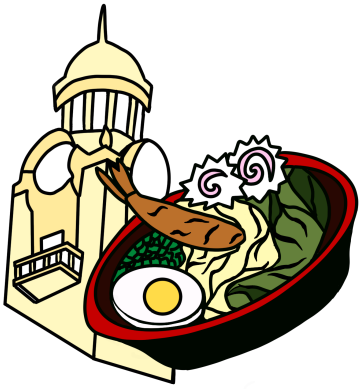


PROJECT MAKANGO

WRITTEN REPORT

Project MakanGo (9-06)

Members

Wu Cheng Sheng (2i2'23) - Leader
Alvin Liu En Yu (2i2'01)
Gwee Jyun-En, Asher (2i2'06)
Zhu Yichen (2i2'28)

Table of Contents

1. Introduction **4**
1.1 Description of Idea 4
1.2 Rationale and Significance of Project 4
1.3 Scope of Project 4

2. Literature Review **5**
2.1 Case Studies 5

3. Study & Research **6**
3.1 Ideation of Study 6
3.2 Needs Analysis 6

4. Methodology **7**
4.1 Methodology 7
4.2 Development Tools 7

5. Project Development **8**
5.1 Job Distributions 8
5.2 Project Timeline 8

6. Outcomes, Analysis & Discussions **9**
6.1 Flowchart of Features 9
6.2 Summary of Features 10

7. Implications and Recommendations **11**
7.1 Areas for Improvements 11
7.2 Further Extensions 11

8. Conclusion **12**
8.1 Reflections & Learning Points 12

9. Bibliography **13**
9.1 References in APA Format 13

10. Appendix A **14**
10.1 Login Screens 14
10.2 Ordering Screens 15
10.3 Order Screens 17
10.4 Leaderboard Screens 19
10.5 Vendor Screens 20
10.6 App Icon 22
10.7 Database 23

11. Appendix B **25**
11.1 Survey Results 25

12. Appendix C **27**
12.1 Showcase Video Link Address 27
12.2 GitHub Repository Link Address 27
12.3 HC MakanGo APK Link Address 27

1. Introduction

1.1 Description of Idea

HC MakanGo is an application to increase the convenience of the current food ordering system for the students, staff and vendors. Summaries of the food orders would be provided to the vendors and a rating system is also in place.

1.2 Rationale and Significance of Project

Students need to queue for a long time in the canteen to buy their food, increasing the possibility of catching COVID-19. This application was developed to decrease the spread of the virus when students buy food from the canteen. It also makes food ordering faster and more convenient. The app will be able to aid vendors in food preparation and to provide convenience to students buying food. Vendors can also receive feedback from the student rating, thus helping them improve their food. Students can view the popular stalls through the rating leaderboard too.

1.3 Scope of Project

Our project aims to provide a food ordering platform for our audience, the students, staff and vendors, in the Hwa Chong Institution canteen. It will benefit our audience through expediting the food ordering and collection system.

2. Literature Review

2.1 Case Studies

Based on our observations in 2021, it takes an average of 7 minutes for students to queue up for food in the canteen. The duration increases as students are released late for recess or lunch. The issue of crowding would occur when multiple classes have meal breaks at the same time. The United States Centers for Disease Control and Prevention advises that "enclosed spaces with inadequate ventilation or air handling within which the concentration of exhaled respiratory fluids, especially very fine droplets and aerosol particles, can build-up in the air space". This increases the risk of transmission of COVID-19, which is worsened when students spend large periods of time queuing in the canteen.

HC MakanGo expedites the traditional food ordering and collection system. In a study conducted by Sarah Breathnach et al. ("Experience of Using an Online Pre-Ordering System for A Workplace Canteen That Offers Lower-Energy Swaps: A Think-Aloud Study"), app features such as reminders to order, user-friendliness and a swift collection service facilitated efficiency. In the research, participants regarded the ordering application as easy to use as its intuitive layout and clear instructions made pre-ordering a quick process. User-friendliness in our app will thus play an important role in simplifying the ordering process.

According to the British Waste & Resources Action Programme in an article published in 2014, food waste at colleges and schools adds up to about 250 million pounds of extra cost each year. However, the elimination of avoidable waste would reduce the cost of a school meal by 22 pence. A food ordering app, like ours, will facilitate the reduction of food waste in schools as vendors will not overestimate the amount of ingredients to be prepared.

References to support issues raised can be found in ***Section (9)***.

3. Study & Research

3.1 Ideation of Study

The idea of our project came up when our leader had noticed the persistent queues in the canteen and found it problematic, especially during COVID-19. There were students from various levels, making it very easy for COVID-19 to spread. Our group pinpointed the issues of our canteen, and discussed the solutions. This app emerged as the best solution.

3.2 Needs Analysis

We collected data on student's satisfaction with the current canteen situation. Among 52 responses, 46.7% of the respondents felt that canteen queues were long, and only 33.3% of respondents felt satisfied with the general canteen situation, regarding food ordering and collection. 90% of respondents agreed that a food ordering app would solve the aforementioned issues.

*Survey results can be found in **Appendix (B)**.*

4. Methodology

4.1 Methodology

Alvin and Asher were the main programmers. Initially, we were unfamiliar with the new programming language, Dart. After attending the Flutter Sabbaticals at the end of Term 1, we became more confident. We learnt Dart ourselves afterwards from online resources like StackOverflow and GitHub. Pub.dev, an official Flutter package repository, assisted us in obtaining information on Flutter packages. Besides programming, Alvin and Asher also had to understand Firebase, an integral part of our app, where the majority of app data is stored. We made use of our phones and emulators to test out our app.

Cheng Sheng and Yichen were the designers. For our logo, we had chosen a bowl of ramen and our clock tower. The hand-drawn logo depicts our vision to improve the food ordering situation in our school. For the app colour theme, we chose a colour combination of cadet grey and sky blue, after referencing design websites to find this colour combination most comfortable on our eyes. We selected Roboto as our app font as it is modern and crisp. Roboto allows letters to take up as much space as it needs, making for an improved experience for the reader. For the showcase video, we screen-recorded our app on a mobile phone, before editing it using Adobe Premiere Pro. It was crucial that we made the video short and concise which would showcase our app features clearly.

