

Team Hobby

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1.Introduction

1.1 Abstract

“Hobby Project Generator ” is a web application that supports browsers that runs .NET framework 5 and the upcoming .NET 6. The application finds and recommends projects based on the users’ available tools and preferences.

1.3 Scope

“Hobby Project Generator” is a web application that is intended to recommend physical projects to hobbyists based on the available tools as well as their preferences. In addition, the application serves as a place for users to post personal projects with step by step guidance for others to follow.

Our web application is currently limited to the North America region only with language support only for English.

1.4 Technical requirements

Software requirements:

- Operating System: Windows 10 64-bits, any Linux distribution 64-bits
- Web Browsers: Chrome, FireFox, Microsoft Edge

Minimum hardware requirements:

- CPU: Intel 3th Generation or AMD FX series
- 1GB RAM
- Graphics: Intel HD graphics

1.4.1 Operating Systems

Operating Systems that our team use to build our web application:

+Microsoft Windows 10 Pro build 9042.11165 and 19042.1237

+Microsoft Windows 10 Home build 19043

Operating system to run our web application with normal behavior:

- + Windows 8, 10 64-bits
- + Linux distribution: Ubuntu, Kali, Debian 64-bits

1.4.2 Web browsers:

“Hobby Project Generators” require Chrome browser version 94.0.4606.61 and latest version of Chrome as of **05/20/22**

1.4.3 Hardware requirements:

Minimum hardware requirements:

- CPU: Intel Pentium or AMD FX Series
- 1GB Ram
- Graphics: Intel HD graphic

Recommend hardware requirement:

- CPU: Intel 7th generation or AMD Zen 2 architecture
- RAM: 8GB
- Graphics: Intel HD graphic

1.5 Non-goal

- We will not be supporting a mobile application to access the website

1.6 Future goals

The addition of software projects along with the addition in the set of user's preferences and skill sets to accommodate software projects. The web application also recommends projects to users based on programming languages they know such as Python, C++, C, Java,

Product recommendation feature where users will be presented with links to third party sites to buy tools that are required for projects.

1.7 Assumptions and Dependencies:

The operating system is assumed to be functional and stable internet connection

2. Technology Stack

2.1 C# Programming Language

2.1.1 What is C#:

Developed by Microsoft in the early 2000, C# is an object oriented language that is designed to support different programming paradigms such as: procedural, object oriented, functional and logic. C# improves from C and C++ language with characteristics that are very similar to Java such as garbage collection for heap memory management.

2.1.2 Why use C#

- Most web application is developed using C# due to its compatibility with the .NET framework developed by Microsoft which our team is using for our “Hobby Project Generator”
- Faster development time with a large library and high scaling capability
- Reduce problems involve memory management like memory leak through the use of automatic garbage collection.

2.2 ECMAScript 11+ / TypeScript 4+ Language

2.2.1 What is ECMA 11+ / TypeScript 4+

ECMAScript is a general purpose language designed with the intention to increase compatibility between internet applications across different web browsers. ECMAScript is also known as JavaScript language. ECMAScript is commonly used to write server applications along with Node.js.

TypeScript is a superset of ECMAScript(Javascript) while including optional static typing as a feature. Javascript programs can also be run by Typescript much like how C programs are also valid C++ programs. Used to write server and client applications along with Node.js.

2.2.2 Why use ECMA 11+ / Typescript4+

- Support compatibility across different web browsers and web applications.
- Enhance IDE support using static typing from Typescript to help spot common errors through Intellisense.
- Safely refactoring and renaming files.
- TypeScript is compatible with ECMAScript and allows any .js file to be renamed to “.ts” file and run through the compiler.
- ECMAScript supports backward compatibility so that JavaScript code and syntax will also run on it.

2.3 Backend Framework .Net 5+ / 6+

2.3.1 What is .Net Framework?

.Net framework is designed as a standard way to build and deploy applications in order to increase interoperability between web applications and browsers. .Net

Framework is made up of two parts with the first being Framework Class Library (FCL) and second is Common Language Runtime (CLR). FCL is a library that stores functionalities that are written in different languages that can be used by web application developers even if they are not using the same programming language. In addition, FCL provides UI, cryptography, database access, ... and more. The CLR part of .NET frameworks handle memory management and error handlings.

2.3.2 Why use .Net Framework?

- Increase compatibility between old and new applications
- .Net Framework is language dependence by supporting all data types and constructs available in other languages.
- Free the programmer from memory management tasks by taking care of garbage collection on the heap using a garbage collector.
- .Net framework supports languages with static typing such as languages like C, C++, C#, Java, ... as well as dynamic typing languages where the data type is inferred such as Python.

