



Industry Project

Third Year Work Placement

Public Services Card Project

Table of Contents

Introduction:	2
Public Services Card (PSC):	2
User Requirement Specification:	2
Customer:.....	3
Staff:.....	4
Manager:.....	4
Project Technologies:.....	5
Design Specification:	6
Database Design:	6
Entity Relationship Diagram:	6
About The Entity Relationship Diagram:.....	7
Testing:.....	8
HTTPS and SSL:.....	9
User Manual:.....	9
Login:.....	13
Customer Registration:	13
Customer Appointment View:	14
Staff Members Appointments View:	15
Managers Views:.....	15
All Staff View:	15
All Buildings View:.....	16
All Appointments View:	16
Users and Roles:.....	17
Test Accounts for Lecturers:	18
Bibliography:	18

Introduction:

The project I have been assigned to complete is a booking system for the Department of Social Protection's Public Services Card which is available to every citizen in the Republic of Ireland. To date, there is no online booking system for appointments to receive this card. This is something that my manager said needs to be addressed sooner rather than later and asked me if I could create a prototype for this system as part of my third year work placement. I proposed this idea to the college which was accepted and now a prototype has been built. In this document I will outline information about the Public Services Card, diagrams of use cases, the design specification, and the user manual.

Public Services Card (PSC):

The Department of Social Protection (DSP) introduced the Public Services Card (PSC) in 2012 to replace the Social Services Card which had been used prior. Public Services Cards are free to gain and have a number of services on them. These cards act as a unique identifier which allows the DSP to identify the customer when using services which are essential to everyday life. Nowadays PSC's are issued when a person is issued a PPS number. As I said previously, appointments cannot be made online when trying to apply for a PSC. This leads to a serious amount of unneeded hassle for the user.

There are two ways in which a person can gain a PSC. The first is by a postal registration. This will play a small part of the functionality of this project but the second way will play a more important role. The second way is by meeting a staff member in a PSC centre and bringing the correct documents which are needed to allow applications to be processed. Applications usually take around one week to be processed, afterwards the card is then issued by post. Meeting face to face will play an important role in this project. There are a number of locations in which the public can avail of these cards. I will make sure to include this in the web application which is being developed so the public is informed.

User Requirement Specification:

Due to the short amount of time this system was constructed in, I used an agile methodology approach with test driven development at the heart of the coding process. Traditional documentation is limited as it was all carried out at the end of the development cycle. With the short time frame, work started immediately. I had not time to carry out an interview or questionnaire. Instead I had a brief meeting with a manager within the DSP. In this short meeting, three core users were identified. These are the customer, the staff member, and the manager. These users have been implemented in the system. I researched similar system to that I designed. I tried to implement similar parts which I thought suited the scope of my system.

Customer:

The main aim of this system is for the Customer to have the ability to register for the services that we are providing. In this case, make an appointment with a DSP member of staff in order to gain a Public Services Card. This is the core functionality of the system.

Customers want to be able to register and log into the system and then have the ability to choose a time and date suitable to their needs to go for an appointment with the DSP to gain their card. This part is mission critical as this is the core functionality of the project. If this cannot be done then I have not reached my goal. I can now say that this is completed.

Once a Customer has completed these stages and made an appointment convenient to themselves, if something arises, there is no problem. With less than four clicks, the user can reschedule their appointment and the DSP has the new record instantly. This allows for other Customers now to gain this appointment date and time which improves efficiency.

If the Customer has made an appointment and changes their mind about getting a Public Services Card, they can easily cancel their appointment resulting in the same as above, a free slot for other Customers availing of this service to gain. This also improves efficiency greatly as no time slots will be left unfilled resulting in more Customers gaining their cards in less time.

If Customers are not sure of where the building is in which their appointment is taking place, quickly find it on our Google Map which is integrated on our system. From here Customers can quickly find out information about the building. Information such as its address and phone number which is conveniently displayed in table format which makes it easier to read.

Customers are able to download an application form which is displayed as a PDF. This allows the Customer the ability to print off an application form and send it to the DSP along with the correct documents needed for processing. This is known as Postal Registration in the DSP and is another way for Customers registering for our services. When this form is completed correctly, it takes around ten days until the Public Services Card is delivered to that customer. This is not a critical feature but would be a nice addition to the systems functionality but it has been completed and now Customers may download the application by navigating to the Home View and clicking on the button which reads "Postal Application". This immediately starts the download for the Customer.

Staff:

Staff members have a very similar view to Customers. However their appointments view is quite different as it displays their appointments for the work day. From here they know their schedule for any given day with what Customer's as well. This is a nice feature of the system as it is directed at the staff member who is logged in.

Staff members also have the power to cancel appointments also. This is added in just in case a Customer cannot get access to the system. In this case the Customer rings the office of where they are due to have an appointment, explains the situation, from this then the manager can go into the system and cancel the appointment for the Customer. For those on the go without internet access, this may prove quite useful.

Manager:

Managers have the most power on the system as they are essentially the administrators. They're view is similar to both the Customer and the member of staff. However they have a number of other views. A Manager can go into the Staff view and add a new member of staff who has gained employment within the DSP's Public Services Centres. They may also remove staff members from the system if needs be. They are the only users of the system who have the ability to complete this task. Staff members and Customers cannot do this and do not know about this section as it is not displayed on the navigation bar.

Managers may also add a new building if one has been built for the DSP. The Manager must specify the name of the building, the address, and the phone number. Once this has been added, Customers are free to make appointments for this building. Managers must add the staff who will work in this building into the system. Managers can also view all the staff who works in a specific building by selecting the details. The building details are then displayed on the view where the Manager can view the staff member's names within that building. If by any chance a building has been demolished or removed from the DSP's ownership, then this building can be deleted from the system. Next thing is though what happens with all the staff working in that building? If staff members have been relocated then the Manager needs to go in and update the staff member's information. This is easily done with less than 4 clicks.

