1 General Description

1.1 General Purpose

The purpose of the designed web application is to act as a Strategic Awareness Game that helps train employees in Cyber Security. The Game will be conducted as an interactive survey in which a situation is described to the employees and they will have to choose the best course of action to take. The situation presented along with the questions posed are part called a **Scenario**. Each Scenario is split up into **Stories** where each Story is concerned with a specific phase or theme in the Scenario. Each Story is composed of slides (called **Injects**) that constitute the main building blocks of a Scenario and are what will ultimately be presented to the Participants. An Inject can either contain some text and an image that describe the situation or a question that the employees must answer. Initially, a Scenario will be created and stored in the local database, however a Scenario that is instatiated (being presented) is called a Game.

1.2 Layout of Strategic Awareness Game

There are two kinds of users in the Strategic Awareness Game: Admins and Participants (the employees). Generally, there will be a main presenter screen on which the Admin can display the Injects and any other necessary information such as answer statistics. Additionally, the Admin will have his/her own private screen from which he/she can control and monitor the progress of the Game. Participants can access the Game through their own phones or laptops using a URL and ID that will be given to them. In addition to viewing the Injects being displayed, Participants can use their personal devices to submit answers to the questions being posed throughout the Game. Note that Participants can only access a Game not a Scenario meaning that Scenarios that have not yet been instantiated by an Admin will remain inaccessible to Participants even if they have the correct URL and ID. Figure 1.1 displays the general layout of the Strategic Awareness Game where an Admin uses his private screen to control the Game that is being presented on the presenter screen. Furthermore, the Participants are using their personal devices to submit their answers which can be displayed by the Admin on the presenter screen in the form of charts (e.g pie or bar charts).

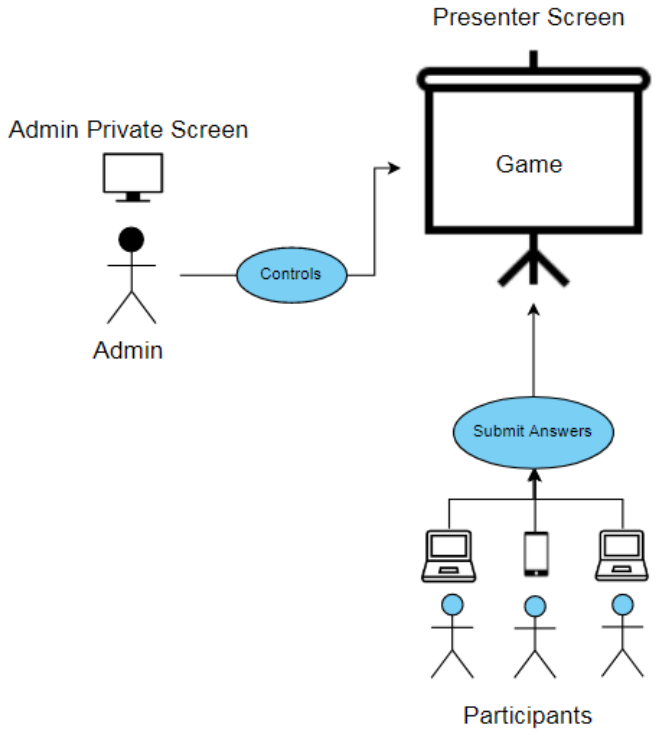

Figure 1.1: General layout of the Strategic Awareness Game

1.3 Users

1.3.1 Admins

Admins have the ability to create, view, edit, delete, duplicate, or present Scenarios. Admins also have access to statistical data about the answers submitted for each question and they can decide to show this data to Participants in the form of charts (e.g. bar, pie charts) on the presenter screen. Admins can also download the Scenario statistics for later reference.

1.3.2 Participants

Participants, on the other hand, can only take part in a survey being presented by an Admin. To join in on the survey, Participants will be shown a URL and ID which they can use to access the Game through their personal phones or laptops. From there, Participants will be able to see the Injects as they are being presented and also submit their chosen answers for MCQs.

1.3.3 Moderator

Additionally, there can also be a third kind of user called a Moderator. Like the Admin, the Moderator can view or present Scenarios and download the Scenario statistics. However, the Moderator cannot create, duplicate, edit, or delete Scenarios.

2 Functional Requirements

The following table lists the Functional Requirements for the Strategic Awareness Game. Note that the Priority field can either be Mandatory or Optional and is used to signify whether or not a Funcitonal Requirement is essential during the development the web application.

