National College of Ireland

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Cut!tOut

The secure cyberbullying prevention application

Technical Report

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Executive Summary

The number of people that have access to the internet is growing daily. As with most things in life there are positives and negatives to this growth. Bullying has been around for a long time however, in this modern World, the internet provides bullies with a new and ideal platform to act as they please. The internet provides a direct link to their victims without the fear immediate retaliation from the victims or other people who may witness it. They can attack and single out their victims in the safeness of anonymity on the internet.

Another negative aspect of this incredible growth and expansion of the internet is the rise in cybercrime. Sophisticated criminal organisations are expanding their reach by attacking organisations or individuals online. Sensitive data can be accessed by a variety of means and used to damage reputations or extort money. This type of crime is essentially a more grievous and insidious cyber form of school yard bullies spreading rumours or beating up their classmates for lunch money.

Cut!tOut aims to address both of these issues in the following manner:

Firstly, I have built a secure web application the allows the user to gain a better knowledge of cyber bullying and gives them a platform to communicate with other users who have also been the victim of cyberbullying.

Secondly, I have combined the skills I have acquired over the past four years, particularly my final year as a cyber security student, to build a functional web application that is secure from attacks such as, SQL injection and brute force attacks.

This brief is aimed to guide the reader through the project from start to finish. It also allows the reader to see the various milestones I successfully completed throughout the process.

1 Introduction

1.1 Background

The reasoning for this project came from the harsh realities that I have witnessed with almost everyone today having access to the internet be it through their phones or laptops. With this access comes the possibility of being bullied or harassed online. I have witness this such behaviour myself on social media and have been appalled by the behaviour of some people. I have also seen how easily web applications have been attacked and with sensitive information being shared on Cut!tOut it is imperative to provide a secure application that the users feel safe with.

What really struck me is that many of the perpetrators who carry out the online bullying would never act in such a way in person and seem to find comfort in the fact they may never actually meet the people they are bullying. Therefore, I feel cyberbullying is especially heinous as the bully may never face the consequences of their actions. My application will tell the stories of the victims and help them to recover and in a way, protect themselves in the future. Cyberbullying extends to all ages and each demographic will be catered for.

With my application, my goal is to provide the user with a secure application where they can get advice on cyberbullying as well as communicate with other users on their experiences. When cyberbullying occurs, the victims are often advised to block the bully and tell a parent or co-worker. Research has found that 9 out of 10 people suffer in silence - they do not tell anyone. Cyber bullying victims suffer from depression, anxiety, low self-esteem, and are more likely to drop out of school or college. Several solutions that are in place today address bullying after the damage is done. My application will help the victim to be proactive against cyberbullying hopefully before he/she suffers too long at the hands of their bully.

With wider access to computers and other devices that can connect to each other online, the potential for cyber bullying has increased. No longer are bullies confined

to picking on others on the school playground. Today, many bullies are refraining from physical bullying, opting instead to bully by email, social media, instant-messaging, and other online modes of communication. Although cyber bullying doesn't have the same, obvious signs that physical bullying has, it can be just as damaging in the long term.

One study carried out by The National Crime Prevention Centre[1] in the UK showed that:

- More than half of adolescents and teens have been bullied online, and about the same number have engaged in cyber bullying.
- Of those who admitted they had been bullied, 87% said it had happened on Facebook, 19% on Twitter and 13% on BlackBerry Messenger.
- 1 in 6 parents know their child has been bullied via a social networking site.
- More than 1 in 3 young people have been threatened online.

GuardChild | Protecting Children in the Digital Age (2017) available at www.guardchild.com accessed 11/12/2016

1.2 Aims

1. To help users identify if they are victims of cyber bullying as well as helping those who may have bullied someone to rectify the harm they may have caused.
2. Allow users to access a forum securely and anonymously to share their stories or seek access from people who have experience in these situations.
3. The application will aim to give the correct advice and guidelines to users of all ages and that information must be pertinent to the age of the user.
4. To develop a secure web application that prevents an attacker from gaining knowledge of any user's information.
5. Allow only registered users to access to certain areas of the application, such as the forum.
6. Securely store the information provided by users in an encrypted database.

1.3 Technologies

Visual Studio

I will be using Visual Studio as the main base for all my programming, the language I will be using is c#.

SQL Server

The project will make use of SQL Server which is Microsoft's relational database management system supporting SQL queries that will hold the data on this server using it to easily gain access to it no matter where the admin might be. This way attainability of the data is assured allowing for use on multiple machines.

Twilio

Twilio is on online tool that I will be using to build multi-factor authentication into the app that will give the users extra security.

2 System

2.1 Functional requirements

2.1.1 Requirement 1 <Registration with Multi-Factor Authentication>

Description & Priority

To allow users to login into the system they must first register their details. They will be asked for the following;

- A valid email address
- A valid password
- A mobile phone number

Upon receiving the above details, a verification code is sent to the mobile number provided. This adds an extra layer of security to this process that will reconfirm the user's identity. Its purpose is to make attackers' life harder and reduce fraud risks. I will be using a 3rd party application called Twilio to perform this function.
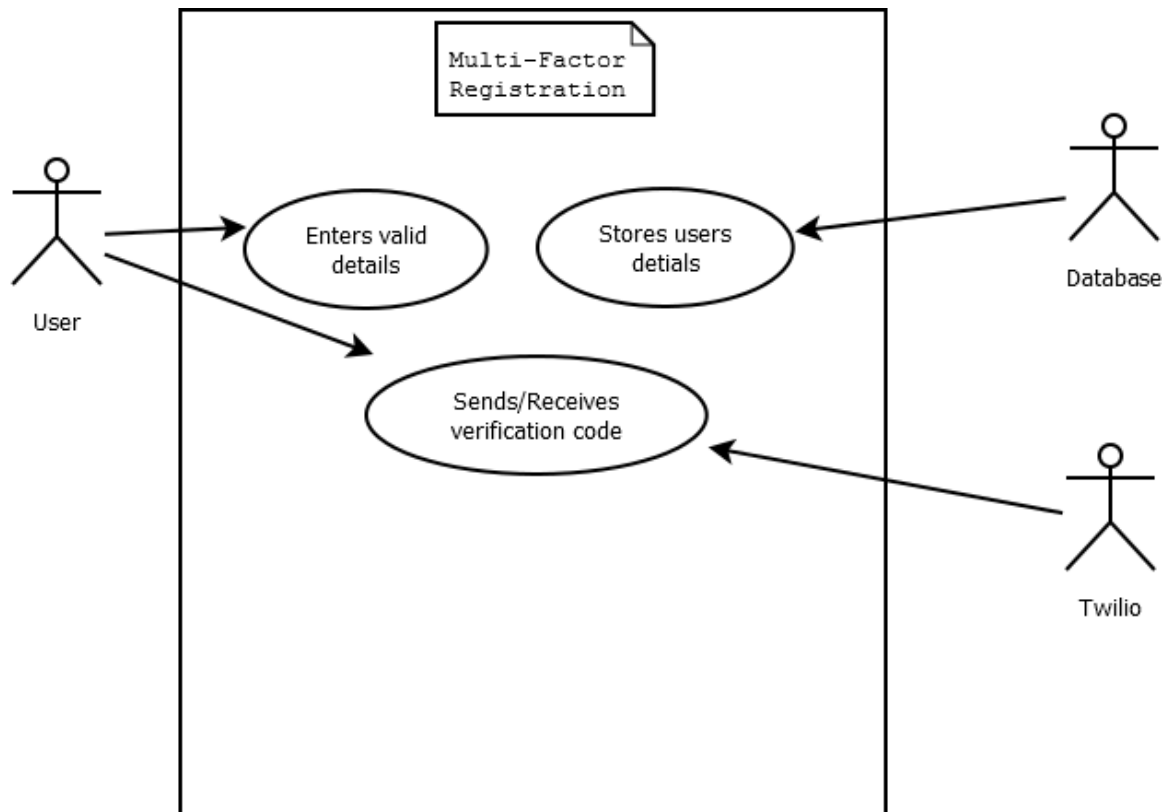
Use Case

The user wants to join the system or view the forum, they are asked to then register their details.