4.2 Development Tools

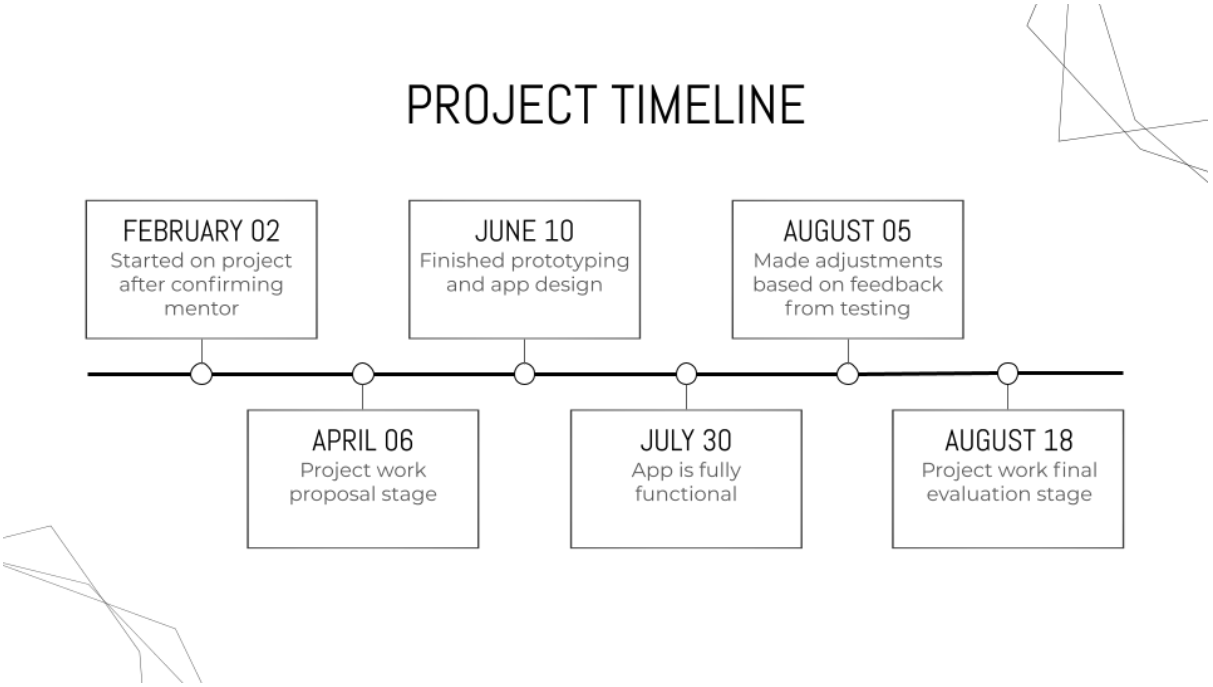
Tool	**Description**	**Rationale**
Flutter	UI Toolkit	-Cross-platform development with a unified language (Dart)
Cloud Firestore	Database	-Storing of orders and data such as vendor accounts -Provide vendors order summary through consolidating student orders
Figma	Prototyping	-Prototype our app before coding and have an app preview

5. Project Development

5.1 Job Distributions

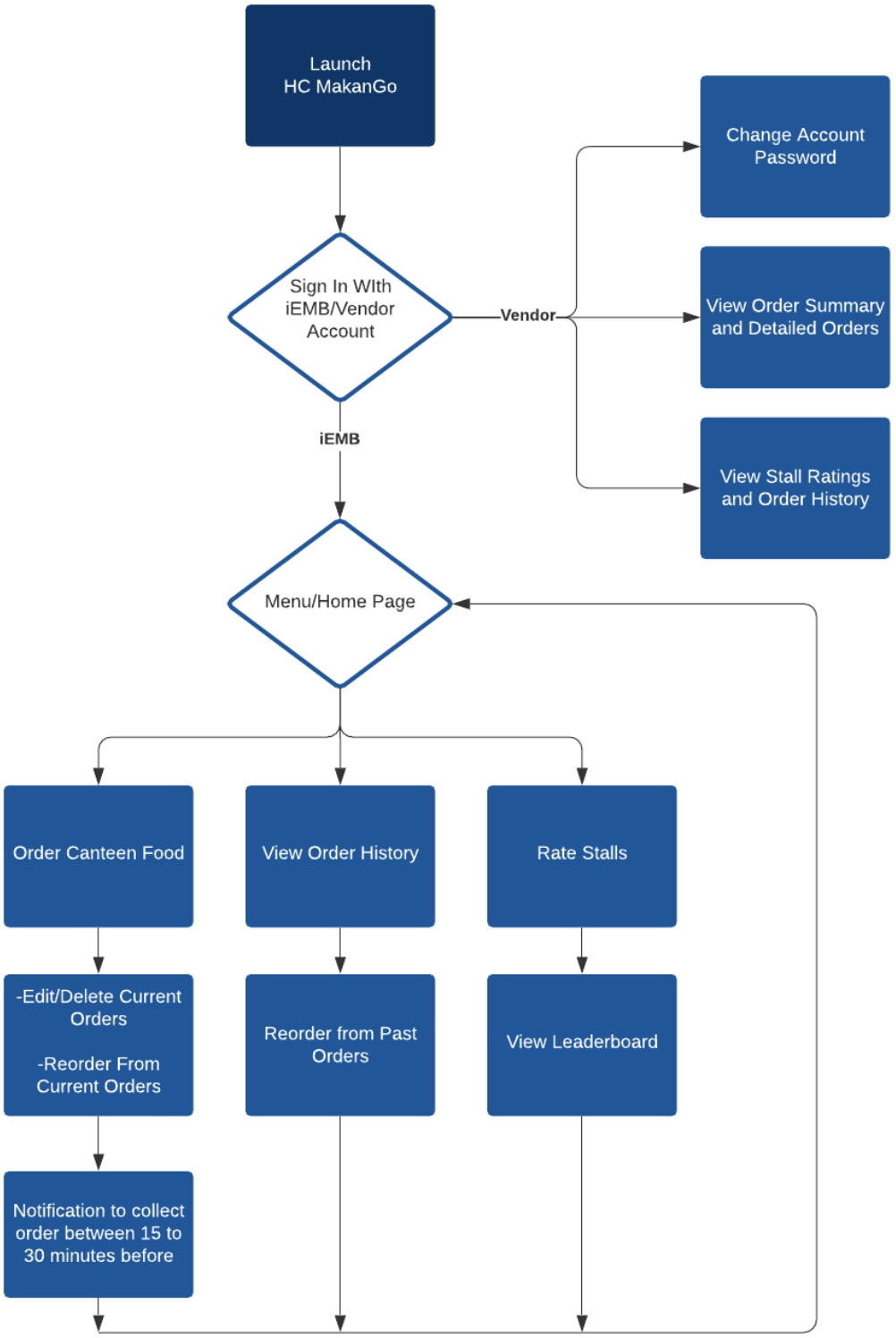
Member	Job Description
Wu Cheng Sheng	-Prototyping and design -Research, slides, written report and showcase video -Coordination among members and with mentor
Alvin Liu En Yu	-Coding and bug fixes
Gwee Jyun-En, Asher	-Coding and code optimisation
Zhu Yichen	-Prototyping and design suggestions -Research, slides, written report

5.2 Project Timeline



6. Outcomes, Analysis & Discussions

6.1 Flowchart of Features



6.2 Summary of Features

Below is a breakdown of the app features for student users and vendors.

