



UTM
UNIVERSITI TEKNOLOGI MALAYSIA

**SYSTEM ANALYSIS & DESIGN
SECTION-08**

SECD2613

20232024/2

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1.0 Overview of the Project

Easytrack is a system that we proposed to enhance the efficiency of the security system and the safety measures in the area of the Sunway Lagoon Theme Park. We will collect information requirements and review the system requirements for the project. This project will identify information needed to the operating system.

There are some interactive methods for information gathering. First, We survey our customers by questionnaires using Google Forms to collect their information. We use nominal and scale queries to get more detailed data from different perspectives. After gathering requirements information, we develop a deep understanding of business capabilities based on precise information about people, goals, data, and processes.

Then, we will get information on the current systems based on AS-IS analysis using context diagrams in the following steps, which are described as high-level data flow diagrams (DFD). The context diagram describes all the flow of information and detailed overview of the current state of the process, culture, and capabilities in the entire system. Data flow diagrams are used to describe the external entities, data flows, data stores, and processes involved after creating the context diagram. Then, we need to draw a diagram 0 which is the explosion of the context diagram. After that, we create a child diagram as each process on diagram 0 may explode to child diagram. This helps us to control the signify completion of tasks or error conditions.

After the DFD, an entity relationship diagram (ERD) is constructed that describes the relationships between the entity sets. After ERD, data requirements and transaction requirements are generated. The task is finally completed, now we have a thorough understanding of the current system and data flow diagram, entity relationship diagram and information requirements.

2.0 Problem Statement

1. Lack of Real-Time Monitoring:

There is no centralized tracking system in place at Sunway Lagoon Theme Park's current security setup to keep an eye on visitors' movements in real time. In the absence of this ability, park management will find it extremely difficult to recognize and respond quickly to safety issues, like missing children or emergencies. This restriction impairs the park's ability to properly manage and mitigate potential risks and incidents in addition to jeopardizing the safety and wellbeing of its visitors.

2. Limited Communication Infrastructure:

At Sunway Lagoon Theme Park, staff members primarily communicate via walkie-talkies, which have a number of drawbacks. During emergencies, the use of walkie-talkies can cause communication breakdowns and make it more difficult to transmit vital information. Additionally, poor range or signal interference may make it more difficult for park employees to coordinate effectively, which could jeopardize the effectiveness and efficiency of emergency response operations. The necessity for a more durable and dependable communication infrastructure is highlighted by this reliance on antiquated communication technology.

3. Insufficient Surveillance Coverage:

A small staff team's manual patrols throughout Sunway Lagoon Theme Park may leave gaps in the monitor system. It's possible that some park areas are under- or unmonitored, which leaves them open to unreported safety incidents or security threats. The park's capacity to promptly and effectively identify and manage possible risks or incidents is weakened by this lack of thorough surveillance coverage. To increase overall security and safety in the park, it is essential to improve surveillance coverage through technological solutions or staff placement that is strategically planned.

4. Lack of Guest Accountability:

The absence of a centralized tracking system makes it challenging to hold guests accountable for their actions or whereabouts within Sunway Lagoon Theme Park. Without a mechanism to monitor guest movements and behavior, park management may face difficulties in addressing safety concerns or managing unruly behavior effectively. Establishing guest accountability measures, such as digital tracking systems or guest registration processes, is essential to enhance overall safety and security within the park. These measures not only promote responsible guest behavior but also enable park management to respond swiftly to safety incidents or emergencies.

3.0 Proposed Solutions

Easytrack is an extraordinary system that improves guest safety and security by providing seamless integration with existing security infrastructure. It can detect the location of the guest when the guests scan their ticket with the time recorder machine which will show guest's location to the theme park management .Easytrack can empower park management to effectively monitor guest movements and respond swiftly to emergencies. This system has the potential to revolutionize the way theme parks manage crowd control, ensuring a safer and more enjoyable experience for all visitors.

Technical feasibility

Easytrack requires a time recorder machine in different areas of the theme park ,strong database system and user-friendly interface for theme park management to know the guest's location.The current technical resources are sufficient for the new system.

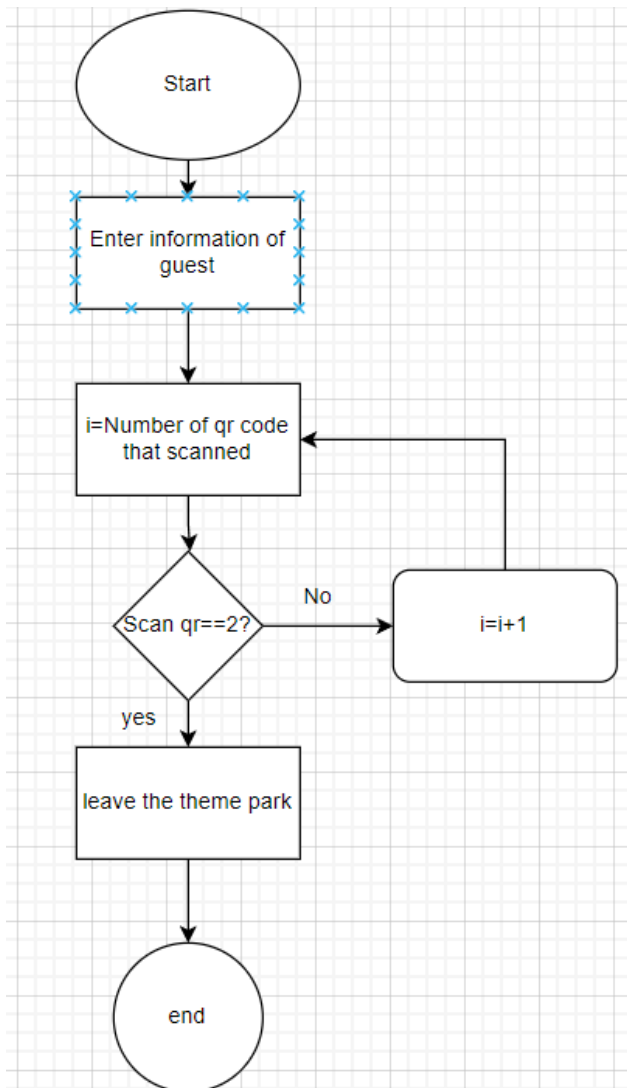
Operational feasibility

Easytrack is essential and needed for guests to ensure their safety and create an environment where guests can enjoy their trip with peace of mind.Besides,staff training will be provided so they can use Easytrack effectively and enhance overall operational efficiency.Human resources are available to operate the system once it has been installed.

4.0 Current Business Process/Workflow

Scenarios and workflow of ticket scanning system for guest:

- 1) Provide information to the workers on the counter so they can enter the guest's information.
- 2) The qr code of the ticket can only be scanned twice to make sure all the guests enter at opening time and leave at closing time.



Scenarios and workflow of ticket scanning system for theme park management:

- 1) Login to the Easytrack with your password.
- 2) Customizing according to preference.
- 3) Tick the radio button to select important options .

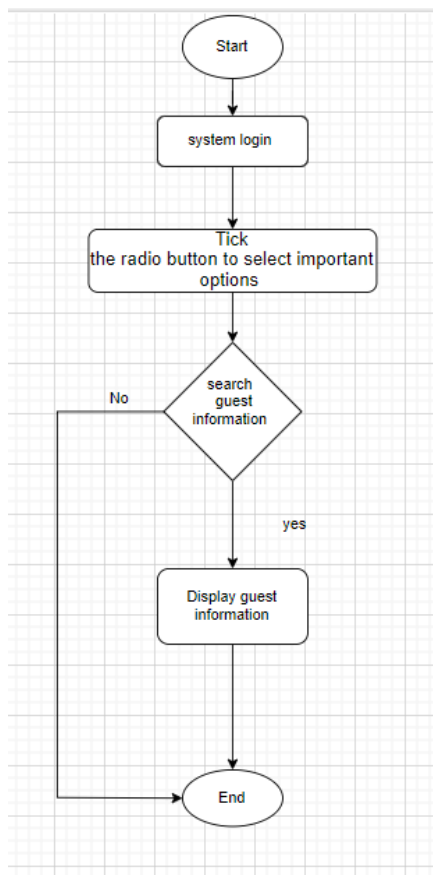
Option:

3.1 Name

3.2 Phone number

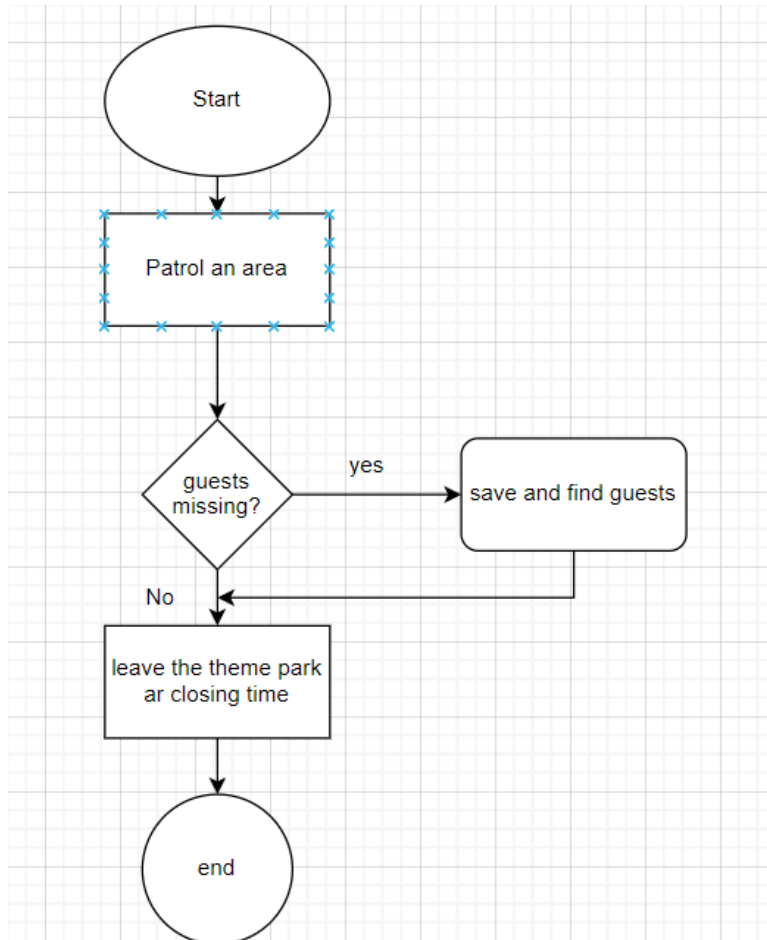
3.3 Date

- 4) The guests' information will be displayed on the screen if you search the guests' information by typing specific information in the text box.



Scenarios and workflow of ticket scanning system for rescue team:

- 1)Patrol an area.
- 2)Get the information from the ticket scanning system if guests are missing.
- 3)Leave at closing time.



Proposed system

Scenarios and workflow of Easytrack for theme park management:

- 1) Login to the Easytrack with your password.
- 2) Customizing according to preference.
- 3) Tick the radio button to select important options .

Option:

3.1 Name

3.2 Phone number

3.3 Date

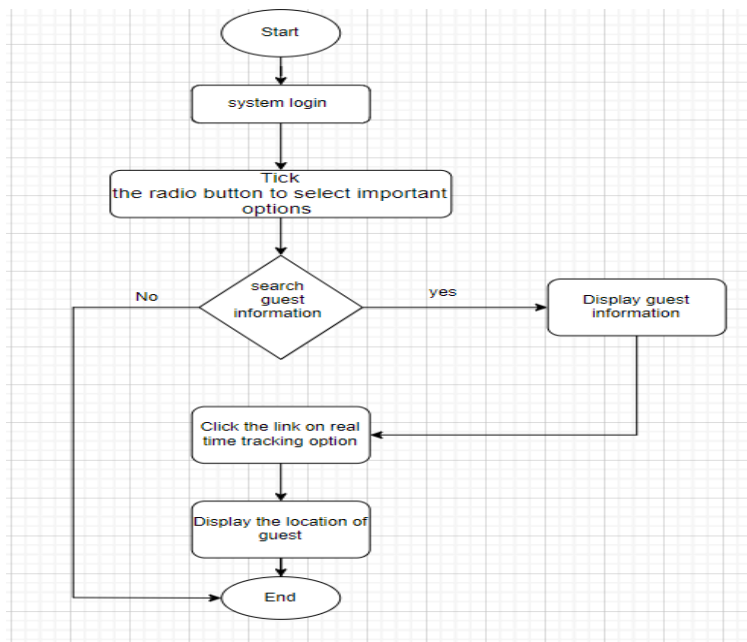
3.4 Time record

3.5 real-time tracking

4) The guests' information will be displayed on the screen if you search the guests' information by typing specific information in the text box.

