By

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**Software Engineering Group Report CMP020N204S**

Abstract

Abstract narrative

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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**Date:** 24/04/24

Signed

Acknowledgements

Acknowledgements narrative

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**1. Introduction**

In the era that we live in today data is so valuable and decisions are pushed by information, The importance of population data cannot be emphasized enough. Organizations globally acknowledge the importance of demographic insights in defining successful strategies and policies. With this in mind, we have been tasked with designing and implementing a new system to allow easy access to this population information.

In this project we will be creating a user-friendly system for accessing population information seamlessly. This system will be able to create reports based on continents, countries, regions, cities, the languages, and populations. With access to resources like the SQL database from the World Database, our aim is to transform the way demographic data is utilized today. Using present-day technology and database management methods, our aim is to overcome the problems linked with standard reporting approaches and offer the stakeholders effortless, seamless access to crucial demographic understandings.

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**Research Question or Problem that will be Addressed.**

Q- How can we make sure that everyone, no matter how much they know about technology, can use the population information system easily even those who aren't very good with technology?

Q- Will the system be secure regarding security and what security measures are in place so that the system is in line with the regulation?

Q- By improving the new system will it be efficient, seamless, and simple to use, does it allowing the following criteria to be sorted like the country, continent, region, city, and language?Top of FormBottom of Form

**Hypothesis:** By implementing intuitive user interfaces that is helpful to all levels of expertise will allow the population information system to remain accessible and reliable for users with different technical backgrounds. This will allow the system to generate the correct report in an efficient manner allowing smooth processes and navigation throughout the database. These improvements will help simplify efficient report generation by allowing users to easily sort and filter data based on criteria such as country, continent, region, city, and language. In addition, taking steps to challenge possible obstacles, like feedback channels for ongoing enhancements, will additionally boost the system's usability and efficiency.

**Aims**

The aim of this project is to develop a durable population information system facilitating smooth access to demographic data across multiple hierarchical tiers. Using the SQL database provided via the World Database, the system will then generate extensive population statistics at global, continental, regional, and national levels. The reports will be personalised to organizational requirements, covering country, city, capital city, and population data. By using a quick data retrieval that is automated will help quicken processes and allowing user to not have to deal with manual labour resulting in more errors. This will allow the reports to be more accurate and given in a timely manner.

Additionally, the system will incorporate advanced functionalities such as data management, security measures, and language-based population analysis to improve usability and effectiveness. The main objective is to develop a user-friendly platform that achieves organizational reporting needs while ensuring scalability, security, and adaptability for future enhancements making It robust.

**Objectives**

To make our population information system strong and efficient, we have some objective we need to tackle. This will ensure we are able to build a system that's easy to use, will be able to handle changes especially with the consent change in technology, able to keep data safe, able to work automatically. Each will focus on different areas like making it easy for users, like able to keep data accurate, and making sure the system can grow and adapt over time.

* **Create Easy-to-Use Interface-**  Making a simple and user-friendly interface for the population system so that everyone, regardless of their tech skills can use it.
* **Manage Data System -** Set up a system to organize all the different kinds of demographic data, making sure it's accurate and reliable.
* **Keep Data Secure-** Put strong security measures in place, like passwords and encryption, to keep the data safe from hackers. The system will be tested and with training.
* **Automate Data Collection and Reporting-** Make the system automatically collect data and create reports, saving time and effort and manual labour.
* **Make System Ready for Growth-** Improve the system so it can handle more data and changes in what users need.
* **Understand Languages -**Develop tools to understand and analyse different languages people speak around the world.

**Legal, Social, Ethical and Professional Considerations**

In creating our population information system, in the era we live in now, data and information is very important, we've kept in mind the importance of legal, social, ethical, and professional factors, by learning these factors, we've been able to create a population information system that's not only effective but also follows rules and guidelines, in respect to everyone’s rights and privacy.

**Legal Considerations -**  We have made sure to follow laws that protect people's privacy, like the GDPR. This means being careful with how we collect and use data in a legal way to respect everyone's rights.

**Social Considerations -** We really aim for inclusivity in our system design, ensuring ease of use for diverse users. We're mindful of potential community impacts and strive to mitigate any adverse effects. Transparency about system functions fosters trust.

**Ethical Considerations -** We've made sure to do things the right way by getting the permission before using peoples data and keeping it safe and legal. We've also worked to be fair and respectful in how we handle demographic information, making sure not to harm anyone in the process.

**Professional Considerations -**We have followed industry standards and hired skilled professionals to build and run our system. We're committed to keeping up with the latest practices to do the best job possible.

**Ethical Concerns -** We got approval to use sensitive data and took steps to protect it, like encrypting it and controlling who can access it with admin log in. We also made sure to follow ethical guidelines and get permission from anyone whose data we use.

**Background**

The background is important when launching the feasibility and impact of our MSc project. Its main objective is to provide the user with essential appropriate understandings,.  
Setting the base for a clear understanding of our project this has been done by conducting thorough assessments, including a technology review and a literature search, we aim to validate the importance and creativity of our project.