FOR STUDENTS

Signing In:
- Sign in using iEMB username and password
- Username is locally stored on user's phone

Home Page:
- Shows all unarchived orders that have been created

Ordering Process:
- Choose date and time, then select preferred stall and food
- Option to choose multiple food in a single order
- Option to edit and delete order one day before

Notification:
- A reminder notification will be sent to users to collect order in less than 30 minutes

Order History:
- Users can check past orders, which are archived every 1 hour
- Option to reorder from history

Leaderboard System:
- Students can rate any stalls and view the leaderboard
- Leaderboard rankings are refreshed every week

FOR VENDORS

Home Page:
- Shows summary of the day's and the next day's order

Detailed Order:
- Shows what each student ordered

Order History:
- Shows all archived orders from students

Changing Password:
- Ability to change password after first log-in

Leaderboard System:
- View rating leaderboard

*Screenshots of all the aforementioned features can be found in **Appendix (A)**.*
*Video showcase of all features can be found in **Appendix (C)**.*

7. Implications and Recommendations

7.1 Areas for Improvements

An area to improve on will be to use GitHub for better collaboration and version control between the programmers. Another area would be to provide the vendors with an option to use Google Authentication so it is more convenient for them.

7.2 Further Extensions

An extension would to carry out further testing with vendors and students. However, due to the large scale of users that could be involved, we did not contact the school for testing. An issue that was brought up during the consultation with vendors was of users ordering food without collecting. We felt that this was a long term issue that requires concrete solutions, which we did not have time for.

8. Conclusion

8.1 Reflections & Learning Points

1. **Wu Cheng Sheng**
   Through this project, I managed to be more proficient in prototyping and designing an app. I realised how meaningful it is to apply knowledge and technical skills in real life. As a leader, I also had to coordinate the progress within the group and set manageable targets, which allowed me to hone my leadership skills.

2. **Alvin Liu**
   Personally, I feel that this year's learning curve was quite steep but I am thankful for it. At the start of the year, I did not know anything about Flutter or app development, but now, I am fully capable of coding an app.

3. **Gwee Jyun-En, Asher**
   This project was a different experience for me. From deciding on the project to starting to code, it was a challenging yet fulfilling learning journey. This project gave me the chance to learn a new programming language and to work better as a team.

4. **Zhu Yichen**
   This one-year project has been a very fulfilling experience. Despite the many difficulties faced, it was a good learning opportunity where I was able to work on individual aspects like time management, and group aspects such as teamwork and cooperation.

9. Bibliography

9.1 References in APA Format

a. Centers for Disease Control and Prevention (n.d.). *Scientific Brief: SARS-CoV-2 Transmission*. Centers for Disease Control and Prevention. https://www.cdc.gov/coronavirus/2019-ncov/science/science-briefs/sars-cov-2-transmission.html

b. Mahmud, A. H. (2021, June 19). *Bukit Merah View COVID-19 cluster: Virus could have spread via long queues, surfaces in toilets, says MOH*. CNA. https://www.channelnewsasia.com/news/singapore/covid-19-bukit-merah-cluster-long-queues-surface-toilets-15040558

c. Breathnach, S., Llewellyn, C.H., Koutoukidis, D.A., van Rugge, C.R., Sutherland, A., Lally, P. (2020, November 17). E*xperience of Using an Online Pre-Ordering System for A Workplace Canteen That Offers Lower-Energy Swaps: A Think-Aloud Study.* Multidisciplinary Digital Publishing Institute - Nutrients Journal. https://www.mdpi.com/2072-6643/12/12/3878

d. Mirosa, M., Munro, H., Mangan-Walker, E., & Pearson, D. (2016, September 5). *Reducing waste of food left on plates: Interventions based on means-end chain analysis of customers in foodservice sector*. British Food Journal. https://www.emerald.com/insight/content/doi/10.1108/BFJ-12-2015-0460/full/html

e. Google LLC. (n.d.). Flutter Documentation. https://flutter.dev/docs

f. Google LLC. (n.d.). Dart programming language. Dart. Retrieved July 15, 2020, from https://dart.dev/

g. Stack Exchange, Inc. (n.d.). Stack Overflow - Where Developers Learn, Share, & Build Careers. https://stackoverflow.com/

h. Google LLC. (n.d.). Firebase Authentication. Firebase. https://firebase.google.com/docs/auth

i. Figma, Inc. (n.d.) Figma: the collaborative interface design tool. Figma. https://www.figma.com/

