

Institute of Technology Carlow

Software Development

4th Year Project

E- Scratch Cards

Research Document

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1. Introduction

The purpose of this project is the develop and maintain on scratch card application. This application will allow users to purchase scratch cards on a website or a mobile client through payments methods such as PayPal. Security will be a big feature with this project as it must stop any malicious attacks from gaining access to user accounts or credit card information. Along with this the application must be user friendly, in the sense that the functionality and the appearance must be up to date and easy to use.

This document will look at the various technologies that are going to be used in the development process of this application and the different coding languages such as Python, C# and C++. The potential ways of storing user's data will also be and the possible graphical user interface.

Some thoughts for developing such application would include some of the following:

- ✓ Knowing what application already exist on the marketplaces.
- ✓ Decide on a technology and programming language that is most comfortable with my own personal values.
- ✓ Find out what potential users want or need.
- ✓ What ways will the application be hosted?
- ✓ Native or Hybrid?

2. Similar Applications

Having similar applications on the market can have its advantages and disadvantages. The advantages being able to look at the applications to get the look and feel of what applications have, checking the feedback from the users are giving to determine what features are good and bad. The disadvantages would be that some companies might already thought of an idea that I have thought about. With having completed some research the following applications would be considered like the project that I have chosen to undertake.

2.1. National Lottery

The National Lottery is a state lottery in the Republic of Ireland government passed the 'National Lottery Act, 1986' to assist on raising funds for good causes such as health, welfare. Sport and recreation. It began gaming operations in March 1987 with scratch cards. However, now the National lottery operates three families of drawing games such as 'Lotto', 'Euromillions' and 'Daily Million'. The National lottery games are available both online and throughout 3,700 of retail agents nationwide. At the end of 2013 the National lottery achieved over 12 billion euros in sales and paid out approximately 6.7 Billion euros in prizes. In addition to this, it also raised over 4.4 Billion euros for charity and good causes. The popularity has been continuously increasing as it was reported that in 2011 approximately 2.2 million Irish people reported playing the National Lottery games with 1.5 million of those reporting to play on a weekly basis. (En.wikipedia.org, 2018) All prizes are paid as tax free lump sums.

There are a few rules that the National Lottery has set such as the following; the winner only has up to 90 days to claim their prize. The second rule is that it is illegal for any individual under the age of 18 to play or purchase tickets. Lastly the winner does have the right to remain anonymous if they wish to do so. The National lottery is an application that allows users to view the latest draws and gives users detailed information about scratch cards that can be purchased in shop. It has both a web and mobile clients. The website offers the new users to register for an account and an option for current users to login. There is a lot of information about the different types of lottery games provided throughout the website, which includes rules, prizes and cost of each game. The overall look of the website is very presentable and user friendly.

The mobile application has much of the same functionalities as the web application with the same methods for logging in and for new user being able to register. One of the main differences between both applications is the function of being able to scan your lottery ticket on your phone to check if it's a winning ticket.

2.2. LottoLand

LottoLand is another application that allows users to view the most recent lotto draws. It's somewhat like the National Lottery application in the sense that it gives the user detailed information about scratch cards, but it gives the user an option different amount of games that can be played and shows the better savings of purchasing different amounts. The login process and registering for a new account is also available on the website. There is also a section called "Instant Win" which presents a wide range of money winning games. This application has an online chat support feature that allows the user to contact an admin of the website directly if they have any issues or questions with using the application.

The Mobile side of this application allows users to purchase scratch cards the same as on the Website. Showing user's, the savings when they purchase more than 1 game and has the online live chat support feature. The overall application both Web and Mobile client is user friendly, looks great and feels very well to use.

3. Text Editors

Choosing a program for developing the project is very important. It will take some experimenting to find the one that will suit the project and my personal needs the most. There is a wide selection of Text Editors that can be used, so with this section I will investigate some of the most common Editors along with one's that I have used in the past.

3.1. Visual Studio

Created by Microsoft, Visual Studio is an integrated development environment. It's used for developing computer programs, websites and mobile applications. It allows the use of viewing and editing nearly any kind of code and then debug, build and publish applications for Windows, Android and iOS. It can produce both [native code](#) and [managed code](#) and provides a wide selection of development languages such as C#, PHP, C, JavaScript and C++. Some of the features of Visual Studio include a code editor that supports syntax highlighting and has IntelliSense which is supported for different languages and code completion for variables, functions, methods and loops. Developers are also allowed to write extensions for Visual Studio to extend its capabilities.

Advantages:

- It has simple sharing mechanisms.
- Simplified build mechanism

Disadvantages:

- No support is available.
- Requires a modern browser.
- No control over IDE or environment features and tools.

(2010, 2017)

3.2. PyCharm

PyCharm is an Integrated Development Environment used specifically for the Python programming language. It was developed in Czech Republic by a company by the name of JetBrains. It provides code analysis, a graphical debugger, and integrated unit tester, integration with [version control systems](#), and supports web development with [Django](#).

PyCharm is cross-platform, with Windows, Linux and macOS operating systems. There are two different downloaded versions, one being the Community Edition which is released under the Apache License, and the other being the Professional Edition that is released under a proprietary license that provides extra features. It also supports other languages such as C, C++, Java and PHP.

