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INDIVIDUAL ASSIGNMENT COVERSHEET

Family Name: **Kandel**   Given Name: **Dipak**

Student Number: **20030909**   Lecturer's/ Tutor`s Name: **Sajad Ghatrehsamani**

Subject Code & Name: **ICT728 Capstone Project 1 T125**

Assignment Title: **Individual Literature Report (25%)**

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Assignment Receipt

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1. Introduction

So, as a project to develop a thesis management system in the Capstone project, various tools and technologies are reviewed along with a literature review of similar software/tools. The system aims to allow students to choose the thesis topics, which, when approved by the supervisor, lead to the submission of various assessments and marking by the supervisor. It includes more processes, which were detailed in the project proposal previously.

This technology review critically reviews the tools, platforms, and methods that will be relevant to the development of the project. The selection of programming language, development platform, database and methodologies is done via intensive research, examination and use case. The alternatives were identified, and limitations were measured beforehand to make sure that the technological decisions are not only functional but also scalable, secure and fulfil the requirements of the project development. The development, scalability, integration capabilities, and community support were also considered.

The tools, language selected after the research have strong community support and a large number of resources available for learning, which will help our team to learn easily and reduce development bottlenecks. Having time constraints in this capstone project, choosing technologies with well documentation and resources becomes crucial.

2. Technology Review

2.1.   Front End Technologies

a. HTML5

HTML 5 is the latest version of the Hypertext Markup Language, commonly known as HTML. It is used for web development and for structuring the content semantically. For our project, it will be used to create a foundation layer in the user interface. The forms, tags, cross cross-device functionality of HTML will be used to ensure that the application is usable by students, supervisors and admins on multiple devices (Lubbers et al., 2011).

Strengths:

- Lightweight and fast rendering
- Integrated multimedia support
- Universal browser support

HTML 5 is used for the development of similar thesis or learning management systems, such as Moodle and Google Classroom. Hence, using HTML5 for our project will be a good choice for us. It also supports responsive elements, reducing the dependency on additional plugins and ensuring accessibility compliance.

b. CSS3 and Bootstrap

CSS3 is the latest version of Cascading Style Sheets, commonly known as CSS. It is used for designing and customising the web pages and interfaces. Bootstrap is a popular CSS framework that gives us pre-designed components and grids that are responsive (Hong, 2018). When used together, we can ensure that the website is visually appealing, responsive and consistent design across different device sizes and browsers.

Strengths:

- Consistent and Global styling

- Increased development speed with Bootstrap reusable components

- Enhanced design options and responsive designs.

Various education portals relevant to our project, such as Coursera and Khan Academy, have used CSS3 and Bootstrap in their frontend development, hence, it will be easy and fruitful for us to use them in our project. Additionally, Bootstrap's grid system simplifies responsive design, eliminating many manual efforts in aligning and styling content. The extensive component library of Bootstrap includes modals, dropdowns, carousels, etc., which we can use to enhance interactivity in our project.

2.2. Backend Technology

a. Python Django

We will be using Python Django for the backend development of our project. Python is a widely used programming language for web applications, software development, as well as data science and machine learning. It used Model View Template (MVT) architecture for development and promotes clean design (Forcier et al., 2008). Django makes secure, scalable and maintainable web application development easier.

Strengths:

- Rapid prototyping and scalability

- Extensive libraries and frameworks

- Cross-Platform and Open Source

- Simplicity and Readability

- Built-in security features

Although it can be heavy for a very simple application, we will be using this as our project is not small and needs to be scaled later. Educational platforms like edx have used Django for secure academic and content-driven systems. Hence, we will be using Python Django for our backend systems development. Additionally, Django supports API development through Django REST Framework, which can be leveraged in future phases for mobile or third-party integrations.

2.3. Database

a. MySQL

MySQL is a widely used open-source relational database management system based on Structured Query Language. It will be used to store all data such as user accounts, thesis details, documents, and every other detail. It can be easily integrated with our backend system developed using Django (Gore et al., 2021).

Strengths:

- Fast operations and reliability

- Efficiently Scalable

- Secure and Open Source

Mysql is used by Moodle and WordPress, which manage a large volume of academic data and content. Hence, using MySQL for our system will be a good choice for us. Not only that, It is supported by all major hosting providers, which makes future deployment easier and cost-effective. Backups and scaling tools are well-supported by My SQL.

In comparison to NoSQL databases like MongoDB, MySQL is more suitable for us due to its support for complex joins, rigid schema design and transactions, which will be ideal for us for our student, thesis relationships and submission records and assessment histories.

