DESIGN THINKING (DATABASE SYSTEM)

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TABLE OF CONTENTS

INTRODUCTION

Design thinking is a problem-solving skill that is gaining popularity nowadays and being implemented in various fields such as business, education and industries. It involves the interactions between the developers and the users in which the developers try to understand their needs and provide the best possible solutions for the users. The approach of design thinking skills is divided into five different steps which are empathize, define, ideate, prototype and testing.
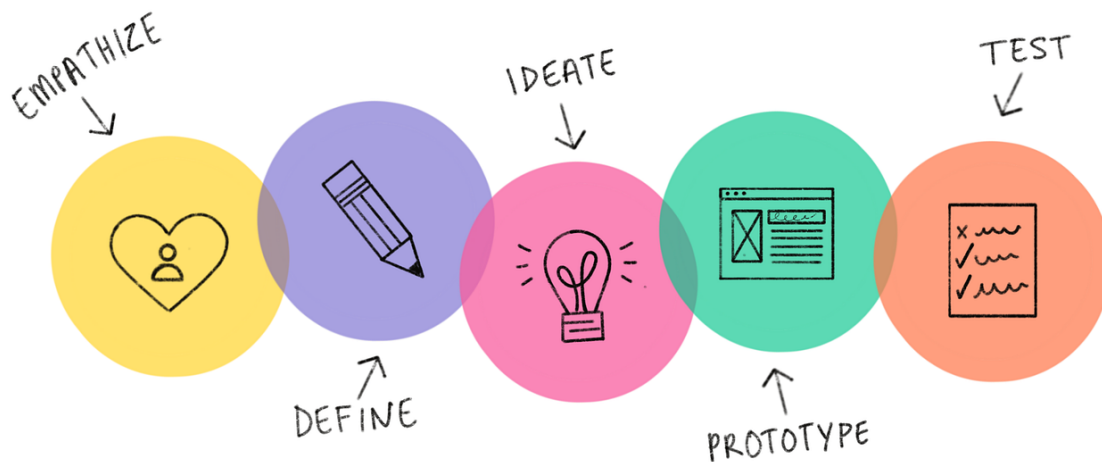
Database systems are systems that are used for collection, management and retrieval of data. These systems act as an interface between the users and the data. It uses specialized softwares such as Microsoft Access and MySQL which can manage large volumes of data in a way that the user can create, update, use and manipulate the data efficiently. The systems also can control the authority by who can access the data to ensure it remains accurate and reliable. Database system involves data modeling, data integrity and data security to maintain the data quality as it is fundamental in various industries like finance, business and others. The systems offer a lot of benefits compared to the traditional system in aspects of flexibility and user-friendly interfaces.

EMPATHIZE

Empathy is the first approach for the design thinking process as it is the step where we have an engagement and interaction with the users and try to understand their needs.

We had some interviews with the person who is in charge of the database system of University of Technology Malaysia, Mr Aris bin Ariffin. And few questions was asked during the interview which is :

1. What are the common problems that you faced while managing the database system ?
2. What are the possible solutions that you hope to solve the problems that you have faced ?

The first issue that was being brought up by Mr Aris is that from the user point of view in managing the database system, the user usually needs to create the table and check the properties of the table in terms of normalisation and indexing manually by themselves. This will become a problem when a beginner and rookie that are not familiar with the data handling, they will face issues in creating the table for their data and managing it proficiently.

On the other hand, we asked Mr Aris about how he sees this issue from his point of view. Mr Aris recommended that there should be a tool that can assist the users to create the data table and check the properties of the table automatically. Thus, it will potentially reduce the cost and energy of the users to manage their data in the system.