10. Appendix A

10.1 Login Screens

Fig 10.11: Startup Page

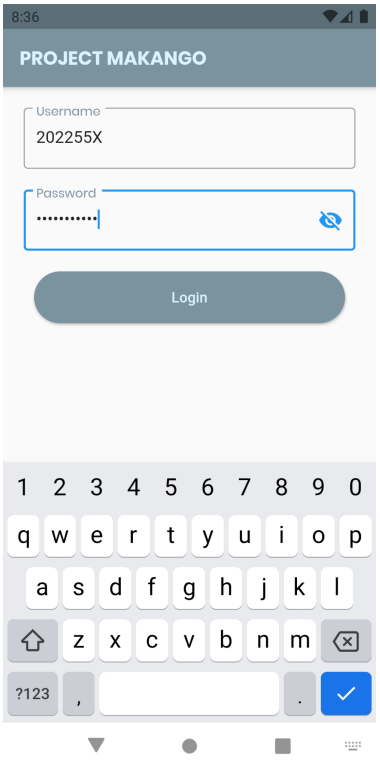


Fig 10.12: Login Page

10.2 Ordering Screens

Fig 10.21: Stall Options Page 1

Fig 10.22: Stall Options Page 2

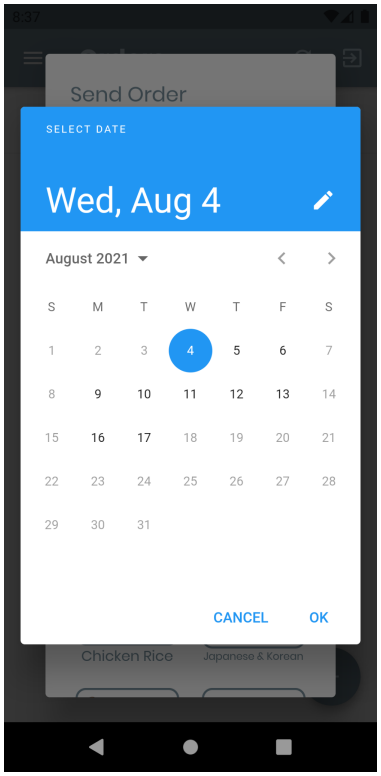


Fig 10.23: Date Choosing Page

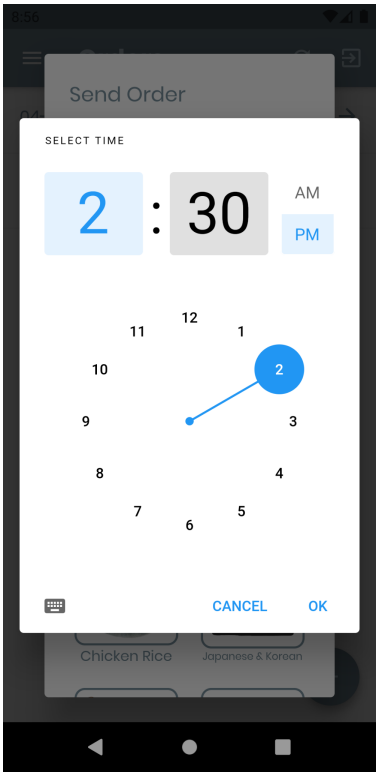


Fig 10.24: Time Choosing Page

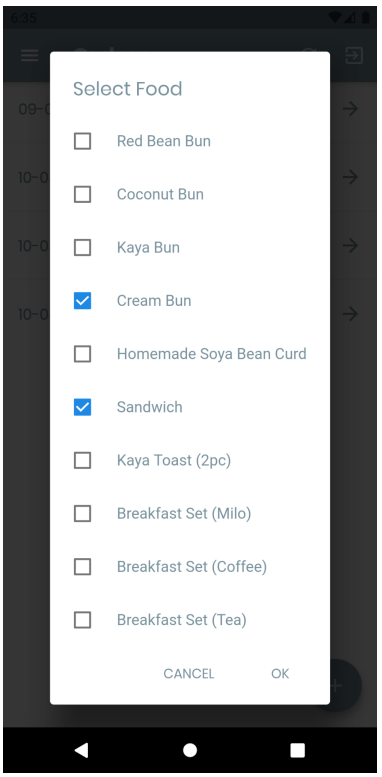


Fig 10.25: Food Options Page

10.3 Order Screens

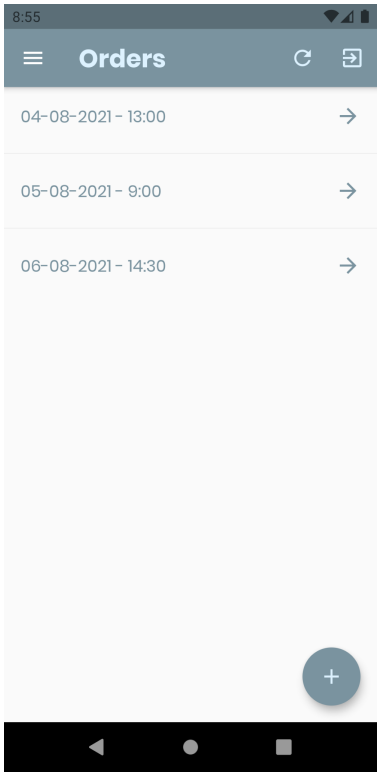


Fig 10.31: Orders Page

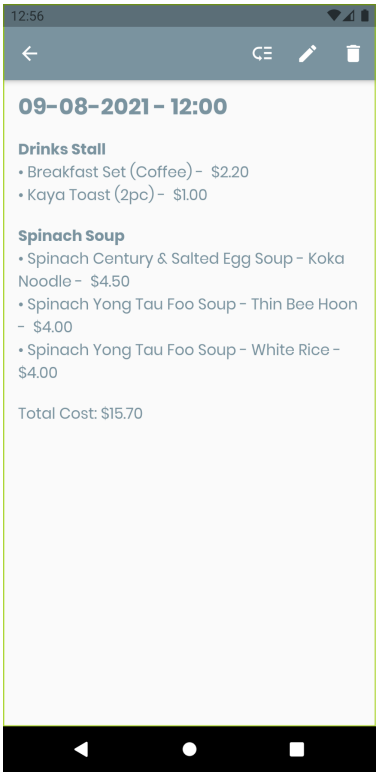


