A black background with grey leaves

Description automatically generated

Coursework 2 – CSI\_4\_RAU

CyclingInLondon scenario

A grey logo on a black background

Description automatically generated

Student ID: 4214293

Table of Contents

[**Introduction** 2](#_Toc164626063)

[**Part 1: UML modelling** 3](#_Toc164626064)

[Stakeholder identification table (Internal stakeholders) 3](#_Toc164626065)

[Stakeholder Onion diagram – includes all stakeholders 5](#_Toc164626066)

[User stories 6](#_Toc164626068)

[*1.* *New cyclist/Registered user* 6](#_Toc164626069)

[*2.* *Casual visitors* 6](#_Toc164626070)

[*3.* *Experienced cyclists* 6](#_Toc164626071)

[*4.* *Cycling instructors* 6](#_Toc164626072)

[*5.* *Manager* 6](#_Toc164626073)

[*6.* *Executives* 7](#_Toc164626074)

[Use case Diagram 8](#_Toc164626075)

[ *New cyclist interactions* 8](#_Toc164626076)

[ *Casual visitor interactions* 9](#_Toc164626077)

[ *Experienced cyclists* 9](#_Toc164626078)

[ *Cycling instructors* 10](#_Toc164626079)

[ Manager 10](#_Toc164626080)

[ Executives 11](#_Toc164626081)

[Use case Description 12](#_Toc164626082)

[Activity Diagram 13](#_Toc164626083)

[Domain class diagram 15](#_Toc164626084)

[Database – data structures 16](#_Toc164626085)

[**Part 2: User Cantered Design (UCD)** 17](#_Toc164626086)

[Reference list 22](#_Toc164626087)

# **Introduction**

The purpose of the application is to allow new cyclists to book cycling sessions with experienced cyclists (cycling instructors), for them to essentially increase their confidence and experience before they start cycling and learn about how to effectively use cycle lanes and the safe cycling routes and practices.