DEFINE
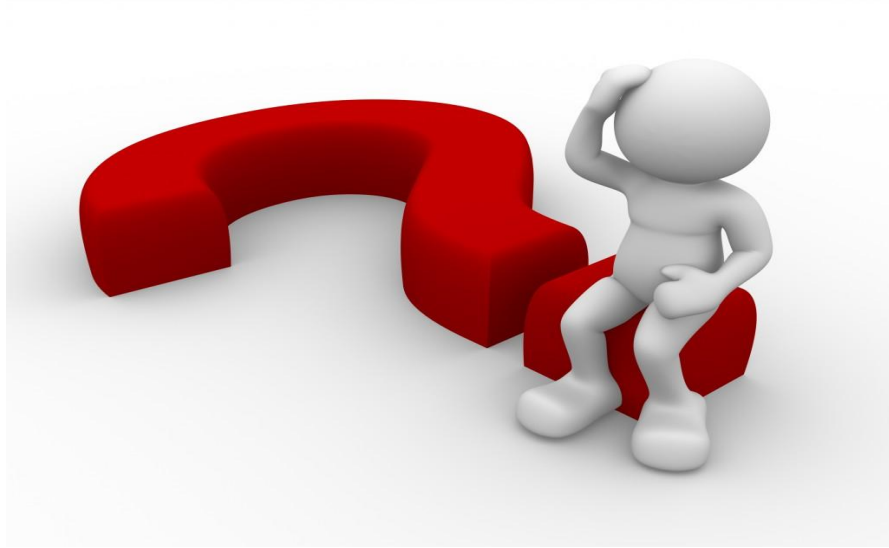
For this phase, we analyzed and evaluated the results we obtained from the interview and we had established a clear idea of our problem statement.

Through our interview, we found out that most users in the database system are clueless on how to manage their data effectively due to lack of skills in using the softwares. For instance, some users especially the newbie might have difficulties in using Oracle and MySQL because they do not have any general knowledge about how to use it.

Furthermore, the users might drain their energy and cost to handle their data because the current systems do not have any tools that can help them to manage the data automatically. Therefore, they need to do it manually by themselves.

IDEATE

For the third stage of completing the design thinking project, we briefly visualized our user interface and user experience (UI/UX) for our prototype based on the ideas that we have generated on our identified problem. We bear in mind that it needs to be user friendly and as simplified as possible to enhance our user experience throughout the use of our software. Therefore, we have done our interviews with Mr Aris bin Arifin the Database Administrator of UTMDigital in search of a more clear and vast concept of creating our prototype and so that it is relevant to the needs of our customers and current market.

The idea of our prototype is to assist the user on an application software that involves database management like Microsoft excel using an ai assist. To elaborate, our software called Power Business Management abbreviated as Power BM can help our user in doing data normalization, indexing, and checking by our owned AI called Neuro Intelligence Sorting Assistance, NISA AI. In addition, this AI can also guide its user on how to solve the problems that occur step by step. Furthermore, by adapting this AI can also improvise its algorithm as it stumbles upon harder and more complex situations. This innovation not only solves the problems that arise, it also improves its user skills in managing databases.

By ideating this concept we ensure our customers maximize satisfaction on our software and we will further compensate our loss by hearing out and implementing our users' opinions on improving our product.

PROTOTYPE

Moving on to a more fun concept of building a prototype which is a mockup or an early concept of the product intended by the idea we talked about earlier on the Ideate part. It is typically used to test a new configuration to improve the accuracy of our software analysts and consumers.

We did some research on any software that matches our prototype before proceeding to build one in order to identify its user friendliness.
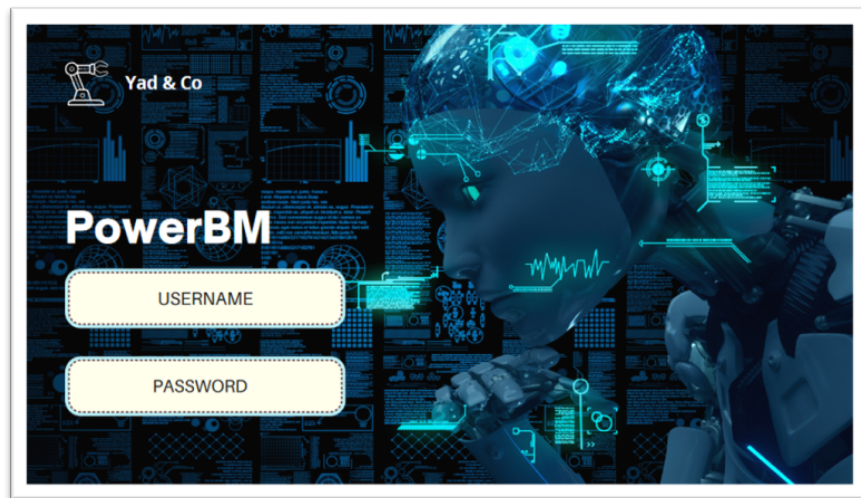
As the image above illustrates, when the user first entered the software, they were required to enter their username along with their password if only they have an account, if not they will have to register one themselves.

