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Software Engineering Group Report

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Declaration

I hereby certify that this report constitutes my own work, that where the language of others is used, quotation marks so indicate, and that appropriate credit is given where I have used the language, ideas, expressions, or writings of others. I declare that this report describes the original work that has not been previously presented for the award of any other degree of any other institution.

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**INTRODUCTION**

This assignment entails developing an application for a company that provides demographic data reports. Using Node.js for the back end, PUG for the front-end, Express.js for communication between them, applying CRUD (Create, Read, Update, Delete) application, and a MySQL database for storage. The reports that must be produced contain data on nations, cities, and capitals, as well as demographic data for continents, regions, nations, and districts. A list of persons who speak each language, ranked from most to least, together with their fraction of the global population, must also be included in the application. Prioritizing requirements, assigning tasks, determining the project's scope, identifying stakeholders, and managing risks are all necessary before you can start the project. You must also determine the functional and non-functional needs of the application.

Hypothesis: The effectiveness and precision of producing population reports for the organisation will be increased by the implementation of a CRUD application for population information management.

Research question: What effects does the use of a CRUD application for population information management have on the effectiveness and precision of populace report generation for an organisation?

The project's goal is to create a CRUD (Create, Read, Update, Delete) application for a company utilising the methods and technologies covered in the module, including PUG for the front end, Node.js and Express.js for the back end, and a database for storage. The application should be deployed as a Docker container, version managed using Git, and publicly available on GitHub. A Scrum team will manage the project, which includes identifying functional and non-functional needs, prioritising requirements, assigning tasks, determining the project's scope, identifying stakeholders, and managing risk. The programme will produce several reports, including nation, city, capital city, and population reports, based on population data from a supplied SQL database. The system ought to include data on the number of speakers of various languages.

The following are the objectives of the group project:

1. Create a CRUD application using PUG for the front end, Node.js for the back end, and Express.js to connect the two.
2. To managing and storing population data, use a MySQL database.
3. Assign tasks to team members based on the application's needs in order of importance.
4. Determine the project's scope and its stakeholders.
5. To reduce project risks, implement risk management measures.
6. Create a variety of demographic reports depending on user input, including those that show the population of nations, cities, continents, regions, and districts, as well as the amount of people who speak various languages.
7. Application deployment as a Docker container.
8. Use GitHub for collaboration and open access to the application, and Git for version control.

The following are the legal, social, ethical, and professional issues relevant to the project:

1. Privacy issues: The gathering and archiving of personal information generates privacy issues. The project team is responsible for ensuring the security, integrity, and safety of user data.
2. Bias and discrimination: If the project's algorithms are prejudiced, this might lead to the unjust treatment of some people or groups. The group must guarantee that the algorithms are impartial and fair.
3. Cybersecurity: we avoid unauthorised access, data breaches, and cyberattacks, the project was constructed with the appropriate cybersecurity protections.
4. Accessibility: there was no discrimination in our project work against any group of people and was accessible to those with impairments.
5. Professional standards: While working on the project, my team uphold ethical standards and professional norms, such as maintaining honesty, integrity, and transparency in all interactions.
6. Social impact: The project's social impact was considered, and the team make sure that it does not have any unfavourable effects or injure anyone or any group of people.

By writing the project background we first determine the system's functional and non-functional needs. The qualities and abilities that the system must have to satisfy the demands of the organisation which is known as functional requirements. The characteristics that the system must possess, such as performance, usability, and security, are known as non-functional requirements.

Functional requirement:

* Create country, city, and capital city reports
* Create statistics on the population of continents, regions, and nations.
* Give statistics on how many individuals speak a particular language.
* Sort the reports from greatest to lowest population.
* Permit users to decide how many results to display

Non-Functional requirements:

* It must be simple to use and navigate the system.
* A secure system with user authentication and authorisation is required.
* For the system to manage massive volumes of data, it must be scalable.
* The system must respond quickly and have short load times.
* The system must be dependable and have backups and data recovery procedures.

Following the identification of the criteria, we rank them in order of relevance to the organisation. This will assist you in assigning jobs and establishing the project's scope. We also identified the stakeholders, including the management, staff, and users of the company, and consider their requirements and viewpoints.

We then identify potential problems that might affect the project, such as technical challenges, delays, or changes in requirements, to manage risks. Create backup strategies to deal with these risks and lessen their influence on the project.