# **Part 1: UML modelling**

## Stakeholder identification table (Internal stakeholders)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Stakeholder** | **Stakeholder Role/Responsibility** | **Importance** | **Influence** | **Interests/ Positive Impacts** | **Concerns** |
| New cyclists | Individuals who would like to gain cycling experience and confidence, when it comes to cycling in a city like London. | High, they’re important to the development teams as they’ll be contributing user stories, and they will be directly using the software. | Medium, their engagement, and feedback can change the features and contents of the app. | Being able to learn about cycling lanes, safe cycling routes and practices. | Software usability especially for people how don’t have high computer literacy level. |
| Casual visitors | Users can read information regarding cycling routes, cycling safety. They can ask questions by filling in a contact form. | Medium, potential future users of the application.  Their experience with the app is important, such as experience with the app’s UI and available information (for cycling).  Provide a positive experience for causal visitors can contribute to the app's growth. | Low, while they may contribute to the growth and the expansion of the app, they can provide feedback on improving the user experience. | Reading information, allowing them to increase awareness of different(safe) routes they can take whilst cycling in London.  Stay updated on the latest information.  Ask questions by filling out a contact form. | In order to book cycling sessions with an instructor, they need to register and also provide their contact details in order to comment on user’s posts. |
| Experienced cyclists | Individuals can register to become cycling instructors and teach new cyclists how to cycle through London. | Medium, they hold importance in terms of guidance and can suggest contributions to the app, which might be able to benefit new users who want to get into cycling. They can suggest features which will help people get into cycling, post about cycling advice. | Low, when they decide to become a cycling instructor it may not contribute to the growth and the success of the app. Their decisions will not impact the app's functionality and the decisions which are made by the managers. | Being able to share their knowledge and experience with new cyclists.  Providing ways to stay safe when cycling in London. | Getting their application rejected by the manager who assesses whether they’re fit enough to become an instructor.  Balancing responsibilities of being an instructor and their other commitments. |
| Cycling instructors | Individuals can post information which will benefit inexperienced cyclists to learn about the best ways to cycle in a city like London. | High, ensuring that new cyclists are trained for cycling in London. They specialise in teaching directly impact the quality of the cycling sessions offered through the app. | Medium influence on the app’s features and user experience – despite them not having any part in the decision-making of the application.  They create and post content and interact with the users on that platform. With their feedback and suggestions for improving the app’s services and features it can have a medium impact on meeting the cyclists need. | Being able to post information which will help inexperienced cyclists to learn about the best practices for safe cycling.  Allowing users to view and read the posts – including causal visitors. | Make sure that their profiles show their experience to build user’s trust.  Being able to communicate with the registered user before and during sessions. |
| Managers | Their role is to be able to run reports for checking when the app is used the most i.e. during peak times.  As well manage and organize cycling sessions for users and cycling instructors. | High, their decisions are what ensure that the app is used by multiple users.  They play a vital part when it comes to decision-making for the app so that they’re able to provide that service which is highly demanded by users. | High, when it comes to the app in terms of decision-making, policymaking, and ways to increase user engagement.  They play a crucial role in collaborating with stakeholders, solving problems, and finding ways to increase the app’s growth and number of users. | It is being able to manage and organize cycling sessions, such as posting information.  Looking at new instructor applications. | Ensuring that there is organization of the cycling sessions, such as routes, scheduling etc.  Ensuring that the instructor applications are looked at thoroughly and carefully so that the right decisions are made when recruiting new instructors. |
| Executives | They want to be able to attract as many users as they would, to encourage cycling in London. | High, they hold a role where their decisions basically, shape the app will run as they would like the app to attract many users to increase cycling in London, perhaps promoting a healthier lifestyle.  Executives set goals in the direction of the company/organization. | High, due to making strategic decisions as they give guidance and support to the management and development team.  The executives must rely on managers to make decisions which will benefit the growth and success of the app.  Being able to attract and retain users will be influenced by the impact of cycling in London, alongside the executive goals. | They’re interested in the overall success of the system as well as the user engagement of the application. | Making sure, that cycling gets promoted via the CyclingInLondon app to encourage people to live a healthy lifestyle and not travel by car.  Ensure that the user’s data is stored in a private and secure area, to prevent data breaches from happening. |

**Figure 1.1 – Stakeholder Identification table**

I have taken guidance from, (American Society for Quality, 2017) to help me construct my stakeholder diagram.

## Stakeholder Onion diagram – includes all stakeholders

## A blue circle with orange text Description automatically generated

**Figure 1.2 – Stakeholder onion diagram**

To create the onion diagram, I have taken help from, (www.youtube.com, 2014).

* An onion diagram contains all the stakeholders (both external and internal stakeholders) for the CyclingInLondon application i.e. people who are interested or affected by the product directly or indirectly. The following stakeholders are:
  + **Core stakeholders** – stakeholders who will be interacting with the system frequently:
    - *Users (casual and registered)*
    - *Cycling instructors*
  + **Supporting stakeholders** – stakeholders (external groups) who have an interest in the application and what it has to offer – they take part in any decision making:
    - *Mangers*
    - *Executives*
  + **External stakeholders** – individuals who work outside the company or organization.
    - *Competitors* – Other companies or apps which offer similar services (i.e. cycling services in London)
    - *Politicians* – politicians such as the Green Party might be interested in the app and how it will change the way others travel in London, like using public transport, biking to different places over taking a car. I.e. concerned with reducing carbon emissions in London.
    - *The public* – They’re interested in the app and will consider downloading it to get the latest information regarding cycling, as they may be travelling into London by bicycle, or they may want to get trained to cycle comfortably in London.
    - *Cycling community groups* – Those people who recommend cycling safety and infrastructure improvements for CyclingInLondon. As these communities will be interested in the app and may be able to start their community on the app and post about cycling and safety information as well other community events.