Number	Requirement	Priority
F1	There will be three kinds of **users**:	
(a)	Admin	M
(b)	Participant	M
(c)	Moderator	O
F2	A presentation/survey is also called a **Scenario**. Participants can access the Scenario by using a **URL** and **ID** given to them.	M
F3	Each **Scenario** is divided into one or more of **Stories** and each Story has one or more of slides called **Injects**.	M
F4	There are two kinds of **Injects**:	
(a)	**Input Injects**: Contain a question the Participants must answer by:	
i.	Selecting one of the possible answers	M
ii.	Selecting a number of the possible answers	O
iii.	Typing their answer in a textbox	O
(b)	**Static Injects**: Further progress the Story without requiring any input from the Participant	M
F5	Injects can have one of two **states**:	
(a)	**Open**: This state means that Participants can still submit their answers	M
(b)	**Closed**: This state means that voting is now closed for Participants	M
F6	Each **Input Inject** can contain :	
(a)	A headline/title	M
(b)	Question Text	M

(c)	List of answer choices	M
(e)	Hidden script (called **Command**) that will run in the background. This can only be seen by Admins.	O
F7	For each Input Inject, answer statistics include:	
(a)	Chart representing answer choice distribution	M
(b)	Number of people that actually voted	M
	and are stored for :	
(c)	The latest Game session	M
(d)	All Game sessions	O
F8	Each **Static Inject** can contain:	
(a)	A headline/title	M
(b)	Text or Image	M
(c)	Hidden script (called Command) that will run in the background. This can only be seen by Admins.	O
F9	The **Admin can** do seven things:	
(a)	Create a new Scenario	M
(b)	View a list of existing Scenarios	M
(c)	Edit an existing Scenario	M
(d)	Delete an existing Scenario	M
(e)	Download the answer statistics for a Scenario	M
(f)	Copy/duplicate an existing Scenario	M
(g)	Present an existing Scenario	M
	However the **Admin cannot**:	
(h)	Edit/present Scenarios that are currently being edited/presented by another Admin	M
(i)	Manipulate the statistics of a Scenario	M
F10	While **creating/editing** a Scenario the Admin can:	
(a)	Receive a warning if editing the Scenario will delete previously stored answer statistics	
(b)	Edit Scenario properties including:	
i.	Background image or color	O
ii.	Font color	M
iii.	Logo	M
(c)	Add new Injects	M
(d)	Rearrange the order of Injects	O
(e)	Delete/edit existing Injects	
	However, editing the answers of an Inject will clear it's statistics.	M
F11	While **copying/duplicating** a Scenario:	
(a)	All answer statistics for the new Scenario are set to zero	M
(b)	All Stories and Injects are copied to the new Scenario	M
F12	While **presenting** a Scenario the Admin can:	
(a)	Display the Scenario URL and ID to Participants so they can join	M
(b)	Start a Game	M
(c)	Navigate to the next Inject and back	M
(d)	Change the Inject state from Open to Closed and vice versa:	
i.	Manually	M

ii.	By setting a Timer that will be displayed on :	M
1)	Admin Private Screen	M
2)	Presenter Screen	M
3)	Participants' Screens	O
(e)	Display answer statistics for the Participants to see in the form of a chart (e.g. bar or pie chart) on:	
i.	The presenter screen	M
ii.	The Participants' screens	O
(f)	End a Game	O
F13	Each **Participant can**:	
(a)	Join in on a Scenario using the URL and ID given by the Admin	M
(b)	View answers he has previously submitted. However he cannot change/resubmit his answers	M
	However **Participants cannot**:	
(a)	Access the Scenario if an Admin has not yet activated it	M
(b)	Navigate to the next Inject before the Admin	M
F14	The **Moderator can** do two things:	
(a)	View existing Scenarios and their last answer statistics	O
(b)	Present an existing Scenario (F12)	O

3 Non-Functional Requirements

The following table lists the Non-Functional Requirements for the Strategic Awareness Game. Note that the Priority field can either be Mandatory or Optional and is used to signify whether or not a Non-Funcitonal Requirement is essential during the development the web application.