Managers can view all the appointments made through the system also. As they are staff members, Customers can also select to make an appointment with them so there are two options located on the system. These are to view all appointments and to view their appointments. If the all appointments option is selected then the manager can see all the appointments in the system, both new and old will appear. They also have the same abilities as staff members do with this section of the system. Managers can also view charts which show a lot of useful information within them. There is an option on this view in which they can see them.

Managers may also view all the users of the system and what roles their profiles possess. As another option I wanted to allow Managers manually change staff roles to Managers if they have gained a promotion within the DSP. Unfortunately this proved to be quite difficult and is something I need to investigate more in future expansions.

Project Technologies:

There are quite a few different technologies used within the development of this system. These are:

- C#
- Asp.Net MVC
- SQL Server used by Linq Queries
- Entity Framework
- JavaScript and JQuery

The business logic was carried out through mainly C# although JavaScript and JQuery were used a bit also in the development process. C# was mainly used in the Controllers where the business logic lived. These Controllers were the power behind the system.

MVC is the design pattern used in the system. The model is where class attributes live while the controller is where the business logic exists. The views are the display, which is where I used HTML, CSS, Bootstrap, and Razor Syntax to display it how it looks.

SQL Server is where the data lives which is needed for this system to work properly. To access the data living in the SQL database I used Linq Queries. These queries are very similar to SQL Queries, except the syntax is slightly different and backward. I enjoyed using this language because it was something different which now I can say I can use.

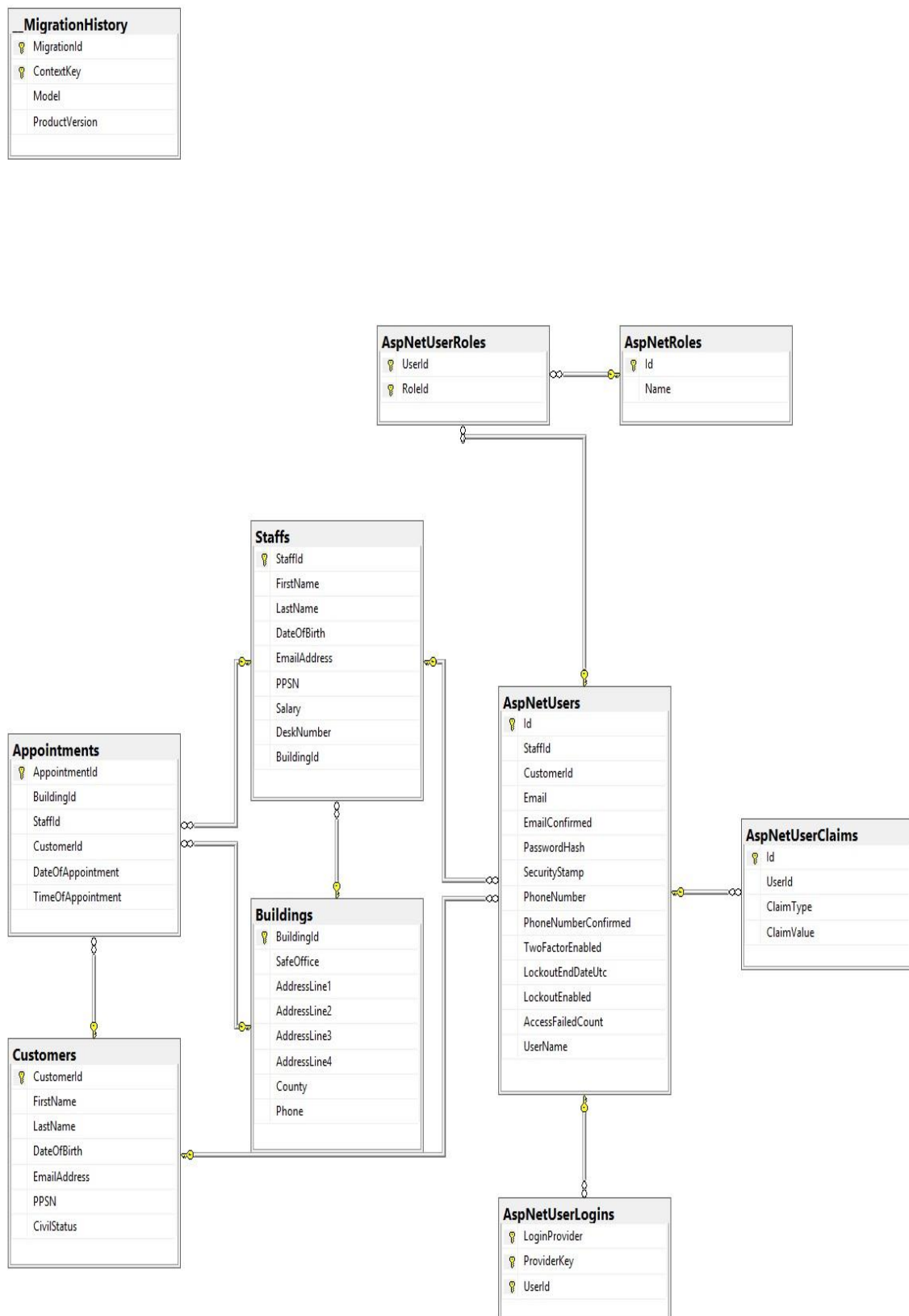
Entity Framework is used in Asp.Net and was very useful in this project. This is a useful way to work with relational data using domain-specific objects. I enjoyed learning this new to me framework within the development of this system.

