Technology Stack

TASK 9.1G

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Design and Implementation Plan

To design our project, we are going to break the design process into steps. Using steps help improve the effectiveness of the user experience through certain principles of design. Developing wireframes and writing down what needs to be achieved provides a quick and easy way to find what the final product may look like. This excludes any colors, any major UI designs, and focuses on the layout of the product. This leads to designing the UI and prototypes that can be reviewed by the client and tested by users. This can then be passed on to the development team to implement.

To implement our project, we are focusing on the ability to effectively create these design parts from our technology stack. A Github has been created and will be used to keep track of versions and keep every part of the project in one, easy-to-access location. Once we have our design to the point that we are satisfied with, we will look to implement it in a way that allows swift access to testing before releasing it to the public.

Technology Stack A

Front-end technologies	HTML, CSS, Balsamiq, Adobe XD
Back end technologies	PHP, LAMP
Database	MySQL
Operating system	Linux
Communication b/w Front-end and Back-end	Ajax
Security technology	Amazon Web Application Firewall
Caching system	Memcached
Server for web application	Apache

Technology Stack B

Front-end programming languages	HTML, Tailwind CSS, React.js, Next.js
Back end programming language	Java
Database	MongoDB
Operating system	Windows server
Communication b/w Front-end and Back-end	Express.js
Security technology	Azure Web Application Firewall
Caching system	Redis
Server for web application	Node.js & Nginx

Technology Justifications

Difference between tech stacks used in Technology Stack A and Technology Stack B

Without vs With React.js
To streamline the loading process we have upgraded our frontend from a basic HTML system in Technology Stack A to a cache-based system in Technology Stack B that we can make serverless by deploying with Next.js. This allows for much faster load times especially after the first visit of the first page.

PHP vs Java
We have used the LAMP Technology Stack A which means Linux as the operating system, Apache as a web server, MySQL as a database, and finally PHP as server-side programming languages. PHP has a wide range of databases which makes writing database-enabled web pages in it simple and easy. PHP is an interpreted language which means it is first compiled into bytecode and then interpreted by a runtime engine. PHP was designed specifically for web development which means it can develop and deploy any used app in a matter of minutes.
For Technology Stack B we chose Java as our back end programming language. Java is a compiled programming language so it can be run on any operating system. Java is compiled into bytecode and runs on JVM. Java ensures safety to our system from attacks and bugs and java is also statically typed which helps detect errors in the early stage of the SDLC process. Java is specifically used to develop complex and complicated applications.

MySQL vs MongoDB
Structured Query Language (SQL) is a relational database management system. MySQL provides data security and high performance. MySQL is globally renowned for being the most secure and reliable database used in popular web applications like Facebook, Twitter, and WordPress. It offers unmatched scalability to facilitate the management of deeply embedded apps. It also offers on-demand flexibility to the developers.
And on the other hand MongoDB is a NoSQL database management system. The main benefit of MongoDB is that it is very easy to install and setup. Its basic feature is that it is a schema-less database and it has the ability to derive a document-based data model because it stores the data in the form of Binary which helps to store data in a very rich way while holding arrays and other documents.

Linux vs Windows Server
Linux is an open-source operating system so it is easily available for everyone. It is the most secure OS and less vulnerable than others. Linux is free to download and use. Linux provides high stability i.e. it does not need to be rebooted after a short period of time and it rarely slows down or freezes.
Windows server is often considered a complete solution as it is easy and quick to set up as compared to Linux. Windows server package includes technical support, along with regular updates and security fixes.

Web Application Firewall
A web application firewall is integral to a functioning and secure website. It allows the administrator to monitor, filter, and block access to and from the web application. Amazon Web Services and Azure

both offer their own web application firewalls, it just depends on which service we use to host our website.

Memcached vs Redis
Memcached is a general-purpose distributed memory caching system. Generally Memcached Unix-like operating systems and Windows server, but also it can run on the Linux system which is the operating system in Stack A. Memcached is commonly used to reduce the number of times external data sources must be read by caching data and objects in RAM, in this way it can speed up the reading speed of the website. Memcached is popular now, lots of applications are using it such as Youtube and Facebook. Redis(Remote Dictionary Server) is a key-value caching system. Similar to Memcached, in order to ensure efficiency, data is cached in RAM, but it supports relatively more stored value types than Memcached, including string, list, set, zset, and hash.

Apache vs Node.js
Apache is the number one web server software used in the world. It can run on almost all computer platforms. Because of its cross-platform and security, let Apache be one of the most popular Web server-side software.
Node.js is a JavaScript operating environment based on Chrome V8 engine, it is suitable for Input / Output intensive applications, such as online multiplayer chat, multiplayer online mini-games.

SWOT Analysis

Plan A

	Front End	Back End	Security
Strengths	HTML and CSS are the most commonly used tools for designing websites Balsamiq enables more focus on the layout rather than the UI Adobe XD can be used to design the prototype efficiently	PHP is open source and regularly updated LAMP is very stable and allows more freedom and control Having PHP as a framework makes maintenance easier MySQL is a high security database technology	SQL has the capability to handle complex and large amounts of data
Weakness	Balsamiq has very limited collaboration abilities Adobe XD has a learning curve	PHP has slower execution as well as requiring more resources. LAMP costs more to use	Issues can be caused when deploying new data and break the database
Opportunities	Adobe XD has a substantial amount of features for free software Used in collaboration, Balsamiq and Adobe XD allow for efficient design of both the UX and UI	PHP is widely used in the design community and offers support and resources. Linux is a free OS and offers capabilities not found on other OSs MySQL is available for both cloud and Software as a Service.	Is open source and the source code can be viewed and modified to suit needs User friendly
Threats	If there is a lack of operational knowledge among associated members, progress will be slowed While Adobe XD is free and contains many features, there is a lack of personalisation	MySQL is vulnerable to injection attacks if improperly implemented	If many people are using the service at the same time, the network may become overloaded

Plan B

	Front End	Back End	Security
Strengths	Axure RP can be used to create more event-based and rich prototypes over Adobe XD jQuery is a library of JavaScript which helps to make React.js is a JavaScript library which makes it easier to develop	Same programming language can be used for both front end and back end It is a cross-platform technology stack	JavaScript does not require compilation process for the program to run so it saves time The environment is easy to get used to and adapt
Weakness	The learning curve is greater on Axure compared to Adobe XD May take longer to produce as we're changing technologies	Java is a slow programming language. Java also takes up more memory space. MongoDB has a limit for document size	The structure being simple so it offers limited functions Can be easily exploited by cyber attackers
Opportunities	Axure RP offers free enrolment for students and teaching staff without any upfront fees	MongoDB is there for both cloud and SAAS Make the website much more interactive Known for high compatibility MongoDB is user friendly and suggested for beginners	Helps in identifying security issues and fix them protecting the website from any kind of cyber attack Its independent of OS or platform
Threats	Axure costs money for teams and is harder to get into which can lead to a longer development time	MongoDB lacks authenticity and hence invites cyber attacks JavaScript being cross platform might result in data loss Can cause network traffic easily	Low level security Very limited functions and features