## User stories

### *New cyclist/Registered user*

* “I as a new cyclist would like to book cycling sessions with experienced cycling instructors, so that I can learn to cycle and feel safe whilst cycling.”
* “I as a new cyclist, want to be able to comment on user’s posts, and submit posts on the app, to ensure that there is clarity amongst the users as well as build connections on that platform.”
* “I as a new cyclist, would like to be able to share and save new routes with other users using the platform.”
* “I as a new cyclist, want to be able to see a confirmation message that my cycling session has been booked successfully, with details such as the date/time, location, instructor name, and profile picture.”

### *Casual visitors*

* “I as a visitor, would like to be able to read/access cycling information, so that I am able to stay up to date with the latest information”.
* “I as a visitor, want to have the option of becoming a registered user, if I ever decide to use the app’s full features”.
* “I as a visitor, would like to be able to ask questions, even if I need to fill in my contact details.”

### *Experienced cyclists*

* “I as an experienced cyclist, want the application to provide up to date information about cycling lanes and road conditions, so that I am able to post information as well as answer questions users have related to cycling in London”.
* “I as an experienced cyclist, would like to have a feature within the app, where I can apply for becoming a cycling instructor”.

### *Cycling instructors*

* “I as a cycling instructor, want to be able to view which sessions I need to do and which I have completed, so that I can keep track”.
* “I as a cycling instructor, would like to be able to conduct cycling sessions, as I would like to be able to share my experiences with other inexperienced cyclists.”
* “I as a cycling instructor, would like to have the ability to post information and be able to answer the user’s questions to ensure that there is clarity”.

### *Manager*

* “I as a manager, it is crucial that I can look at instructor applications so that I can recruit the best cycling instructors and ensure that they deliver quality cycling classes to inexperienced cyclists”.
* “I as a manager, would like to have access to real-time reports for checking the app’s performance and user activity.”
* “I as a manager, would like to have a feature where I can communicate effectively with the instructors and users of the app, to provide whatever support they need”.

### *Executives*

* “I as an executive, want to ensure that the application aligns with the goals of increasing cycling in London and promoting a healthier lifestyle.”
* “I as an executive, want to ensure that the app has security measures and regulations put into place to protect user’s data”.
* “I as an executive, want to be able to check the success of the app through data visualisation like pie charts, line graphs etc.”

For all the diagrams down below in the modelling part (part 1), I have used Visual paradigm (Visual-paradigm.com, 2018).

## Use case Diagram

### A diagram of a person with text Description automatically generated*New cyclist interactions*

**Figure 1.2.1 – New cyclist Use Case Diagram**

* Use case diagram relating to new cyclist use cases:
  + Selecting session, i.e. viewing, and selecting a particular date/time and location is included before confirming the booking of a cycling session – viewing the session information. Once user confirms session the user can receive to a confirmation notification (either via email or SMS – depending on what the user selects) telling them their session has been booked successfully – once the booking has been confirmed.
  + Comment on posts, the user being able to view other user’s posts and add their own comments to the other user’s posts.
  + View route information, allowing the user to check for information regarding a specific route, save that specific route and share it with other users using the application.
  + Creating an account, allows the new cyclist to gain access to features like booking a cycling session.

### *Casual visitor interactions*

A diagram of a person with text

Description automatically generated

**Figure 1.2.2 – Casual visitor interactions Use Case Diagram**

* Use case diagram relating to Casual visitor use cases:
  + Access/read information cycling information, allowing casual visitors to stay up to date with the latest cycling information.
  + Filling out a contact form if they would like to ask questions.
  + Register as new cyclist (user), it allows them to access the app’s other features, booking cycling session etc.