2.4 Data Store

2.4.1 What is SQL Server 2019 Developer/Express Edition?

SQL Server 2019 is a database management system developed by Microsoft designed to serve functionality such as sending, retrieving (query) data from a server that acts as a database. In addition, SQL Server supports relational databases which is a designed pattern to show relationships between tables as well as how different rows and columns are related.

Furthermore, SQL server supports multiple users from viewing, editing data at the same time. This is done using a solution lock to prevent race conditions from occurring and preserve data integrity. Data can be query or manipulated using SQL language.

2.4.3 Why use SQL server 2019 Dev/Express Edition?

- SQL Server 2019 can be installed just by running an executable making the installation process simple and convenient.
- Has many different versions designed for different product scales such as enterprise, home use,
- Support data encryption using symmetric or asymmetric keys to increase security.
- Most robust and vetted database system.

2.4.4 What is SQL Server Management Studio?

SQL Server Management Studio is a software application with graphical user interface design to interact with the servers that run SQL. It is used to access data that is stored within the server. Configure the server as well as providing other administrating tools.

2.5.2 Why use SQL Server Management Studio?

- High compatibility with SQL Server
- Ability to access data, configure server settings, administrating tools are available within SQL Server Management Studio

2.5 IDE

2.5.1 Visual Studio Code 1.59+

Visual studio code is a code editor designed for windows, linux, and MacOS. It is optimized for debugging and building web or cloud applications.

2.5.2 Why use Visual Studio Code 1.59+

- Many plugins that support different languages such as C family codes, Java, Python, Haskell, SQL. Programmers don't have to switch between different IDEs to edit code.
- Built in version control support which is compatible with Git and Github.
- Support code completion to save time from typing whole functions, variables, class names.
- Strong community support ensures compatibility.

2.5.3 Visual Studio 2019 Community Edition

Visual studio community edition is a robust IDE designed by Microsoft. The IDE contains a code editor, debugger, compiler, and a wide array of tools to assist in software development.

2.5.4 Why use Visual Studio 2019 Community Edition

- Built-in support for C family languages compared to other IDE.

2.6 Web Server

2.6.1 What is IIS 10+?

IIS is web server software to provide interatiaction and configuration with the server developed by Microsoft. IIS supports many different connection protocols including HTTP, HTTPS, SSL connection that use asymmetric encryption. IIS provides

the basic functionality that is expected of a web server such as handling requests, authorization and authentication, ...

2.6.2 Why use IIS 10+?

- Support .NET application
- Easy to update to install. IIS can be updated along with Windows update.

2.6.3 What is Apache HTTP Server 2.4+?

- Apache is an open-source web server software maintained under the name of Apache Software Foundation(ASF). The ASF consists of a group of contributors that go by the name of “Apache HTTP Project Management”(PMC). The PMC now determines the direction of the project. Apache is cross-platform and has support for many protocols such as HTTP, HTTP/2, and HTTP with OpenSSL certification(HTTPS). It also is able to handle everything that a web server should be able to do such as handling requests, authorization and authentication. The latest stable revision **2.4.49** was released on 09/16/21.

2.6.4 Why use Apache HTTP Server 2.4+?

- No cost association with the use of the web server.
- Supports all of the industry standard web protocols.
- Cross-platform ensures that the web server will work on the three main Operating Systems(Linux, Windows, MacOS).
- Easily deploy static websites when using technologies such as TypeScript 4+ with HTML.
- Allows for connection through a proxy where guidelines of who can connect to the server can be set.

2.6.5 Analysis between IIS and Apache and Conclusion

Although both IIS and Apache can be used for our project “Hobby Project Generator”, there are certain features that Apache has that will satisfy our requirements. As mentioned in the scope section of our project, we will only be supporting the North America region which will require the use of a proxy. Currently, only Apache web server software supports proxy and IIS does not which is a crucial part of our web application.

In addition, Apache is designed and developed by a dedicated community that respects free and open source which means that it will have a tendency of staying as a free software. On the other hand, IIS is developed by Microsoft corporation which tends to have a tendency to monetize their product. This means that our project is safe from monetization if Microsoft decides to charge for their web server software.

In conclusion, we chose Apache because we need the ability to use proxy to region lock our web application to limit the scope. With a dedicated community that support Apache as well as the open source nature of the software which give its the advantage over the IIS.

2.7 Web Browsers

2.7.1 Chrome Internet Browser

Chrome browser, version 94.0.460661 is required for minimal support with our application.

2.7.2 Why use Chrome?

- Chrome has the most market share in terms of browser.

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