2.4.   Development Tools

a. Visual Studio Code (VS Code)

VS Code is a lightweight and powerful open-source code editor software developed by Microsoft, and it supports a wide range of programming languages, including HTML, CSS, JavaScript, and Python, which we will be using for our development. It will be used as the main Integrated Development Environment for the development of our thesis management system. It supports code suggestion, auto-completion and seamless integration with GitHub (Team, 2024)

Strengths:

- Rich extension ecosystem

- Lightweight and Customizable

- Easy Git Integration

- Open source and Free

Since VS Code is mostly used in modern software development, we will be using VS Code over other IDEs. It will improve our code quality and help us to debug easily with its built-in debugging tools by providing Django-specific extensions.

b. GitHub

GitHub is a cloud-based Git Repository service used for version control and collaboration. For our project, we will write code and push it to GitHub on every update made. It could be accessed by all our team members, and versions can be managed collaboratively.

Strengths:

- Enables collaborative and synchronous coding
- Easy code history and reliable changes

Since GitHub is used for almost all development tasks, we will be using GitHub in our project as well. We can implement GitHub Actions as well by integrating Continuous Integration and Continuous Deployment CI/CD pipelines. This will be beneficial for us in testing and auto-deployment.

2.5. Design Tools

a. Figma

Figma is a collaborative interface design tool that allows us to create designs before we develop using code. Hence, we will be using it to create prototypes and visual layouts directly in the browser. We will use Figma as it is easy to learn, make designs and is free as well.

Strengths:

- Real-time collaboration between team members
- Easy sharing, review and comments
- Browser-Based, no installation required

Large companies such as Zoom, Slack, etc. use Figma for their design prototyping. Hence, we will be using Figma for our UI/UX prototyping in our design phase before our

development begins. We can achieve version control in Figma and we can use component libraries to maintain consistency across different design elements.

2.6. Development Methodology

a. Agile Methodology

Agile is a project management methodology that breaks the whole project into short iterative cycles known as sprints over time, resulting towards the completion of the project. It allows the team to develop the project systematically over the cycles. Using agile methodology, it will be easier for us to adapt to the ongoing changes and adjust features based on requirements (Hu et al., 2008).

Strengths:

- Encourages stakeholder collaboration

- Reduces risk via continuous delivery

- Adapts well to changing requirements

Agile methodology is used in software development, which then results in a high project success rate. Hence, we will be using agile methodology in our project development instead of other development methodologies. We might use tools like Trello to manage agile methodology tasks and track the progress. We will be doing daily stand-ups and meetings to ensure continuous feedback and team alignment.

Compared to traditional development methods like waterfall, agile will offer us flexibility in scope management and allow us to accept client feedback or changes even after the features are delivered and throughout the development process. Therefore, it will be ideal for us where requirements may evolve based on feedback from the supervisor and client.

3. Reflections and Recommendations

From the research made on various programming languages, we have selected HTML5, CSS3, Bootstrap, Django, Mysql, VS Code, GitHub, Figma and Agile methodology. We compared these with other alternatives and found that these selections will be a good choice for our project and goal. These language /tools are widely adopted in the industry and are scalable, secure and well-suited for our needs.

Recommendations

- We will use Figma to prototype the user flow and validate it with the client before starting to work on development

- We will use GitHub to organise development and save versions of our code so that it will be safe for any revisions.

- We will use Django for scalable backend system development

- We will use reusable Bootstrap components for frontend development

- Agile methodology will be used to deliver the project function by function at a time

- MySQL will be used for a secure and scalable database

- VS Code Extensions will be used to ensure consistent code formatting and quality

Hence, to conclude, after doing a literature and technology review, we are confident about the tools and technologies we will be using to develop our project. All team members will be involved in learning and implementing these tools the build the project from scratch. The documentation and learning materials will be used by all team members to make the learning curve easier and make the overall project development process easier and eventually make the project successful.

REFERENCES

Forcier, J., Bissex, P. and Chun, W.J., 2008. Python web development with Django. Addison-Wesley Professional.

Gore, H., Singh, R.K., Singh, A., Singh, A.P., Shabaz, M., Singh, B.K. and Jagota, V., 2021. Django: Web development simple & fast. Annals of the Romanian Society for Cell Biology, 25(6), pp.4576-4585.

Hong, P., 2018. Practical web design: Learn the fundamentals of web design with HTML5, CSS3, bootstrap, jQuery, and vue. js. Packt Publishing Ltd.

Hu, R., Wang, Z., Hu, J., Xu, J. and Xie, J., 2008, October. Agile web development with web framework. In 2008 4th International Conference on Wireless Communications, Networking and Mobile Computing (pp. 1-4). IEEE.

Lubbers, P., Albers, B., Salim, F. and Pye, T., 2011. Pro HTML5 programming (pp. 107-133). New York, NY, USA:: Apress.

Team, C., 2024. Getting Started with Visual Studio Code and Building HTML Websites. [Online] Available at: https://www.codecademy.com/article/visual-studio-code