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Design and Development of an App for Zoo Kemaman

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KEYWORDS

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ABSTRACT

Technology has become an integral part of our daily lives, revolutionizing the way we interact, learn, and explore the world around us. Within the realm of recreational activities, zoos stand as one of the most beloved destinations, offering a glimpse into the numerous wildlife that inhabits our planet. However, as visitors wander through the winding paths and marvel at the diverse array of creatures, they are often left yearning for a more immersive and informative experience. Traditional signage and pamphlets have long served as the primary means of disseminating information to zoo visitors. While these resources provide valuable insights into the animals' habitats and behaviors, they often fall short in engaging and captivating modern audiences. As such, this project focuses on the development of an infotainment App for visitors to Zoo Kemaman in Terengganu, which is the only zoo located on the East Coast Zone of Peninsular Malaysia. It spans 35 acres, combining a mini zoo, garden, water theme park and the largest natural habitat for wild life in Terengganu. The zoo is home to 54 different species including tigers, elephants, crocodiles, birds and others. This project leverages the use of Flutter, MySQL and Vscode in the design and development of the App. Initial response is encouraging with many users welcome such an App for Zoo Kemaman. It is hoped that in this era where smartphones and tablets are ubiquitous, this App would enhance zoo experience greatly.

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1.0 INTRODUCTION

Creativity is a pressing need for innovation and improvement in the realm of zoo visitation interactivity [1-2]. The current system in place lacks the engagement and educational potential desired for the diverse group of visitors, especially children aged 5-11 [3-5]. Recognizing the limitations of the existing web-based platform, the decision to develop a mobile app emerged as a natural progression toward creating a more dynamic and enriching experience for zoo-goers [6-9].

With the digital landscape constantly evolving, it is imperative to harness the power of mobile technology to cater to the ever-growing demands of younger generations [10-13]. The proposed mobile app seeks to fill the gap by offering an interactive and educational solution to its user for that not only changing the way of the zoo visitation experience but also it helps extends the learning opportunities beyond the confines of the zoo itself [14-16]. By providing an extensive complete category of animal information, including detailed descriptions, real pictures, and engaging multimedia content, this app aims to inspire curiosity and catch the passion for wildlife among children.

As such, this project focuses on the development of an App for visitors to Zoo Kemaman [17] in Terengganu, which is the only zoo located on the East Coast Zone of Peninsular Malaysia. It spans 35 acres, combining a mini zoo, garden, water theme park and the largest natural habitat for wild life in Terengganu. The zoo is home to 54 different species including tigers, elephants, crocodiles, birds and others.

The *KeZoo App* represents the future of digitalization, allowing young visitors especially kids to explore the wildlife of animals in a fun way and informative manner. It is not confined to the compound of the zoo itself but also in the leisure at one's home. The KeZoo App encourages a deeper understanding and appreciation for the natural world while making Zoo Kemaman a more attractive and educational destination for families and young explorers alike.

2.0 SIMILAR SYSTEMS

2.1 Comparison of Similar Systems

This section presents the several similar systems to the proposed KeZoo App namely Denver Zoo [18], Zoo Negara [19], and Zoo Taiping [20].

2.1.1 Denver Zoo

Figure 1 are screen shots of the Denver Zoo App. The App has a lot of features including the interactives map of the zoo, description of the animals, and an online booth for purchasing tickets. It is good for exploring the zoo without missing anything and it has a GPS that will enable users to track their location within the zoo.

Figure 1: Denver Zoo App

2.1.2 Zoo Negara

Figure 2 are screen shots of the Zoo Negara (Malaysia) App. The App has many features including 3D interactive map and AR visualization. It requires the user logins to secure sensitive account information. Also included are online booking and daily schedules for shows throughout the zoo.