Number	Requirement	Priority
NF1	The Strategic Awareness Game is expected to **support** up to 200 users (including Admins and Participants).	M
NF2	The Strategic Awareness Game will be at least 95 percent **available**, where availability equals the ratio of up time to the sum of up time and down time and where up time is considered when the Application can support 200 users.	M
NF3	The Strategic Awareness Game will have a **latency** of less than 3 seconds.	M
NF4	The Strategic Awareness Game will be highly **usable** requiring a training time of less than 15 minutes before the Admin and Participants are fully capable of using it.	M
NF5	The Strategic Awareness Game will have a **capacity** of upto 100 Scenarios where each Scenario can contain upto 200 Injects.	M
NF6	The Strategic Awareness Game's database of answer statistics will be **secure** from any manipulation whether by an Admin or any external parties.	O
NF7	The Strategic Awareness Game will have detailed **documentation** to allow further scaling by other developers.	M

NF8	The Strategic Awareness Game will be a mobile responsive web applicaiton.	M

4 User Interface

4.1 Participant UI

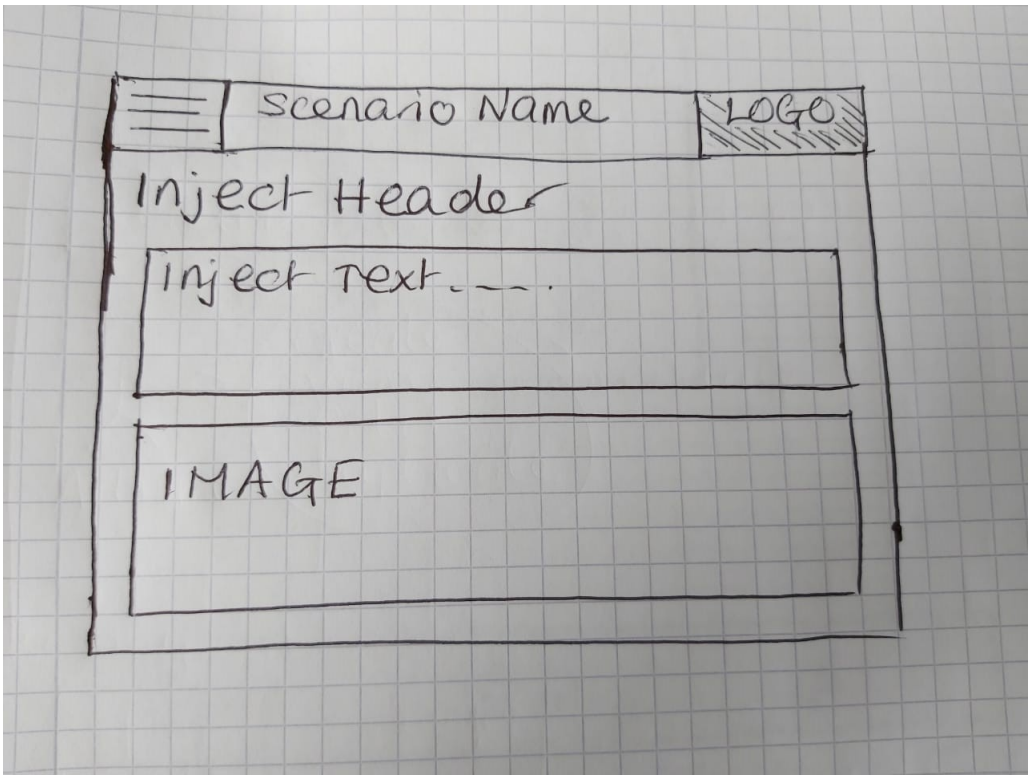

Figure 4.1: Particpant UI with Static Inject

Figure 4.1 shows the Participant UI when a Static Inject is selected. By clicking on the top left menu icon the Participant can view a list of all available Injects as shown in figure 4.2.