### *Experienced cyclists*

A diagram of a person with text

Description automatically generated

**Figure 1.2.3 – Experienced cyclists interactions Use Case Diagram**

* Use case diagram relating to experienced cyclists use cases:
  + Being able to apply for a cycling instructor role, to help those inexperienced cyclists learn ways of cycling in London.
  + Create a profile, which will allow registered users to view what experience they must’ve to ensure people (who would like to learn how to cycle) to have the confidence in the trainer themselves. Allowing the experienced cyclists to have the ability to view their own profile as well being able to edit their profile.

### *A diagram of a person with text Description automatically generatedCycling instructors*

**Figure 1.2.4 – Cycling instructors interactions Use Case Diagram**

* Use case diagram relating to cycling instructor use cases:
  + Post information which will help inexperienced cyclists, allowing them to learn the best practices for safe cycling.
  + Answer questions related to cycling – asked by registered users, to ensure that there is clarity amongst the users.
  + Conduct cycling sessions for inexperienced cyclists to help them get started in Cycling in London.

### A diagram of a person with text Description automatically generatedManager

**Figure 1.2.5 – Manager interactions Use Case Diagram**

* Use case diagram relating to manager use cases:
  + Looking at instructor applications, managers will ensure that the correct applicants are picked for becoming an instructor.
  + Being able to manage and organise cycling sessions will ensure that there are cycling sessions available to book with different cycling instructors. So that users can have the option to book from a variety of different instructors.
  + Posting session information such as date/time and the certain routes which are available for everyone to view.

### Executives

A diagram of a person with text

Description automatically generated

**Figure 1.2.6 – Executive interactions Use Case Diagram**

* Use case diagram relating to executive use cases:
  + Reviewing the success of the application, with the goals of increasing cycling in London.
  + Promoting safer ways of cycling in London, through cycling sessions, courses relating to cycling safety etc.
  + Finding ways to find and attract users to the application, so that it aligns with goals of the application.

## Use case Description

|  |  |  |
| --- | --- | --- |
| **Use case name:** | Booking cycling sessions with cycling instructors | |
| **Scenario:** | Users, such as new cyclists who would like to book cycling session with cycling instructors (who have experience in cycling in cities like London), to increase their confidence in cycling. | |
| **Triggering event:** | The user (new cyclist) basically starts the process of booking a cycling session with the cycling instructor. | |
| **Brief description:** | New cyclists would like to book cycling sessions with experienced cycling instructors so that they can increase their confidence and cycling skills. | |
| **Actors:** | New cyclist, Cycling instructor, Manager | |
| **Related use cases:** | Selecting booking, receive booking, view available sessions, confirm booking | |
| **Stakeholders:** | New cyclist, Cycling instructor, Manager | |
| **Preconditions:** | * The user (new cyclist) must be registered and logged into the CyclingInLondon. * Cycling instructors are assigned to available sessions and they’re able to select which days and timings they can do. * Whichever cycling sessions are available, they’re scheduled by the manager. | |
| **Postconditions:** | * The user was able to book the session for the specific date/time location. * The cycling instructor has received a notification that the user has booked a session for that specific date/time. * The manager will update the session booking and which sessions the instructor is going to take on. | |
| **Flow of activities:** | **Actor** | **System** |
| 1. The user logs in to book cycling sessions. 2. The user selects the book sessions icon from the app’s menu. 3. The user will be selecting a session (booking) – depending on their preference. 4. Once the user is satisfied with their booking, they confirm their booking for the selected session. | 1. It will verify the user’s login details. 2. It will display the available date, time, and instructor. 3. It will check whether that instructor is available for that session, selected by the user. 4. The system will process the confirmed booked session and once the booking is successful, it will display the booking details (i.e. date/time, location, and instructor). |
| **Exception conditions:** | 1. Network connection failure/problem – The system will ask the user (new cyclist) to rebook their session once they have a connection (Wifi or 4G or 5G signal).  2. Session fully booked – the system will notify the user to tell them that the session is fully booked, therefore suggest the user alternative options to choose from.  3. Instructor unavailability – the system will ask the user to choose another session where an instructor is available or wait for instructors to be available for a cycling session.  4. Login details incorrect – the user will be prompted to enter their login details until they’re correct. | |

**Figure 1.3 – Booking cycling sessions Use Case Description**

## Activity Diagram

A diagram with blue squares and text

Description automatically generated

**Figure 1.4 – Activity Diagram for booking cycling session**

I have used (GeeksforGeeks, 2017), to help me create the activity diagram.