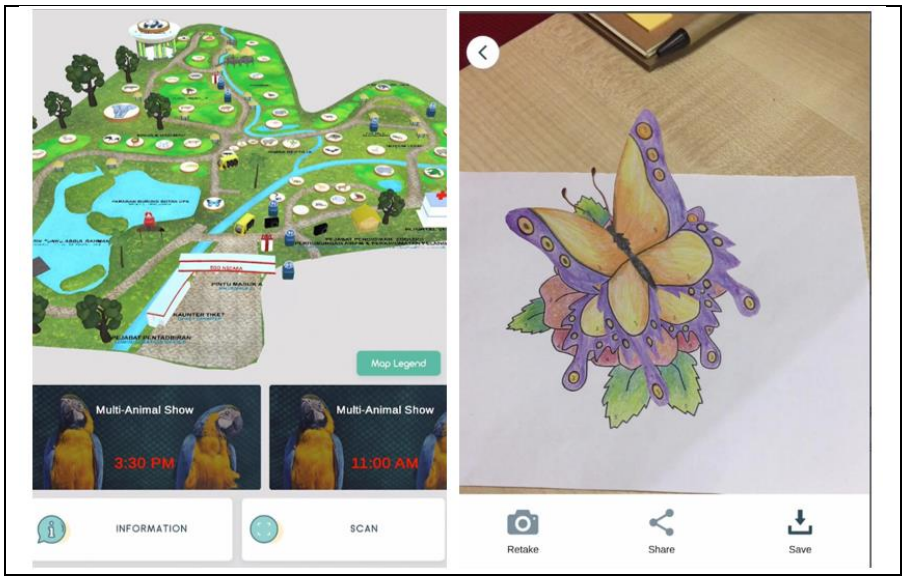

Figure 2: Zoo Negara App

2.1.3 Zoo Taiping

Figure 3 are screen shots of the Zoo Taiping App. Features include description of animals with pictures and audio. The App is part of the digitalization efforts for the Zoo Edu Tour at Zoo Taiping & Night Safari.

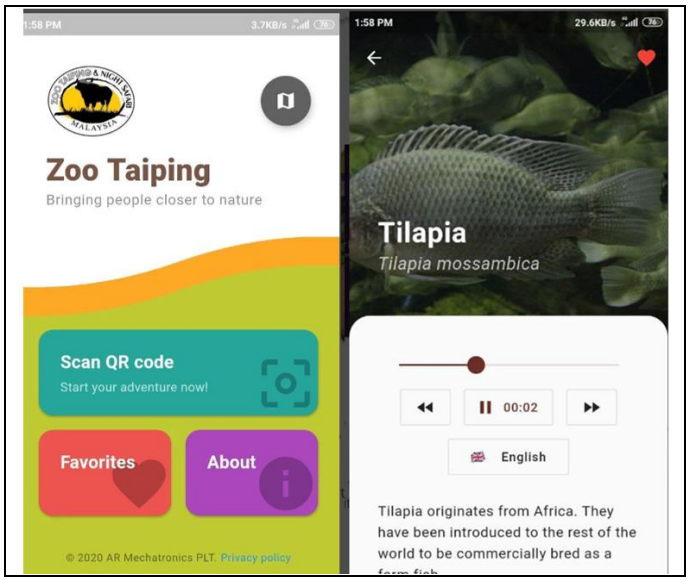

Figure 3: Zoo Taiping App

3.0 SYSTEM DESIGN

3.1 System Flow

Figure 4 illustrates the system flow for the KeZoo App. Users will need to input their email for accessing the App. Then, users have the option of viewing locations or searching for animals. If the user opts for viewing location, a list of location with respective animals will be presented to them. If user opts for searching, the text search function will be invoked with the option of saving the animal in the favorite list.