Scope

The scope is to allow the user to register to the system using their own personal information.

Use Case Diagram

Flow Description

- ➤ User is asked for their registration details (email, password, phone number).
- ➤ User is sent a verification code.
- ➤ User inputs code into the system.
- ➤ User is granted access to the system.

Precondition

The user must have a valid email and phone number as well as providing a password that fits the chosen parameters.

Activation

Upon receiving the correct verification code, the user is granted permission to enter the system.

Alternate flow

The system will not act as intended if the following conditions occur:

- ➢ User enters an invalid email.
- ➢ User enters a password that does not contain valid characters.
- ➢ User enters an invalid phone number.
- ➢ User does not enter the verification code.

Exceptional flow

<System cannot connect to database>

- ➢ The user enters data.
- ➢ The system is unable to reach the database to access/save details.
- ➢ The system display's a message to inform the user.

Post condition

The user is brought to the home page of the application.

2.1.2 Requirement 2< Login>

Description & Priority

The login allows the user to view certain pages of the system, such as the forum. Logging in ensures that only registered users may view these pages. After logging in a user may edit or delete their details.

Use Case The user clicks on Log In and is prompted to enter their username and password.

Scope

The scope of this Use Case is to allow a user to enter their details to allow them access to the forum. They must also be able to access their details.

Use Case Diagram
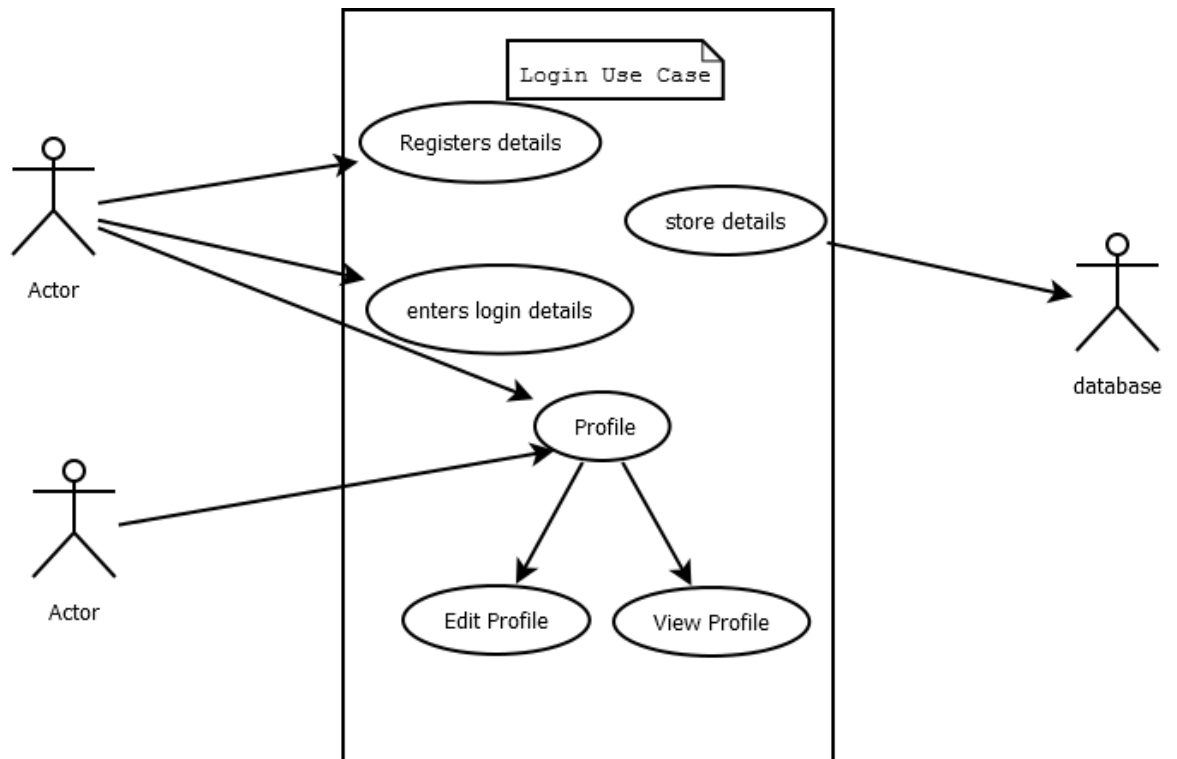
Flow Description

> ➢ User clicks 'Log In'.
> ➢ User is asked for email and password.
> ➢ User is granted access.

Precondition

The user must register with the system.

Activation

This use case starts when a user wants to access the forum.

Alternate flow

The system will not behave as intended if the following conditions occur:

> ➢ The user inputs an incorrect email or password

Exceptional flow

<System cannot connect to database>

> ➢ The user enters data.

> ➢ The system is unable to reach the database to access/save details.

> ➢ The system display's a message to inform the user.

Termination

The system presents the next step after login.

Post condition

The system returns to the home page.

2.1.3 Requirement 3 <Access the Forum >

Description & Priority

This requirement allows the user to access the forum so they can read or post subjects. If users want to access the forum they must register their details to the system.

Use Case

The forum must be secured by preventing non-registered users from accessing it. The topics and posts in the forum may contain information that users may not want in the public domain.

ScopeUser's' access to the forum may be grantedby registering their details and/or logging onto the system.