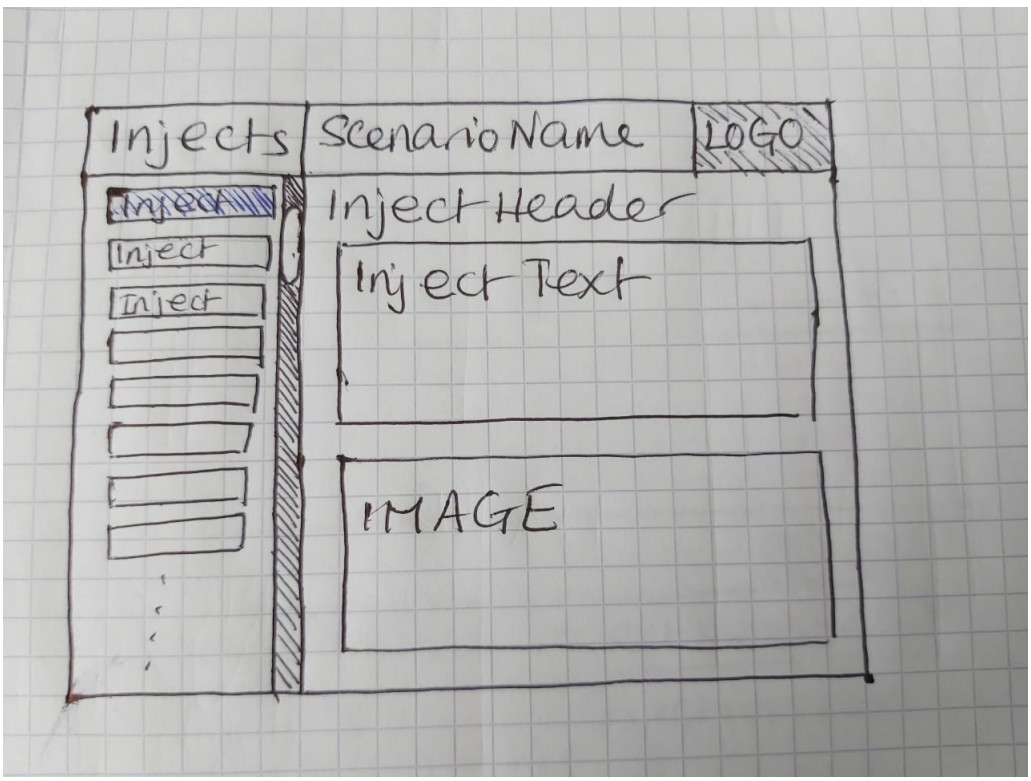

Figure 4.2: Participant UI with Injects List displayed

4.2 Admin View Mode UI

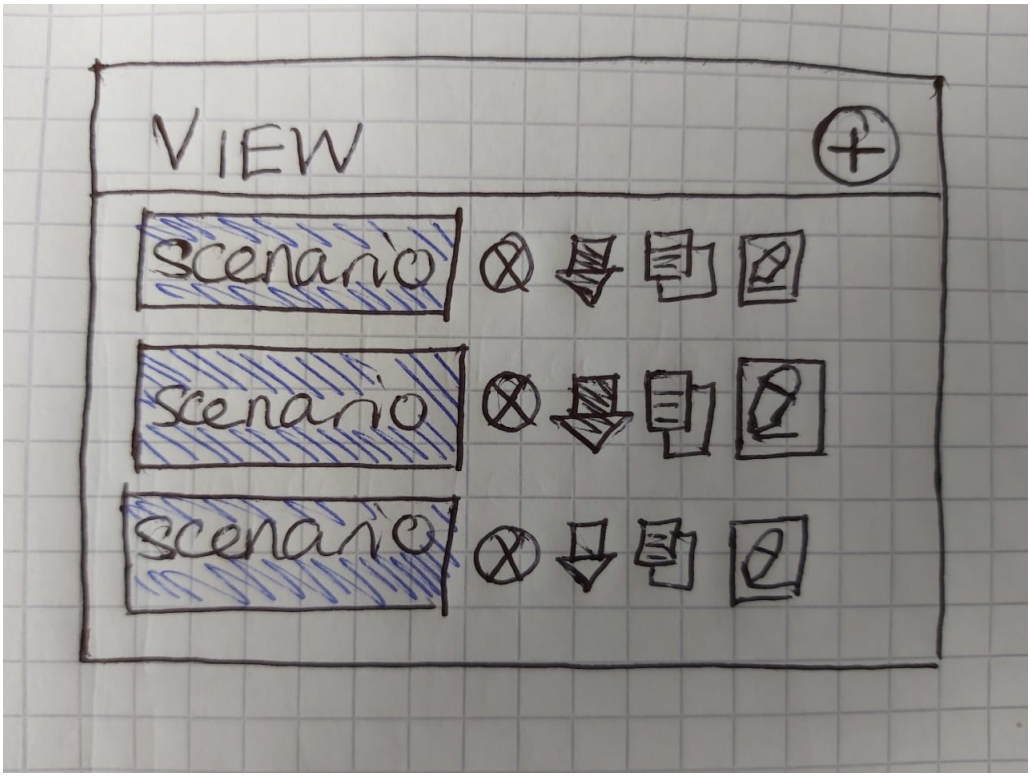

Figure 4.3: Admin View UI of Scenario List.