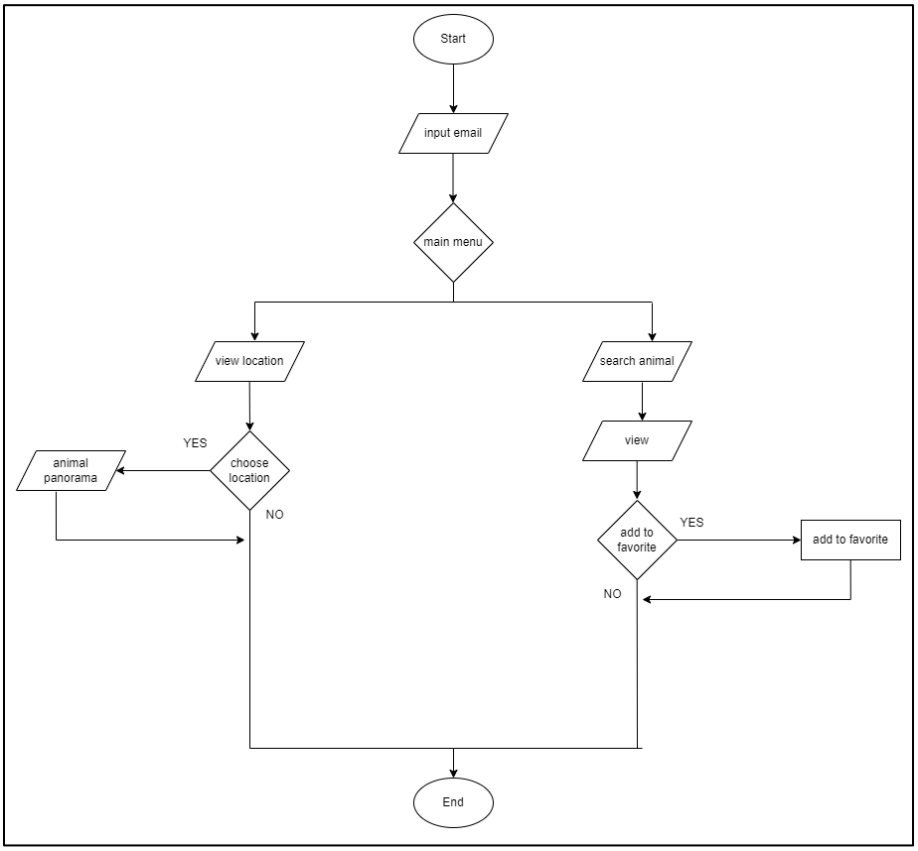

Figure 4: System Flowchart

3.2 Data Flow Diagram

Figure 5 illustrates the DFD (Level 1) for the KeZoo App. A total of two external entities namely *user* and *admin*; and six processes namely *adding animals to favorite*, *view favorite*, *view animal descriptions*, *search animal lists*, *manage animal records*, and *insert new animals* have been identified.

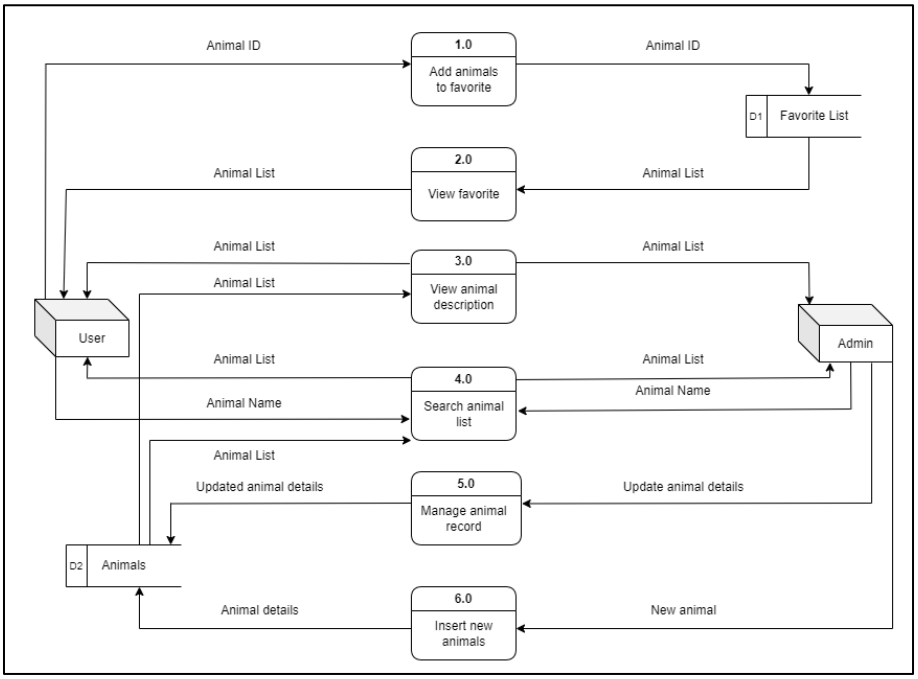

Figure 5: DFD level 1

3.3 Entity Relationship Diagram

Figure 6 illustrates the ERD for the KeZoo App. A total of five tables namely *admin*, *animals*, *location*, *favorite list*, and *user* has been identified.