Use Case Diagram
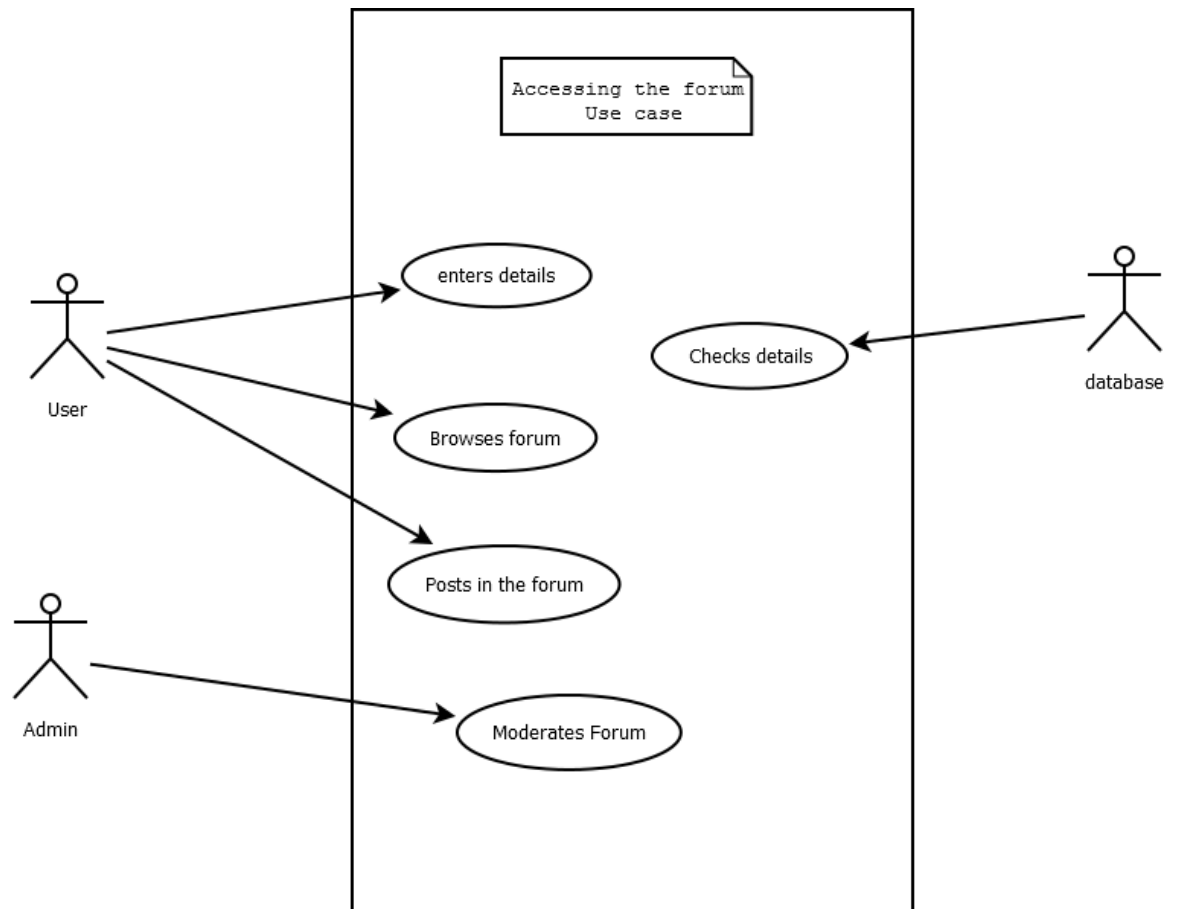
Precondition

The user must have registered and/or logged in to access the forum.

Activation

This use case starts when the user inputs their correct details after selecting the Forum page.

Main flow

> ➢ The user selects Forum.
> ➢ The system prompts user to enter their login details.
> ➢ The system checks the login details in the database.
> ➢ The user is granted permission to enter the forum.

Alternative flow

<User enters incorrect details>

> ➤ The user enters details.
> ➤ One of the fields of information is incorrect e.g. username.
> ➤ The system displays a message asking the user to re-enter the username.

Exceptional flow

<User is not registered >

> ➤ The user enters details that are not registered.
> ➤ The system checks database and returns a message prompting user to register their details.
> ➤ The user then registers their details.

Termination

The system allows the user access to the forum.

Post condition

The system allows the user access to the forum page.

2.1.4 Security Features

Overview

This section will outline the security features which I have added to the application. Many applications are designed with security being of low priority, whether it is budget constraints or just an oversight. With cybercrime on the rise, these security features are becoming ever more important to protect users and their sensitive information. As I am specialising in cyber security in the final year of my course, I believe that adding these functions to my application showcases the skills that I have learned this year. I have used the Open Web Application Security Project (or OWASP for short), as a guide on this project. Owasp is an industry standard body who research and advise on the top 10 most common attacks on mobile applications.

2.1.5 Security feature 1<Input Validation>

Input validation is a very important safeguard against the number one form of attack on Owasp's 2016 list, SQL injection. SQL injection occurs when an attacker uses an SQL command in a text box on a web application, the system reads the malicious input as a query and if the correct syntax is used the attacker is granted access to the system. By implementing correct coding practices, I have ensured the system only allows valid email addresses to be entered. This takes advantage of the '@' symbol, which is not used in any SQL queries but is needed for email addresses.
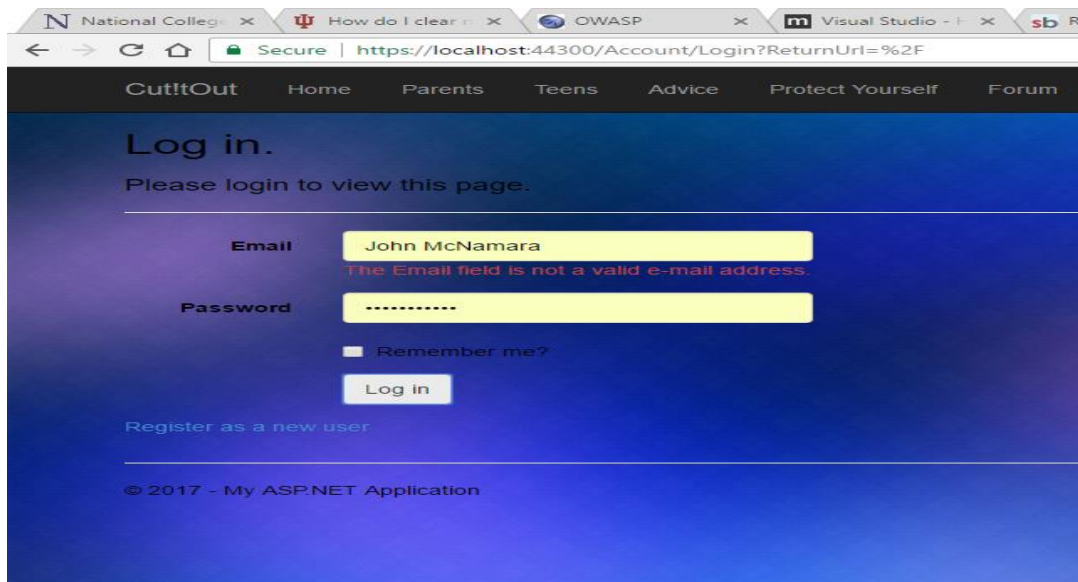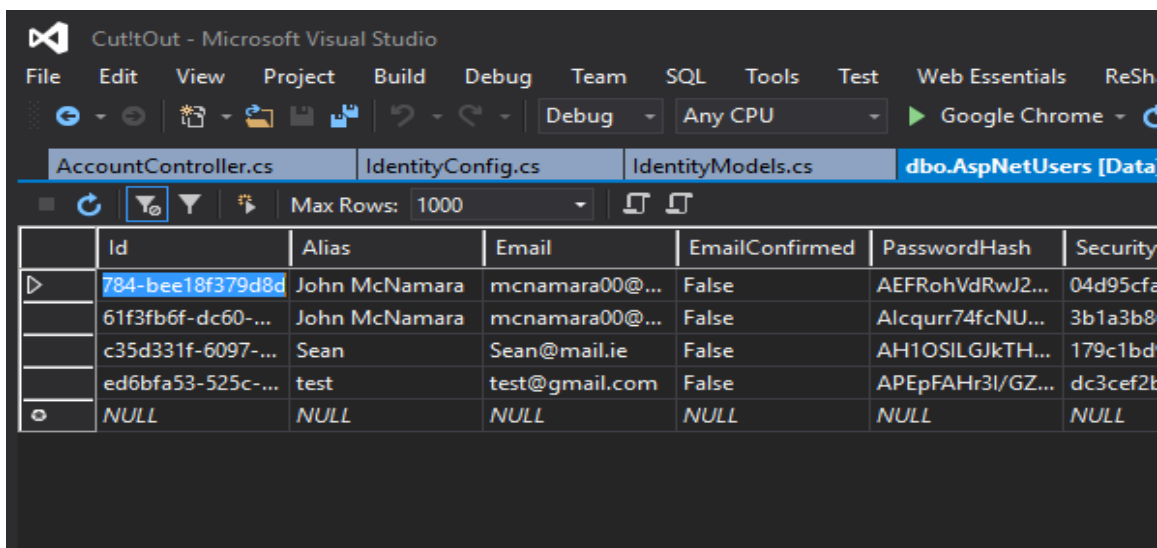
As you can see from the above screenshot, if a user does not enter a valid email address, a clear warning is displayed. This works for both a malicious user and for a genuine user error.