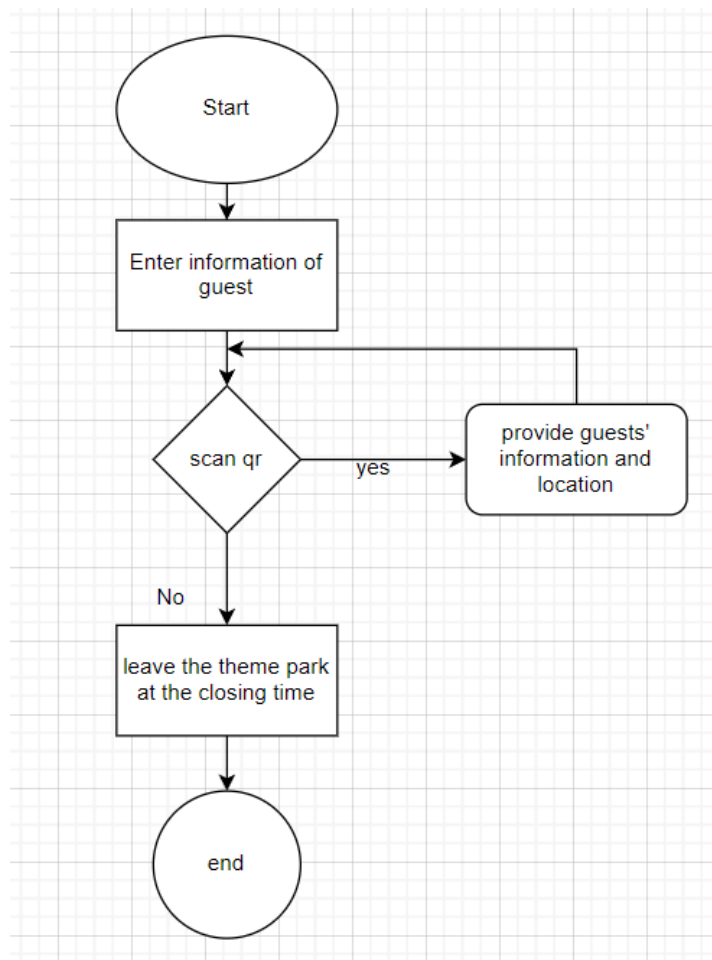
5) Option for real-time tracking

5.1 Click the link provided on the option and Easytrack will start to track the location of guests.



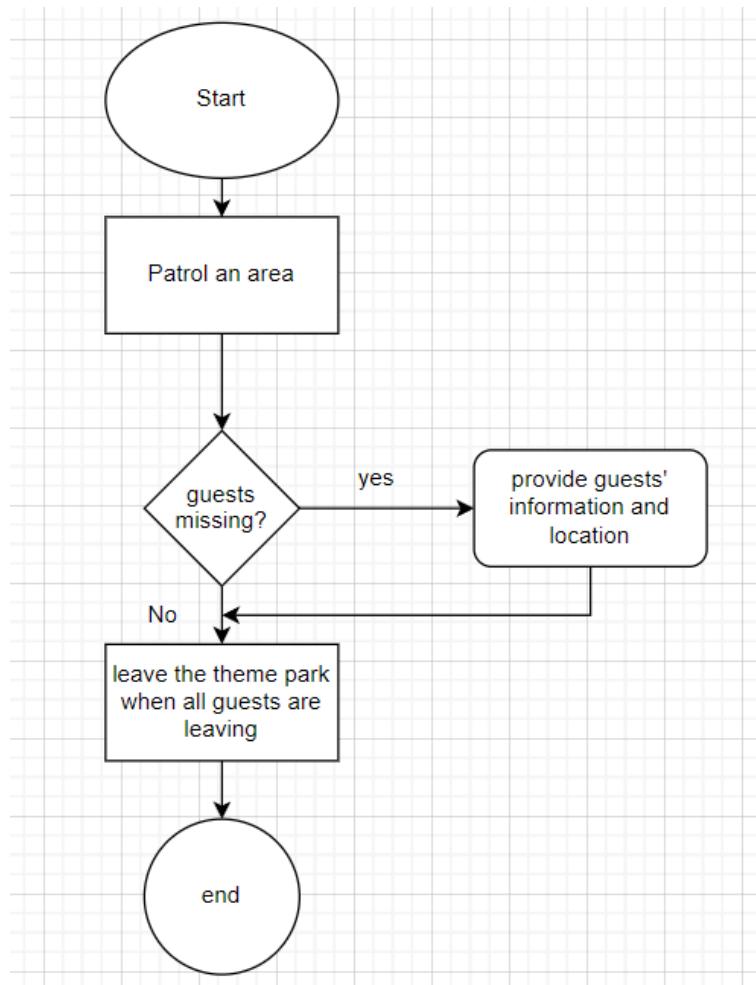
Scenarios and workflow of Easytrack for guest:

- 1) Provide information to Easytrack.
- 2) Scan the qr code of the ticket to the time recorder machine to make sure the guests' information is recorded to the system when entering the theme park.
- 3) The qr code will be scanned again on the different areas of the park so Easytrack can detect your location and make sure the real-time tracking is working.
- 4) Make sure all the guests leave at closing time.



Scenarios and workflow of Easytrack for rescue team:

- 1) Patrol an area.
- 2) Get the guests' location and information from Easytrack if guests are missing.
- 3) Leave at closing time if all guests are leaving.



5.0 Logical DFD (AS-IS)

Context Diagram

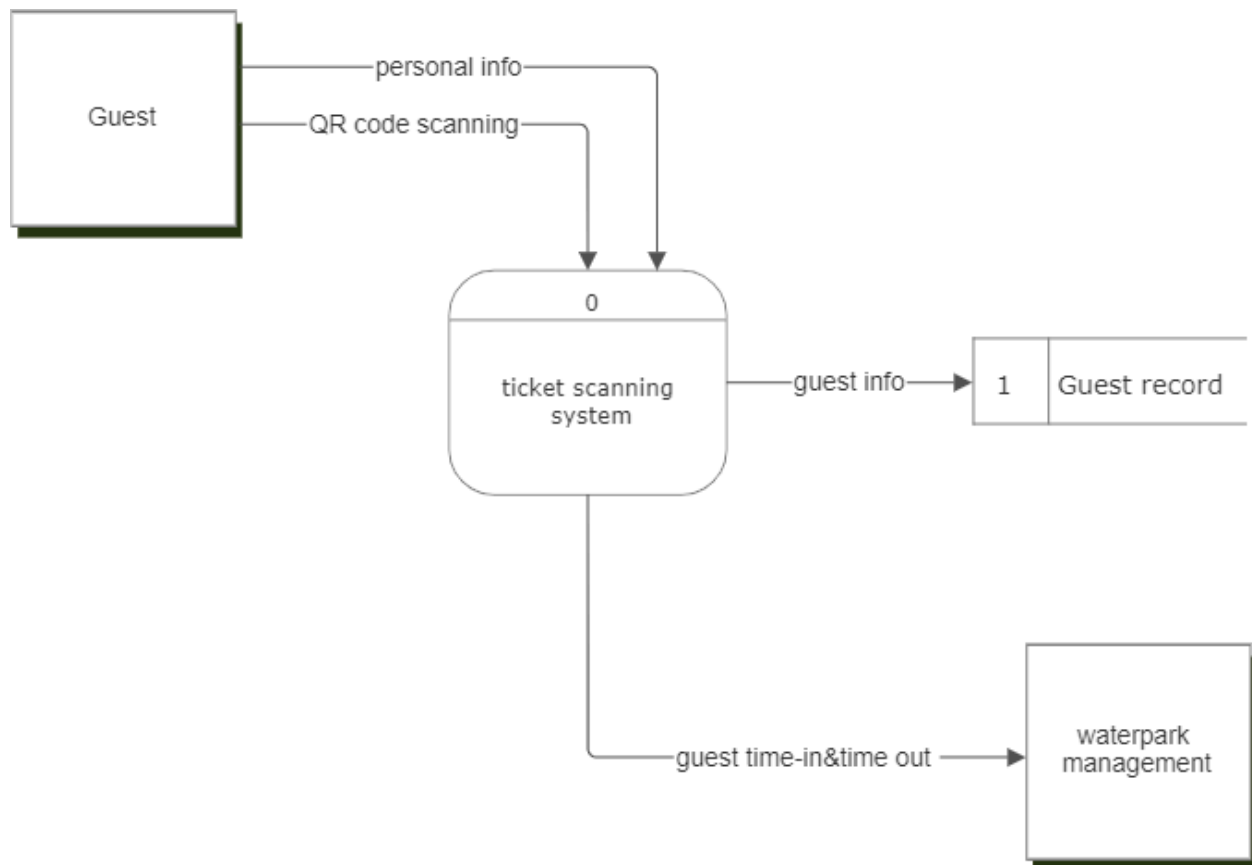
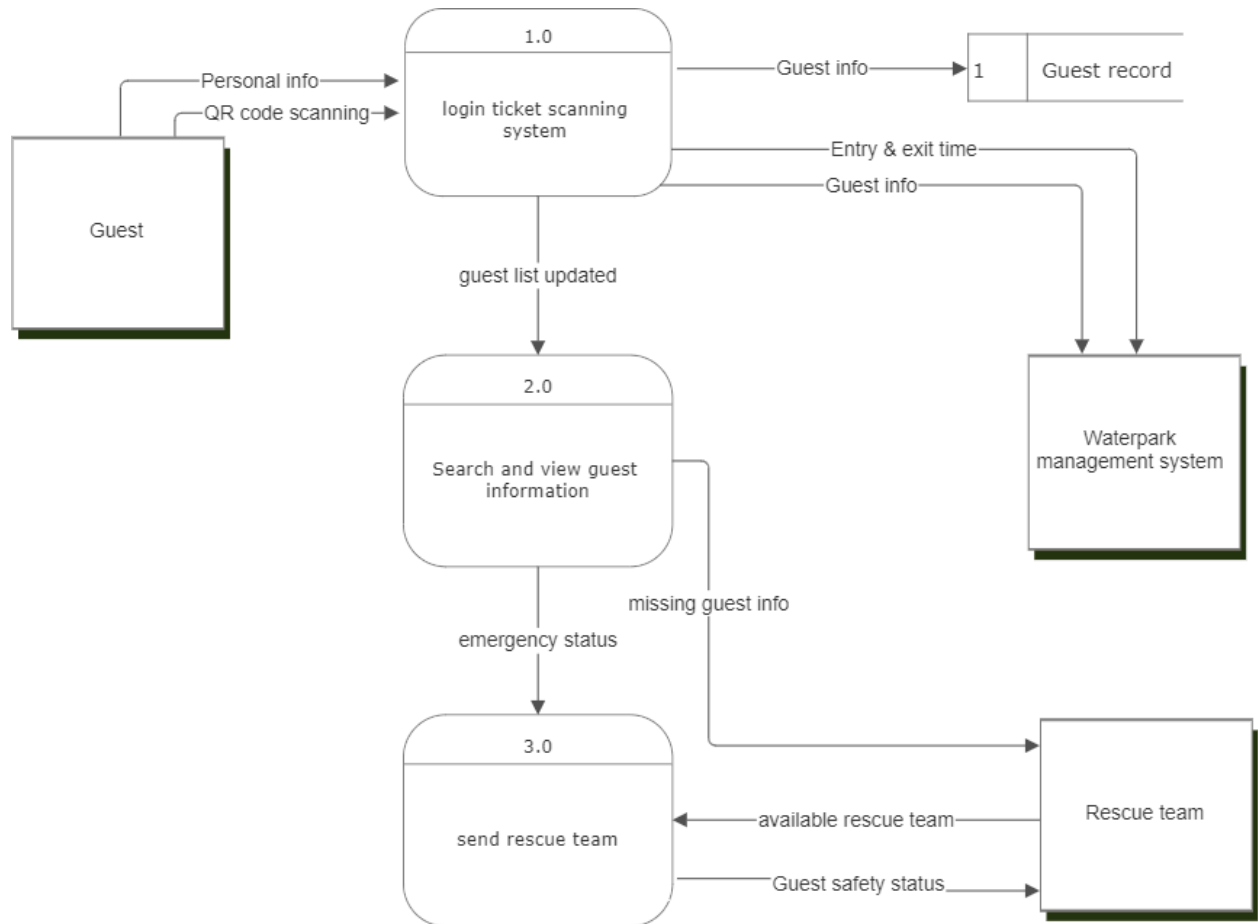
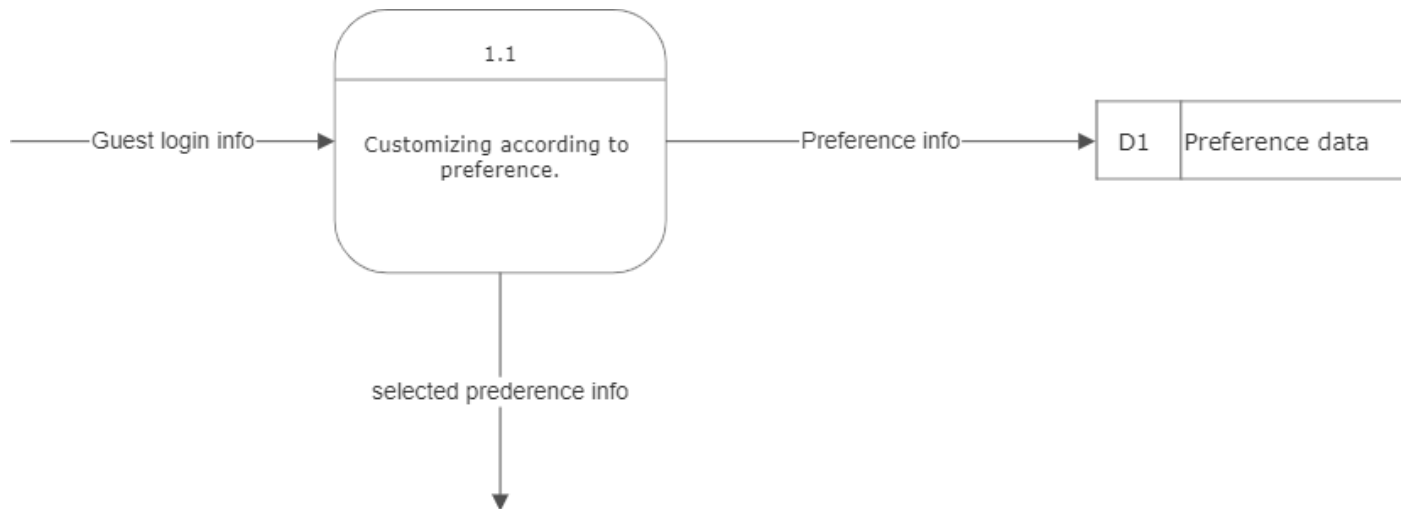