Figure 4.3 displays the screen that Admins will see when they login. The screen displays all the Scenarios that have been created and beside each Scenario are buttons responsible for deleting, downloading statistics, duplicating, and editing respectively.

4.3 Admin Edit Mode UI

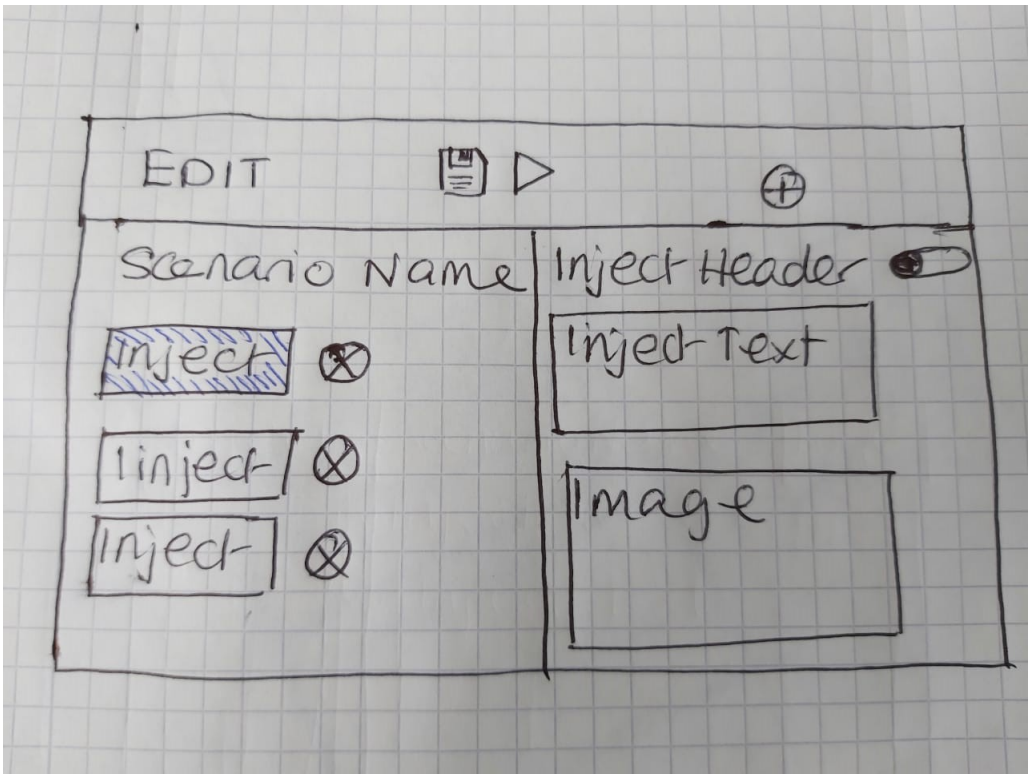

Figure 4.4: Admin Edit UI (Static Inject).