2.1.6 Security feature 2 <Database Encryption>

To protect against a user's login details being viewed inside the database I have applied the hashing algorithm, PBKDF2. This encryption technique is a security technique that uses a pseudo random number generator to encrypt the user's password. I have teamed this with a strong password rule, each password must have, a number, one lower and one upper case letter as well as a symbol. It must also be at least 7 characters long. This makes the encrypted value stronger as, should an attacker attempt to decrypt the password, it would take significantly longer to do so.

As you can see from the screenshot above, the fourth column (PasswordHash) stores the password in the database and it is encrypted securely.

2.1.7 Secure feature 3 <SSL Certificate>

SSL Certificates are data files that digitally bind a cryptographic key to an organization's details. When installed on a web server, it activates the padlock and the HTTPS protocol and allows secure connections from a web server to a browser. Usually, SSL is used to secure credit card transactions, data transfer and logins, and more recently is becoming the norm when securing browsing of social media sites.
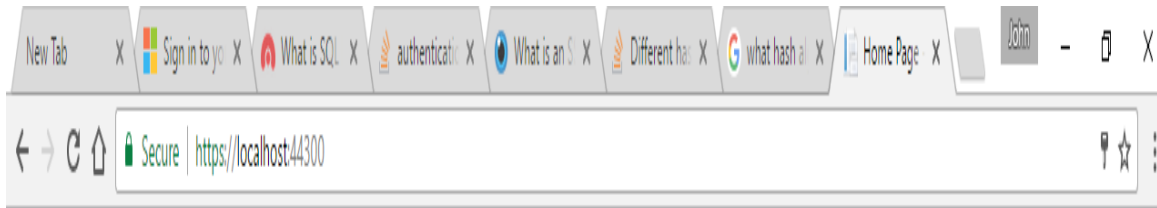
As you can see from the screenshot above, SSL Certificates make the following changes to the URL:

➢ They tell the user that the application is secure.

➢ They add an 'S' to the HTTP tag which stands for 'secure'.

➢ The key symbol on the right hand side shows that there is a public key attached to the certificate.

SSL Certificates protect your sensitive information such as credit card information, usernames, passwords etc. It also:

• Keeps data secure between servers.

• Increases your Google Rankings.

• Builds/Enhances customer trust.

2.1.8 Security feature 4 <Brute Force Prevention>

Brute force attacks are attacks on the login details of an application. Attackers use software to perform guesses on passwords. The software will iterate through a sequence until it cracks the password. This attack is very time and resource consuming. Once again, the password rules which I have in place make for a more complex password and therefore harder to crack.

Another way in which I have protected the system against a brute force attack is to enforce a 'lockout' rule. A lockout rule will lock a user out after a certain amount of failed login attempts. This would place even more time constraints on an attacker.

```
var result = await SignInManager.PasswordSignInAsync(model.Email, model.Password, model.RememberMe, shouldLockout: true);
switch (result)
{
    case SignInStatus.Success:
        return RedirectToLocal(returnUrl);
    case SignInStatus.LockedOut:
        return View("Lockout");
    case SignInStatus.RequiresVerification:
        return RedirectToAction("SendCode", new { ReturnUrl = returnUrl, RememberMe = model.RememberMe });
    case SignInStatus.Failure:
    default:
        ModelState.AddModelError("", "Invalid login attempt.");
        return View(model);
}


GET: /Account/VerifyCode
llowAnonymous]
lic async Task<ActionResult> VerifyCode(string provider, string returnUrl, bool rememberMe)
```

Above, is a screenshot of the code that is used to perform a lockout, you can see that the 'shouldLockout' is set to 'True'.

2.1.9 User requirements

After talking to the team of testers who I will be involving in this project, the below requirements are a reasonable description of what the users of Cut!tOut will expect for this application to be successful.

- The system should start in a reasonably quick time, certainly no longer than 15 seconds.
- The system should be easy to navigate.
- The system should be monitored and maintained by the administrator, due to the potentially sensitive nature of the content.
- The system should give adequate advice pertaining to the topics the user is searching for.
- The forum must be confidential, meaning no unregistered user can post or reply in the forum.
- The system should be maintained and updated to ensure the security features are still adequate.

2.2 Design and Architecture

The following is a representation of the system architecture. The application will be hosted locally using Microsoft Visual Studio, the system will be using the ASP.NET MVC architecture. The application will have a back end database that will store all the user's credentials. The reason I went for this approach was that I felt it would give me the correct set up to achieve my goals (as set out at the beginning of the project).
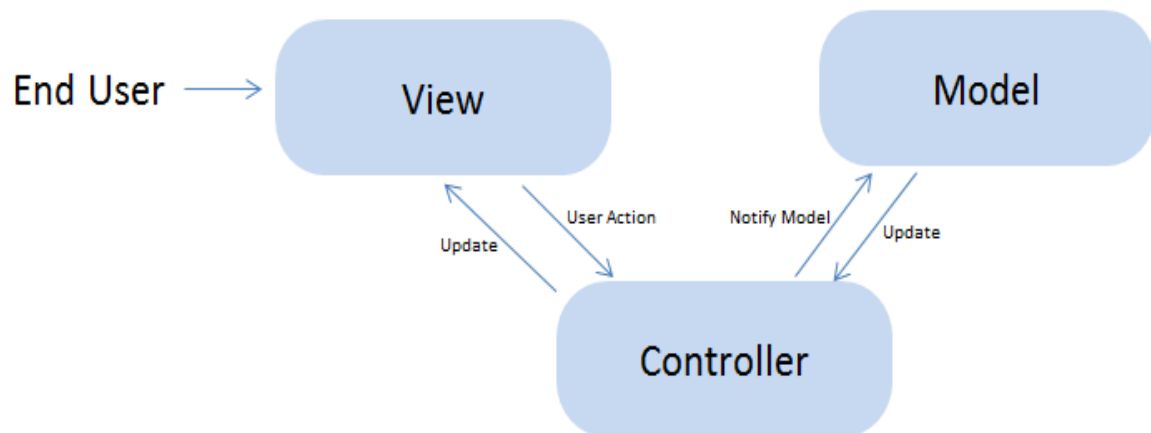
2.3 Implementation

The reason I chose to use Visual Studio to build my project was, after exploring other IDEs, I felt it was the best fit for the goals I wanted to achieve. It has a very strong library of built in packages that I was able to utilise without much code writing or time wasting. The Bootstrap CSS package that comes built into the default projects is a very handy design and layout package. It should also be noted that the API foundation for Microsoft development is called the .NET Framework, and provides support for language interoperability. This was very important as I had a lot of code from the Android Studio project that I was able to carry over to this IDE.

I was also very familiar with visual studio due to building a secure application project this year.