Fig 10.32: Specific Order Example

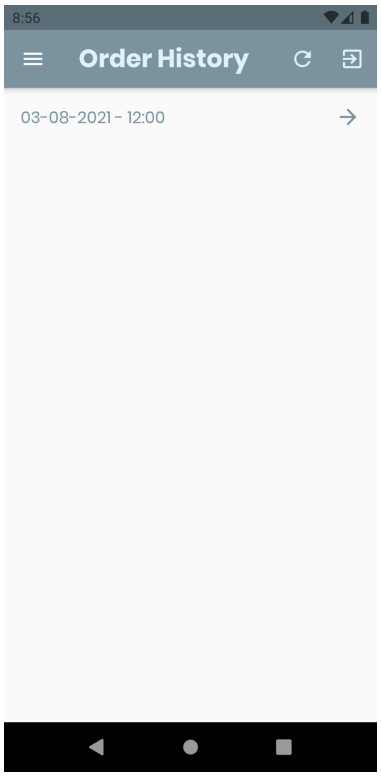


Fig 10.33: Order History Page

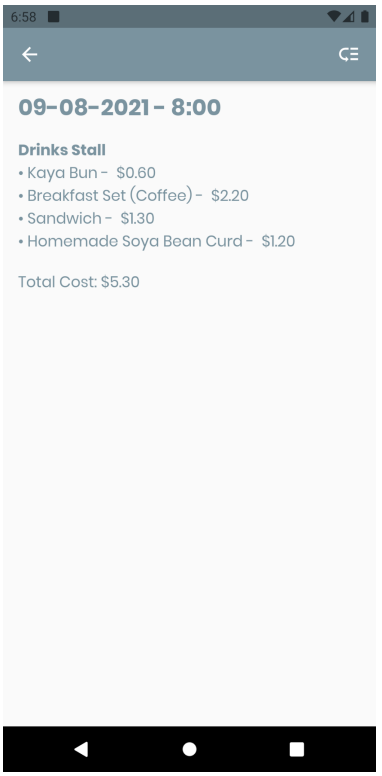


Fig 10.34: Specific History Example

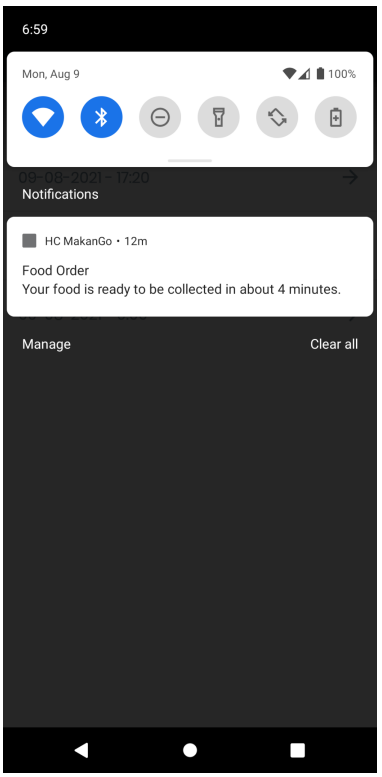


Fig 10.35: Collection Notification

10.4 Leaderboard Screens

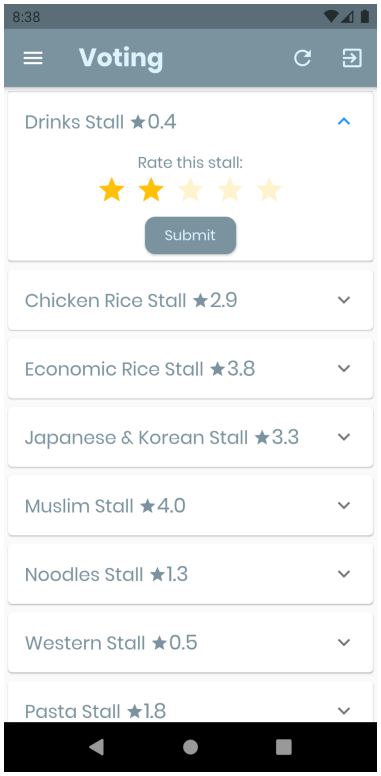


Fig 10.41: Voting Page

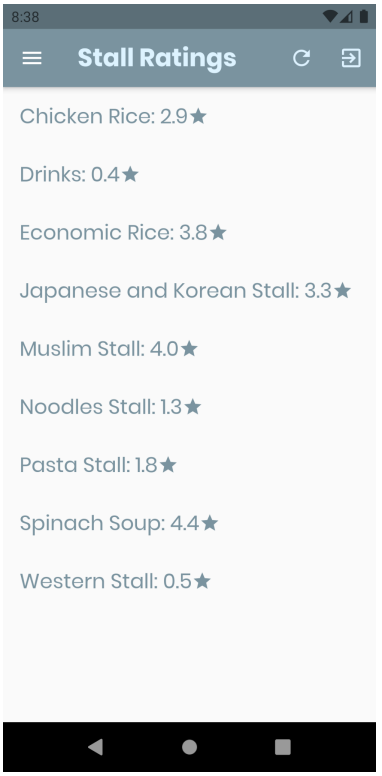


Fig 10.42: Stall Ratings Page

10.5 Vendor Screens

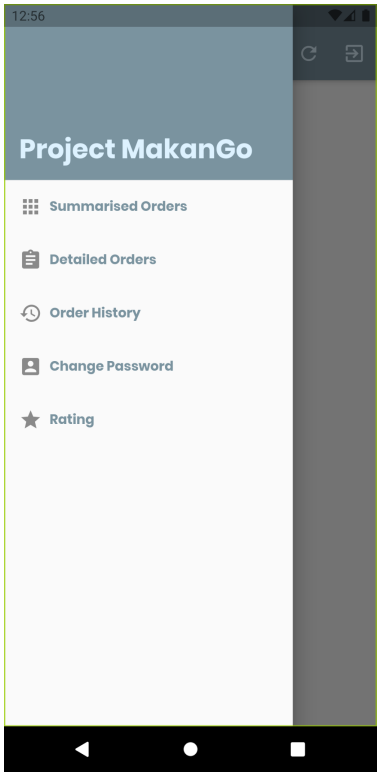


Fig 10.51: Vendor Side Menu

Fig 10.52: Vendor Summary Page 1