JavaScript and JQuery were used when there was no need to refresh the browser. This became quite useful when implementing drop down options. This was due to the fact of one drop down depending on another i.e. displaying the correct data when an option is chosen in the second drop down. Another time they were needed was populating pins in a Google Map for location of offices where a Customer can gain a Public Services Card.

Design Specification:

Database Design:

Entity Relationship Diagram:

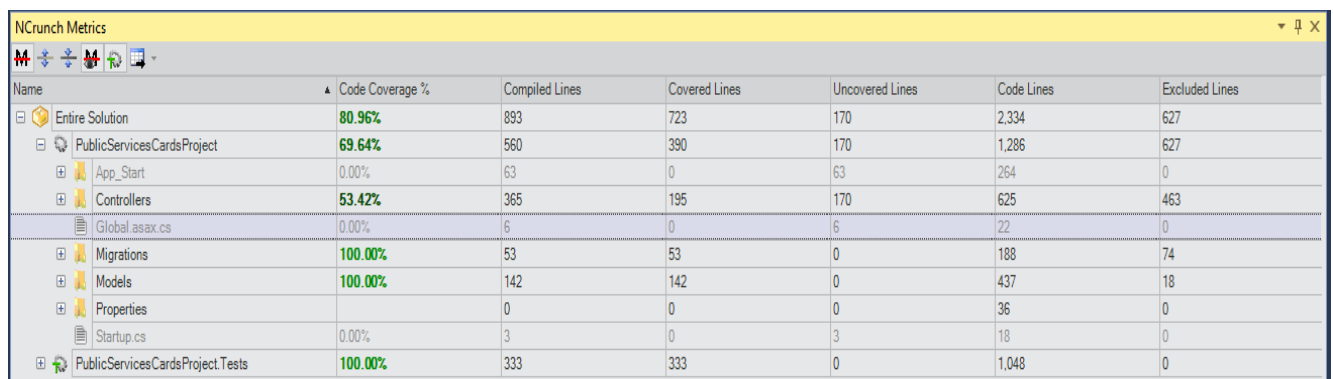


About The Entity Relationship Diagram:

My database was helped by using the Entity Framework in Visual Studio. The actual design I suffered with at the start as I was still learning the framework. Through a lot of practice and research I managed to get my database the exact way I wanted it. This can be seen as above. Entity Framework uses Code First Migrations which I have become quite fond of. This means you write your classes first, the way you want them to work in the database, then issue a migration command through NuGet Package Manager Console, which is an extension in Visual Studio, and now your database schema is generated for you. I found this quite useful as time was of the essence. Another file would be generated. This file is named the Configuration.cs. In this file, developers insert their test data into a Seed() method which gets called when one issues the "Update-Database" command in NuGet Package Manager Console.

Testing:

As I said previously, I took an agile methodology approach and used test driven development within this systems development. I wrote my methods with testing in mind. Everything I have created has been vigorously tested through unit testing. To help me with unit tests, I used NCrunch which is a very useful automated testing tool. This saved an enormous amount of time because I never had to run a single test manually. This tool detected code changes and would run the tests again. If the tests succeeded one would see green dots located on the left hand side of Visual Studio. If they were failing, they would appear as red dots instead. Black dots represented as not being tested. Test metric figures are quite high which I shall show in screen shots below:



Name	Code Coverage %	Compiled Lines	Covered Lines	Uncovered Lines	Code Lines	Excluded Lines
Entire Solution	80.96%	893	723	170	2,334	627
PublicServicesCardsProject	69.64%	560	390	170	1,286	627
App_Start	0.00%	63	0	63	264	0
Controllers	53.42%	365	195	170	625	463
Global.asax.cs	0.00%	6	0	6	22	0
Migrations	100.00%	53	53	0	188	74
Models	100.00%	142	142	0	437	18
Properties		0	0	0	36	0
Startup.cs	0.00%	3	0	3	18	0
PublicServicesCardsProject.Tests	100.00%	333	333	0	1,048	0

Overall the entire solution is 80.96% tested which is a great figure. The metric is brought down by a controller class which is proving difficult to test but will be investigated and solved. Here are the controller figures:



Controllers	Code Coverage %
AccountController.cs	4.53%
AppointmentsController.cs	5.39%
BuildingsController.cs	92.22%
HomeController.cs	100.00%
ManageController.cs	8.08%
StaffController.cs	94.74%

The model classes are 100% tested and functioning as expected. Here are the figures also:



AppointmentModels	Code Coverage %
Appointment.cs	100.00%
Building.cs	100.00%
Customer.cs	100.00%
Staff.cs	100.00%

I am happy with all the test code that has been wrote and I know that the most important methods are being tested and are working correctly.

HTTPS and SSL:

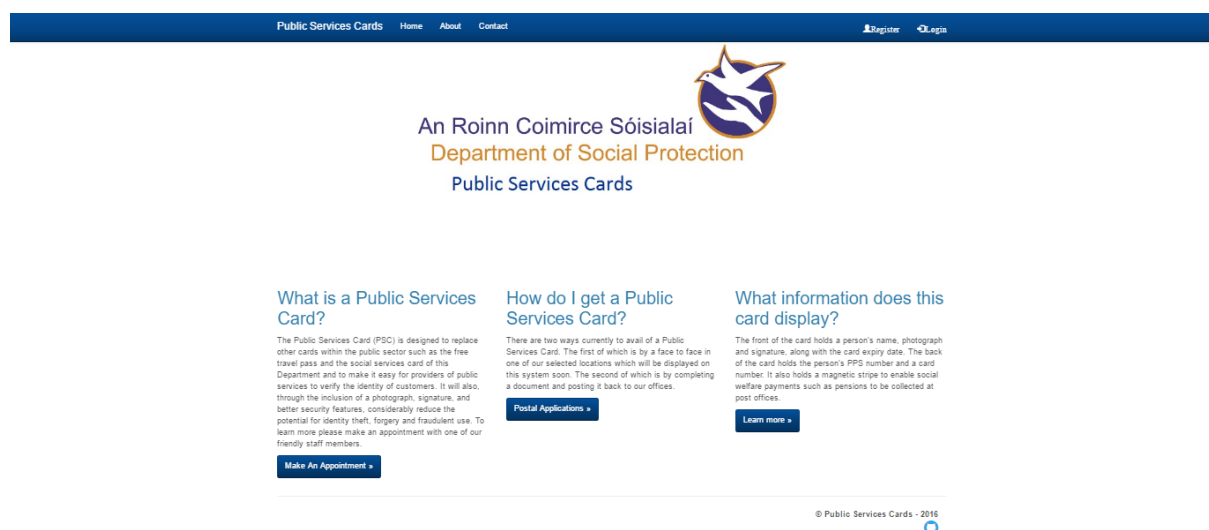
The system has been enabled to use Secure Socket Layer (SSL) and Hypertext Transport Protocol Secure (HTTPS). This makes the system more secure for the end user, meaning they can trust the connection as it is encrypted to the server. This has been enabled as users enter their personal information into the system and from experience users do not trust entering information into sites that do not use HTTPS or SSL.

User Manual:

In this system, there are three main users. These are:

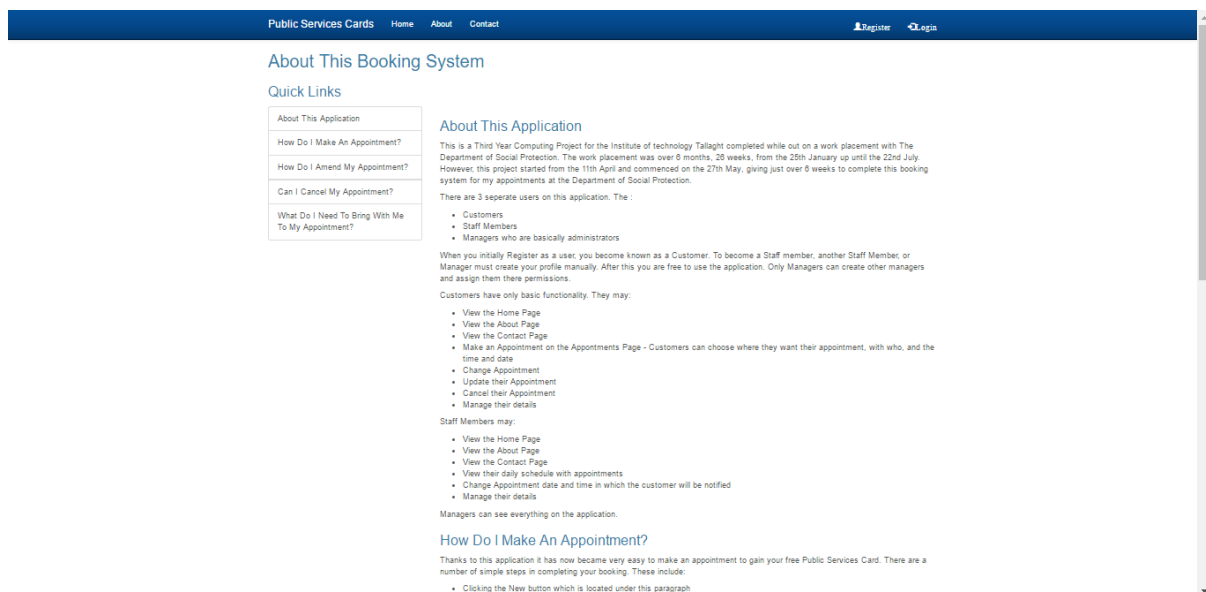
- Customers
- Staff Members
- Managers

Each user has a different view. However some are similar, the functionality is different though on the other hand. Now I will begin with what the non-user of the system is presented with. This view is the same as the Customers, Staff Members, and Managers views. This is the Home View:

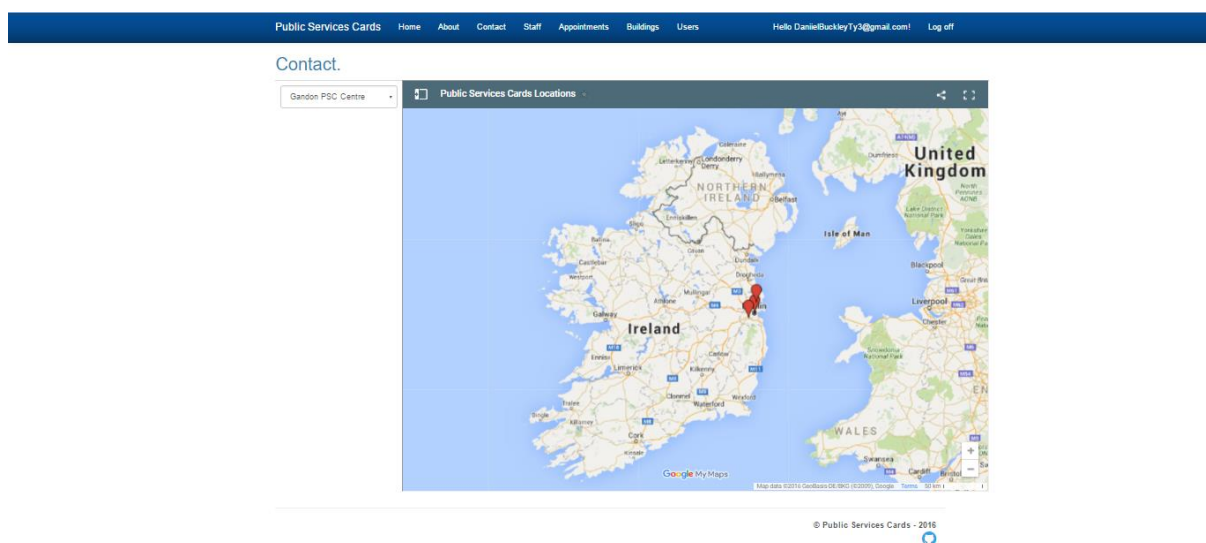


This Home View is the same all over the system. Customers, Staff Members, and Managers each have the same view. From here Customers may download the application form needed if they wish to avail of the postal registration option. They do this by simply clicking the button which reads “Postal Applications”.