Advantages

- It marks what lines was added compared to the last commit if the project is under version control system which.
- It helps to navigate through source code of a project

(AxiaCore, 2017)

Over the research of PyCharm, I didn't come across much information of any disadvantages which leads me to believe that this text editor might be a good choice for developing my project in.

3.3. Android Studio

Android Studio is the leading developing environment for the android operating system. It is available for download on Windows, macOS and Linux based operating systems.

On May 16, 2013 at Google, it was announced that I/O conference would be released, and it would be available under the Apache Licence 2.0. Developed with android in the means that it will meet all the required packages and tools, unlike eclipse which required the ADT plugin to develop for android

Advantages

- It has a good workspace distribution which helps to make a friendly environment of app development.
- It's the best-known application for developing android applications

Disadvantages

- Problems with updates
- Takes some time to get familiar with how it works.

(Wingnity Blog, 2017)

3.4. Apache Cordova

Apache Cordova previously known as PhoneGap is a mobile application development framework that was created by a company called Nitobi. Adobe Systems bought Nitobi and later released an open source version of the software called Apache Cordova. The program enables software developers to build mobile applications using CSS, HTML and JavaScript instead of relying on platform-specific APIs like Android and iOS. It enables wrapping up of CSS, HTML and JavaScript to work with the device. It extends the features of HTML and JavaScript so that they work with the device.

Advantages

- Managing images for multiple devices is a lot easier with CSS and media queries than it is for an iOS xcode project and an Android project with its ldpi, hdpi, xdpi, and whatever dpi.
- You don't have to learn any new languages if you're already a decent web developer

Disadvantages

- Some features from other text editors that users might be familiar aren't there for all devices.
- There are complications with linking to other apps like Google maps.

3.5. Sublime Text 3

Sublime Text is a cross-platform code editor with a Python application programming interface. It supports a wide range of programming languages and mark-up languages. Functions can be added by users with plugins typically community-built and maintained under free software licenses. Some features include quick navigation to files, symbols or lines; the command palette uses adaptive matching for quick keyboard invocation of arbitrary commands and its simultaneous editing which makes the same interactive changes to multiple selected areas. There are currently two downloaded versions, Version 2 and Version 3. Version 3 being the newest update was first only available for users who had purchased Sublime Text 2 but in 2013 it began downloaded for the public.

4. Developing Languages

There is a wide selection of different programming languages available for software developers, so it can be difficult to choose which one's would be best suitable for this project. The first bit of research that was completed was searching up the most popular languages over a span of different resources.

1	Java
2	Python
3	C
4	Ruby
5	JavaScript
6	C#
7	PHP
8	C
9	SQL
10	C

(Inc.com, 2017)

From this research I decided to consider some of more popular languages that I found along with some languages that I was already familiar with.

4.1. Java

The Java programming language is one of the most popular used programming language designed for the use in the distributed environment of the internet. It is still the most popular language for developing Android smartphone applications. Java was designed to have the look and feel of the C++ language, but it is much easier to use and enforces an object-oriented programming model. Java can be used to create simple applications that can run and be tested on a local computer or be distributed among servers and clients in a network.

4.2. Python

Python is a popular high-level programming language with dynamic semantics that was created by Guido van Rossum and first released in 1991. Its high-level built in data structures, combined with dynamic typing and dynamic binding, make it very attractive for Rapid Application Development. It is also designed to make code readability a lot easier and a syntax that allows programmers to express concepts in fewer lines of code than might be used in languages such as C++ or Java. Python can be used to build server-side scripts for web applications using HTML, CSS and JavaScript to build front end and run client-side scripts. Python can use different frameworks for web developed such as Django and Flask and is good with dealing with large amounts of data.

4.3. C#

C# is an object-oriented programming language from Microsoft that aims to combine the computing power of C++ with the programming ease of Visual Basic. C# makes programming easy to use using Extensible Mark-up Language and Simple Object Access Protocol which allows access to a programming object or method without requiring the programmer to write additional code for each step. With being able to build on existing code rather than always having to duplicate it, C# is expected to make it faster and less expensive in the development of applications.

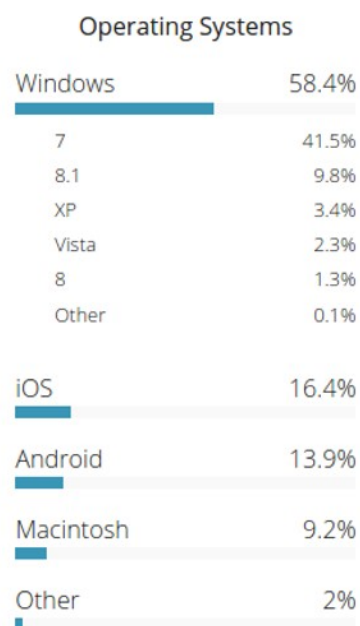
4.4. PHP

PHP also known as Hypertext Preprocessor, is a very common open source server-side scripting language. PHP scripts are executed on the server side and then results are generated and sent to the browser as plain HTML. PHP allows you to store, delete and update information that have been saved in your database it also one of the main functionalities behind a website's authentication, where the system must validate the username and password. PHP is an easy language to learn and for people just beginning to learn how to program it's a great starting point. Another great aspect of this language is its an open source project. It is widely used by the developers worldwide so it makes it very easy to look for help, or code that will help you at times of difficulties

5. Platforms

This section will be talking through the most suitable operating system to develop the project on. An operating system is the system software that manages and controls the hardware and software resources and provides common services for computer programs. All computer programs require an operating system to function.