Diagram 0

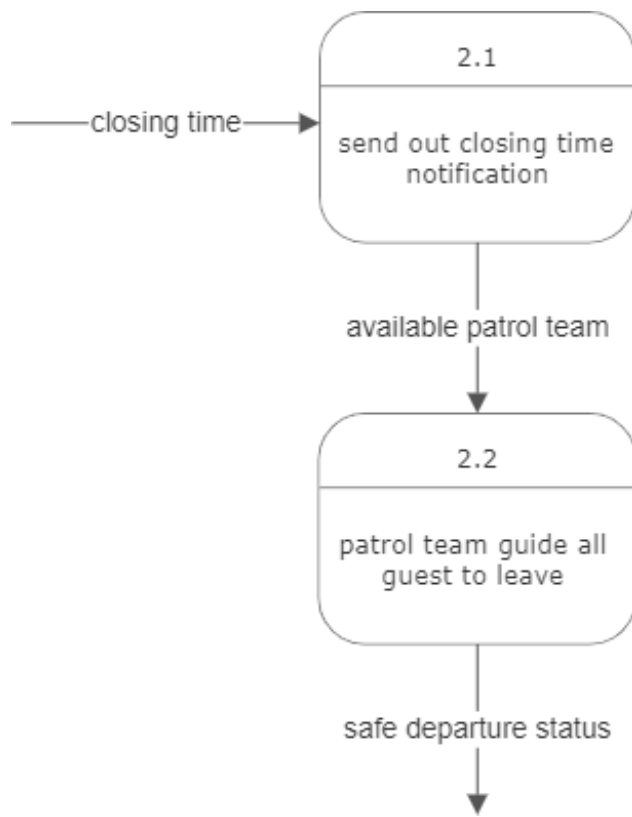


Child diagram

Process 1: Login to Easytrack



Process 2: search and view guest information



6.0 System Analysis and Specification

6.1 Logical DFD TO-BE system (Context Diagram, Diagram 0, Child)

Context Diagram

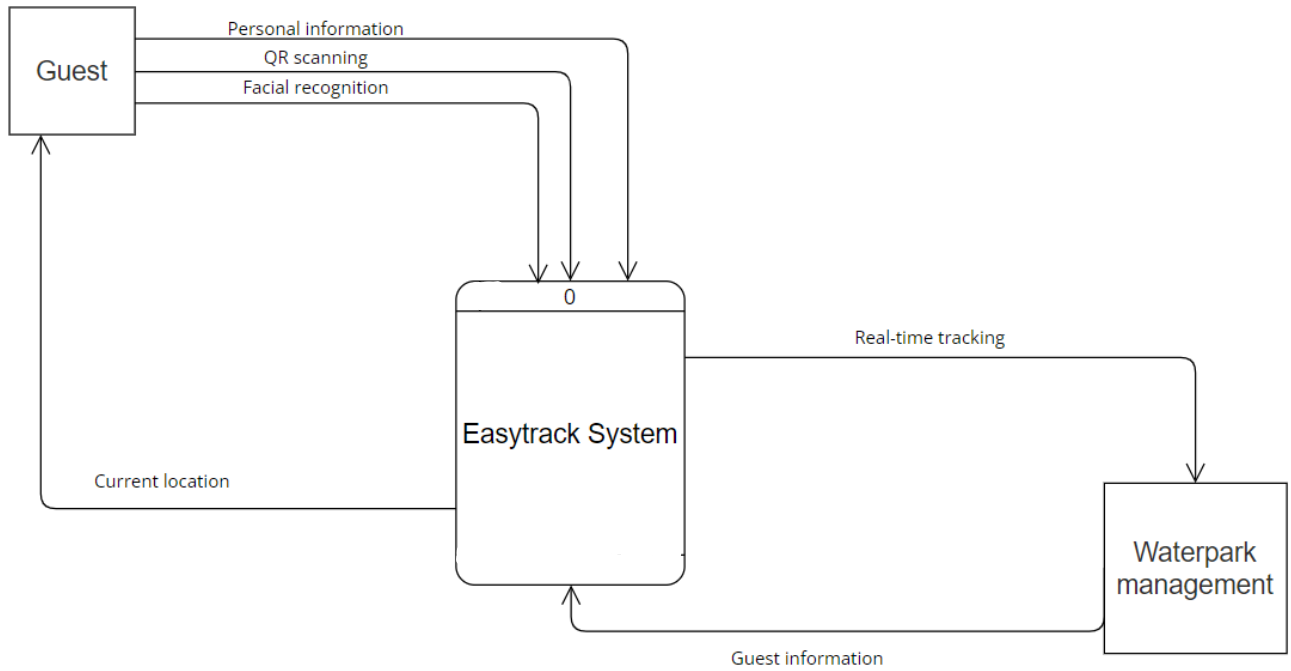
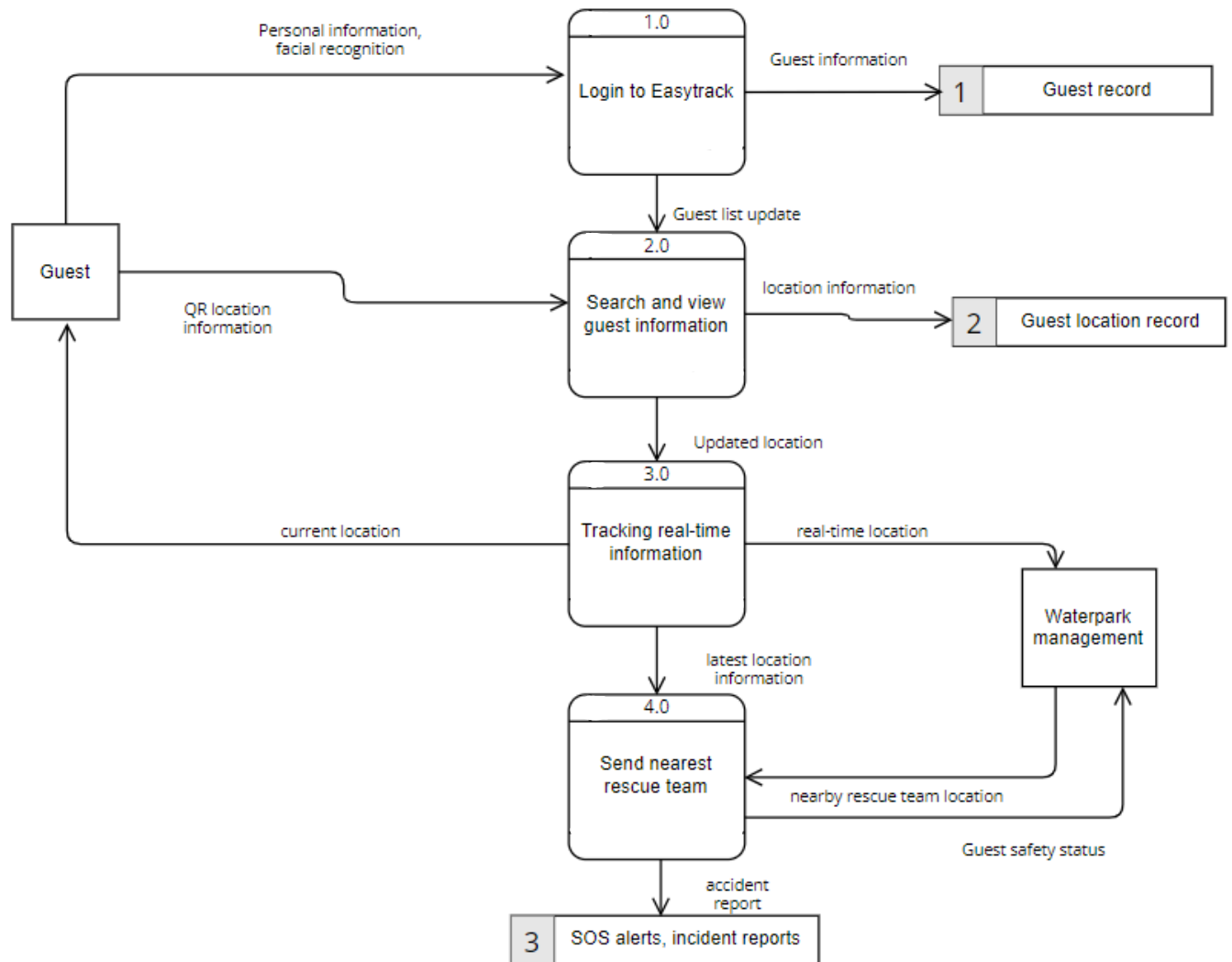
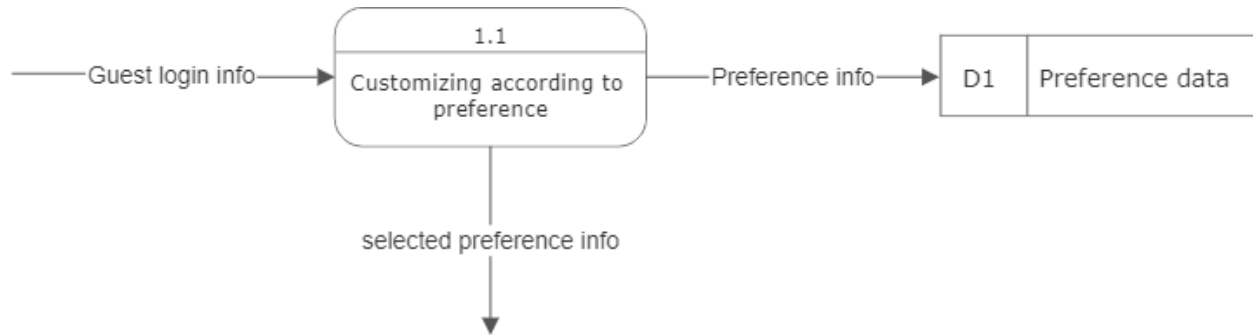


Diagram 0

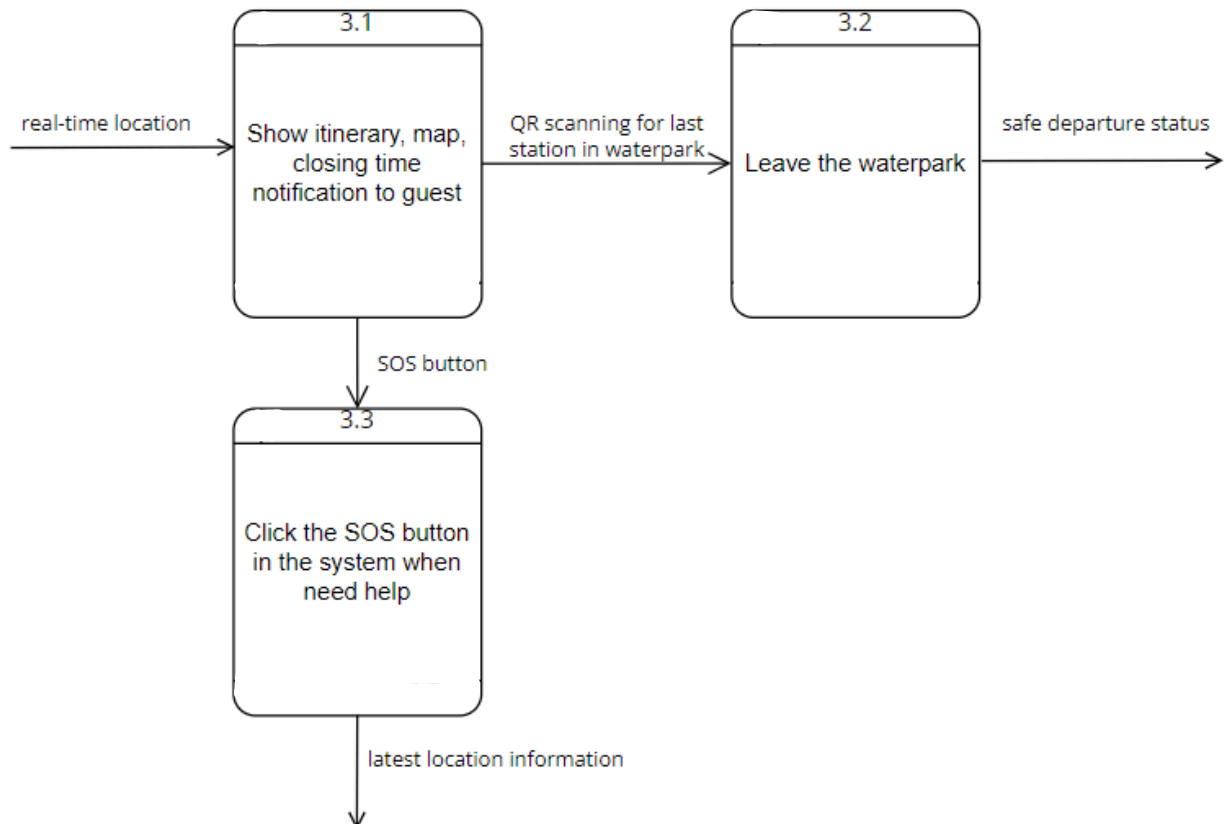


Child diagram

Process 1: Login to Easytrack



Process 3: Tracking real-time information



6.2 Process Specification (based on Logical DFD TO-BE)

Structured English is used to model and illustrate the process of the Logical TO-BE system based on the Logical DFD TO-BE.