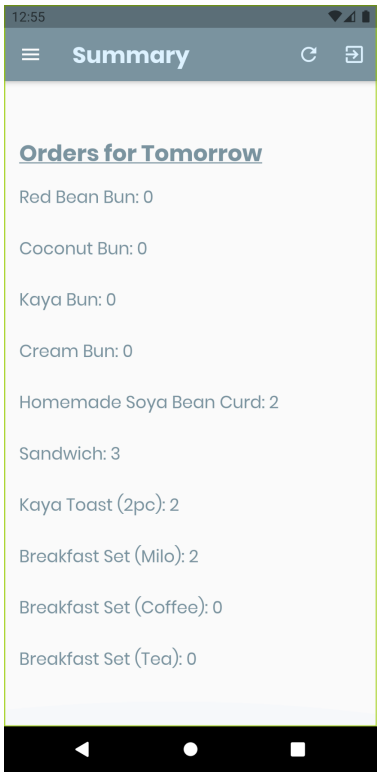


Fig 10.53: Vendor Summary Page 2

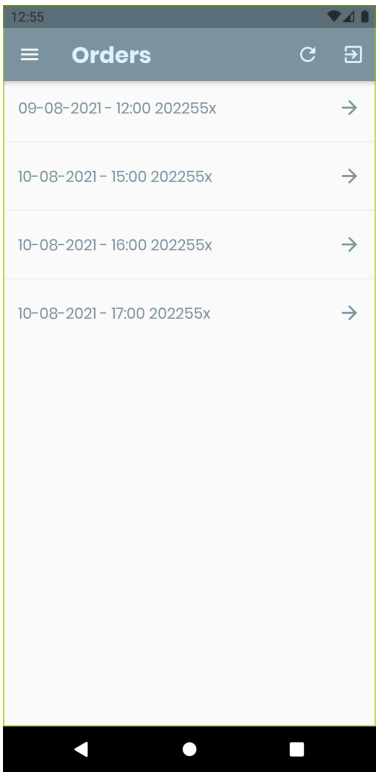


Fig 10.54: Individual Orders

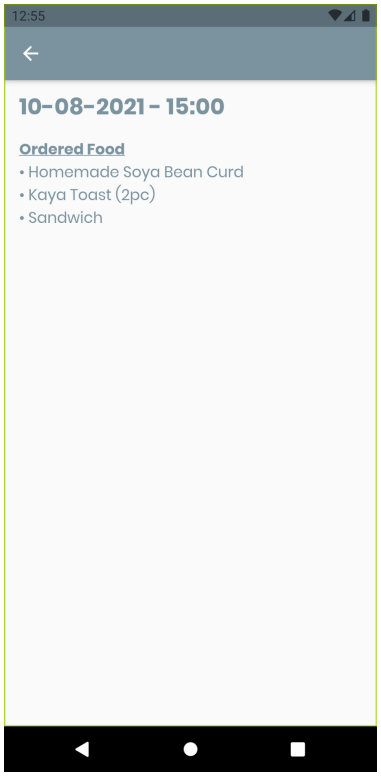


Fig 10.55: Individual Order Detail

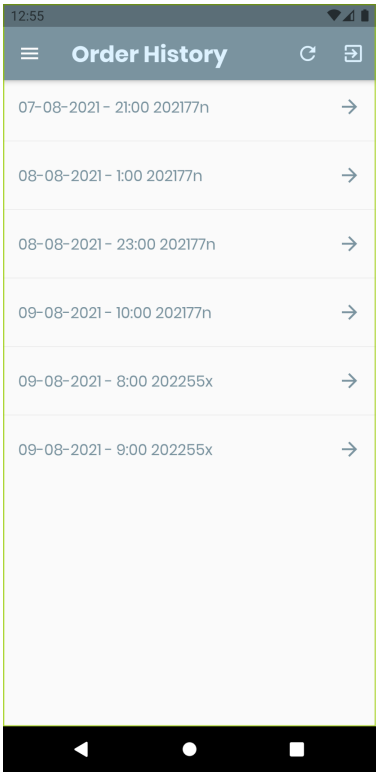


Fig 10.56: Order History Page

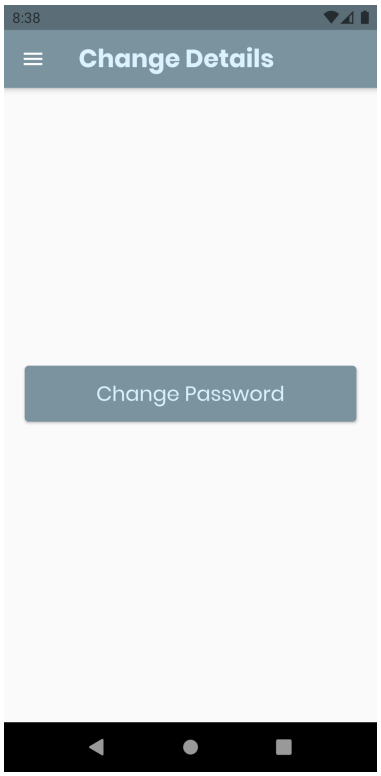


Fig 10.57:Change Details Options Page

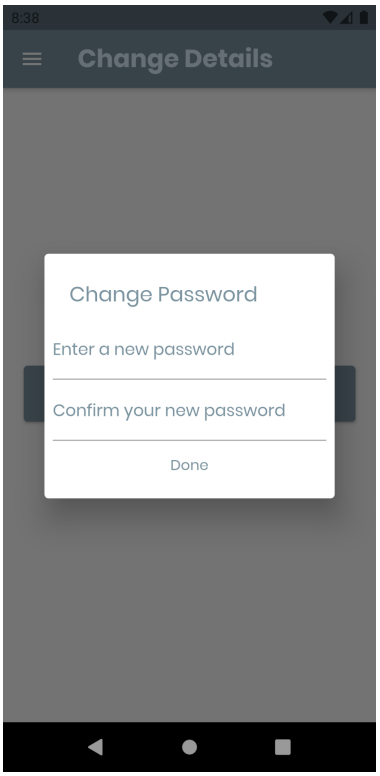


Fig 10.58: Password Changing Page

10.6 App Icon

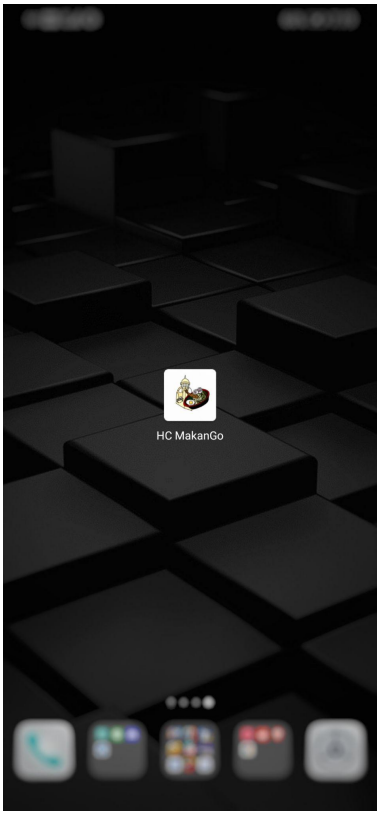


Fig 10.6: App Icon On A Phone

10.7 Database