Representation of an activity diagram of booking a cycling session:

* User Login:
  + The process begins by the user logging into the CyclingInLondonApp.
  + The system will verify the user’s credentials, ensuring that their username, password is correct. Ensuring that the user is authenticated whilst they’re using the App.
  + Once the user is logged in, they’re able to access the app’s features.
  + If not, the user will be promted to login again.
* Session booking:
  + Once the user has been successfully logged in, the user will be able to select the book session icon, to book a cycling session with an instructor.
  + The system will display the date/time with an associated instructor for that date/time.
  + The user will be able to select a session to book.
* Confirmation of session booking:
  + Upon the user selecting a session booking, the system will ensure that the instructor is available for the selected session.
  + Once the system has approved session booking availability, the user will be able to confirm their session booking.
* Bicycle confirmation:
  + The system will ask the user whether they have a bicycle.
  + If they have a bicycle, the booking process will continue.
  + Otherwise, if they don’t have a bicycle, the system will output to the user that they must have a bicycle to attend the session, since they can’t supply others with bicycles (for the cycling session), thus making it a requirement.
* Health problem:
  + The system will ask the user of any health problems.
  + If they don’t have any health problems, then the user can proceed with the booking process.
  + Otherwise, they will need to specify their following health problem.
* Final confirmation:
  + Once the user has dealt with specifying health problems (if applicable) and if they own a bicycle.
  + The system will confirm the user’s booking and finalize the booking (session) details.
  + The system will then send a confirmation message either via the app, SMS, or email to the user regarding their session details, such as date, time, instructor, and any additional information for the instructor to know about the user on the day of the session.

## A diagram of a computer Description automatically generatedDomain class diagram

**Figure 1.5 – Domain class diagram**

I have used (Visual Paradigm, 2019), to help create a domain class diagram.

The app contains a one-to-many relationship with users, cycling instructors, cycling session, posts, comments, routes, and shared routes. Users can be taught by many cycling instructors and one instructor can teach one session at a time. In the posts and comments class, one comment can be associated with one post and a post can have multiple comments under one post. A shared route would be associated with one route. A manager can create multiple posts and have one account associated with them. They’re able to post multiple comments under one post and have one app usage report associated with them. An executive has one account associated with them and will be checking on multiple different managers. Each executive will have their app usage report created for them.

## Database – data structures

Users (UserID, FirstName, LastName, UserName, Password, Email, UserType, PhoneNumber)

CyclingInstructor (InstructorID, UserID\*, Biography, Experience, PhoneNumber)

CyclingSession (SessionID, InstructorID\*, Date, Time, Route, Maxparticipants, Availableparticipants)

Posts (PostID, UserID\*, Title, Content, DatePosted)

Comments (CommentID, PostID\*, UserID\*, Comment, DateCommented)

Route (RouteID, UserID\*, StartingPoint, EndPoint, Description, Dateadded)

SharedRoutes (SharedRouteID, RouteID\*, UserID\*, DateShared)

AppUsage (UsageID, UserID\*, UsageDate, UsageTime)

Managers (MangerID, UserID\*, Department, Responsibilities, DateHired, SessionsAssigned, Reports)

Executives (ExecutiveID, UserID\*, Position, Department, Responsibilities, DateHired, Reports)

# **Part 2: User Cantered Design (UCD)**

**A screenshot of a calendar

Description automatically generated**A screenshot of a phone

Description automatically generatedThis section shows the wireframes which have been created using Mockflow, Wireframepro (wireframepro.mockflow.com, n.d.) for the CyclingInLondon app. These wireframes demonstrate usability principles such as consistency, visibility, mapping, feedback, learnability, efficiency, and navigation.