6.2.1 Manage Guest Information

DO

 READ login credentials

 BEGIN IF

 IF received valid credentials

 Access Easytrack system

 Customize system settings based on user preferences

 Select important options (Name, Phone number, Date, Time record, Real-time tracking)

 Store customized settings in database

 ELSE continue

 END IF

 IF search for guest information

 Read guest information from database using search input

 Display guest information on screen

 ELSE continue

 END IF

 IF real-time tracking enabled

 Click tracking link

 Start tracking guest's location

 Display real-time location information on screen

 ELSE continue

 END IF

END

6.2.2 Record Guest Entry and Movement

```
DO
READ guest-provided information
BEGIN IF
IF valid information provided
    Store guest information in Easytrack
    Scan QR code at entry
    Record guest entry time and information in system
ELSE continue
END IF
IF guest moves within park
    Scan QR code at various locations
    Record location and time in system
    Update real-time tracking information
ELSE continue
END IF
IF guest presses SOS button
    Retrieve guest's real-time location
    Send alert to rescue team with guest's location and SOS signal
    Display guest's location and status to rescue team
ELSE continue
END IF
IF closing time approaching
    Notify guests of closing time
    Display exit instructions on screen
ELSE continue
END IF
IF closing time
    Ensure all guests have exited
    Record guest exit time
    Update system status to reflect guest exit
ELSE continue
END IF

END
```

6.2.3 Locate Missing Guests

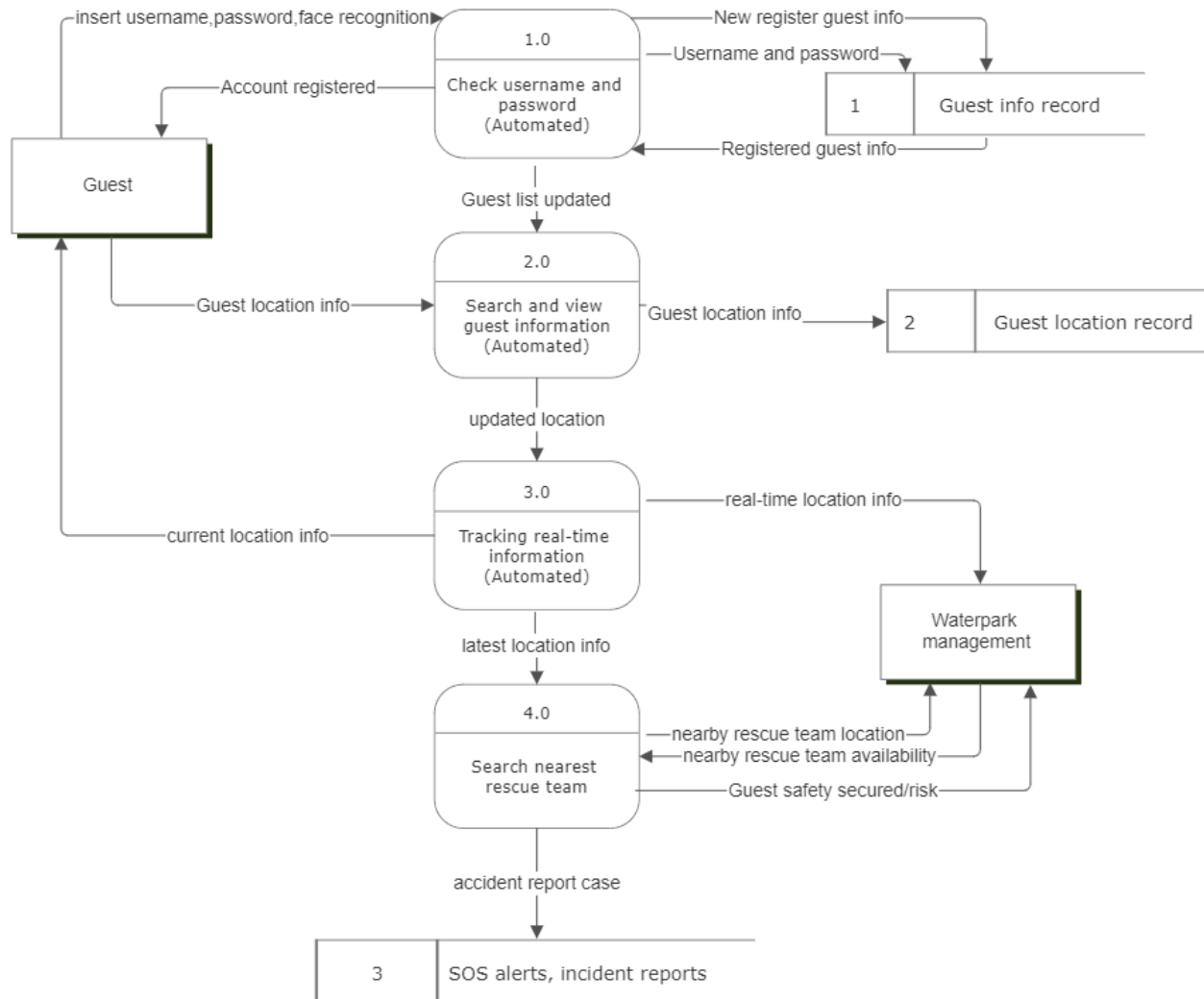
```
DO
READ patrol schedule
BEGIN IF
IF patrolling area
    Monitor guest activity
IF SOS button pressed
    Retrieve guest's real-time location from Easytrack
    Alert rescue team with guest's location and SOS signal
    Display guest's location and status to the rescue team
ELSE continue
END IF
IF closing time
    Ensure all guests have exited
    Record rescue team exit time
    Update system status to reflect team exit
ELSE
Continue
END IF

END
```