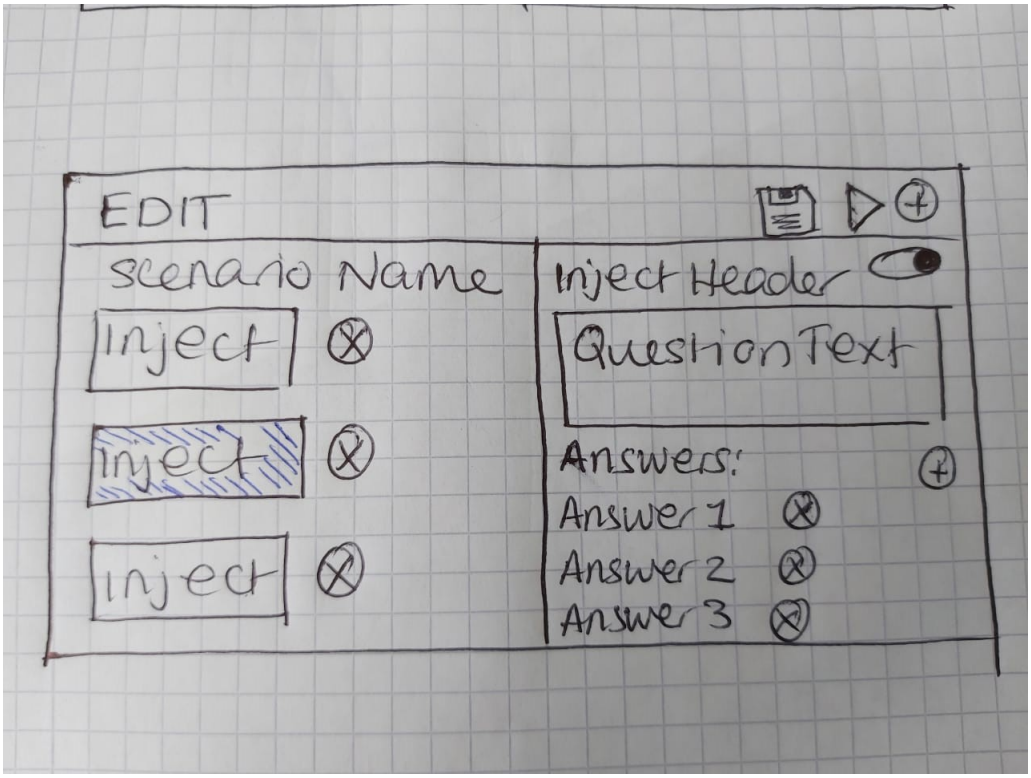

Figure 4.5: Admin Edit UI (Input Inject).

Figures 4.4 and 4.5 display the Edit screen visible to Admins. On the left panel is the Scenario Name along with the Injects it is composed of.

On the right panel, the Admin can select the Inject type by using the toggle on the top right corner. Afterwards, the Admin can either add an image or an answer depending on the type of Inject.

4.4 Admin Present Mode UI

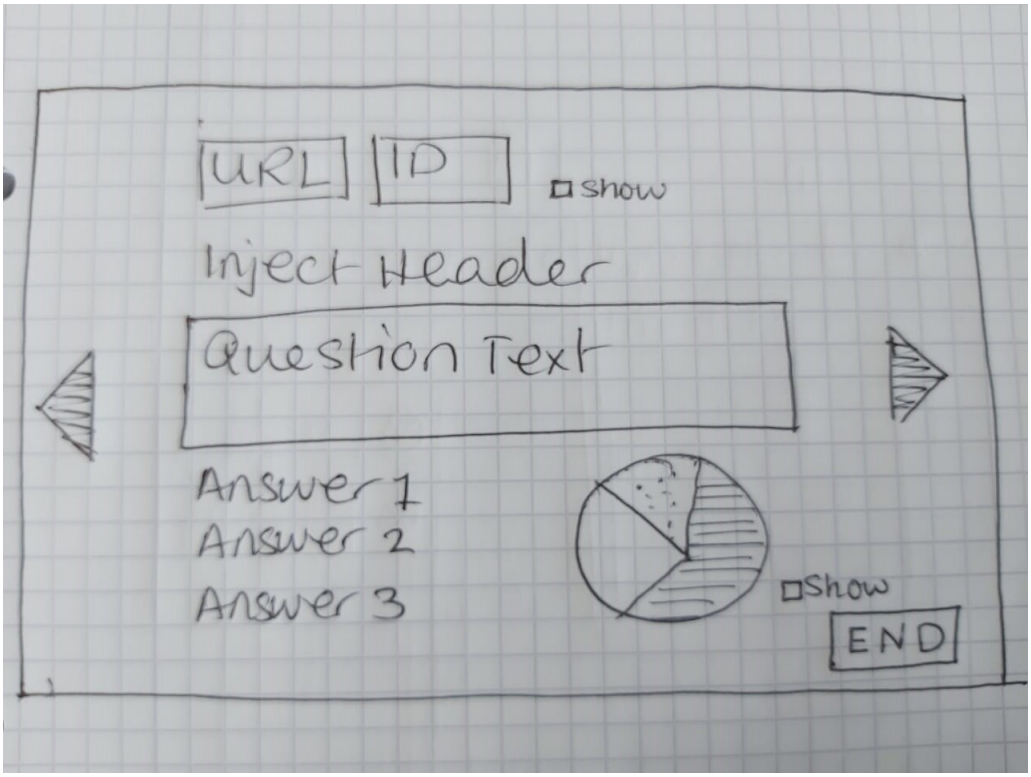

Figure 4.6: Admin Secret Screen with Input Inject.

Figure 4.6 displays the Admin's Screen with an Input Inject. The Admin can navigate to the next Inject using the two arrow buttons on the side of the screen. Also he has the option to show or hide the Scenario URL and ID or the statistical chart for the Participants to see on the main presenter screen.