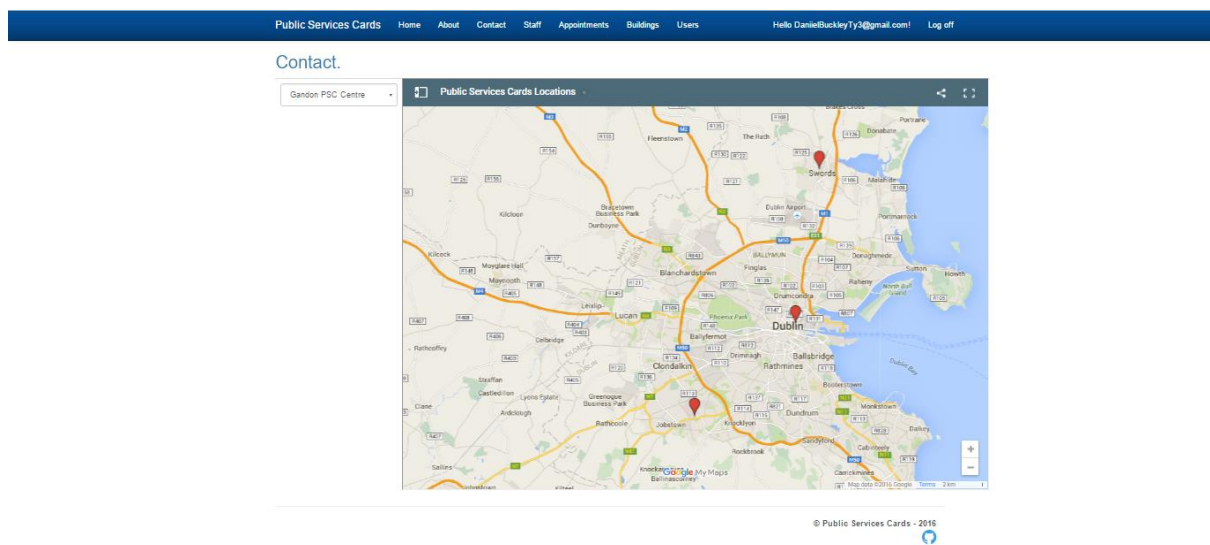
The next View is the About View. This is also the same throughout the system. This view has information about the system and about Public Services Cards on it. This is a very informative page as is shown underneath:



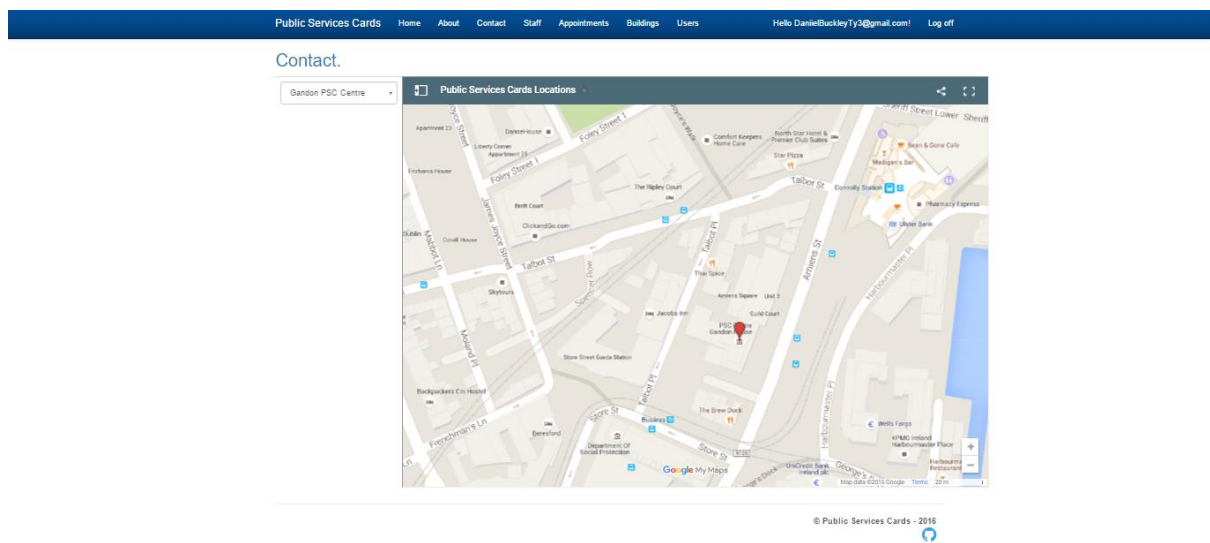
This is the place where Customers will come to visit if they have a question that needs to be answered. Another view is the Contact View. This shows exactly where Customers can go to get a Public Services Card. The view is also the same for all users and is shown underneath:



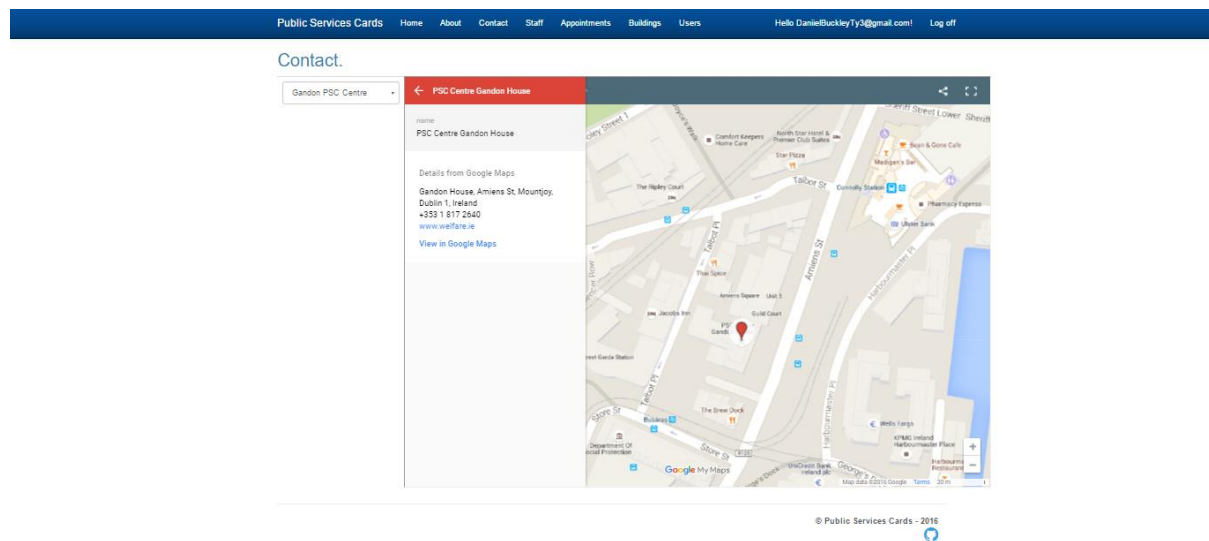
The user can see the markers which represents office locations. The Customer then has the ability to scroll in and pin point the location which they would like to attend an appointment in. When any user scroll in they are met with the next view:



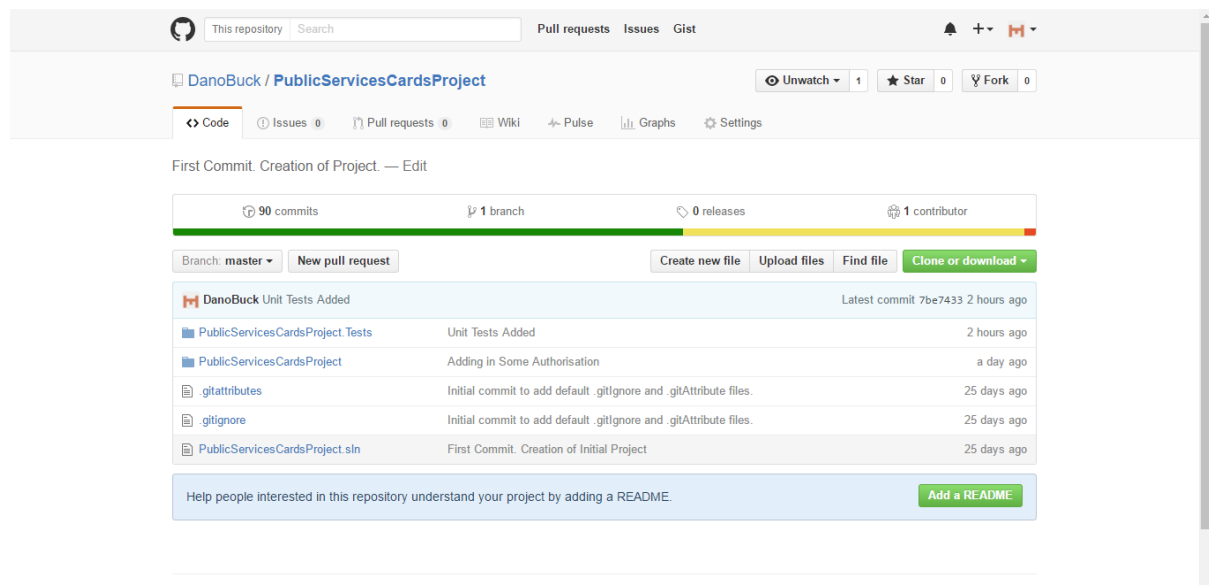
They now can scroll even further to get the pin point position which is shown as:



Now the user knows the pin point position of where an office is. If the user clicks on the marker of the map, they can see the relevant information on the map. This can be seen as:



Information such as the address and phone number now appear for the user. Notice how there is a GitHub icon in the footer of the system if a user clicks this icon, they are brought to where the code lives, within a GitHub Repository. When clicked they are met with the following view which is external to the system:



This is the GitHub Repository where all the code needed for the system is stored. The repository is public meaning everyone can view the code inside it. This repository was updated very regularly.

Login:

Logging in is fairly straight forward in this system. The user simply clicks the “Login” link located on the navigation bar. This in turn brings the user to the Login View which looks as followed:

The screenshot shows the 'Login' page of the 'Public Services Cards' system. The page has a dark blue header with the site name and navigation links (Home, About, Contact). On the right of the header are 'Register' and 'Login' links. The main content area is titled 'Log in' and includes the instruction 'Use a local account to log in.' Below this are input fields for 'Email' and 'Password', a 'Remember me?' checkbox, and a blue 'Log in' button. A link to 'Register as a new user' is at the bottom left. On the right, under the heading 'The Actual Card', is an image of a blue Public Services Card. The footer contains the copyright notice '© Public Services Cards - 2016' and a small circular logo.

As appears there are two fields located on this view, an Email field and a Password field. Both must be correct to enter the system. The image on the right of the view is of an actual Public Services Card and is what each user of the system will gain.