7.0 Physical System Design

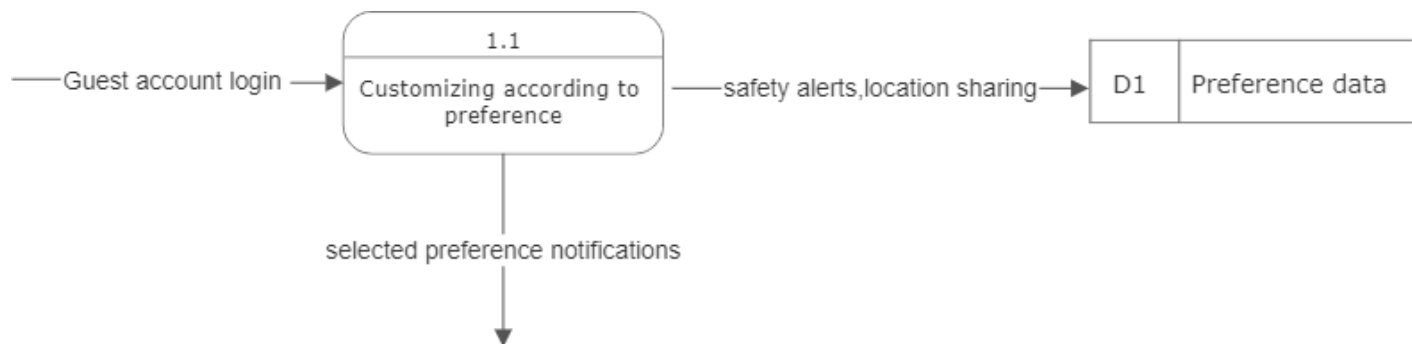
7.1 Physical DFD TO-BE system

7.1.1 Level 0 Diagram

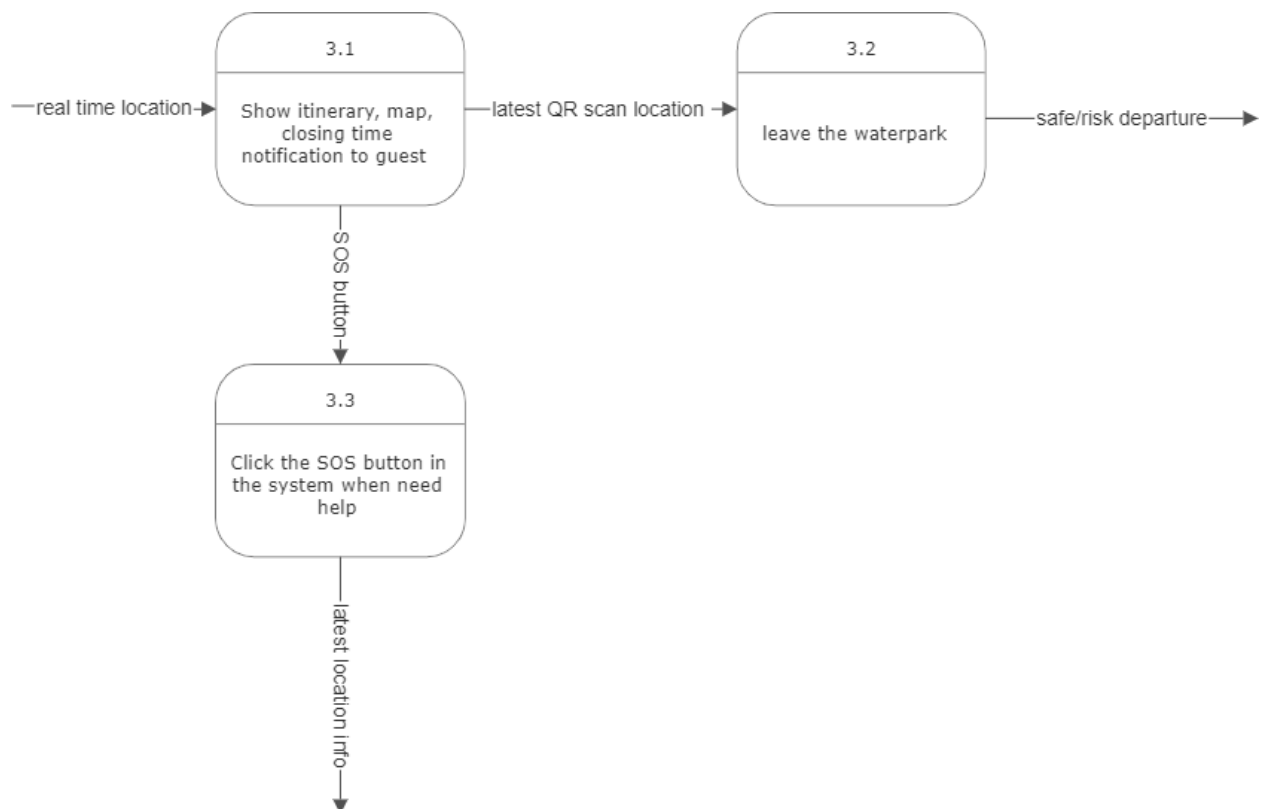


7.1.2 Child diagram

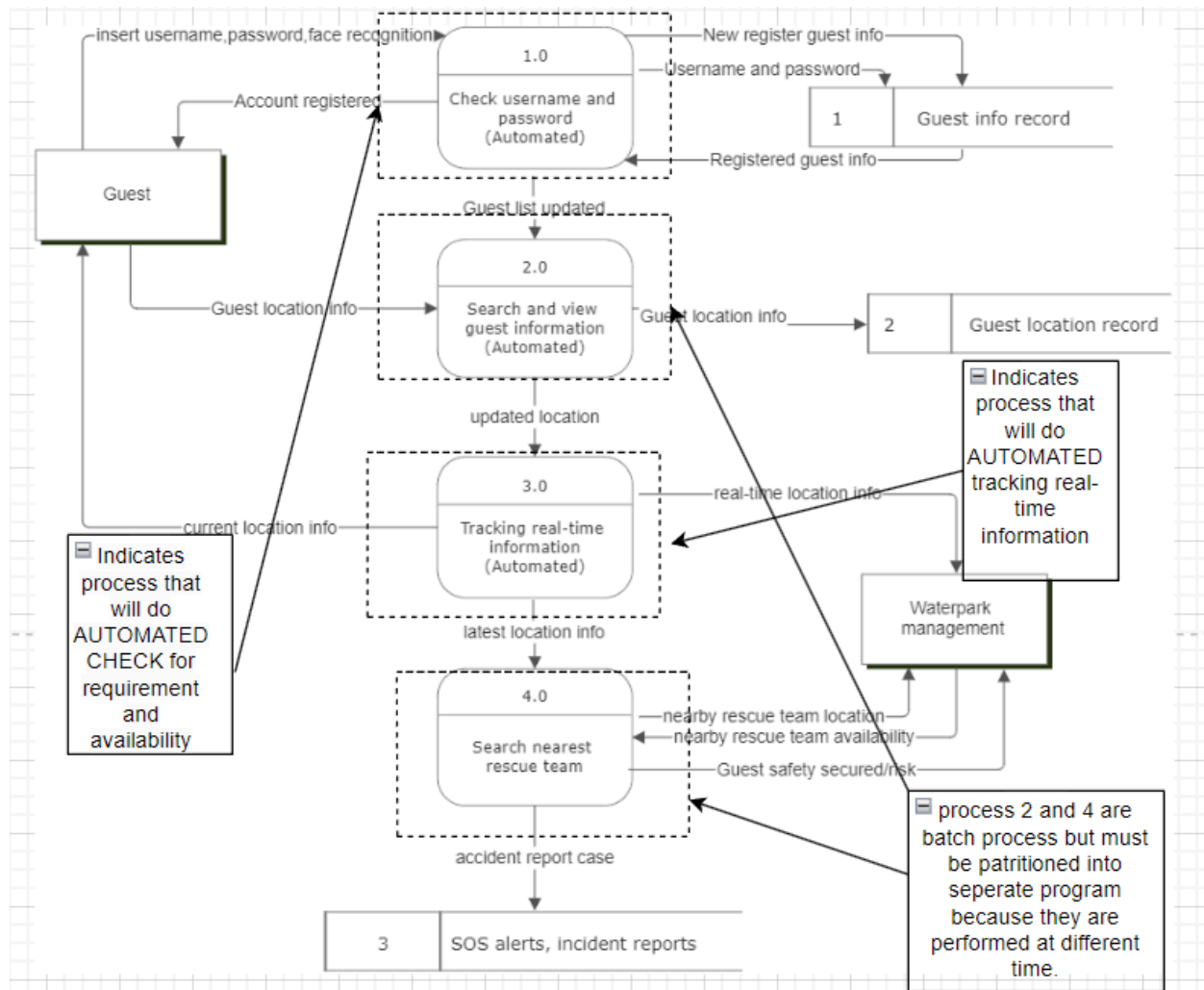
Process 1: Login to Easytrack



Process 3: Tracking real-time information

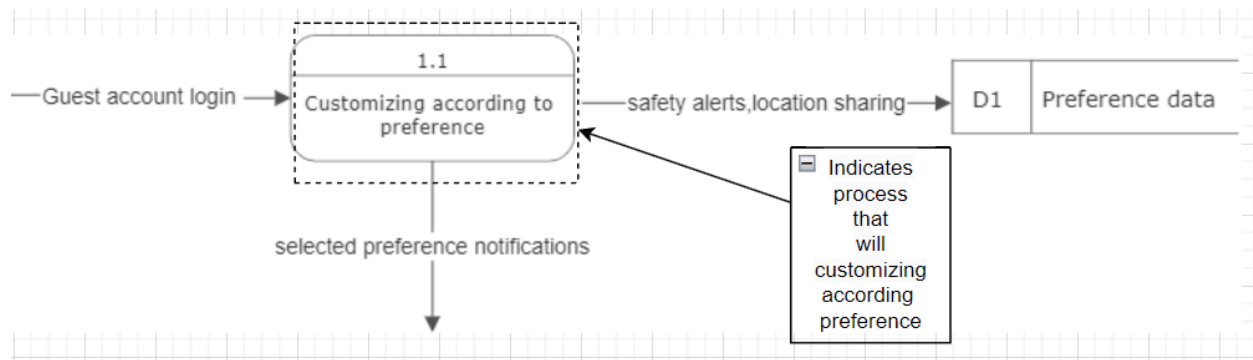


7.1.3 Partitioning Diagram 0

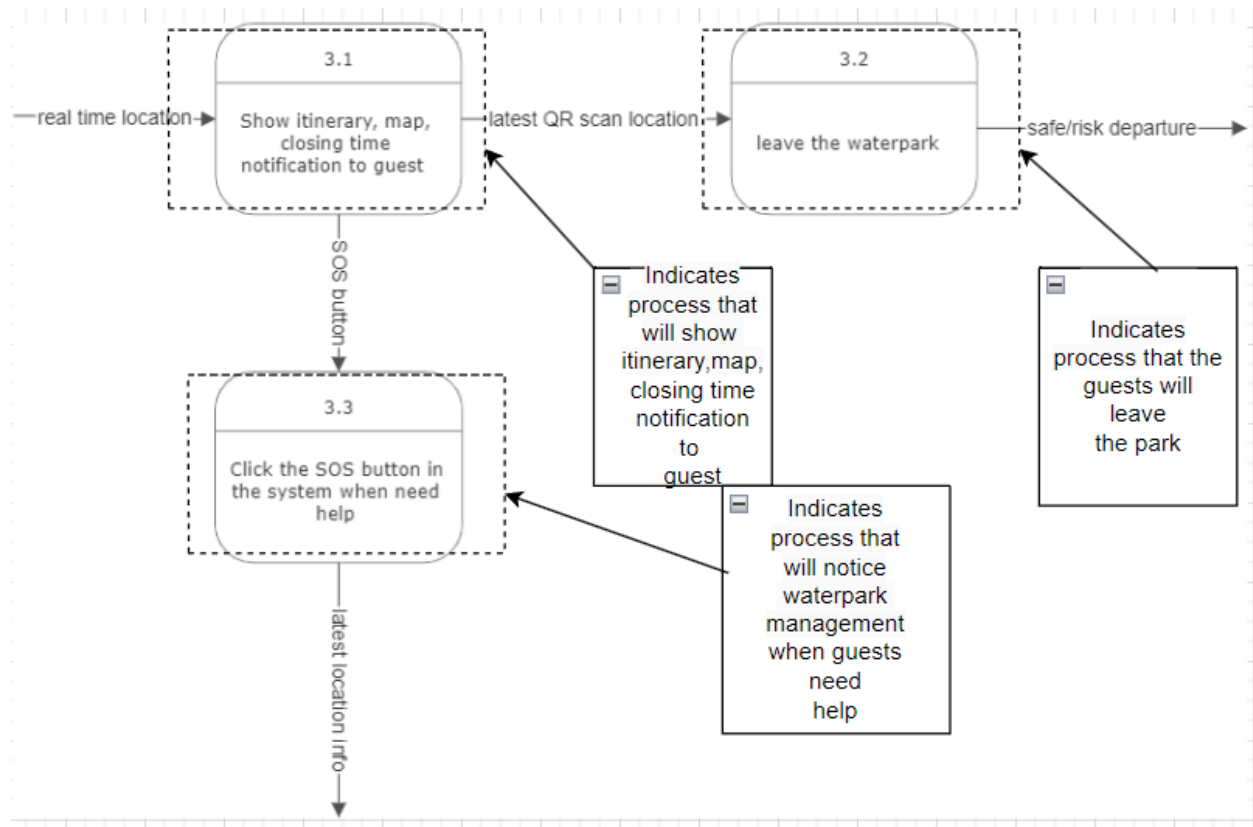


Child diagram

Process 1: Login to Easytrack



Process 3: Tracking real-time information



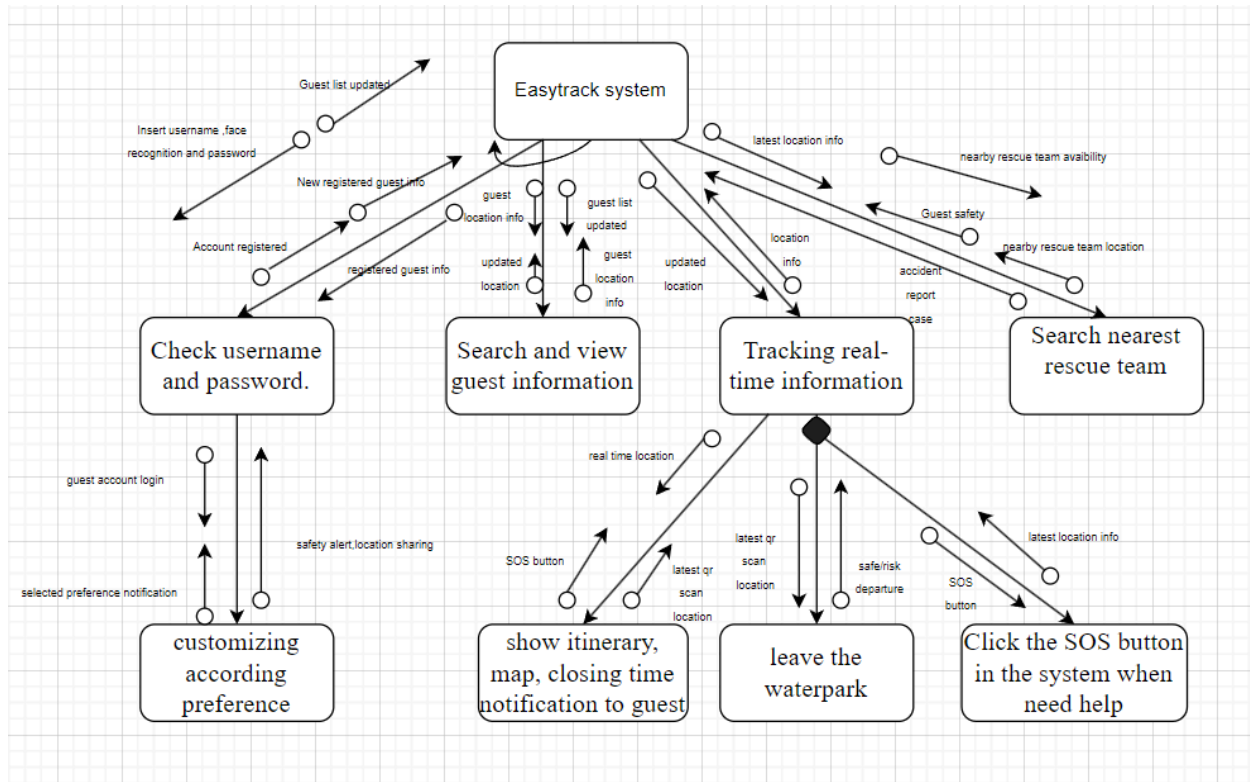
7.1.4 CRUD Matrix

| Activity | Guest info | Guest location | Incident report | Rescue team location |
|-----------------------------------|------------|----------------|-----------------|----------------------|
| Guest login | R | R | | |
| Search and view guest information | CU | CU | | |
| SOS alert | | | C | |
| Tracking real-time information | | RU | | |
| Search nearest rescue team | | | | R |
| Leave theme park | D | D | | |

