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Technical Standards Essay

1. Xamarin and C#

Xamarin and C# are open-source platforms and the programming language we use for our mobile application.

Xamarin is an open-source platform for building modern and performant applications for iOS, Android, and Windows with .NET. Xamarin is also an abstraction layer that manages communication of shared code with business logic code. Xamarin can help programmers run the program in a managed environment with some convenient functions such as memory allocation and garbage collection, etc. Xamarin allows programmers to share above 90% of their programs across platforms and Xamarin also allows users to write all of their business logic in a single language but can also have native performance.

C# is a useful and type-safe object-oriented language that enables programmers to build a variety of secure and reliable applications that could execute on the .NET Framework. Programmers can use C# to create Windows client applications, XML Web services, distributed components, database applications, mobile applications, etc.

Visual Studio's Visual C# provides a user-friendly code editor, convenient user interface, useful debugger, and many other tools to make it easier to develop applications based on the C# language and the XAML Framework from beginning to end.

Xamarin: https://docs.microsoft.com/en-us/xamarin/get-started/what-is-xamarin

C#:https://docs.microsoft.com/en-us/dotnet/csharp/getting-started/introduction-to-the-csharp-language-and-the-net-framework

2. AutoCAD and phpCAS

AutoCAD and phpCAS the tools we use to build maps coordinate data and manage data security.

AutoCAD is a professional computer-aided design software. It helps designers, architects, and engineers to create accurate 2D / 3D models. It can design almost any model and has a certain toolset to help a more convenient design. AutoCAD includes industry-specific functions and smart objects for architecture, mechanical engineering, electrical design, and more. In our project, in order to build an accurate positioning and navigation system, we use AutoCAD to establish precise coordinate axes on the floor map and identify the coordinate points corresponding to each room/feature.

phpCAS is an authentication library that allows PHP applications to easily authenticate users through a central authentication service (CAS) server. This is an extension tool based on PHP features. According to the current difficulties and customer requirements, we have made the library's computer usage data into a web page and protected it with phpCAS. Because our University's UniqueID also uses phpCAS technology, users can log in to miamiID directly to securely access library computer usage.

AutoCAD: https://knowledge.autodesk.com/support/autocad/learn
phpCAS: https://github.com/apereo/phpCAS

3. A* Algorithm

A* algorithm is a mapping and search algorithm that is frequently used in computer science and software construction due to its optimal efficiency and completeness. It will not only search for the shortest path nearby but also in a specific large map, the A* algorithm will be able to trace back if reaches the end of branches or self-adjusted between each path in order to find the best result.

Our main purpose of the project is to develop a mobile application which can completely run on smart devices. Therefore, we must have to have an optimal algorithm that can be fully handled by the smartphone, and also it should be as complete as possible to provide accurate pathline.

It also helps us to find a way to transfer the Libary's maps into a grid system. By setting notes on the map to create a coordinate system, we finally have a functioning mapping system that can be displayed on the visible map. And for optimization purposes, if we want the program to run faster, we have to sacrifice the accuracy which could easily be done by reducing the number of notes on each map.

Introduction to A*, *Theory.standford.edu.*
:http://theory.stanford.edu/~amitp/GameProgramming/AStarComparison.html