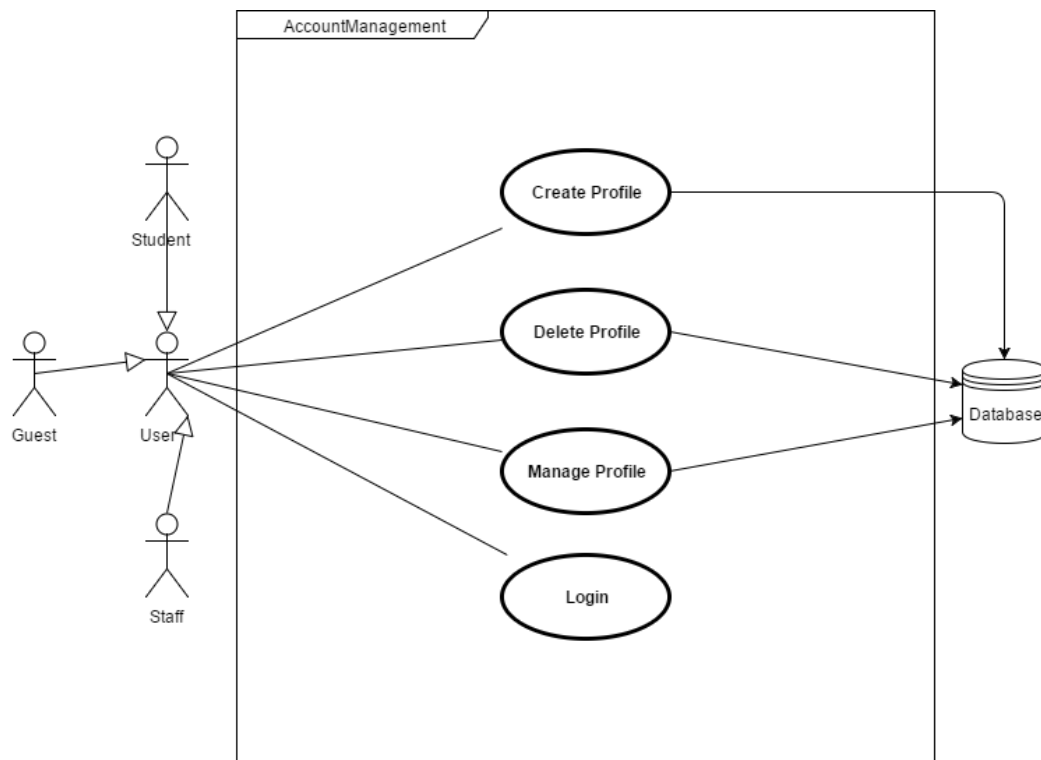


Figure 8: Account Management Sub-System Case Diagram:

## **4.9 Entertainment Sub-System**

### **4.9.1 CA26: View Event Nearby**

- The user will be able to view events which are nearby the users current location
- Pre-Condition
  - User must be registered.
  - User must be logged in.
  - User must have valid location.
- Post-Condition
  - Returns a list of nearby events.

### **4.9.2 CA27: View Location of Society**

- The user will be able to select from a list of Society and view there locations.
- Pre-Condition
  - User must be registered.
  - User must be logged in.
  - User must choose a balid Society.
- Post-Condition
  - Show location of Society on map
  - Extra option to navigate to location
- **Entertainment Sub-System Case Diagram:**