With some research on the most popular operating systems, the following diagram was found which indicates a list of operating systems and gives a great understanding on the most used. With the use of this diagram I have decided to consider looking more into each of these with more detail to find the advantages and disadvantages of each.



(Vaughan-Nichols, 2017)

5.1. Android

Android is a mobile operating system developed by Google and is designed for mobile devices such as smartphones and tablets. It is one of the most popular mobile operating systems along with Apple's iOS. Android's user interface is mainly based on direct manipulation, using touch gestures that loosely correspond to real-world actions, such as swiping, tapping and pinching, to manipulate on-screen objects, along with a virtual keyboard for text input. However, it is constantly updating, offering more features and fixing any software bugs. Android is used by many large companies such as Samsung, HTC, and LG as their main operating system. In addition to touchscreen devices, Google has recently developed Android TV for televisions, Android Auto for cars, and Android Wear for wrist watches, each with a specialized user interface. Variants of Android are also used on game consoles, digital cameras, PCs and other electronics

5.2. I.O.S

iOS formerly known as iPhone OS, is a mobile operating system created by Apple Inc. It is the operating system that operates all the apples devices, such as the iPhone, iPad and iPod Touch. It's the second most popular mobile operating system falling behind Android. At first in 2007 the operating system was developed for the iPhone, since then it has been extended to support all the other Apple products. The App Store contains more than 2.2 applications. The user interface is based upon direct manipulation, using multi- touch gestures. Apple have been praised for incorporating accessibility features into iOS, enabling users with vision and hearing disabilities to have no trouble using their products.

5.3. Windows

Windows is an operating environment created by Microsoft that provides an interface for personal computers. It is one of the most popular operating systems to data. Windows introduces a mouse for navigation through menus, dialog boxes, button, tabs and icons to eliminate the need to memorize commands for the command line. Windows was first introduced with version 1.0 in the 1980s and since then it has been updated to Windows 10. Some key benefits and features of Windows would be that it controls the storage of data, the hardware attached to the computer such as a webcam or keyboard and it controls what access to a computer that different users have. It also promotes multi-tasking by allowing users to do serval tasks at the same time.

6. Mobile Application

6.1. Native

A native application is a program that has been developed for use on a one and one only platform or device. With native applications only been written for a specific platform, they take advantage of the chosen operating systems features and other software that is typically installed on that platform. Native apps live on the device it's downloaded on and are accessed through icons on the home screen of the device.

6.2. Mobile Web App

A mobile web application are not real applications they are more like websites but have the functionalities as native applications in some ways. They are developed to run on an internet browser are written in HTML5. Users can access them as the same way as any other internet page, but the difference is they would have an option of installing the application onto their home screen or desktop.

6.3. Hybrid

Hybrid applications are part native and web app. They have the same features as a native application by the way they are saved on the app store and can take advantage of many of the device features available. They also have some features of a web app, like how they rely on HTML being rendered in a browser with the caveat that the browser is embedded within the app.

7. Hosting Environments

7.1. Blacknight Solutions

Blacknight Solutions is an Irish Company based in Carlow. I decided to do some research on this company because I had already got experience with using their hosting environment in 2nd year and 3rd of college and I felt that it would be the best choice for my project because I as already familiar with how to implement it with my project. Unfortunately, it is a monthly paid subscription, but from my past experiences I had no issues and I feel that it's a very good service to use.

7.2. Xampp

Xampp is a technology used for hosting on a local machine. It is free and an open source cross-platform web server package that was developed by Apache Friends. It was mainly written in PHP and Perl programming languages. It is a single lightweight Apache distribution. It is a great way for developers to test their websites before putting them online.

8. Conclusion

In collusion to the research carried out I have chosen the following developing tools and languages. For the developed of this project I chose to go with using sublime text because I liked the way the environment looked and felt. It is also and easy program to get know and provide a lot of small and helpful functionalities. With this application being a web based, I chose to go with using HTML, PHP, JS and CSS mainly because they are the most common languages used, so if I came into trouble with parts of the coding, I know that there is a large community out there that I would be able to get help from. PHP would also allow me to be able to create connections to my database. For the hosting part of my project I decided to use Blacknight Solutions. It was an easy decision for me because I was very familiar with how to form connections to this database and how to create databases. I chose to go with XAMPP for my local hosting. This is mainly just for testing before I submit my application to the live web.

After doing the research document, I feel that it has giving me a better understanding on the different technologies out there and the wide range of languages that can be used. It also gave me a better insight of the similar applications that are already available to users and allowed me to see what faults they might have and give me an opportunity to implement them within my project.

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