As portrayed in the picture above, our tools allow users to interact with NISA ai in order to help them manage their dataset for example in terms of sorting the data. Users ask an appropriate question inside the given chatbox regarding the data normalization.

Moving on, as you can see on the image, all of the information about the students along with the subject they registered have been sorted based on their name. More amazing stuff can be done with this ai such as turning the table of image above into an infographic as presented below :
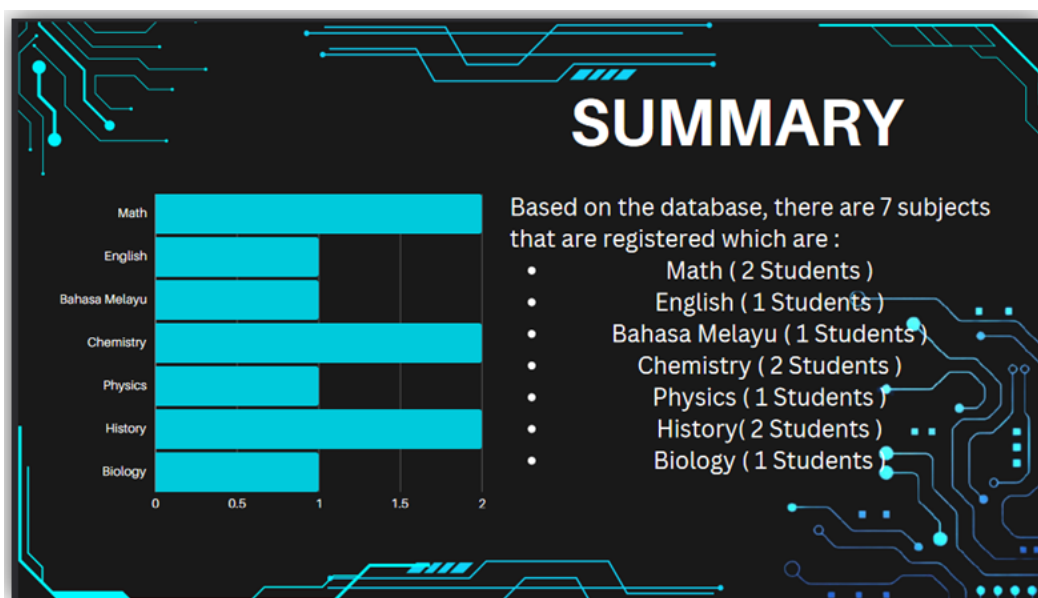
TESTING

The testing phase is the way for us to demonstrate how our prototype works and how it will execute its job as intended so that our consumer knows clearly how our product works. Therefore, to begin the explanation, we first start of with:

1. Identification of issues (data normalization)

The NISA ai will scan through the given dataset to identify any potential normalization problems. This could involve missing data, invalid data types and many more.

2. Alerting user

Upon analysing the problems, NISA ai will come up with a set of guide solutions that highlight the area of defection. Therefore making it obvious for the user to check on the problem closely.

3. Suggesting solutions with an automation

The AI will then suggest an appropriate solution in this case is a way of normalizing a dataset. The AI will then offer itself to automatically solve the problem or guide its user to do it by the order of it so that the user has the flexibility to either learn the solution or use an automation in case of urgency.

4. Real time feedback

Throughout the process of normalization the AI will advise the user the most efficient ways in doing the normalization, also a precaution method on what needs to be done and what needs to be avoided to avoid error that affects other dataset and.

5. Looping adaptation

The AI system can continuously learn from user interactions and feedback. It can improve its recommendations and assistance based on the most efficient ways of normalization techniques applied by users.

REFLECTION

<u>ADAM</u>

The journey through the design thinking process for enhancing database systems involved empathizing with user challenges, defining the problem of skill gaps in managing data, ideating an innovative solution—Power BM with NISA AI—aimed at simplifying database management, creating a prototype that showcased the AI's functionality and user interface, and testing the AI's capabilities in identifying, suggesting solutions, and continuously learning from user interactions. This process demonstrated a user-centric approach, aiming to resolve current issues while evolving with user needs for efficient database management.