Customer Registration:

The Customer can register for the system very easily. They simply click on the Register link on the navigation bar. They are then brought to another view which allows them to enter their details. The view is as the following:

The screenshot shows the 'Register' page of the 'Public Services Cards' system. The page has the same dark blue header as the login page. The main content area is titled 'Register.' and includes the instruction 'Create a new account.' Below this are several input fields: 'PPSN', 'FirstName', 'LastName', 'DateOfBirth' (with a 'dd/mm/yyyy' placeholder), 'Civil Status', 'Email', 'Password', and 'Confirm password'. A blue 'Register' button is at the bottom. The footer contains the copyright notice '© Public Services Cards - 2016' and a small circular logo.

The Customer needs to fill out all of the relevant information on this screen. If not errors are thrown back and the Customer will need to fix them in order to become a user of the system and avail of making appointments. Once completed the system automatically logs them in and an email is generated and sent to their email address which they have specified containing their username and password so that they have a record of this information.

Customer Appointment View:

Moving onto the Customers Appointment View. This view is strictly theirs. Staff Members or Managers cannot access this view and do not know about it either. When a Customer logs in they are met with another option on the navigation bar. This extra option is called “My Appointments”. This is their most important view as it is where they make their booking. When they do not have an appointment, they are met with the following view:

The screenshot shows the 'Make An Appointment' page. At the top is a dark blue navigation bar with links: Public Services Cards, Home, About, Contact, My Appointments, Hello Adam@gmail.com!, and Log off. Below the navigation bar is a light blue header with the text 'Make An Appointment' and a small 'New' button. The main content area is mostly blank, with a copyright notice '© Public Services Cards - 2016' and a refresh icon at the bottom right.

There is nothing on this view except for a button which allows the Customer to make an appointment. Once this button is clicked, the user is brought to another view. This view is shown below:

The screenshot shows the 'Make Appointment' page. At the top is a dark blue navigation bar with links: Public Services Cards, Home, About, Contact, My Appointments, Hello Adam@gmail.com!, and Log off. Below the navigation bar is a light blue header with the text 'Make Appointment'. The main content area contains a form with the following fields: Office (Gandon PSC Centre), Staff Name (Daniel Buckley), Customer Name (Adam Buckley), Appointment Date (dd/mm/yyyy), and Appointment Time (--:--). There is a 'Create' button and a 'Back to List' link. At the bottom right is a copyright notice '© Public Services Cards - 2016' and a refresh icon.

Customers must enter in the correct details to make an appointment. Their name is dynamically entered in the “Customer Name” drop down and cannot be edited. Once this is done, an email is sent to them containing the relevant information of their newly created appointment and they are directed back to where they started but this time their view is different. The updated view is shown below:

The screenshot shows the 'Make An Appointment' page. At the top is a dark blue navigation bar with links: Public Services Cards, Home, About, Contact, My Appointments, Hello Adam@gmail.com!, and Log off. Below the navigation bar is a light blue header with the text 'Make An Appointment'. The main content area contains a table with the following data:

Office	Staff Name	Customer Name	Appointment Date	Appointment Time	
Gandon PSC Centre	Daniel Buckley	Adam Buckley	24-05-2016	12:00	(F Edit) (I Details) (C Cancel)

At the bottom right is a copyright notice '© Public Services Cards - 2016' and a refresh icon.

Notice that the “New” button has disappeared. This means that the Customer may only make one appointment at a time. If “Cancel” is selected then this changes back. If a Customer wishes to edit their appointment they may do so by clicking the “Edit” link. They are shown a page similar to when they make an appointment.

Staff Members Appointments View:

The Staff Members View is very similar to the Customers. However they can only see the appointments for themselves and no other Staff Members as they do not need to see their colleague's appointments. The view is shown below:

Public Services Cards Home About Contact My Appointments Hello MilyMasterson@outlook.com! Log off					
Appointments					
Office	Staff Name	Customer Name	Appointment Date	Appointment Time	
Intreo Centre Swords	Mily Masterson	Finbarr Furey	22-05-2016	12:47	Details Delete
Intreo Centre Swords	Mily Masterson	Adam Buckley	24-05-2016	12:20	Details Delete
Intreo Centre Swords	Mily Masterson	Adam Buckley	13-12-2016	01:20	Details Delete

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Notice how Staff Members may only view details on appointments or cancel them. They do not have the ability to edit a Customer's appointments.

Managers Views:

All Staff View:

Managers have three additional views compared to the other two users. This is because they have more functionality over the system. One of the extra views is the Staff View. This lists all the Staff Members within the organisation along with their details. This view is shown as:

Public Services Cards Home About Contact Staff Appointments Buildings Users Hello DanielBuckleyTy3@gmail.com! Log off									
All Staff									
Office <input type="text" value="All"/> <input type="button" value="Filter"/>									
PPSN	Name	Date Of Birth	Age	Email Address	Salary	Desk Number	Office		
1234567Q	Daniel Buckley	09/01/1995	21	DanielBuckleyTy3@gmail.com	45000	1	Gandon PSC Centre		
1234567A	Cecil O'Hegarty	12/05/1990	25	CecilO'Hegarty@gmail.com	49000	2	Gandon PSC Centre		
1234567B	Freda Burns	01/05/1965	51	FredaBurns@outlook.com	45000	1	Tallaght PSC Centre		
1234567C	Theresa O'Reilly	09/12/1980	35	TheresaO'Reilly@live.ie	49000	2	Tallaght PSC Centre		
1234567KA	Mily Masterson	01/05/1955	61	MilyMasterson@outlook.com	45000	1	Intreo Centre Swords		
1234568A	Billy O'Byrne	06/12/1979	36	BillyO'Byrne@live.ie	49000	2	Intreo Centre Swords		

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On this view, the Manager can see all Staff. He has the ability to filter the table by choosing an option in the drop down list, which contain all departmental buildings, and clicking the filter button. This then returns the Staff Members in which he searched for depending on the building. Managers can also edit a Staff Members details, view their details, and if needs be, delete them out of the system. Once deleted they may not log back onto the system.