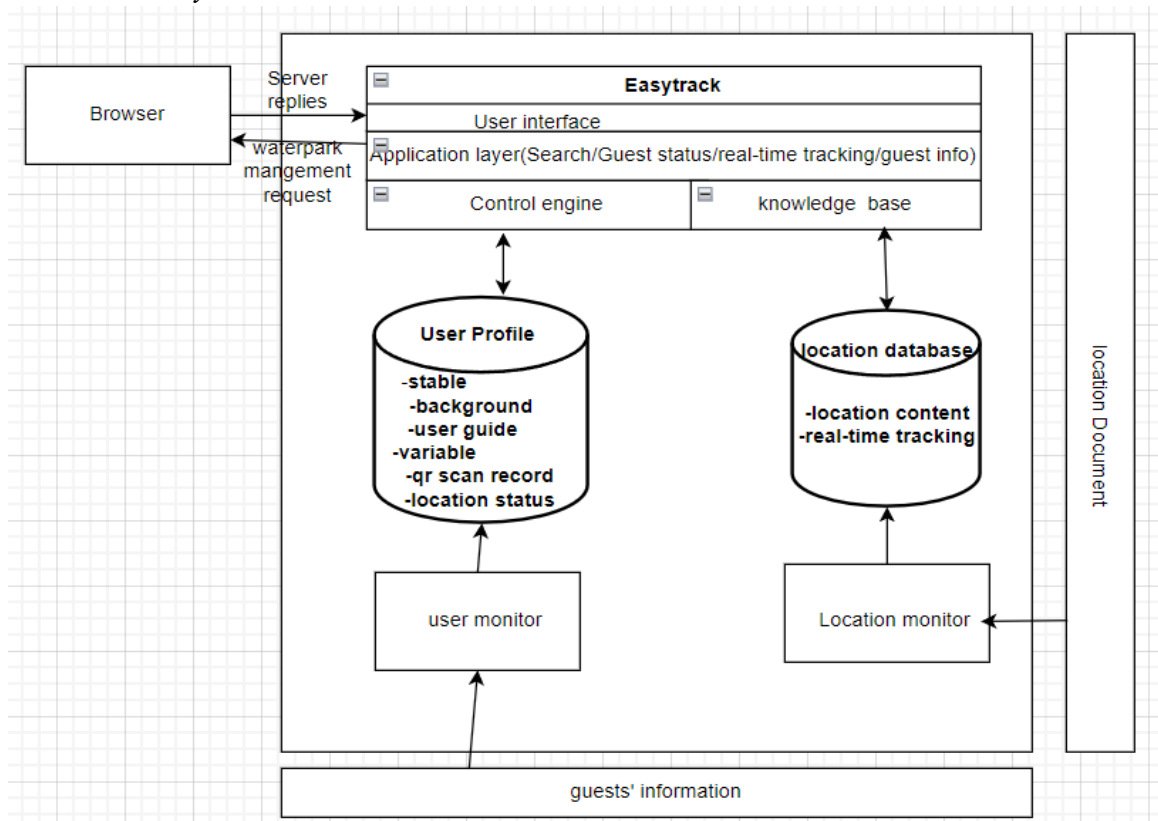
7.1.4 Event Response Table

| Event | Source | Trigger | Activity | Response | Destination |
|---|----------------------|---|---|---------------------------------|----------------------|
| Guest login | Guest | Insert username, password, face recognition | Check username and password. Account registered | Account registered | Guest |
| Guests search and view guest information | Guest | Guest location info | Search and view guest information | | |
| Guests use qr scan location | Guest | Real-time location info | Tracking real-time information | Real-time location info | Waterpark management |
| Waterpark management send guests' location to the nearest rescue team | Waterpark management | Nearby rescue team location Guest safety secured | Search nearest rescue team | Nearby rescue team availability | Waterpark management |

7.1.4 Structure Chart



7.1.5 System Architecture



8.0 System Wireframe

8.1 Input Design

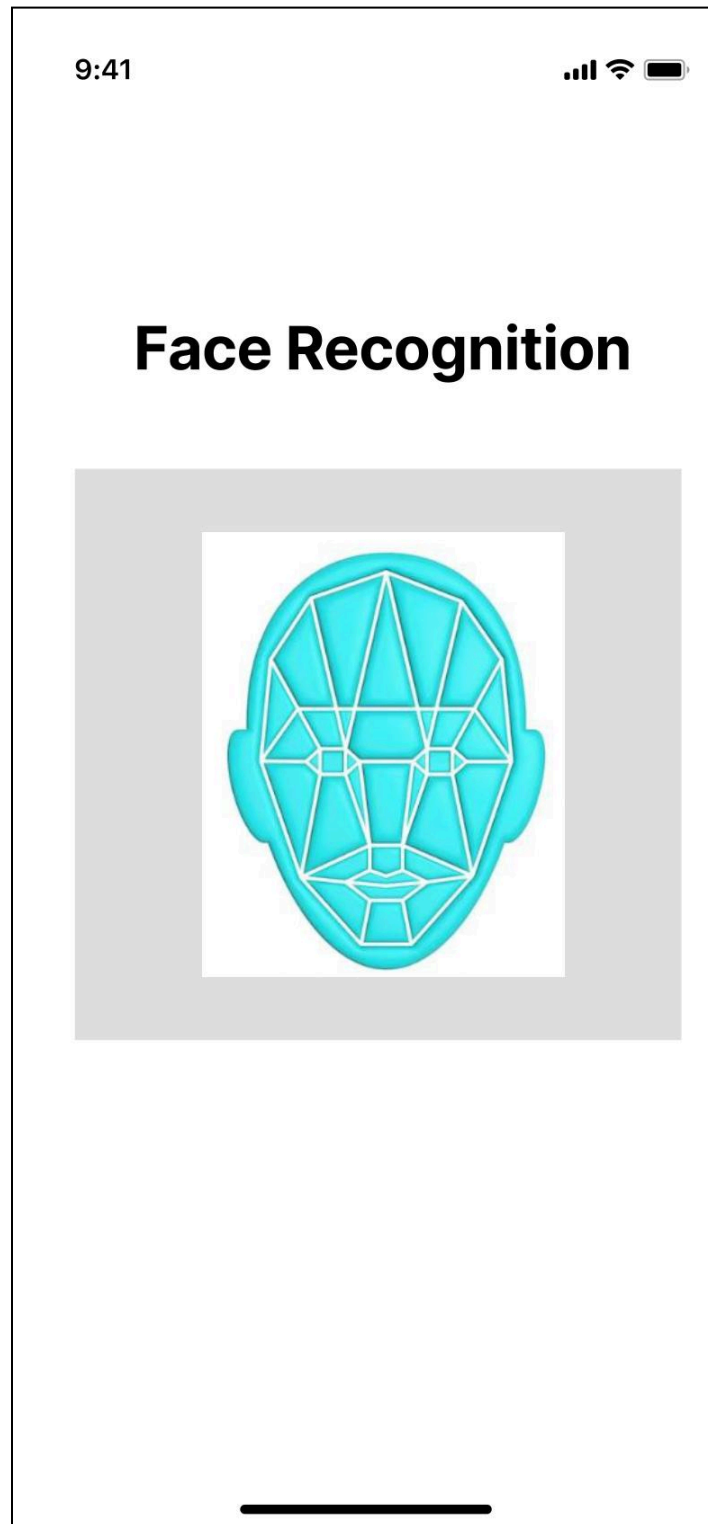
8.1.1 Guest's view

1) Login page

The wireframe shows a mobile app login screen. At the top, the status bar displays the time 9:41, signal strength, Wi-Fi, and battery icons. The app's name, "Easytrack", is centered in a large, bold font. Below it, the word "Login" is centered in a bold font, followed by the instruction "Enter your username for this app". There are two input fields: "Username" and "Password", each with a light gray border and rounded corners. Below the password field is a solid black button with the word "Login" in white. At the bottom, a line of text reads: "By clicking continue, you agree to our Terms of Service and Privacy Policy".

Description: Guests can log in Easytrack from here with a valid username and password.

2) Face recognition



Description: Guests need to complete face reading to complete his/her profile setup.

3) Main menu



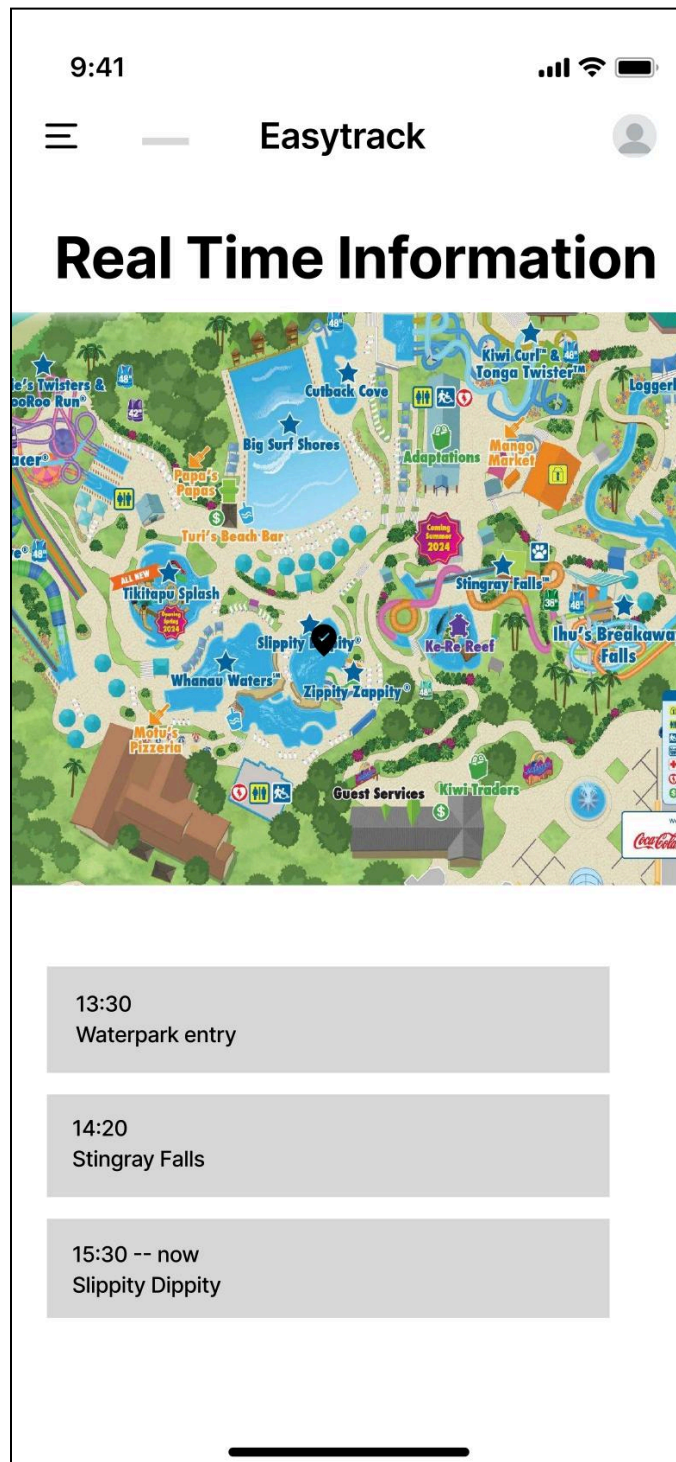
Description: After user log in to the system, there will be provided 5 functions, which are profile, scan QR location, real-time notification, SOS button and exit.

4) Scan QR location



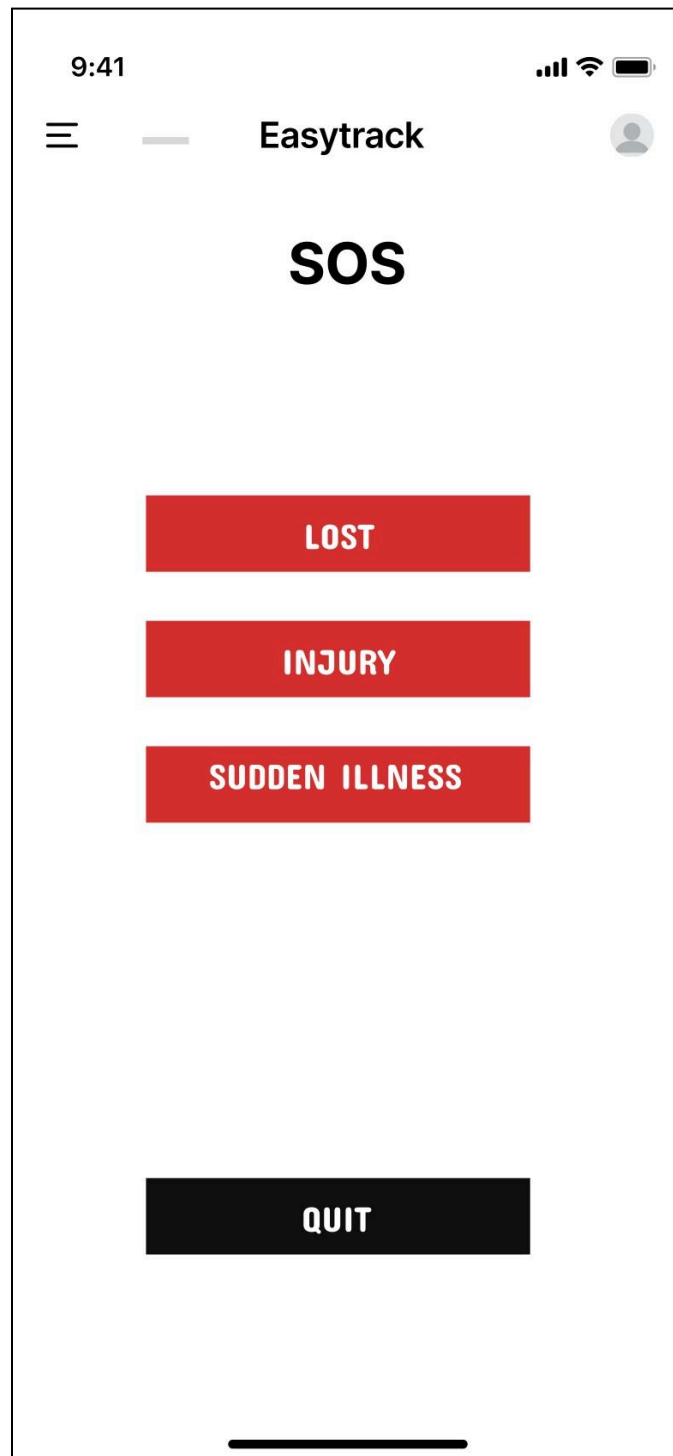
Description: Shown a scanner for guests to scan the latest visited location in the waterpark.