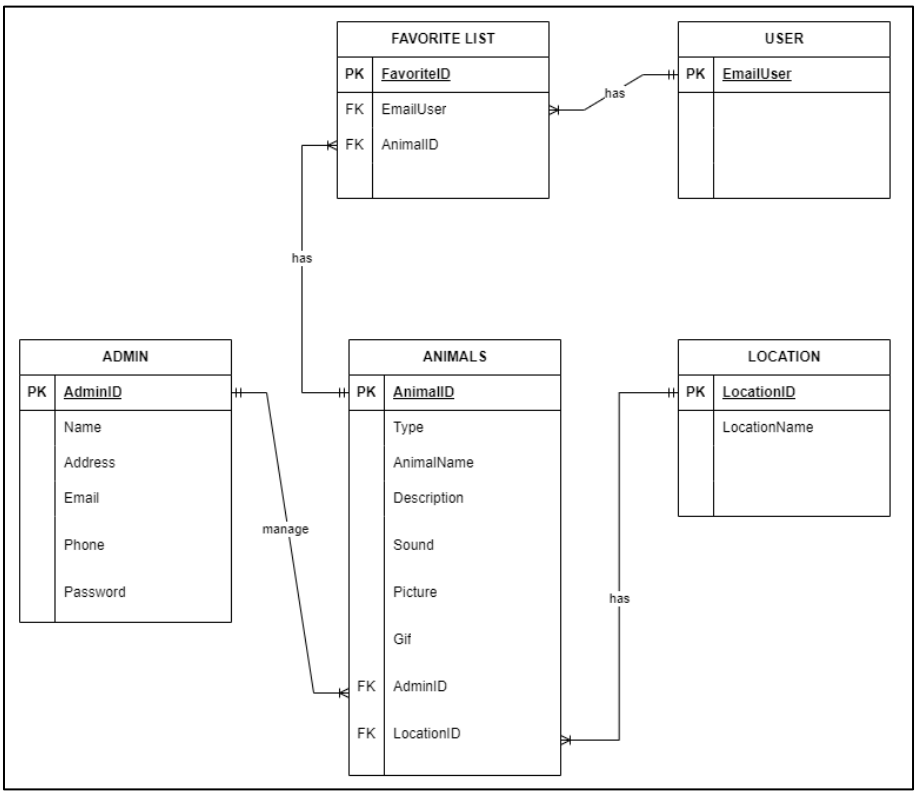

Figure 6: Entity Relationship Diagram

4.0 IMPLEMENTATION

The KeZoo App was designed and developed using Flutter, MySQL and Vscode based on a traditional waterfall model. Figures 7a-7c illustrate the interface of the App.