All Buildings View:

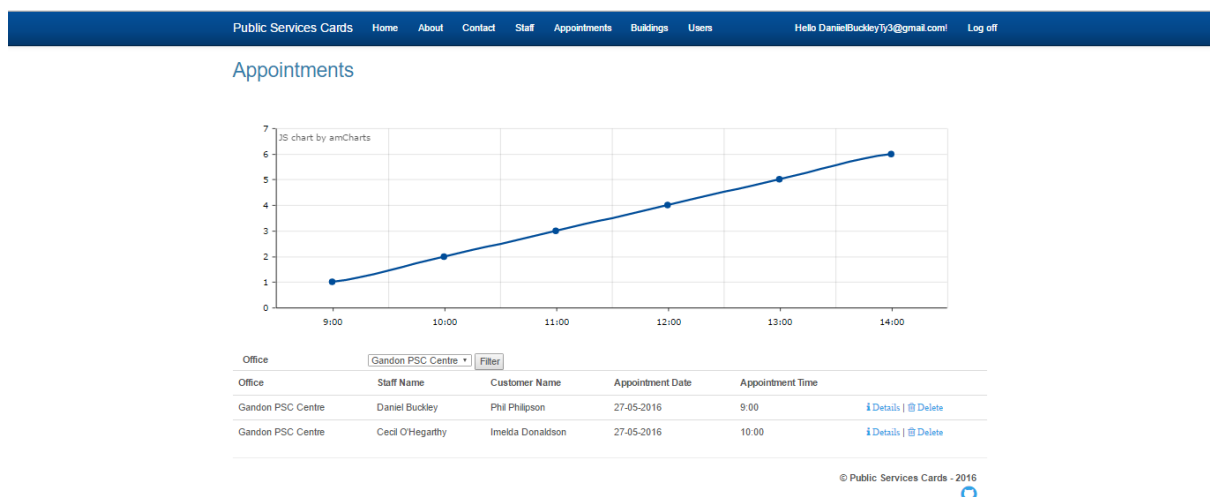
Managers can view all buildings and all their details. They may also update information such as phone number and/or name of the building if they wish. If a building is no longer in existence then they may delete the building. They may also search for a building by its office name if they wish. The view looks like the following:

Public Services Cards Home About Contact Staff Appointments Buildings Users Hello DanielBuckleyTy3@gmail.com! Log off			
Buildings			
Find by office: <input type="text"/> <input type="button" value="Search"/>			
Office	Address	Phone	
Gandon PSC Centre	PSC Gandon, Public Services Card Centre, Gandon House, Amiens Street, Dublin	(01) 8172940	Edit Details Delete
Tallaght PSC Centre	Unit 247, Level 2, The Square Shopping Centre, Tallaght, Dublin	(01) 4029495	Edit Details Delete
Intreo Centre Swords	Mainscourt, 23 Main Street, Swords, Dublin	(01) 4529495	Edit Details Delete
<input type="button" value="New"/>			
© Public Services Cards - 2016			

This is very similar to the Staff View as well but it is totally separate part of the system.

All Appointments View:

The Appointments View is where the Manager can see all the appointments in the DSP. This is done in the form of a drop down list at the top of the view with all the departmental offices. There is also an option called "Mine" in which the Manager can view all of their appointments. There is now a graph located on the Managers Appointment View. This graph summarises appointment times and which time is the most popular among Customers to avail of an appointment. This allows the Manager to know when it is critical to be in the office. The chart has been implemented using the AmChart.js which is freely to use for developers looking to summarise data. The view looks like the following:



Users and Roles:

Managers can also view all the users on the current system. This is done by clicking on the link on the navigation bar which displays “Users”. They are then brought to this view:

Public Services Cards

Home

About

Contact

Staff

Appointments

Buildings

Users

Hello DanielBuckleyTy3@gmail.com!

Log off

Users And Roles

Email Address	System Role	
Adam@gmail.com	Customer	Edit User
Amanda@gmail.com	Customer	Edit User
TheresaO'Reilly@live.ie	Staff	Edit User
DanielBuckleyTy3@gmail.com	Manager	Edit User
FinbarFurey@gmail.com	Customer	Edit User
ImekiaDonaldson@gmail.com	Customer	Edit User
FredaBurns@outlook.com	Staff	Edit User
BillyO'Byrne@live.ie	Staff	Edit User
MillyMasterson@outlook.com	Staff	Edit User
Dogson@gmail.com	Customer	Edit User
Phil@gmail.com	Customer	Edit User
CecilOHegarty@gmail.com	Staff	Edit User

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From here Managers have all the information which they need regarding the users of the system. Managers also have the ability to change a user's role by clicking the “EditUser” link on any of the users. Managers now can change Staff Members to Managers. However, Managers cannot change any Customer Roles.

Test Accounts for Lecturers:

To access the system as a Manager, please use:

- Email: DaniielBuckleyTY3@gmail.com Password: PassWord1'

To access the system as a Staff Member, please use:

- Email: CecilOHegarty@gmail.com Password: PassWord1'

To Access the system as a Customer, please use:

- Email: Adam@gmail.com Password: PassWord1'

Bibliography:

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- *Google maps* Available at: <https://www.google.ie/maps/@53.3723552,-6.3894349,11z/data=!3m1!4b1!4m2!6m1!1s1wn7h1bM9cYolIFn8zRore9CNQm8> (Accessed: 22 May 2016).
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