A screenshot of a phone

Description automatically generated

**Figure 2 – Login screen Figure 3 – Home screen Figure 4 – Book session screen**

**A screenshot of a phone

Description automatically generatedA screenshot of a cell phone

Description automatically generated**

**Figure 5 – Cycling Session information screen Figure 6 – Bicycle confirmation screen**

A screenshot of a phone

Description automatically generated**A screenshot of a phone

Description automatically generated**

**Figure 7 – Health problem inquiry screen**  **Figure 8 – Cycling instructor screen**

**A white rectangular object with black text

Description automatically generated**

**Figure 9 – Booking confirmation screen**

A screenshot of a phone

Description automatically generatedA screenshot of a phone

Description automatically generated

**Figure 10 – Route planning screen**  **Figure 11 – Route sharing screen**

**A screenshot of a chat

Description automatically generated**A screenshot of a phone

Description automatically generatedA screenshot of a map

Description automatically generated

**Figure 12 – Shared route screen**  **Figure 13 – Comments screen** **Figure 14 – Reports dashboard screen**

* **Consistency** – when creating the UI for the different wireframes, it maintains a consistent layout, good design element, and interaction patterns across all the wireframes that have been created to ensure that the CyclingInLondon app allows users to have a familiar and enjoyable experience when using the app.
* **Visibility** – Clear icons and buttons have been provided to the user, to ensure that the user gets a sense about what they should click on, or what they are going to do next.
* **Mapping** – For booking a cycling session page of the app, the next button is used to go to the next stage of the booking process, and the previous button is used to go back to the previous page of the booking process. Furthermore, on all the different wireframe pages the user will have the ability to access their app settings, and their profile, and go back to the homepage. Therefore, users can understand the app’s easy-to-use features.
* **Feedback** – The user interface can output a message to tell the user that their cycling sessions are booked, their date/time and place.
* **Learnability** – The user interfaces have been designed, to be easy for the users to use, with clear instructions and clean layouts. Without any complexity allowing the user to quickly learn and use the application. Making it appropriate for all ages.
* **Efficiency** – The user interface is optimized to carry out and execute tasks efficiently using different buttons/icons which take users to different pages of the application and allow them to carry out their different tasks.
* **Navigation** – Clear menu items like icons and buttons ensure that the users can use the app seamlessly whilst being able to access the different features and move between different screens with ease.

# Reference list

1. American Society for Quality (2017). *What are stakeholders?* [online] Asq.org. Available at: https://asq.org/quality-resources/stakeholders [Accessed 18 Mar. 2024].
2. GeeksforGeeks (2017). *Unified Modeling Language (UML) | Activity Diagrams - GeeksforGeeks*. [online] GeeksforGeeks. Available at: https://www.geeksforgeeks.org/unified-modeling-language-uml-activity-diagrams/ [Accessed 22 Mar. 2024].
3. Visual Paradigm (2019). *UML Class Diagram Tutorial*. [online] Visual-paradigm.com. Available at: https://www.visual-paradigm.com/guide/uml-unified-modeling-language/uml-class-diagram-tutorial/ [Accessed 23 Mar. 2024].
4. Visual-paradigm.com. (2018). *Free UML, BPMN and Agile Tutorials - Learn Step-by-Step*. [online] Available at: https://www.visual-paradigm.com/tutorials/ [Accessed 30 Mar. 2024].
5. wireframepro.mockflow.com. (n.d.). *MockFlow WireframePro - Viewer*. [online] Available at: https://wireframepro.mockflow.com/view/MHRZBxvOPh [Accessed 27 Mar. 2024].
6. www.youtube.com. (2014). *Create an Onion Chart*. [online] Available at: https://www.youtube.com/watch?v=joaNY0EQ3iQ&t=125s [Accessed 6 Apr. 2024].