2.4 Graphical User Interface (GUI) and Page Layout
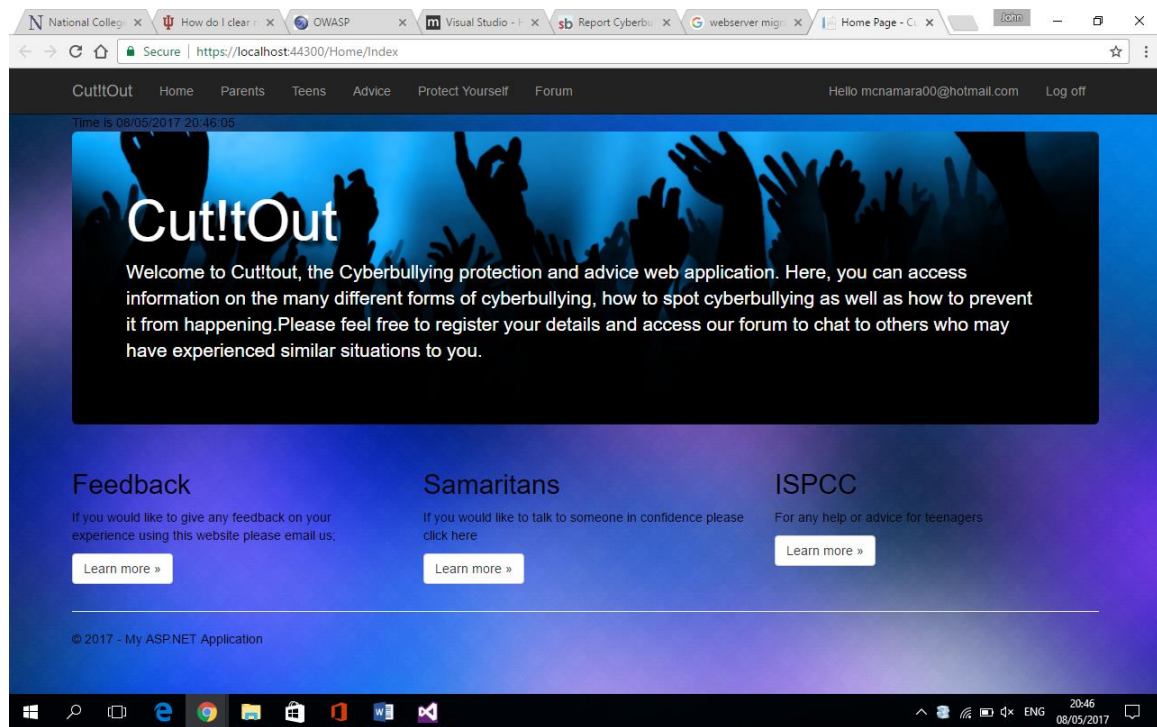
Above is a screenshot of the home page GUI. The other pages I have on the system have a similar layout with information pertaining to each page. The home page has a brief overview of the web application as well as some links to other websites that the user may be interested in visiting for more professional help. The layout of this site is simple and easy for the user to navigate, I have gone for a blue background as it is said to be a calming colour and I am conscious that some users may be upset or emotional when they visit the site.

Here is a brief overview of the other pages that are on the system:

Parents

This page gives parents information and advice on what they can do if they believe their child is the victim of cyberbullying. It will also give them ways in which to protect their children in the future.

Teens

This page is for teenagers who are looking for tips and advice on how to deal with cyberbullying., It is important to stress that though the pages for teens and parents are similar, the advice must be suited to the target user. On this page, the user will be encouraged to share their experiences in the forum.

Advice

This page will give users advice on what steps to take next, whether it be to talk to their parents, a teacher or to a higher power, this page will be aimed mainly towards teenagers but may also be useful for adults.

Protect Yourself

This page will give advice on how to prevent cyberbullying, whether the user is the victim of cyberbullying or in fact the bully themselves. This page is very important as it aims to hit the root of the antisocial behaviour and is pro-active advice as opposed to reactive.

Forum

This page will allow users to interact with each other in a safe and confidential way. The forum is possibly the web application's greatest asset, especially to the non-security conscious user. It must be moderated very well to avoid trolling or bullying from taking place. If a user wishes to post or reply to a topic in the forum, they must register to the system and login each time.

Register

This page will allow users to register their details to access the forum, they will be asked for an email address, a phone number and a strong password. This multi-factor authentication will ensure the user enters a valid phone number so they can receive the authentication code needed to register. It is hoped that this will deter any would be trolls from entering the forum.

Login

This page will allow users to login using their valid information, if they have not got login details they may click 'register as a new user' from this page without having to leave the page. Should the user forget their login details or enter invalid details they will be directed on the correct course of action to take to get logged in to the system.

3 Testing

3.1 Passive Penetration Testing

Overview

Due to the fact that this system is designed to be secure as well as functional, I performed a number of tests. In the first test, we will look at a passive information gathering test I performed with the OWASP Zed Attack Proxy (ZAP). OWASP ZAP, is one of the leading security scanners for web applications. It has an easy to use GUI and can be understood quite easily. The entire system is scanned thoroughly and a list of 'Alerts' is displayed in a pane on the left-hand side of the GUI. The alerts are then classified by flags, with red flags being the most serious and yellow be the least. This information can tell a developer what security vulnerabilities their system may have and how to fix them.

The first step is to have the system running on the machine's local host, I then enter the local host URL into OWASP ZAP to begin the scan, see below.
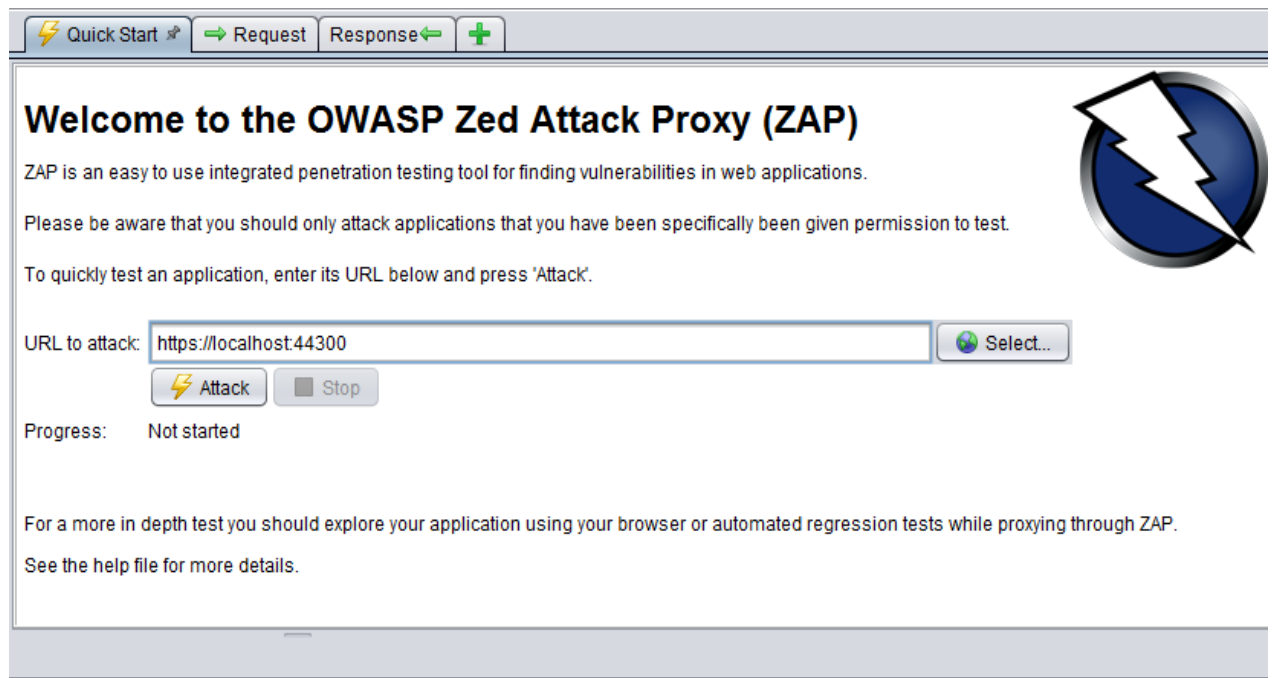
After the scan completed, I have been alerted to four different alerts. They all have a low priority yellow flag, indicating that they are not serious alerts and may be fixed quite easily. An example of one of these alerts is highlighted below, it states; 'Password Autocomplete in Browser'. This is easily fixed by simply adding the following code (autocomplete = off)to the web form in the application.