Our population information system is not just a technical attempt but a showing our focus in user-centric design values. We aim on making the application easy to use by carefully designing every part for smooth navigation allowing it to be pleasing to the eye and modern. Simple and easy to understand labels help users navigate the system smoothly and easily , making it simple to find the demographic information they need and require. The usage off grids to present data in an organized way, making information clear and easy to understand, ensuring users have a straightforward experience without any confusion or feeling lost.

We have made the system so that it is designed to work smoothly on different devices like phones, tablets, computers, and laptops with different screen sizes, making it accessible to all users. Focusing on this adaptability ensures that users can access demographic reports regardless of their preferred platform, encouraging our drive to inclusivity and accessibility in information distribution and filtering. Through the literature reviews, we have secured our system on robust databases with the most current population information available worldwide. By mixing these sources, we ensure that users can rely on the data's accuracy and currency, making our application more trustworthy.

**Report overview**

Describe the upcoming sections in order -- this provides your reader with a roadmap of the report.

**Literature Review**

Our project is underpinned by a thorough examination of existing literature, particularly focusing on databases housing contemporary population data. These databases serve as the cornerstone of our application, providing reliable and up-to-date demographic information essential for decision-making processes. By leveraging the extensive resources of the World Database, our system can access a wealth of population statistics spanning global, continental, regional, and national levels. This literature review reinforces our project's commitment to utilizing robust sources to ensure the accuracy and currency of demographic data, thereby enhancing the reliability and efficacy of our population information system.

**Technology Review**

GUIDANCE (text in blue can be deleted from your final submission) Literature Review (for research or investigation-oriented projects) All projects should reference some academic literature, although it is primarily research-orientated projects that will conduct a significant literature review in the background section. As with the technology review, the goal here is to make it clear why the choices were made in the project. It is expected that at least the research methodology and/or evaluation approach is defined from existing sources.

Technology Review (for build or investigation-oriented projects) The technology review focuses on technology that will be and could be used for the project. Typically, it is expected that you have reviewed different technology options for your project and summarised these options here. It should be clear why the technology choices taken were made.  
The technology review for our project involved an in-depth analysis of modern technologies and tools relevant to population information systems. We examined various database management systems, data retrieval and reporting tools, user interface design frameworks, and data security measures to identify the most suitable options for our project.

After careful consideration of our project's needs, feasibility, and team expertise, we selected the most appropriate technologies. Our choices align with the objectives of our project and ensure efficient and effective delivery of the desired outcomes.  
  
Our evaluation encompassed a range of technologies, including relational databases like MySQL, data visualization tools such as Tableau and Power BI, and programming languages like Python and Java. Each technology was assessed based on its suitability for our project requirements, considering factors like scalability, performance, ease of use, and data security.

We conducted a thorough examination of various technologies and tools associated with population information systems to ensure that our project meets the highest standards of functionality, reliability, and security. Through this technology review, we have identified and implemented the most suitable technologies to support our project's objectives and deliver optimal results.

**3. Design or Methodology**

GUIDANCE (text in blue can be deleted from your final submission) Now you must tell your examination team what you are going by answering the question -- how are you going to undertake the project?

The aim of this section is to explain to your reader the work you are going to undertake. Depending on whether the project is more build or research-focused, this section can take one of the following forms.

Design (for build or investigation-oriented projects) If your project is a build focused project, you should provide a design for what your project will build. The nature of this design will depend on your project, but it should provide a complete idea of what you are going to build, including the technologies to be used.

Methodology (for research or investigation-oriented projects) If your project is research-focused, then you need to define the particular research methodology you are using to gather and assess data. Typically, this will involve some sort of data gathering process and statistical analysis of results. However, you should also describe the tools (e.g., technologies) that you will use as well.

Alternative Approaches

Another important point in this section is to document any alternative approaches you could have taken to complete the project. For example, were there different technology choices, design choices, or methodological choices you could have taken? You should explain why you have taken the approach you have taken rather than these alternatives.

In outlining our approach, we prioritize user-centric design principles aimed at creating an intuitive and visually engaging interface. Our goal is to enhance the overall user experience by employing vibrant colors, intuitive dropdown menus, and clearly labeled sections. These design elements are strategically implemented to facilitate effortless navigation and seamless information retrieval for users of our population information system.

Moreover, we integrate Docker technology into our development process to optimize the initialization process of our application build. By leveraging Docker, we ensure efficiency and reliability in deployment, thereby streamlining the implementation of our system. This strategic utilization of technology aligns with our commitment to delivering a robust and scalable solution that meets the evolving needs of our stakeholders.

As an alternative approach, we could have considered alternative design frameworks or methodologies for interface development. However, our choice to prioritize user-friendliness and efficiency through intuitive design and Docker integration resonates with our project objectives and user requirements, making it the most suitable approach for achieving our goals.