5) Real-time information



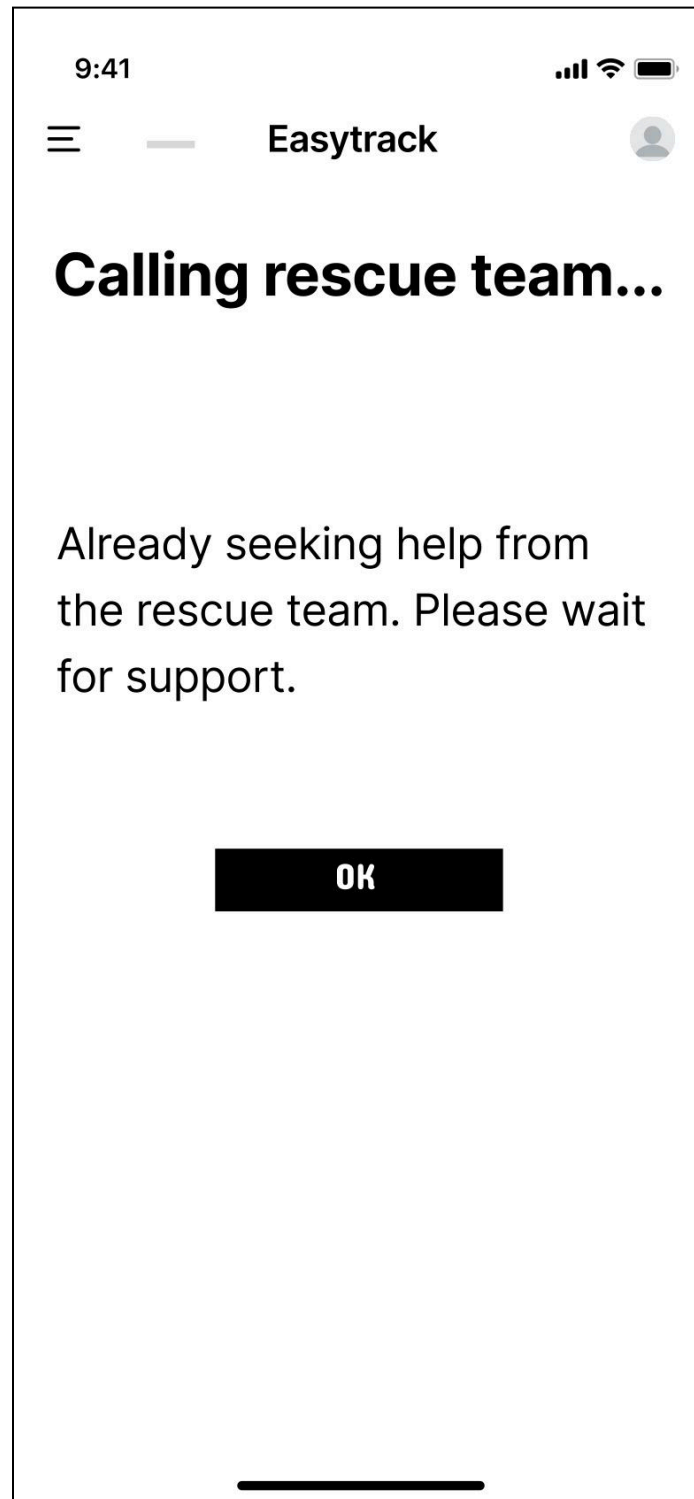
Description: Show guest's itinerary and map of the waterpark.

6) SOS Button



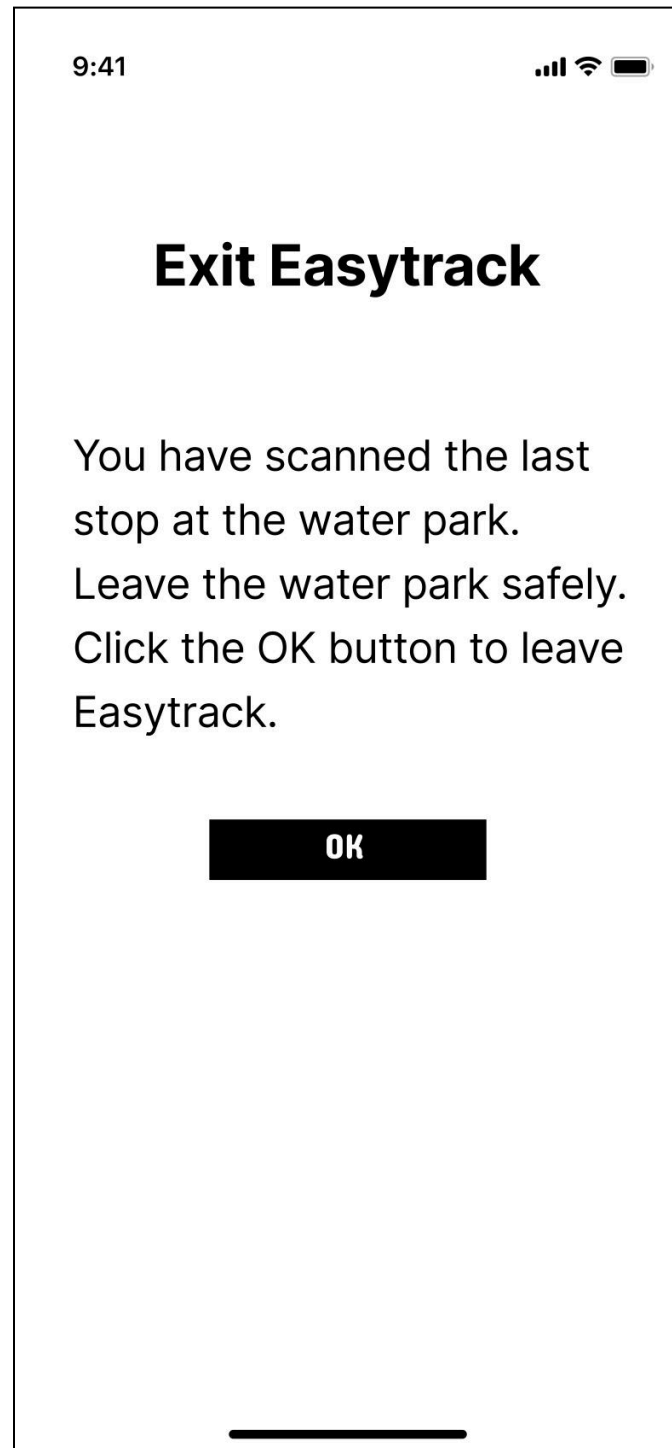
Description: Guests click the SOS button when they need help.

7) Calling rescue team



Description: Show to the guest that the system had called for help.

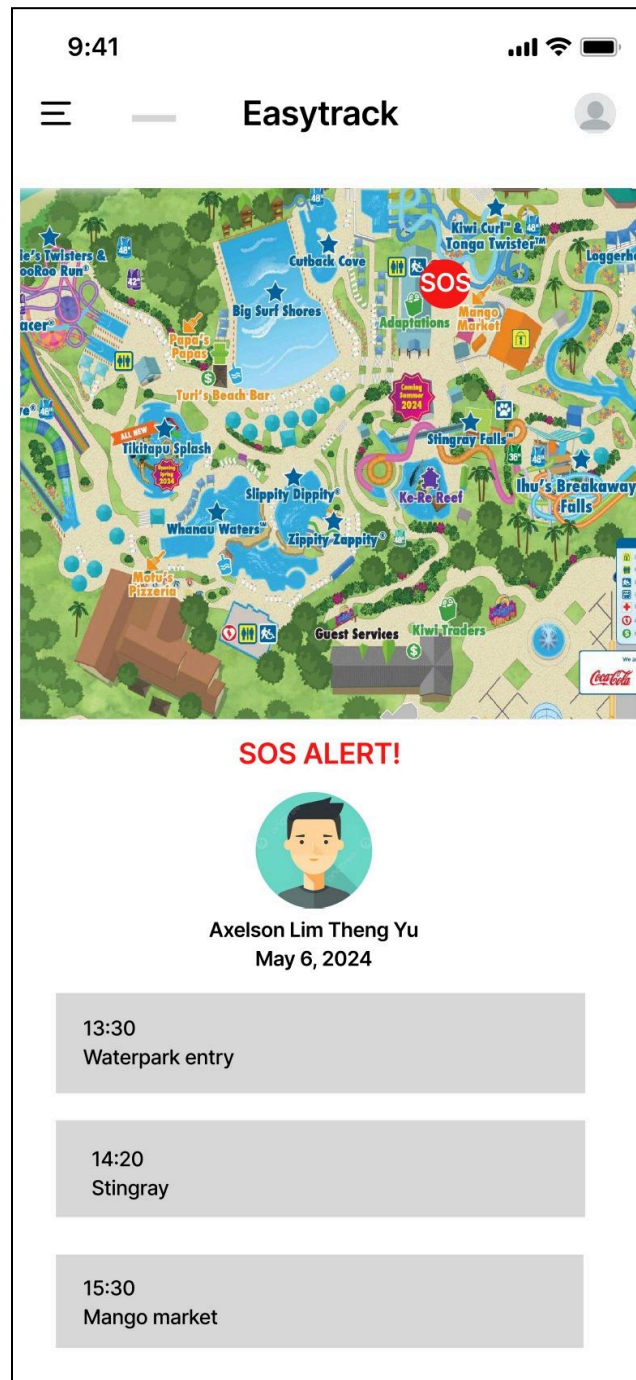
8) Exit system



Description: Guests will exit the system when they are leaving from the waterpark and scanning the last QR code of the entrance.

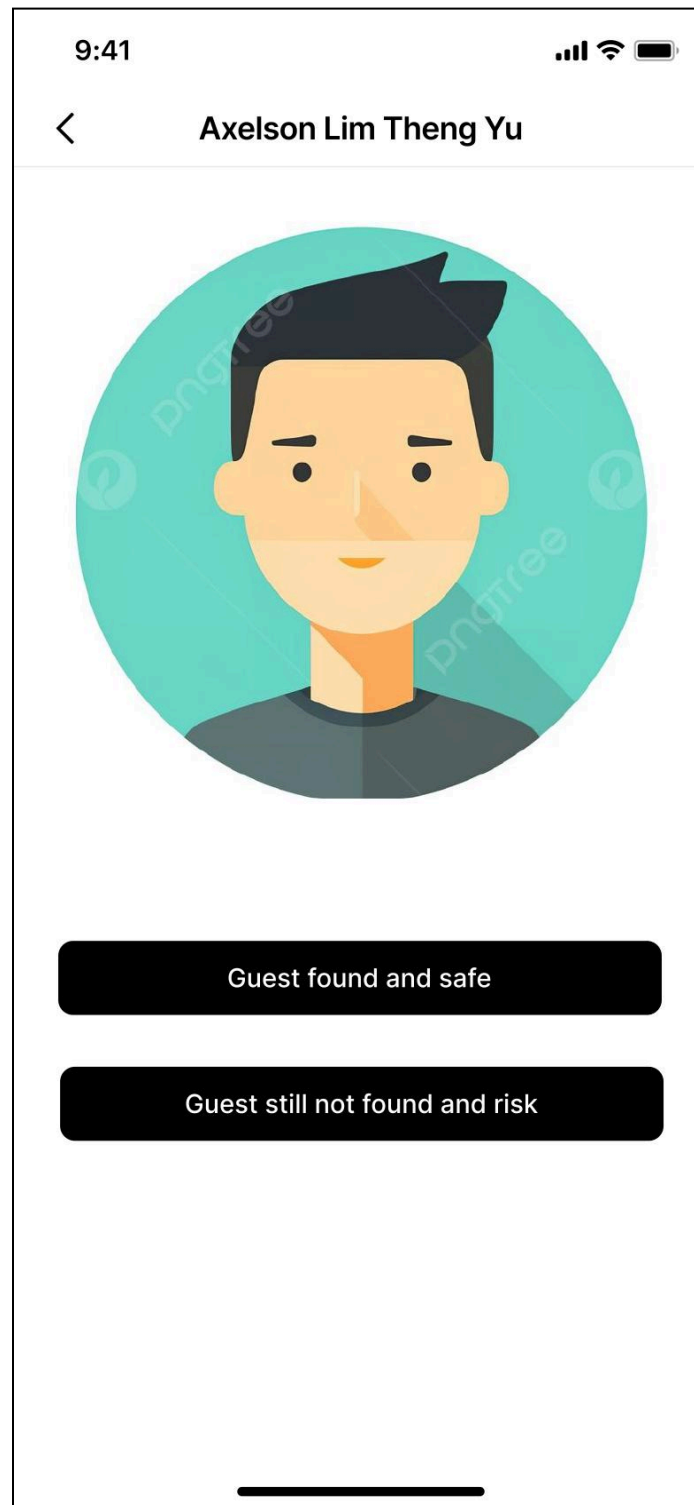
8.1.2 Rescue teams' view

1) SOS notification



Description: The nearest rescue team will receive SOS notification and guest's location