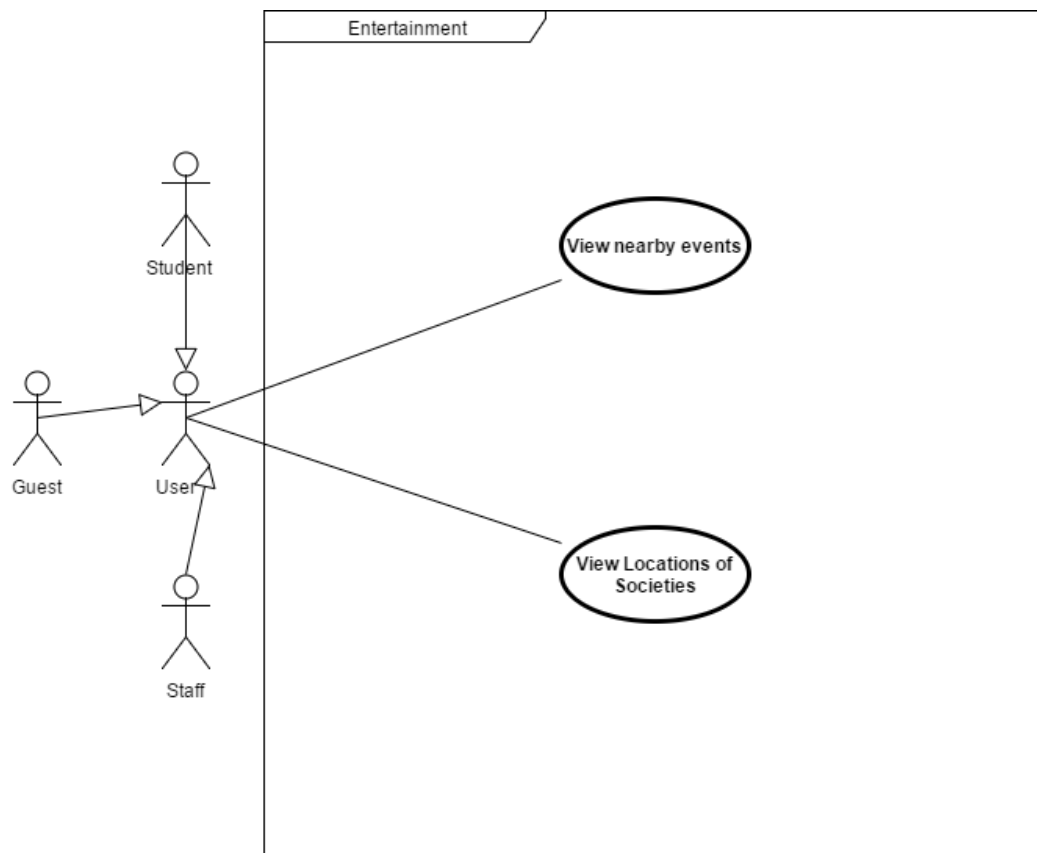


Figure 9: Entertainment Sub-System Case Diagram:

#### 4.9.3 CA28: Location Stats

- Location Stats Sub-System Case Diagram:

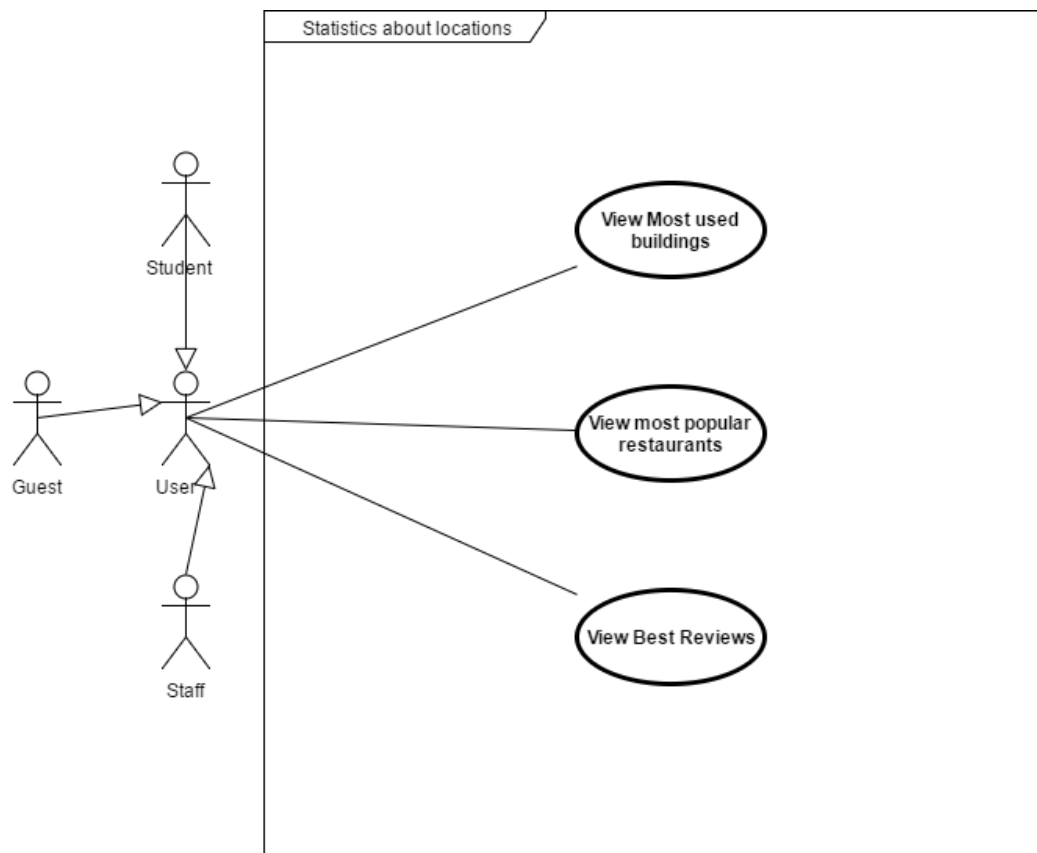


Figure 10: Location Stats Sub-System Case Diagram:

#### 4.9.4 CA29: Map Activity

- Map Activity Sub-System Case Diagram:

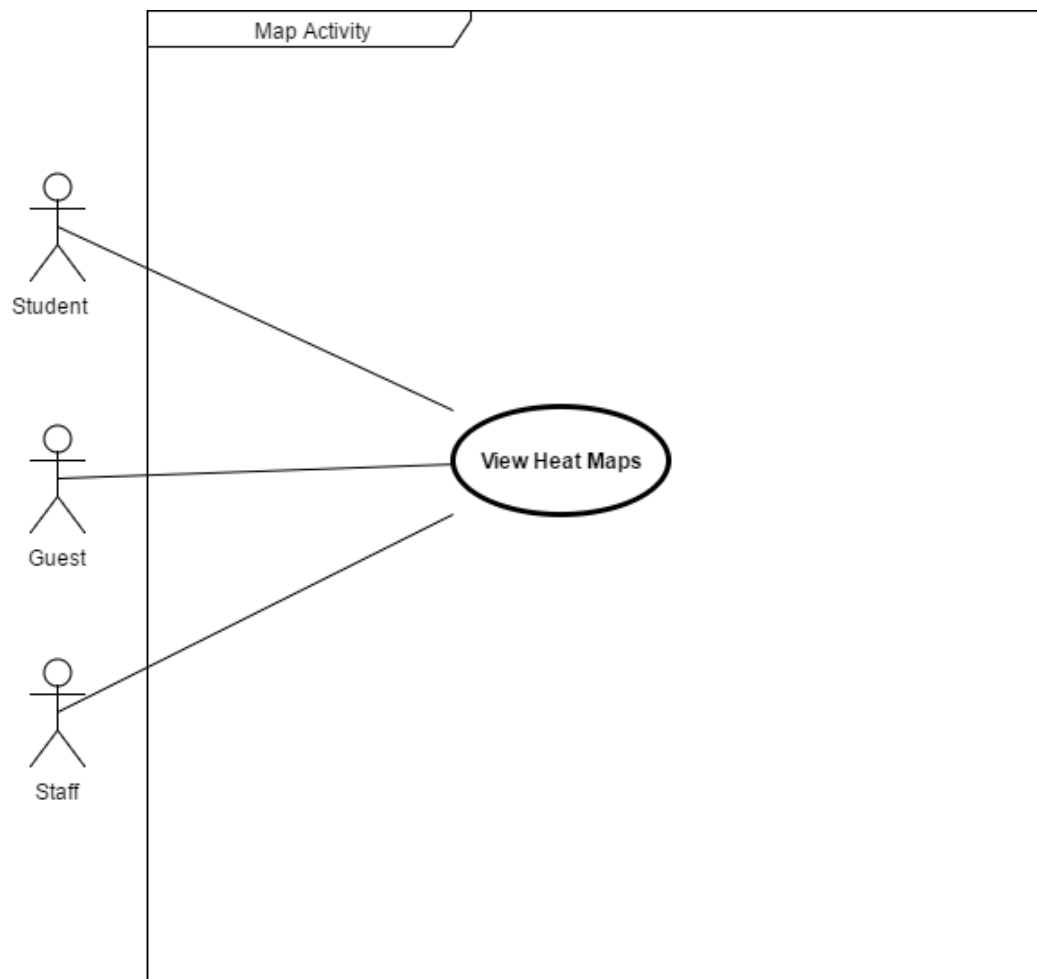


Figure 11: Map Activity Sub-System Case Diagram:

#### 4.9.5 CA30: Timetable

- Timetable Sub-System Case Diagram:



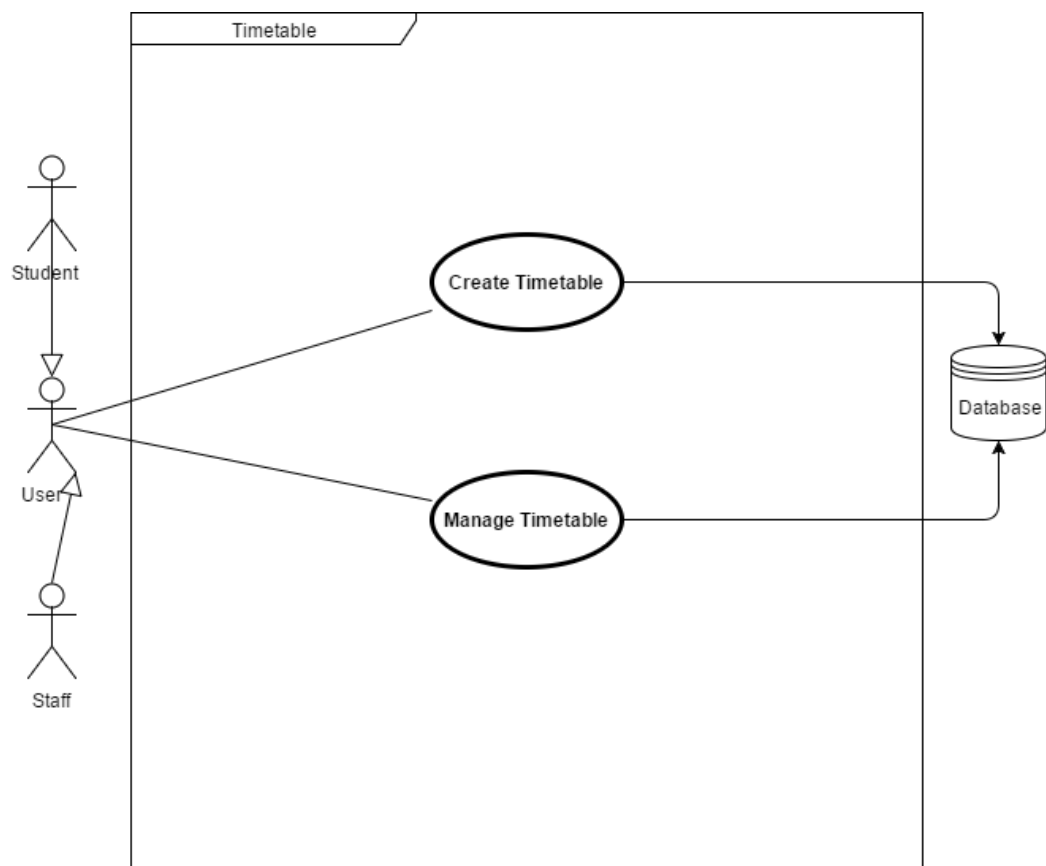


Figure 12: Timetable Sub-System Case Diagram:

#### 4.9.6 CA29: Achievements

- Achievements Sub-System Case Diagram:

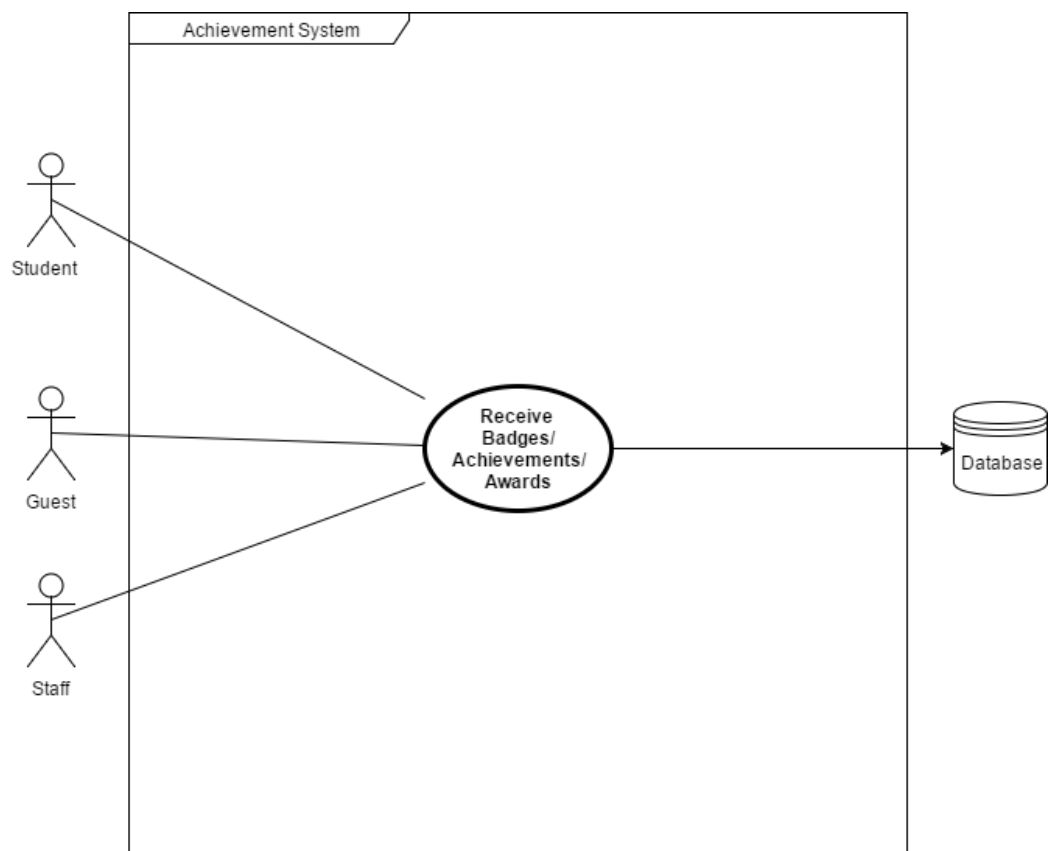


Figure 13: Achievements Sub-System Case Diagram:

## 4.10 Traceability Matrix

Table 1: Core Systems Traceability Matrix

Requirement	Priority	Use Cases								
		CA1	CA2	CA3	CA4	CA5	CA6	CA7	CA8	CA9
R-1	1	X								
R-2	2	X		X	X	X				
R-3	4		X	X						
R-4	3	X			X	X				X
R-5	5	X	X		X	X	X	X		
R-6	7								X	
R-7	8		X						X	
R-8	9	X	X							
R-9	3	X	X							
R-10	6		X							
R-11	7						X			
R-12	9									
R-13	4			X						
R-14	8			X						
R-15	5			X						
Use Case Priority		1	2	3	6	4	5	4	7	7

Table 2: Secondary Systems Traceability Matrix

Requirement	Priority	Use Cases								
		CA10	CA11	CA12	CA13	CA14	CA15	CA16	CA17	CA18
R-1	1									
R-2	2									X
R-3	4									
R-4	3		X	X						
R-5	5				X					
R-6	7	X	X	X						
R-7	8					X	X			
R-8	9			X		X	X			
R-9	3	X		X	X					
R-10	6									
R-11	7							X		
R-12	9				X					
R-13	4								X	X
R-14	8			X		X	X		X	X
R-15	5			X						
Use Case Priority		4	2	2	1	6	5	3	4	5

## 4.11 Actor-System interaction modelling

### 4.11.1 Save my location

<b>Actor: User</b>	<b>System: NavUP</b>
	0. Display users current location
1. User clicks on Save my location	2. System asks the user to confirm if they want to save the location
3 User clicks on confirm button.	4. System saves current location under the users name in the database.
	5. System displays that the location has been successfully saved

### 4.11.2 View saved location

<b>Actor: User</b>	<b>System: NavUP</b>
	0. Display users current location
1. The user clicks on view saved location	2. System displays a list of saved locations

#### 4.11.3 Get current location

<b>Actor: User</b>	<b>System: NavUP</b>
	0. Display campus map
1. Connect to campus wifi	2. Based on signal strength to each wifi router, triangulate the user position

#### 4.11.4 Get direction to location

<b>Actor: User</b>	<b>System: NavUP</b>
	0. Show destination location
1. Click on navigate to location	2. Calculate fastest paths to destination from current location
	3. Display the fastest paths in a list from fastest to slowest
4. Click on path that they want to travel	5. Start navigating to the destination by following the path that the user selected.

#### 4.11.5 Search for location

<b>Actor: User</b>	<b>System: NavUP</b>
	0. Display campus map
1. Search for the location name in the search bar, that they want to travel to or see more details about.	
2. Select the desired location from a list of matches	3. Display the location and information about it and give the user the option to navigate to the location

#### 4.11.6 View location detail

<b>Actor: User</b>	<b>System: NavUP</b>
	0. Display campus map
1. Scroll to a location on the map that they want to see more details about	
2. Select the desired location	3. Display information about the desired location

#### 4.11.7 Report a problem

<b>Actor: User</b>	<b>System: NavUP</b>
	0. Display users current location
1. Click on Report a problem	2. Display problem reporting form
3. Fill out form describing the problem, selecting the location and then clicking save to submit the problem	4. Indicate the problem on the map and display a description of the problem

#### 4.11.8 View heatmap

<b>Actor: User</b>	<b>System: NavUP</b>
	0. Display users current location
1. Click on view heatmap	2. Calculate how many people there are at a location based on how much traffic there is on a specific wifi router.
	3. Combine all the data calculated and create a map indicating where the most traffic is.
	4. Display the heatmap to the user