4. **Implementation or Results**

GUIDANCE (text in blue can be deleted from your final submission) Once the examination team know what you planned to do, you must tell them what happened -

What was the outcome of the work you undertook in the project? A build or investigative project will discuss the implementation. Do not just paste in lines of code to your report and call that an implementation! Your report should feature minimum code to only discuss points. The idea for implementation is to describe how the design has actually turned out. A research or investigative project will present the results from performing the methodology. These results must be correctly presented, using appropriate tables, charts, and statistical tests that suit the nature of the project. Results should be summarised, and any findings clearly presented.

**Evaluation**

GUIDANCE (text in blue can be deleted from your final submission) The examination team now need to know how well the project went -- How good was the outcome

from the project?

Evaluation is an important element of any project. You must tell your reader how good the final

deliverable is. Your project does not have to be perfect -- indeed the outcomes might have been

bad. The point is you must evaluate the outcome and discuss its strengths and weaknesses. A key element of this section is a reflection on the aims and objectives set out at the start of the project, and how well these have been met. Again, it is possible not to achieve an aim or objective. The point is you evaluate how well you did meet your goals.

Throughout the project, all aims and objectives were achieved successfully, resulting in the development of a strong population information system.

We created an easy-to-use interface as well as building a system to handle various demographic data sources. We put in place strong security measures, developed algorithms to automate the data retrieval and reporting processes. We integrated tools to analyse language data, helping users understand language diversity and demographics better.

**Related Work**

GUIDANCE (text in blue can be deleted from your final submission) Answer the question -- Who else has done something similar and how does my work compare? Another key element of this section is evaluating your work against that of others. How good is your work when compared to other people who have undertaken similar work? It is important to be able to understand how well you have achieved your goals in relation to others, while also considering the time limitations of the project.

**5. Conclusion**

GUIDANCE (text in blue can be deleted from your final submission) The conclusion summarises the project. You need to highlight your key outputs and/or discoveries. There are some particular subsections that must appear in your conclusion.

**Reflection**

GUIDANCE (text in blue can be deleted from your final submission) You must critically reflect on the entire project process and how well you have worked on the project. What particular things have you learned during the project? Why were you able and unable to meet project goals? What would have you done differently in hindsight?

A common approach many students take in this section is to claim poor time management. Poor

time management is rarely a problem unless you had too much to do in the project. Normally,

what is called poor time management is poor organisation, planning, and motivation. Being honest in your reflection will help you understand how you can improve these issues rather than focusing on time management issues.

**Future Work**

GUIDANCE (text in blue can be deleted from your final submission) Answer the question -- What next?

You've completed a significant piece of work -- perhaps the largest piece of work you have ever done. But no project is ever 100% complete, and you will have found new ideas along the way. If someone were to pick up your project, what avenues should be explored next?

As we wrap up this project, we see areas where we can make things even better. Along the way, we faced challenges and learned a lot. In short, while we've made progress with our population information system, there's still room to make it even better. By focusing on these areas, we can keep improving the system and make sure it continues to meet the needs of its users.

**Listen to the Users -**   
Listen to the users to know what they think; their feedback can make our system easier to use and help us add features they want. By listening to them, we can keep making the system better, potentially adding a section for suggestions and improvements.

**Data Handling -**   
We'll work on ensuring the accuracy and reliability of our system's data. This could mean double-checking the data more carefully and finding ways to put different pieces of data together more efficiently.

**Works Well Together-**As more and more data get added to our system, we need to make sure it can handle all that information without slowing down. We can explore ways to make the system work faster and handle more data without any problems.

**Using New Tools -**    
There are some interesting and smart tools out there that can help us learn even more from the data we have and explore more into the data world. We can investigate using things like machine learning and predictive analytics to find new insights and make better predictions about future trends.

**6. References**

GUIDANCE (text in blue can be deleted from your final submission) In this section, you must reference any sources used in your work. Typically, these sources will have come up during the investigation and related work sections. Your referencing must use the IEEE referencing style IEEE Citation Guidelines2.doc (ieee-dataport.org) .

It is highly recommended that you use reference management software such as Mendeley or Zotero.

Many students ask how many references are required. That is like asking how long a piece of string is. Your project should have as many references as is required for it. However, having few references indicates that no thorough investigation has occurred.

**7. Appendices**

GUIDANCE (text in blue can be deleted from your final submission) Appendices appear after references. Your appendices depend on the nature of your project. Do not assume people will read your appendices. Even if you direct them to do so in your main text, appendices are considered additional information and should not be relied upon to understand your main body of work. Refer readers to an appendix using a phrase such as see Appendix A for further

details.

The following documents must be included as references:

* Your Project Proposal.
* Your Progress Review Form.
* Your original plan and revised plans as your project evolved.
* A description of how to access any technical output. It is strongly recommended you use GitHub or something similar to do this.

Any important communications between you and external stakeholders -- please ensure private

data is removed and communications anonymised.