I also learn lots of handy information from working to build this tool as we venture deeper into the backend part of the database while also improving my critical thinking in order to create a proper semi functional product.

To sum up, during the process of creating the Power BM tools, I have certainly stumbled upon multiple life lessons that will surely improve my way of thinking along with my way of handling each other in my team in order to create a compact teamworking. I learned to work more effectively under a time compression with ease but most importantly prioritizing its quality. I also learned to be more keen on time management to avoid collapsing times with other events especially with lectures. Lastly, in order to be good in managing database i will also adapt to using tools from oracle and SQL from now on or at the very least know it.

<u>AFIQ</u>

My goals with regard to my course which is data engineering are I want to sharpen my skill and basic knowledge in computing and programming language. I want to master atleast 3 basic languages of programming such as C++, python and php by the end of this course. In addition, I hope that I can develop a skill to analyse the data that I have collected and visualize it in a good way. So, I can develop the ability in using the data to benefit my organization.

This design thinking project makes an impact on my goals because the topic that my group did is related to database systems. From this project, I could learn how the database systems work and get a better understanding about the challenges that developers faced while managing their data. I have gained some knowledge about data handling and visualization due to this experience with Mr Aris. It is such a good experience for me because I can use the knowledge that I got and apply it to my studies in this course.

I think the improvement that needs to be made for myself in order to improve my potential in industry is mainly communication skills. The reason is because all of the companies want to find someone that can communicate clearly. This is an important skill for employees because it will increase our confidence when we interact and engage with other people. Thus, we will be able to cooperate with others in doing the tasks that involve teamworks. We will also bring a good image and reputation of our company to others. In addition, I also need to improve my time management as it is crucial in the work environment. I need to learn how to manage my time properly and to work under pressure whenever I am assigned to handle a big project. It is one of the key components that I should have to succeed in my career.

<u>AFIF</u>

Empathizing with user challenges, defining the problem of skill gaps in data management, ideating an innovative solution—Power BM with NISA AI—aimed at simplifying database management, creating a prototype that showcased the AI's functionality and user interface, and testing the AI's capabilities in identifying, suggesting solutions, and continuously learning from user interactions comprised the journey through the design thinking process for enhancing database systems. This procedure exemplified a user-centric approach, with the goal of resolving current challenges while adapting to user needs for effective database management.

I also acquire a lot of useful knowledge while working on this tool as I go deeper into the database's backend while also developing our critical thinking in order to generate a proper semi-functional solution. To summarize, during the process of developing the Power BM tools, we as a team undoubtedly discovered numerous life lessons that will undoubtedly improve our style of thinking as well as our interactions with one another in order to form a compact teamwork. We learned to work more efficiently and effectively under time constraints while also prioritizing quality.

As a video editor, editing and recording the entire process of our Power BM tool creation journey have been amazing journey.I hope that this Power BM tool can be created when I have enough knowledge to create this system that can ease users who are struggling in managing databases.My goals towards the project is to minimize the error are made by AI until human can rely on them without doubtful.

<u>SYAHMI</u>

My goal with regard to my course which is Data Engineering is I want to have a deep understanding about how to handle huge amounts of data and making sure it's quality and safe. I also want to learn how to make databases, processes for handling data and structures for data that can deal with big data. Other than that, I also hope that by the end of my studies in this course, I will be able to write and develop code proficiently using C++ and Java, thereby expanding my coding abilities and enhancing my problem solving capabilities.

While completing my design thinking project, I have learned many new skills, such as how to deal with people. This skill is very important for students like me because the course I am taking requires me to have skills that can involve and deal with strangers because as we know, in nowadays jobs, we often interact with customers and external individuals for work stuff. Besides that, I also have a better understanding about databases due to my design thinking topic is database systems. I learned how data is monitored by the data admin and some software that they use like Oracle, Power BI and MySQL.

To improve my potential in the industry, I plan to continuously update my skills and knowledge by engaging in lifelong learning. This includes taking relevant courses, taking some workshops and always up to date about the trend in the industry. Also, I need to find a mentor that can give me good advice about the decision that I will make in the future. On the other hand, doing an internship is also one of the ways that can upgrade my potential. It is because, by doing an internship I can get real-life experience about how a job is done and to prepare my mind in pressure situations.

VIDEO LINK

1. Video Link: https://youtu.be/7GaWUb-hk_U

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