I consider this passive scan to be a great success as it has shown my application has no high level vulnerabilities.
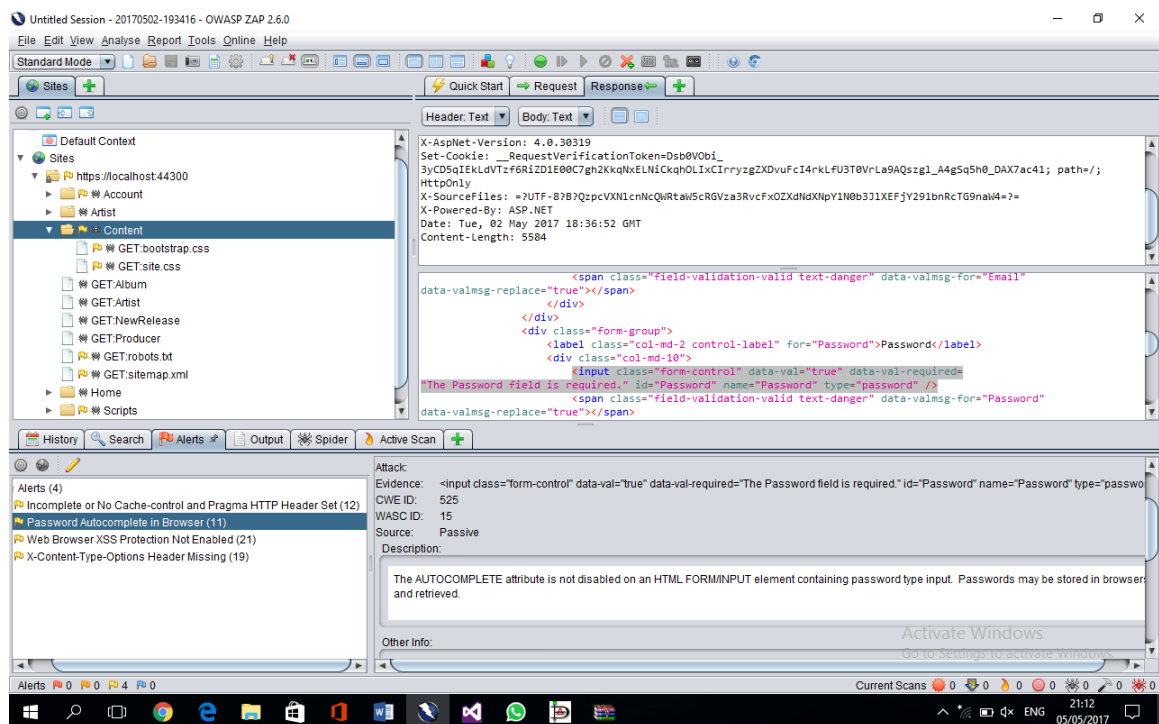
3.2 User Testing

For the user tests, I took a double-edged approach. I asked a classmate, Youcef O'Connor to evaluate the system first by looking at the web application. Youcef has a keen eye for GUI layout as well as a high level of experience in web design. He was pleased with the layout of the application and was impressed by the security features as well as the forum layout. '*the application delivers on what the user is told to expect on the home page'.*

The second user was Aisling Egan, she has no programming or web design experience. I wanted to get Aisling's feedback on the content and navigability of the application, getting her opinion gave me a clear idea of what a typical user would experience when moving around the pages. Aisling found the application to have some very useful information and felt she learned a lot from the different pages she visited, however she did raise the following issue with me;

- Is the phone number completely necessary for registration?

I explained the reason for the need for a mobile phone to be provided and she was satisfied that it was necessary.

4 Conclusions

Looking back on the life-cycle of the project, I have learned a lot. Originally, I had planned a mobile application with some very complex functionality. I had to accept that I was not going to meet those expectations I set for myself. This is where my final year specialisation subject, cyber security, guided me and gave me a clear idea of the project that I wanted to work on and gave me the necessary tools to build it.

Building applications is a huge business today, however, the need for building secure applications is growing bigger and bigger with software development teams no longer treating security principles and practices as an afterthought. I feel I learned a huge amount about implementing these practices, as well as a greater knowledge of the different forms of attacks that can be carried out, often causing massive amounts of damage to both the user and the organisation or team who designed and built the system.

I feel my application displays a great knowledge of the skills I should be displaying, my only regret with it is that I didn't go down this route sooner. The application could grow, offering more to the user by perhaps adding quizzes to educate or even having the user fill out surveys to gather information on cyberbullying trends.

I am very satisfied with the content of my application, I carried out a good deal of research to ensure the advice and information given in the various different pages is accurate and safe.

I will complete this project knowing I have used all of the skills I have developed over the life-cycle of this project, it is a project I will be proud of and I look forward to presenting it in my final presentation.

5 Further development or research

I would like to develop this web application into a mobile application, I feel it is a good concept and if it was readily available on a mobile phone for example, it could be of value to a lot of users. It may be a project I could complete in my own time after I have graduated and is certainly something I may do.

6 References

GUARDCHILD | PROTECTING CHILDREN IN THE DIGITAL AGE

In-text: ("Guardchild | Protecting Children In The Digital Age")

Your Bibliography: "Guardchild | Protecting Children In The Digital Age". *Guardchild.com*. N.p., 2017. Web. 10 May 2017.

NO BULLYING-EXPERT ADVICE ON CYBER BULLYING & SCHOOL BULLYING

In-text: ("No Bullying-Expert Advice On Cyber Bullying & School Bullying")