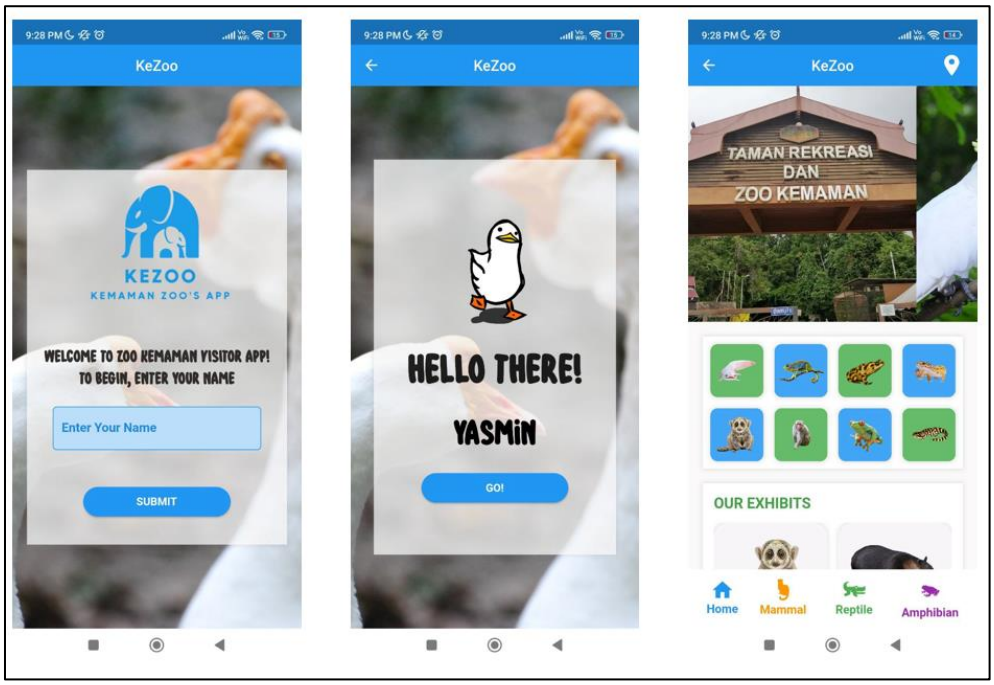

Figure 7a: User Interface

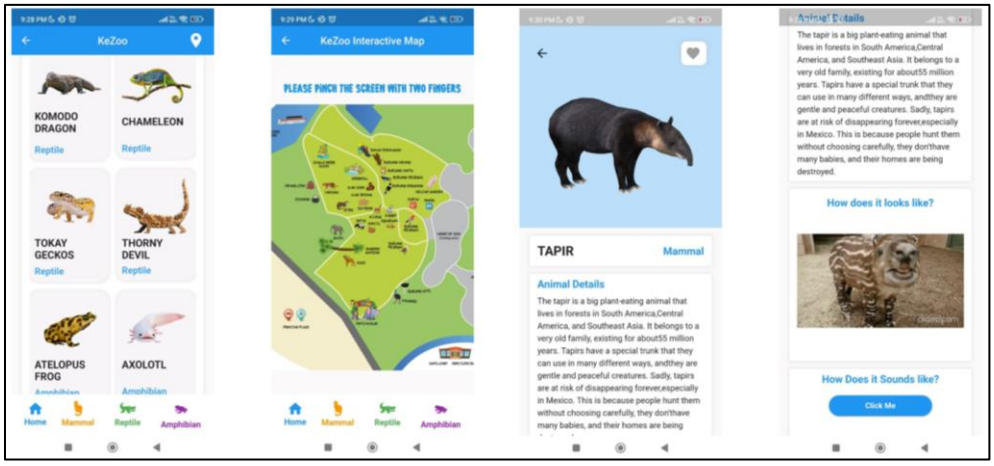

Figure 7b: User Interface

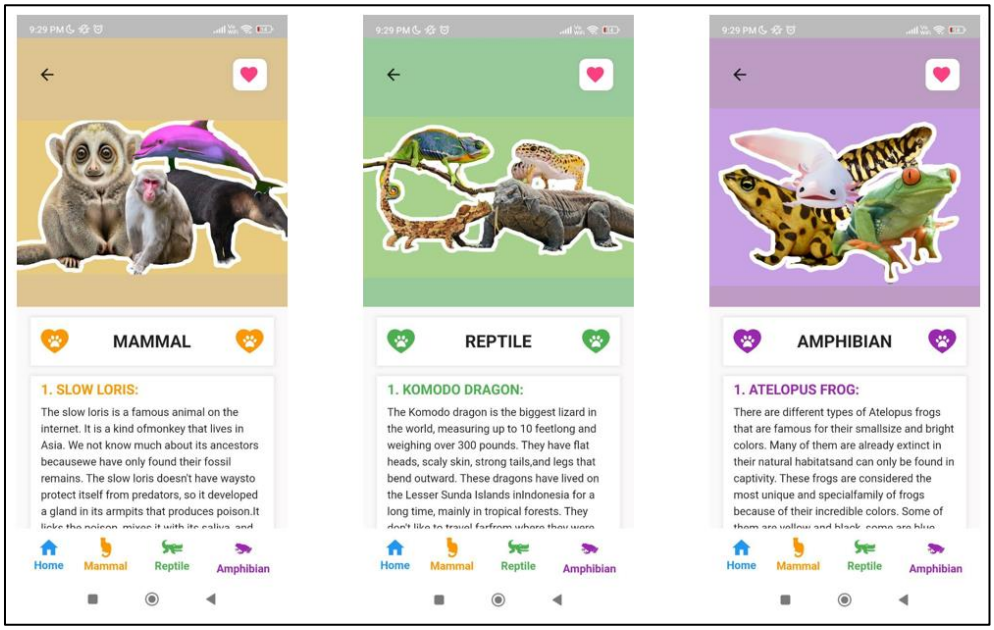

Figure 7c: User Interface

5.0 EVALUATION

Evaluation of the KeZoo App was carried out involving 20 visitors to the zoo. Visitors were asked about the feasibility and functionality of the App. Responses were encouraging with many users welcoming such an App for the zoo including suggestions for future improvement. The App installed without any issues on Android 11 and above.

6.0 CONCLUSION

This project has successfully designed and developed KeZoo - an App for Zoo Kemaman. It leverages the use of Flutter, MySQL and Vscode; and initial response was encouraging with many users welcoming the App. It is hoped that in this era where smartphones and tablets are ubiquitous, this App would enhance zoo experience greatly. Future works include adding additional features including GPS tracking and online ticket purchasing.

Author Contribution

Syahrul Fahmy: Conceptualization, methodology, visualisation, writing and editing. Yasmin M Zaki: Investigation, design and development. Izzah Inani: Investigation, development, writing and editing.