Here is the order of the overview for the upcoming section:

1. Introduction
2. Research Question
3. Aims
4. Objectives
5. Legal, Social, Ethical and Professional Considerations
6. Background
7. Literature or Technology Review
8. Literature review
9. Technology Review
10. Design or Methodology
11. How are you going to undertake the project?
12. Design
13. Methodology
14. Alternative Approaches
15. Implementation or results
16. What was the outcome of the work you undertook in the project?
17. Evaluation
18. How good was the outcome from the project?
19. Relative Work
20. Who else has done something similar and how does my work compare?
21. Conclusion
22. Reflection
23. Future work
24. References
25. Appendices

**Literature of Technology Review**

The literature review for this project mainly revolved around learning the basics which included the introduction to docker, HTML, intro to DeVos and many others. This was the terminology we had learnt before we started compiling our knowledge into actual creating our final project but to be honest for my group when learning the terminology, it didn’t make sense as to why we were learning these skills but then when we started it all made sense and was actually very helpful information for us to process all our ideas.

For the technology review we were introduced to various of different technologies as to which we could use for our product and a majority we did use. The ones we did use include wire frames, class diagrams, Docker files and GitHub. As I mentioned earlier, we didn’t use zube.io as it was another task management tool which is like GitHub but for this project to keep all our tasks to together, we chose to keep it all on one software

**Design or Methodology**

The way we are going to undertake the project as a group is that each week, we will have a group meeting to discuss the upcoming tasks, discuss what each individual is going to do and what each person is going to do to achieve the task they were given, e.g. discussing the application that they are going to be using.

The design portion of our work was designed in the process of sprint two. The design was implemented by using wireframes, which was a first draft as to what we would like our website to look like as a final project

The methodology which we included within our final project included using the coding style of PUG, node.js and express.js to help build the website but when it came to sorting the data on the website that we created through JavaScript (HTML pages), we need to improve on this as although it showed the countries and populations we needed to use merge sort and sort algorithms to allow the user to sort the data if they wanted countries beginning with A for example so this could be a future development for our website.

One of the alternative approaches for the kanban board/ sprint board is which we could have used is zube.io. Zube.io is fairly similar to GitHub to which allows us as a group to work collaboratively with one another but for the purpose we hadn't used GitHub and still processing of how it works as it is quite complicated and been a challenge we decided it was best to stick to the idea of using only GitHub and no other tools but maybe for a future reference we could experiment with zube.io as it expands our knowledge on the different software applications available to us.

**IMPLEMENTATION/RESULT**

The outcome of our project work was very good and successful because it exceeds the goals and objectives and satisfies stakeholders’ expectations and value to the organization. Our project was also completed on time, within budget and with the required quality.

The following are the strength and weaknesses we encountered.

Strengths:

* Clear requirements: The project's requirements are well-defined and give a clear understanding of what must be done.
* User stories that are detailed and actionable can aid in work allocation and prioritisation since they are presented.
* Scrum application: Scrum application aid in project management and make sure that advancements are achieved on a regular basis.
* Using Git and GitHub assist guarantee that the project is properly controlled and maintained. Version control is essential for every software project.
* Use of Docker: Docker aid in application deployment and guarantee consistency across many environments.

Weaknesses:

* Complexity: The project has a wide range of reports and requirements, which might be challenging to monitor and guarantee that everything is carried out correctly.
* Integrity problems: Express's front-to-back communication capabilities bring integration challenges that impede development.
* Problems with data quality: The application's reports are not accurate because the data given in the SQL database was not accurate or consistent.
* Technical difficulties: Technical difficulties arouse while creating a CRUD application with PUG, Node.js, and Express.js, maintaining the database, and deploying the application using Docker, depending on our degree of expertise.

Our fellow student in other groups did the same project as what my group did and if I compare our project work to some groups, we have done a great job which meet the all the project requirements.

**Conclusion**

Time management within our group was not an issue due to everyone being able to complete their chosen/given tasks in the time allocated and we were able to check up on each other over our WhatsApp group as this was the most convenient way for us stay connected when we were not at university. Also, another reason time Managment was not an issue is because when one of us had an issue with our task another group member was able to help and solve any issues another group member was having.

To improve our final project, we need to add in the sort and merge sort algorithm which will allow the user to select the countries with as certain letter and all those with beginning of the same letter would appear and this is also like allowing the user to select how many countries it would like the page to show.

**REFERENCES:**

Our references would all be from Moodle on the software engineering page as this is where we got all our resources from and learnt the content from.

**Appendices**

Project proposal -

During the different processes of our work the plan was revised a few different times as there were certain points during the project as to where people were struggling with certain tasks and others had to help in but the resulted outcome of this would be the group member as to who was struggling was able to pick up another task so they were still contributing to the project but just not how the original plan was devised in the group meeting.

So, our progress review form can be accessed through our GitHub as we have created a sprint board which we put all the tasks on, who they were assigned to, and which sprint they come under. Each meeting we would revise this plan to see where everyone was up to and if we needed to make any changes as to whether people are struggling with the tasks they were assigned,

Linking back to the idea of GitHub, every single group member contributed to the GitHub committing their work although there were times some group members needed help to assist with this but again no problem because it was resolved. All our components to each sprint can be accessed through out GitHub including the final product of our data which we created.