CZ2006 Outline

Problem Statement: Can we design an application that removes the need for physical queues in stores?

List of APIs:

- BestTime API (Human footfall): https://besttime.app/
- Registered Business: https://data.gov.sg/dataset/entities-with-unique-entity-number?resource_id=39201285-b73e-487a-a971-3a12d34ab8d9
- Google Places API: https://developers.google.com/maps/documentation/places/web-service/overview
- OneMap API: https://www.onemap.gov.sg/docs/
- Singpass: https://api.singpass.gov.sg/developers

Elicit and Document Requirements	
Problem	Reduce the need for queues at physical locations
Target User	Singaporean's with a smartphone and Business Owners
Functional Requirements	1. A End User must be able to create an account 2. A End User must be be able to view the wait/queue times for shops, eateries and attractions a. The system shall show the popular times of establishments listed b. A End User should be able to filter/view the wait times by category (shops, eateries, attractions) c. Quick Search 3. A End User must be able to queue for an establishment using the app a. A End User must link their SingPass to join the queue b. A End User must get a **queue number** via the app c. Prompts/notifications must be shown when approaching one's turn/missed queue number (notification system) d. The system must provide an option for the user to rejoin the queue in the event of a missed queue number e. The system shall start a **countdown timer** once it reaches a users' turn, user will be prompt to reach their destination within x mins f. A End User shall leave the queue by scanning a QR Code located at the establishment 4. The system must store a End Users' **favorites/bookmarked section** 5. A Service Provider must be able to create an account a. A Service Queue shall be set up for a Service Provider when that Service Provider sets up an account, without requiring any input from the Service Provider 6. A Service Provider must be able to view and manage its own Service Queue a. The Service Provider must be able to manually insert and remove End Users from its Service Queue b. The Service Provider must be able to notify End Users in the Service Queue 7. A End User must be able to report issues or submit feedback 8. End User can earn points only if they check out of the store

Non Functional Requirements	**Speed** • The system must update the crowds every 10 min • Display crowd/waiting time information to user within 10s **Ease of Use** • A end user shall be able to use all system functions within 10 minutes of first use. The number of help frames displayed to an end user shall be limited to 2. • A end user shall be able to join a service queue within 2 screen transitions from the home screen • Reaching an end point in the system must require a minimized number of clicks (3 - 4) • All features should be reachable within 5 actions • Navigating actions should feel smooth • Once a end user has joined a service queue, the current queue status of that service queue shall be displayed on the home screen • Queue number must be shown on the homepage for existing users checking their queue • Scalability - show places previously visited/liked **Reliability** • There shall be 0 incidents of synchronicity of end user status across different devices • There shall be 0 incidents of synchronicity between the service queue status displayed to end users and service providers • Penalty system for false queue • **Allow user to only queue when they are sufficiently near the area like you must be in the mall to virtual queue for the store? Geolocation api** **Robustness** • In the event of an unexpected system failure, the system shall be restarted within 1 minute • There shall be at most 1% of unique scenarios that result in a system failure in a month • There shall be at most 1% of system failures that result in data corruption in a month **Portability** • A end user shall be able to join the end of the queue using **only** the system **Security** • A service provider shall be uniquely identified by their Unique Entity Number (UEN) • A end user shall be uniquely identified by his or her Singpass account **Usability** • Multiple Language support • A end user shall have the option of enabling push notifications to be notified when they are nearing the front of the service queue Additional Requirements • Try to estimate crowdedness based on real life information • **Show a recommended list of places that are not crowded based on the user search** • Store can remove user from queue if they are not there in time? • Loading display screen with ads from popular/partnered company

Use Case	**Functional Requirements Addressed**
End User Joining & leave service queue (N)	3
End User Viewing Wait Times (N)	2
End User rejoins queue (N)	3
Service Provider Creates Account (L)	5
Service Provider viewing service queue (L)	6
Service Provider manage service queue (L)	6
F&B Service Provider notifies End User of Availability (L)	6
End User providing feedback (Y)	7
End User Favoring Store (Y)	4

End User creates account (Y)	1
End User Checks Out of Store (L)	8

Data Dictionary

End User	A customer or potential customer at a specific establishment using the system
Service Provider	An establishment utilizing the system to complement or replace their physical queuing system
User	Either an end user or a service provider
System	The application as a whole, including the user interface and all backend services
User Interface	The boundary used to collect input from and display output to a user
Service Queue	The virtual model of the queue structure within the system, specific to a certain service provider
Queue Status	Contains the following information about the service queue: • Number of end users in front • Estimated waiting time
Home Screen	The screen which the system first loads into

User Stories

Tom is a 24 year old young adult who just graduated and started working. Eager to climb the corporate ladder and find his place in the company, he spends a great deal of time working. As such, the opportunities that he finds to spend time with his friends and family are precious to him. For Tom, having a nice meal with them after a long day of work is all he really wants sometimes. However, owing to his tight and busy work schedule, he finds it difficult to commit to reserving seats at an establishment, lest he disappoint his friends and family. Instead, he typically queues with them for up to 30 mins, taking the opportunity to catch up with them while waiting.
Mary is a 50 year old housewife with a thrifty mindset. As the one in charge of the household expenses, she constantly looks out for sales and cheap alternatives to help the family save. Being a housewife, her typical day consists of pockets of free time. It is not uncommon for her to spend 30 mins to an hour queueing, especially if there are deals involved. Having spent her younger years in a less technology-centric society, she has become accustomed to the brick-and-mortar shops and struggles with the online shopping platforms,often finding herself confused by the myriad of buttons on them.
John is a 35 year old man who recently entered the world of fatherhood. As someone who promised himself to devote his time wholeheartedly to his child, he is constantly finding ways to spend quality time with his family. He also recently got promoted to a managerial position. With his newfound responsibilities, he struggles to manage his time between work and family life, given that supermarkets always have never ending queues. He wants to spend more time with his family and also not risk getting demoted. As such, he often finds himself returning home late, after having to queue for extended
Elon is a 43 year old manager at Elon's Eatery. Being the manager, he has to be on top of many things in the establishment. However, business has been poor in recent months due to the Covid-19 pandemic, and he has had to let go of several staff. At times, he does still have surges of customers, which causes him to become overwhelmed due to the shortage of hands. In particular, he has to constantly move between the Eatery's dining area and reception area because of the now vacant receptionist position. He hopes that he would be able to ease his burdens without having to hire more hands.
Tze Minh is an impatient 21 year old student who wants to eat fancy food stalls with her friends. She enters the mall and is unsure what to eat but she immediately would like to pick something popular yet has a reasonable queue under 15 minutes