Your Bibliography: "No Bullying-Expert Advice On Cyber Bullying & School Bullying". *NoBullying - Bullying & CyberBullying Resources*. N.p., 2017. Web. 10 May 2017.
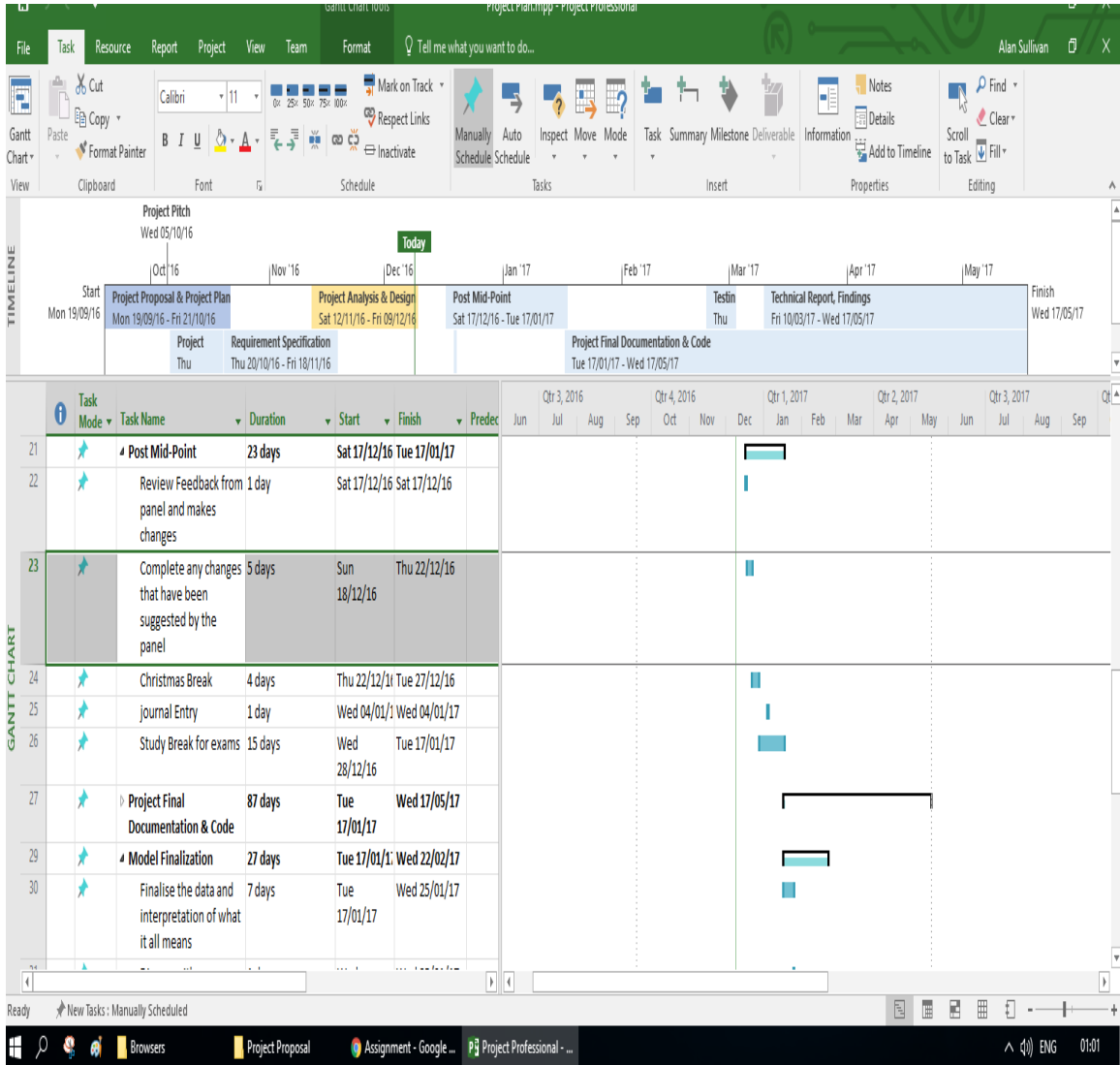

ISPCC - Never give up on a child. Ever

In-text: (www.gaumina.lt)

Your Bibliography: www.gaumina.lt, e-solution:. "ISPCC - Never Give Up On A Child. Ever". *Ispcc.ie*. N.p., 2017. Web. 10 May 2017.

7 Appendix

7.1 Project Plan

7.2 Monthly Journals

Month: September 2016

My Achievements

This month saw the start of 4th year in the BSHC in computing course in which I hope is a successful one. The first week we arrived back was more of a re familiarize ourselves with NCI week considering I had been away for the last 9 months on a work placement. With that being said there was not a lot to get our teeth into other than getting to know our lecturers for each module and in turn learning what the course work would be like.

The second week was a little more foot on the gas as we started to get our projects for the following weeks given to us. The most immediate one that had to take precedent was a report on "Facebooks system architecture" this was a group project for Out API Development module. The group consists of Myself, Jelicho Bachin, Youcef O'Connor and Richie Mangan who I've worked with in the past and knew I could rely on them to produce the work. This week also saw the start of both our AI project and report. The report being an individual research report on three techniques used in developing AI for a chess game and the project being develop a chess game in which a player can play against an AI this is the end of semester goal the first part being a player vs player game. I also got the CA project for my Strategic Management class which is to do a report on a cisco case study it is a three-man report with an individual element based around and individual analysis of the case study. Soffyan Ali is my partner for this project again someone I can rely on to get the work done. I also started to work on my project pitch for my final year project this week.

In week three I had the project pitch which was in front of Keith Maycock, Ron Elliot and Catherine Mulwa, it was my job to convince them that my idea was a feasible study and would have enough substance to be considered a 4th year project. Unfortunately, my idea wasn't accepted as the lecturers felt the subject matter (gambling addiction) was too sensitive an area to work with. I accept their opinions and have started to think about other options.

My Reflections

There was not a lot to look back on and feel I need to change due to it being such a short month and the projects and reports being so straight forward in saying that I am under no illusion of how tough things are about to get…. fun times ahead.

Intended Changes

Next month I'm going to have to come up with a game plan that can fit in all the study I need to get done as well as time for the gym. An extensive study time table will be needed I think.

Supervisor Meetings

Supervisors have yet to be assigned.

Month: October 2016

My Achievements

This month, I decided on my project idea after discussing the idea with Eugene McLoughlin who proposed it. I completed my project proposal which sets out the methods I will complete to achieve my goals. As my project subject is online bullying I have been looking into other apps and websites that are related to online bullying.

My Reflection

I am happy with the goals I have set out for myself and I am ready to start the requirements specification. I have set up a meeting with my supervisor and hope she is happy with the goals I have set out.

Intended Changes

Next month, I will start my requirements specification document, this document is very important in setting myself up correctly for the future. I will also start to build

a prototype of my application, this will enable me to showcase my project at the half way presentation and prove my project is heading in the right direction.

I realised that I need to spend more time on the planning of my project as time is going quicker than I expected, however, the other modules I have are proving to be very time consuming, I am slightly concerned I should have more done but I am hitting my deliverables on time.

Supervisor Meetings

Date of Meeting: At this time, I have not met my supervisor but plan to next Tuesday.

Month: November 2016

My Achievements

November was a rollercoaster and by far the longest month I've experienced in my entire time at NCI. The reading week fell at the start of this month and was a good chance to get ahead on project work and some extra study but 4th year is where good intentions go to die. The week started out great going over a few things here and there and was progressing smoothly until I opened up Web Services; I'll be the first to say my programming abilities are not the strongest and it's not a module I am particularly interested in but I do want good marks out of the module so I decided to put a real effort into studying it for the CA that was coming up after reading week. It was only after spending hours studying the subject that I realised I knew very little about it, unfortunately for me the way in which I learn made it tough to study. This then took up the whole week and by the end of it I felt even less prepared for the CA then when I started

One thing that I was able to get out of the way was the requirements specification document which allowed me to move on quickly with the technical report.

The second week in November saw a shift in focus away from my main project and onto the CAs that were starting to pile up, the first being in security principals which I ended up having technical difficulties and had to apply for a resit which was

approved and security principals which didn't go so well but I learn and move on. Nothing else really happened this week other than touching up my technical document for my main project.

Week 3 of this month was the breaking point for many students including myself who just couldn't keep up with the workload but thanks to the efforts of the class reps and the college a lot of deadlines got moved back so the pressure is off for now.

The final week of this month had 3 main focus points, finishing the prototype and technical report for midpoint presentation, finishing the security principal's assignment and secure applications programming applications project, makes it a long week to say the least. The AI CA was tricky but I done as much as I could with the time was given so hopefully it was enough and finally secure applications project which again I had technical difficulties with but there has been no time to dwell on that and I must have it completed by week 13.