Conflict of Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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REFERENCES

[1] Wißotzki, M., & Wichmann, J. (2019). Application of the digital innovation and transformation process in zoo gardening facilities. CEUR Workshop Proceedings, 2443, 83–97.

[2] Webber, S., Carter, M., Smith, W., & Vetere, F. (2017). Interactive technology and human–animal encounters at the zoo. International Journal of Human Computer Studies, 98, 150–168.

[3] Warwick, C., Pilny, A., Steedman, C., Howell, T., Martínez-Silvestre, A., Cadenas, V., & Grant, R. (2023). Mobile Zoos and Other Itinerant Animal Handling Events: Current Status and Recommendations for Future Policies. Animals, 13(2), 1–46.

[4] Michel, U. (2007). MoZis: mobile zoo information system: a case study for the city of Osnabrueck. Remote Sensing for Environmental Monitoring, GIS Applications, and Geology VII, 6749(figure 1), 67490N.

[5] Panayotova-Pencheva, M. S. (2013). Parasites in Captive Animals: A Review of Studies in Some European Zoos. Zoologische Garten, 82(1–2), 60–71.

[6] Fahlquist, K. (2014). Creating New Experience for Zoo Visitors by Using Media Techniques. http://umu.diva-portal.org/

[7] Green, M., Conkey, A. A. T., & Challoo, L. (2015). Cybersafari: The effects of inquiry and information apps on visitor learning and satisfaction at zoos. Journal of Interactive Learning Research, 26(2), 147–168.

[8] Hlavacs, H., Gelies, F., Blossey, D., & Klein, B. (2005). A ubiquitous and interactive zoo guide system. Lecture Notes in Computer Science (Including Subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics), 3814 LNAI, 235–239.

[9] Kelling, N., & Kelling, A. (2014). Zooar: Zoo based augmented reality signage. Proceedings of the Human Factors and Ergonomics Society, 2014-January, 1099–1103.

[10] Valdellon, L., & Valdellon, L. (2023, September 26). What are the different types of mobile apps? and how do you choose? - CleverTap. CleverTap - All-in One Customer Engagement Platform. https://clevertap.com/blog/types-of-mobile-apps/

[11] Suzuki, M., Hatono, I., Ogino, T., Kusunoki, F., Sakamoto, H., Sawada, K., Hoki, Y., & Ifuku, K. (2009). LEGS System in a Zoo: Use of mobile phones to enhance observation of animals. Proceedings of IDC 2009 - The 8th International Conference on Interaction Design and Children, 222–225.

[12] Michel, U., Plass, C., Tschritter, C., & Ehlers, M. (2008). WebMoZis-Web-based and Mobile Zoo Information System: A Case Study for the City of Osnabrueck. The Intl. Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences, 37(B4).

[13] Incorporation, T. T. (2022, July 29). WHAT ARE ADVANTAGES AND DISADVANTAGES OF MOBILE APPS? https://www.linkedin.com/pulse/what-advantages-disadvantages-mobile-

[14] Dinesh, B., R, G. N., Pavatharani, R., Sneha, R., & Senthilkumar, C. (2022). Implementation Of Hostel Management With Automation Using Design Thinking. 10(4), 156–161.

[15] Ioannidis, Y. E., Livny, M., Ailamaki, A., Narayanan, A., & Therber, A. (1997). ZOO: A Desktop Experiment Management Environment. SIGMOD Record (ACM Special Interest Group on Management of Data), 26(2), 580–583.

[16] Martin, C. F., Muramatsu, A., & Matsuzawa, T. (2022). Apex and ApeTouch: Development of a Portable Touchscreen System and Software for Primates at Zoos. Animals, 12(13), 1–14.

[17] Kemaman Zoo – Kemaman Zoo Official Site. (2024). https://www.zookemaman.my/about/kemaman-zoo/

[18] Denver Zoo. (2023, December 20). Denver Zoo. https://denverzoo.org/

[19] Zoo Negara. (2019). https://www.zoonegara.my/

[20] Zoo Taiping & Night Safari. (2020). https://zootaiping.gov.my/en

[21] Khanna, D. (2022, January 6). Introduction to Waterfall Model of SDLC (Software Development Life Cycle). Medium. https://luciferrocks.medium.com/introduction-to-waterfall-model-of-sdlc-software-development-life-cycle-a01c7ec5e2ef