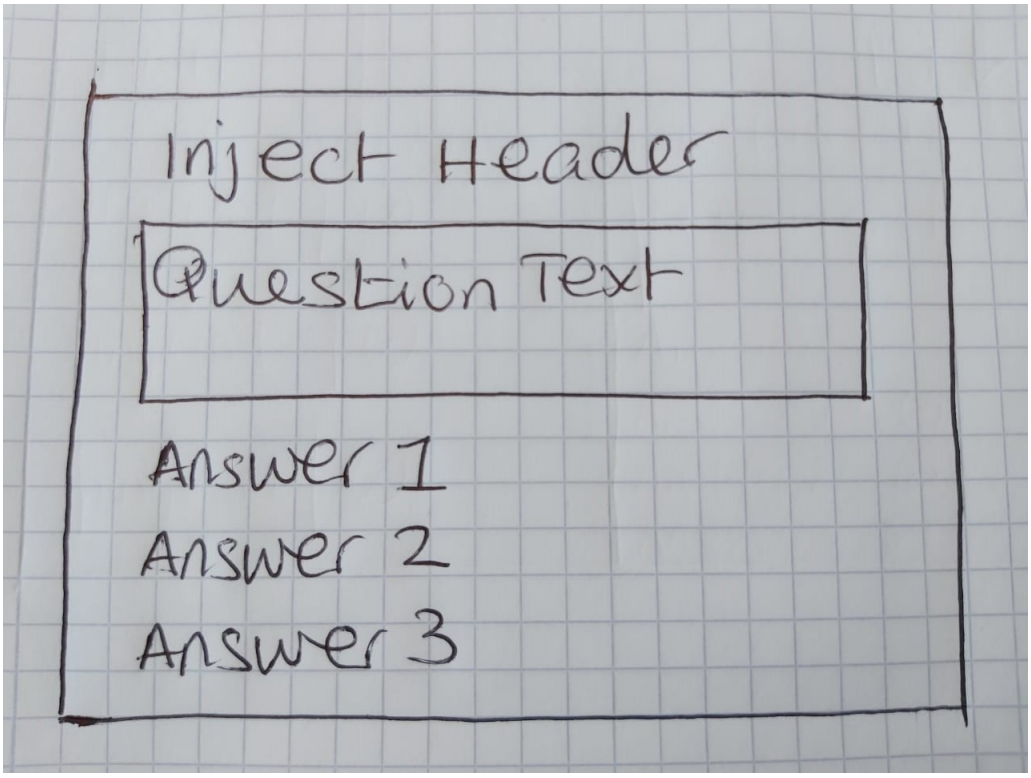

Figure 4.7: Main Presenter screen before Admin displays chart.