My Reflection

Looking back at the month I feel there was not much I could have done differently, with 6 modules on this year I am doing my best to get all the work done and dividing my time as best I can. I put a lot of work and hours in and I'm happy about that, I cannot reduce my hours in my part-time job because I must pay the bills but that is beside the point.

Intended Changes

Next month will be the Christmas break; the only changes I will make is to allow for more time on my project work which should be easier with the end of semester fast approaching.

Supervisor Meetings

I had a few meetings with Kalianee this month and we went over a plan of how I should set up for my presentations as well as how much time I should be giving to each module. The technical document was gone over back to front and both of us were happy with it in the end.

Month: December 2016

My Achievements

December is finally here, this month saw the end of the semester and consisted mainly of just wrapping up projects and going over study material with lecturers for the upcoming exams starting on the 5th of Jan.

The first week I had another meeting with Kalianee in order to finalise my project mid-point presentation which was marked out of 25% and thanks to her tips and edits I managed to score a good grade in this which takes a lot of the pressure of moving into semester two. Finalising the presentation and the prototype was my main priority and took up the whole week, not wanting to shift my focus until I was happy with what I was going to show off I made sure to give it the time required. The only other major event this week was going through my project code for the final part of the Chess CA; this was just a short 5 mins with Keith Maycock where I was asked to explain various parts, this went much better than anticipated. So far so good for my modules.

The second week which was the week leading up to Christmas itself, was a busy one. At the start of the week I had to present my prototype which was well received; but at the end of the week had to re-sit 2 CAs on the same day which didn't give me a lot of opportunity to be prepared as I would have liked but in the end I did very well and was happy with the results. The last few days this week were just for ticking he boxes on two projects that were due for Security principals and Web Services, making sure that everything was in order and working properly. Once these were checked and checked again they were uploaded and it was time to take a break for a few days before the madness of study.

The next weeks were Christmas break which meant relaxing and a bit of fun with family and friends, I took a few days off over the Christmas but jumped straight into study mode considering I didn't have as much time to study as I would have liked it was important stay focused and get my study in, which as of writing this still consumes my life. It's not so bad and I'm nearly there, to think I'll never have to

Christmas exams ever again, well until my bright idea to start a Masters but I'll worry about that when and if I get there.

Anyway, there's not much else to report so I should get back to the study even though this entry has been a nice break I can't really extend it any further this month has been rather uneventful considering how the semester went.

My Reflection

Looking back at semester one, I wouldn't have done anything differently, I put the work in and it paid off. My Grades are all good and I have to keep them that way.

Intended Changes

Next month will be the start of semester 2 and I intended to sit down and evaluate what is left to do on my project and make changes where they are needed.

Supervisor Meetings

I only had the two meetings with Kalianee this month and that was just to go over the mid-point presentation, she gave me pointers on the how the structure should be and looked over my intended prototype. We were both happy with the direction it was going.

I'll sit down with here when I get back and go over what's left to get done.

Month: January 2017

My Achievements

Well it's the start of a new year and the final semester in my four years at NCI, still find it hard to believe I only have 3 Months to go considering I never thought I'd get this far in the first place. January was a bit of an unusual month to say the very least, with exams and transitioning into a new semester my main project took a bit of a back seat.

The first two weeks were all about studying and sitting my exams, which I had four in total and they went well enough. I definitely did enough to make sure I keep my

average up and now it sits on a 2:1 so hopefully I can make a strong finish to this year and keep that grade. After the exams were over I took a small break for myself to recharge and get my head straight about how I wanted to proceed with my project; this was something that was definitely needed.

Starting this semester, I found myself with a lot more time due to the fact that I only have 3 modules this semester which are Advanced Secure Programming which is a continuation of the Secure Programming from semester 1 with Sara Kadry, Penetration Testing with Eugene McLoughlin and Digital forensics with Vivianne Mee, all are very interesting so hopefully I can do well in them. The rest of the week was just getting back into the swing of things and getting the layout of how the modules will go.

Friday was Results and I'm happy to report I did quite well in my Exams and very well overall in the semester which solidified my grades. These results took a lot of pressure of the rest of the year.

All in all, I'm feeling confident but somewhat lacking in motivation, I'm sure that will pass though and I'll come through strong. Anyway there's only 7 weeks left so its game time; no use in complaining just got to get through it.

My Reflection

Looking back at the month I feel like I've made huge strides to completing my project as well as solidifying a grade of 2:1. All in all a good month.

Intended Changes

Going into the next month I Intend to review my project plan and make changes to allow for more project time.

Supervisor Meetings

This month's meetings were all very positive, Kalianee has been extremely helpful and I feel very comfortable dealing with her. We discussed the documents and

where I can hover up the easy marks and she also was very quick to tell me to send her any documents I do so she can ok them before I upload anything.

Month: February 2017

My Achievements

This month was a lot slower than I thought it would be in terms of work load, considering by the second month in semester one I felt that I wouldn't have enough time for anything I have now found myself with more than enough time then I know what to do with. This didn't mean that I had any less to concentrate on it just meant I could shift my attention to my main project.

There were big changes to my project this month, after speaking to a class mate I have decided to change IDE's. I was previously using Andriod Studio but felt that it just consumed too much RAM on my laptop, I had serious problems that were really slowing me down.

I have changed to Eclipse and so far have found it to be far better. I had little trouble migrating my source code over. The CA's for my other classes are starting to come in thick and fast now so, time management is an issue for me but I feel I can handle it easily enough.

The final bit for this month was filling in my project profile for the showcase which Eamon rightly so is putting pressure on everyone to get done. This is a 5% that can bring the grade up significantly.

This semester seems to be going by faster than I can keep up and with only three weeks of lectures left the pressure is starting to mount.

My Reflection

Looking back, it was quite a successful month in terms of project work and organisation for the final upload. I wish I had Eclipse for my mid-point presentation as I lost marks because of the problems I had with Android studio.

Intended Changes

With a month left to go I have set my final goals for finishing my project which are more in the way of giving it more time.

Supervisor Meetings

The Supervisor Meetings with Kalianee as always were very productive. Going over what's been done and what needs to be finished. I'm feeling very confident that I'll be able to produce a project with meaningful results.

Month: March2017

My Achievements

This journal entry will be the end of my 4 year cycle as a student at NCI. I have made huge changes to my project this month, after performing very well in my Advanced Secure Programming project I decided to change the programming language to C#, my project has stayed the same but I have been able to add extra security features to it such as input validation etc. I did not see a point in having those new skills and not applying them to my project. The presentation for this project went quite well which takes a bit of the stress off.

My meetings with Kalianee have been very productive in terms of keeping me on track and it is now with confidence I feel I can answer the questions posed at the start of my overall project. Kalianee has been very good all year with helping me out and keeping me calm and focused on the task at hand.

My final week saw my last official meeting with her as a current attending student, this was just to go over a few points for the final presentation. I have a digital forensics CA to hand in that I feel is strong and hope I can get some marks back after CA1 didn't go well.

My Reflection

Looking back I am very happy I changed my project, I feel it fits to my 4th year specialisation a lot better now and I am confident of a better mark now.

Intended Changes

I do not plan to make any further changes to my project, I just need to build the Forum section and perhaps clean the GUI's.

Supervisor Meetings

The supervisor meetings this entire year have been excellent. With Kalianee's guidance I am in a good position going into my final presentation.