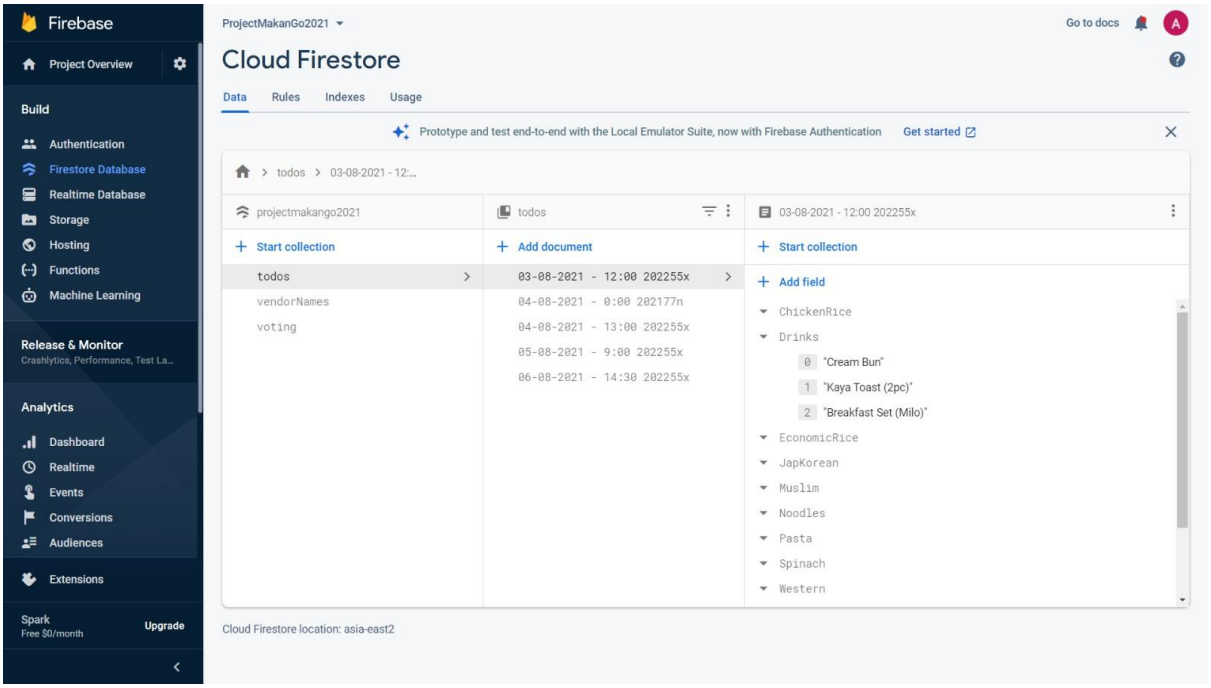


Fig 10.71: Data of Orders on Cloud Firestore

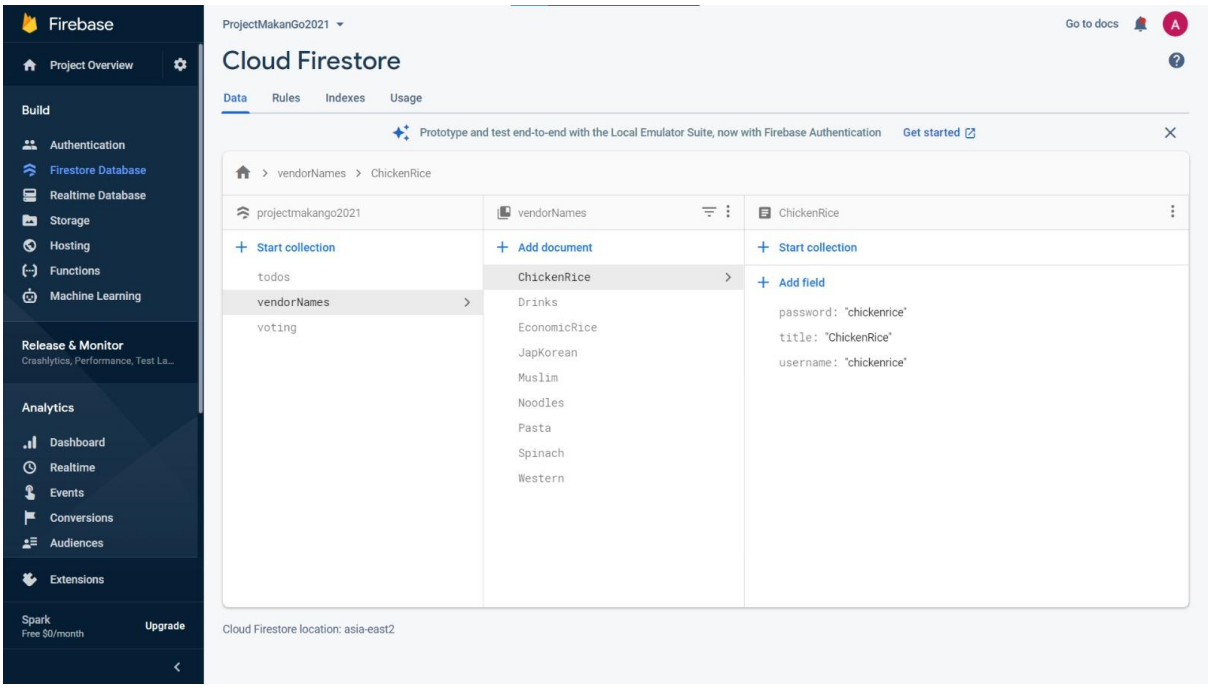


Fig 10.72: Data of Vendors on Cloud Firestore

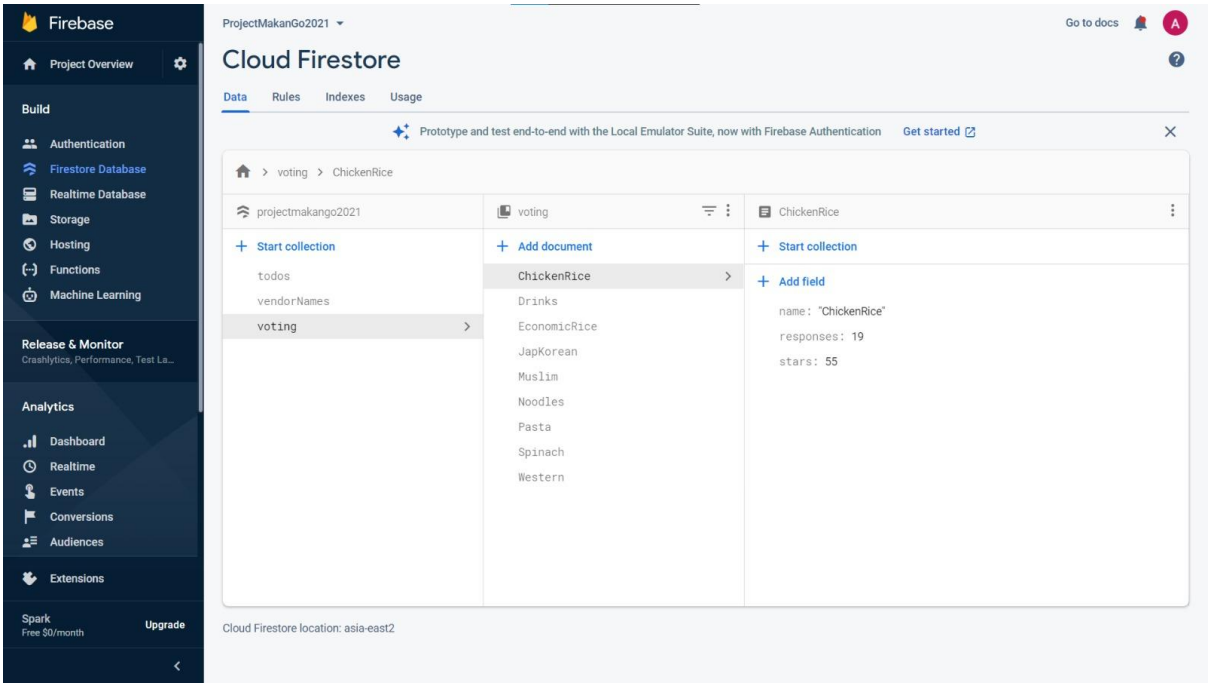


Fig 10.73: Data of Rating Results on Cloud Firestore

11. Appendix B

11.1 Survey Results

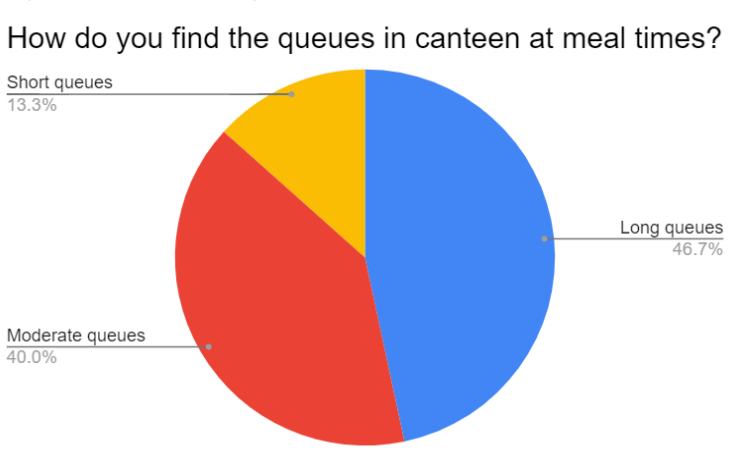


Figure 11.1: 46.7% of the respondents felt that canteen queues were long

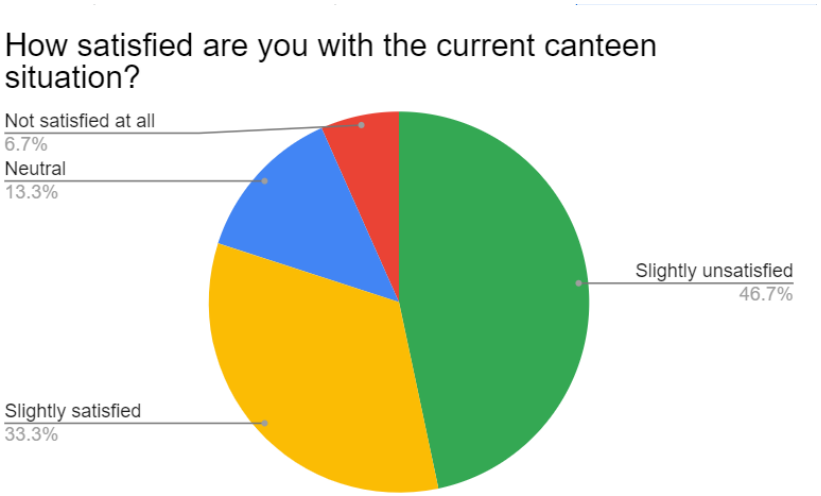


Figure 11.2: 33.3% of respondents felt satisfied with the general canteen situation, regarding food ordering and collection