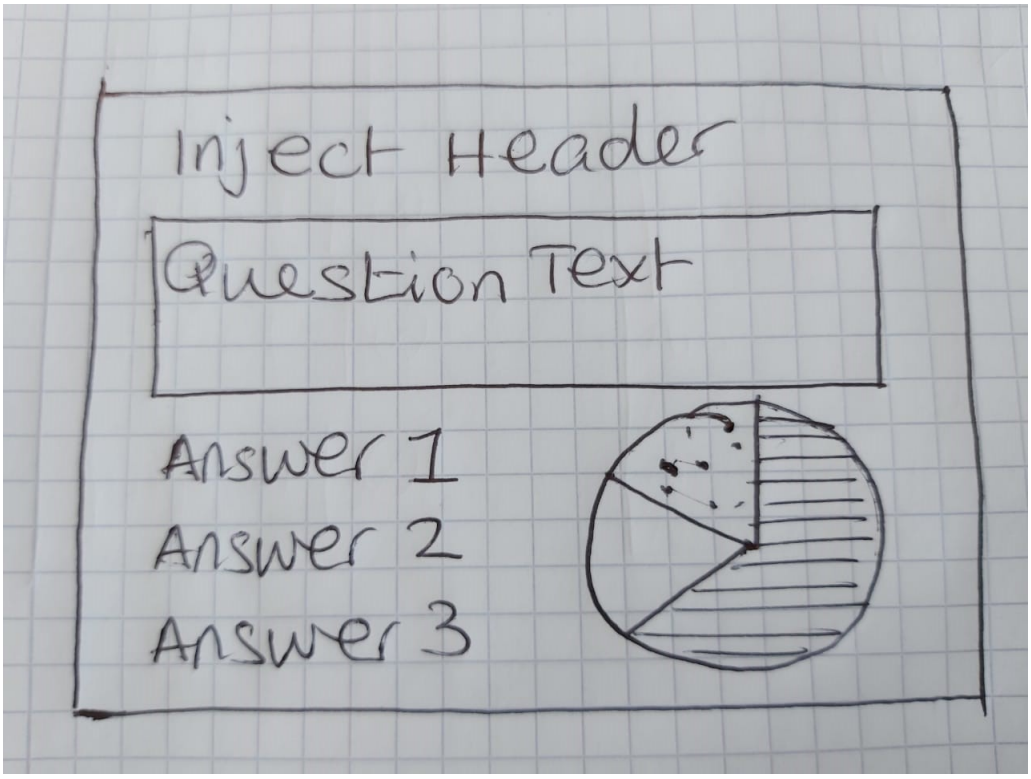

Figure 4.8: Main Presenter screen after Admin displays chart.

5 Site Map

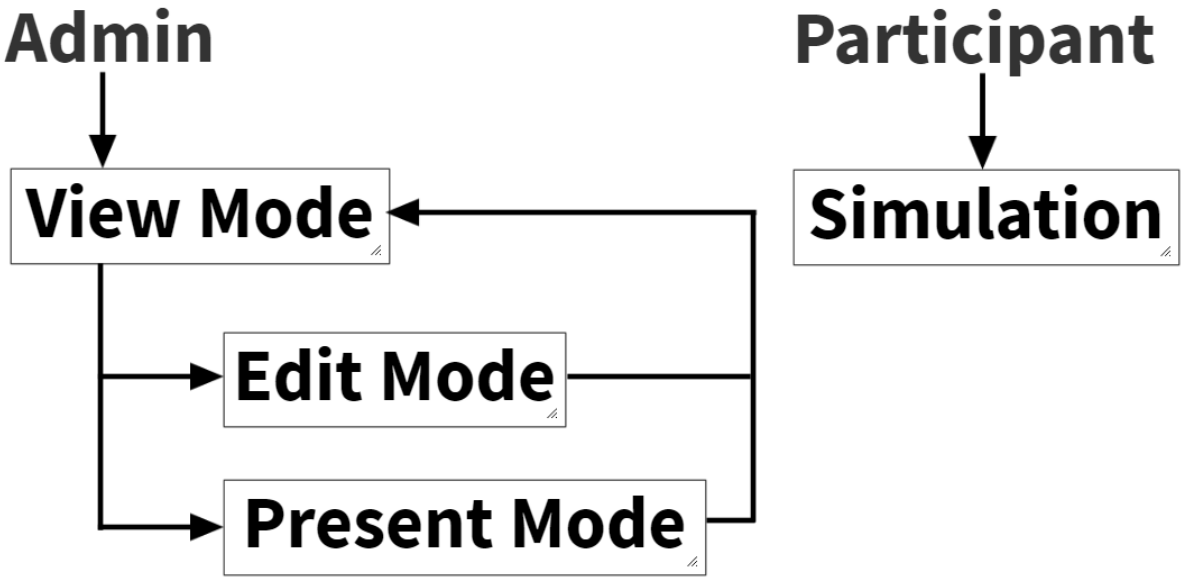

Figure 5.1: Site Map for Web Application.

Figure 5.1 shows the Site Map for the web application. The Admin is automatically redirected to the View page where he can either go to the Run or Edit pages. The Participant only has one webpage available which is the Simulation page.

6 Software Choices

6.1 Database

6.1.1 SQL vs NoSQL

- **Language:** SQL databases use Structured Query Language for defining and manipulating data which can be restrictive. SQL requires the usage of predefined schemas to determine the structure of data before working with it.

  A NoSQL database features a dynamic schema for unstructured data and the data can be stored in many different ways. This flexibility allows you to create documents without first having to carefully plan and define their structure, add fields as you go, vary the syntax from database to database, and have more freedom overall.

- **Scalability:** SQL databases are vertically scalable which means that you can increase the load on a single server by increasing things like RAM, CPU or SSD.

  NoSQL databases are horizontally scalable whcih means that you handle more traffic by sharding, or adding more servers in your NoSQL database. Thus NoSQL can ultimately become larger and more powerful.

Because of the additional flexibility and scalability it provided, NoSQL was chosen for the development of the database in the web application.

6.1.2 Database Layout

6.1.2.1 Scenario, Inject, and Answer

MongoDB allows the two kinds of relationships between documents: Embedding(Composition) and Referencing(Aggregation), where:

- Aggregation implies a relationship where the child can exist independently of the parent.
- Composition implies a relationship where the child cannot exist independent of the parent.