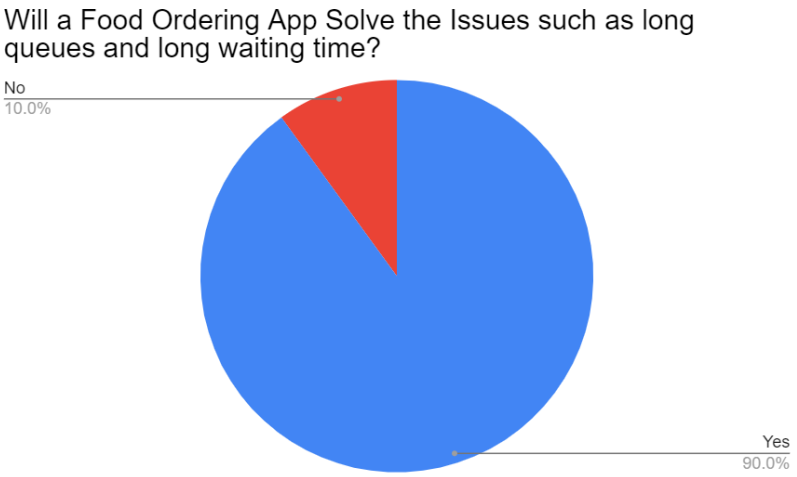


Figure 11.3: 90% of respondents agreed that a food ordering app will be a suitable solution

12. Appendix C

12.1 Showcase Video Link Address
https://tinyurl.com/ProjectMakanGoShowcase

12.2 GitHub Repository Link Address
https://github.com/AleyAleyAley/Project-MakanGo

12.3 HC MakanGo APK Link Address
https://tinyurl.com/ProjectMakanGoAPK

Word Count: 1491[1]

The End

[1] *Word Count excludes Cover Page, Table of Contents, Labelling of Diagrams/Charts, Section (9) Bibliography and Appendix (A) to Appendix (C)*