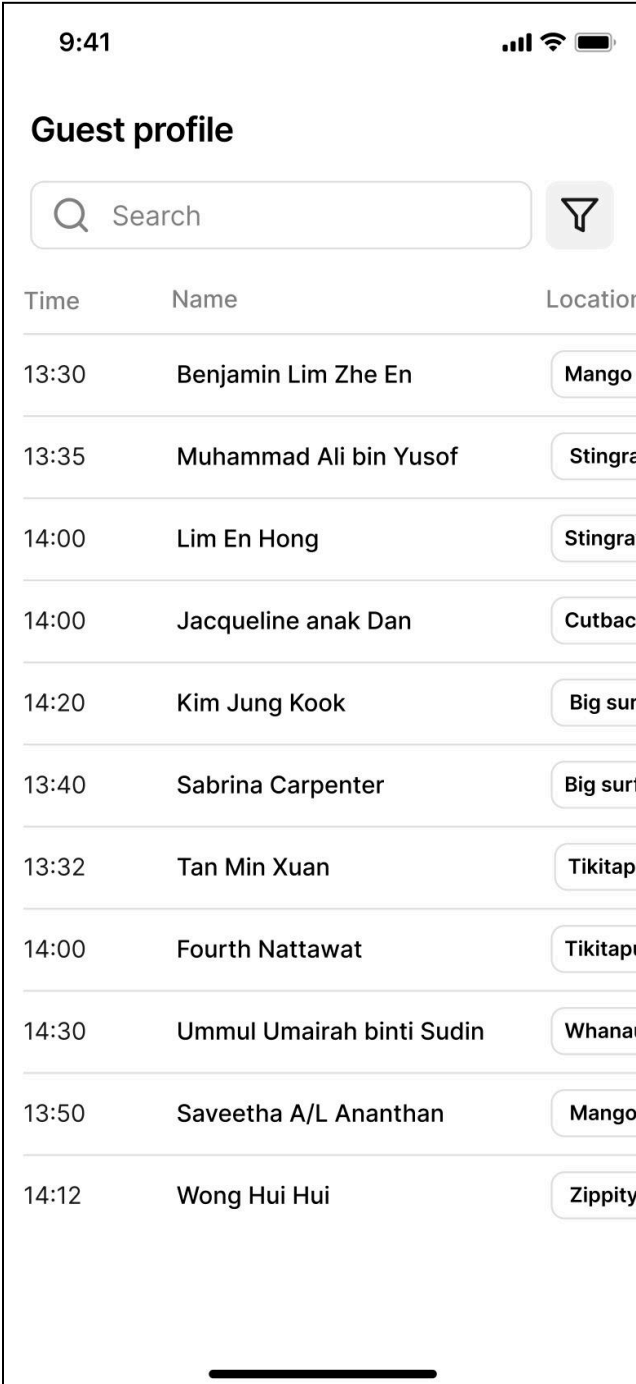
2) Update guest status



Description: After the rescue team gives help to the guest, they will update the guest status.

8.1.3 Management team' view

1)Guests' information

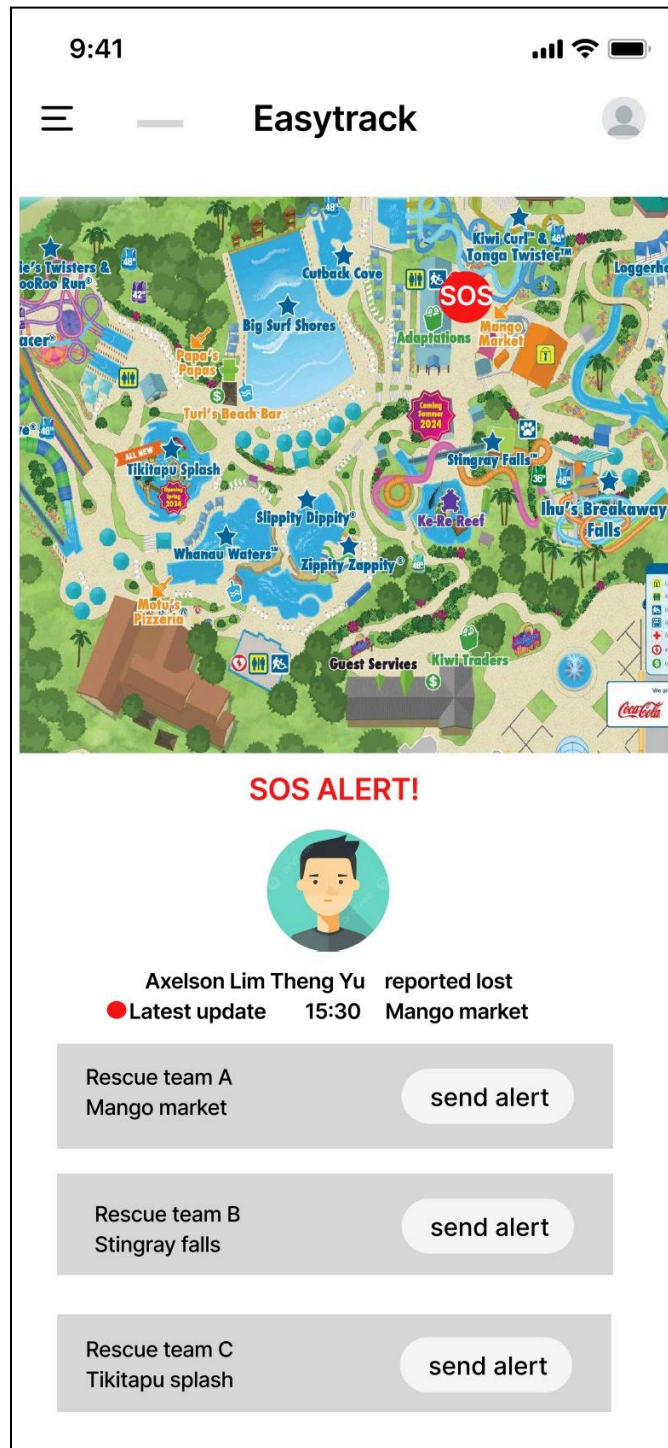


The screenshot shows a mobile application interface for a management team. At the top, the status bar displays the time 9:41, signal strength, Wi-Fi, and battery levels. Below this is a header titled 'Guest profile'. Under the header is a search bar with a magnifying glass icon and the text 'Search'. To the right of the search bar is a filter icon. Below the search bar is a table with three columns: 'Time', 'Name', and 'Location'. The table contains ten rows of guest information. The 'Location' column values are truncated on the right side of the screen.

| Time | Name | Location |
|-------|---------------------------|----------|
| 13:30 | Benjamin Lim Zhe En | Mango |
| 13:35 | Muhammad Ali bin Yusof | Stingray |
| 14:00 | Lim En Hong | Stingray |
| 14:00 | Jacqueline anak Dan | Cutback |
| 14:20 | Kim Jung Kook | Big surf |
| 13:40 | Sabrina Carpenter | Big surf |
| 13:32 | Tan Min Xuan | Tikitapu |
| 14:00 | Fourth Nattawat | Tikitapu |
| 14:30 | Ummul Umairah binti Sudin | Whanau |
| 13:50 | Saveetha A/L Ananthan | Mango |
| 14:12 | Wong Hui Hui | Zippity |

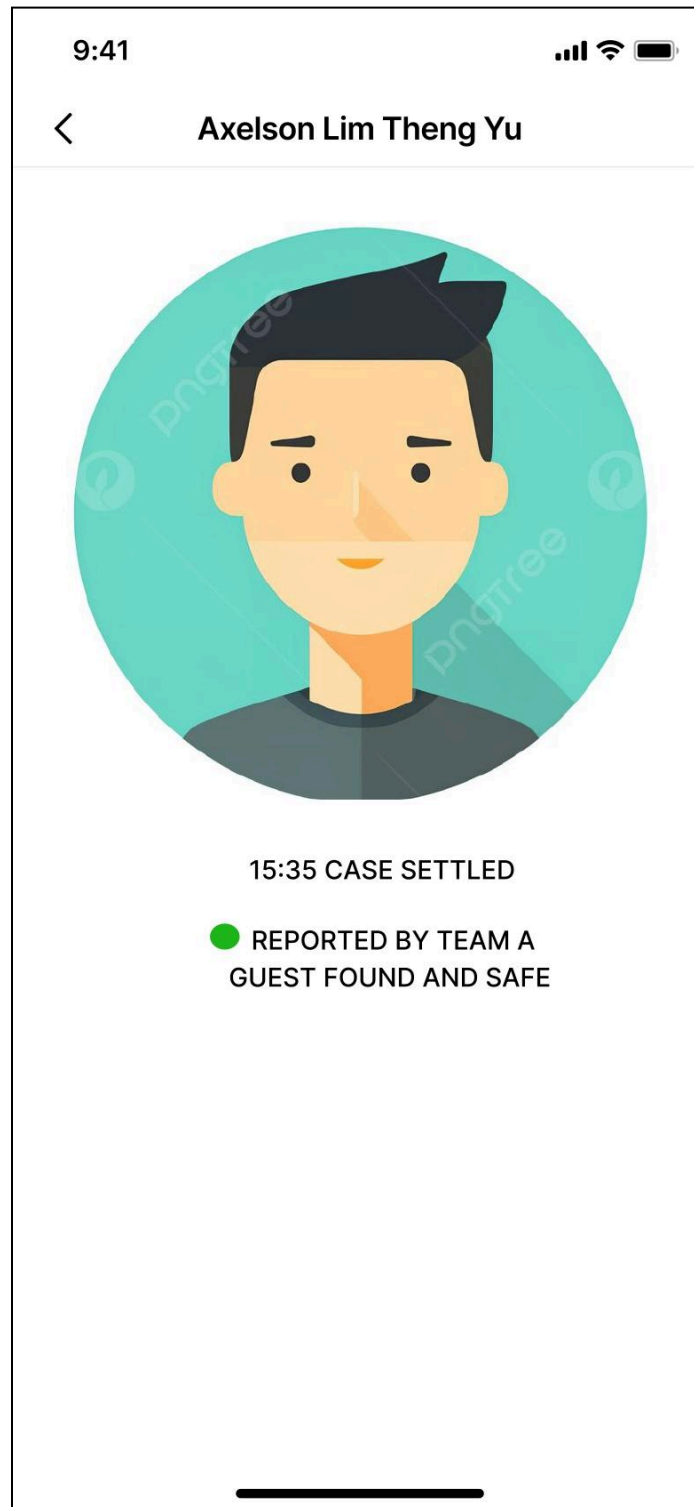
Description: Management team can search for the guests' information.

2) Receive SOS information and notify nearest rescue team



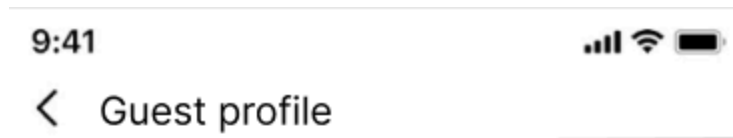
Description: Management team receive SOS information from guest and notify nearest rescue team to give help to the guest.

3) Receive guest status and location from rescue team



Description: Management team receive guest status and location from rescue team

8.2 OutputDesign
Guest info



Name:Axelson Lim Theng Yu

Phone number:[019-1234567](tel:019-1234567)

email address:asd@gmail.com

Total visit:6







Total spend:RM 599.91

Last visit date: 12/3/23

Last visit venue:Mango market

real-time tracking:asdsad.com

Guest profile report

| |  Name |  Phone.number |  email.address |  Total.visit |  Total.spend.RM. |  Last.visit.date |  Last.visit.venue |  real.time.tracking |
|---|--|--|---|---|---|---|--|--|
| 1 | Lim hui hui | 123-4567890 | asdsd@gmail.com | 3 | 234 | 12/3/2022 | Mango market | asdasd.com |
| 2 | asdfq | 345-1234567 | asdfq@gmail.com | 2 | 123 | 12/3/2022 | Stingray Fall | asdasd.com |
| 3 | asd asd | 123-1231232 | lasdlss@gmail.com | 6 | 876 | 12/3/2022 | Stingray Fall | asdasd.com |
| 4 | wer ewr | 234-2342343 | asdsjld@gmail.com | 3 | 675 | 12/3/2022 | Mango market | asdasd.com |
| 5 | qwe qwe | 123-1232345 | ayuisd@gmail.com | 2 | 678 | 12/3/2022 | Kiwi Traders | asdasd.com |
| 6 | lkj jkl | 546-4564565 | asyuiy@gmail.com | 12 | 2342 | 12/3/2022 | Kiwi Traders | asdasd.com |
| 7 | gvc | 789-8997898 | ertd@gmail.com | 5 | 678 | 12/3/2022 | Mango market | asdasd.com |
| 8 | klhtfh | 789-8908909 | tyutyu@gmail.com | 3 | 236 | 12/3/2022 | Whanau waters | asdasd.com |
| 9 | sadkjn | 345-5676876 | cbvd@gmail.com | 4 | 747 | 12/3/2022 | Mango market | asdasd.com |

9.0 Summary of proposed system

Thus, our group has a complete analysis and design phase. In this phase, we show how *EasyTrack* can be done by the user. We have done workflow for several scenarios, logical DFD (AS-IS System) and logical DFD TO-BE system. Based on the logical DFD TO-BE system, we have done process specification on three different scenarios which are to manage guest information, to record guest entry movement and to locate guest missing. We have also done a physical DFD TO-BE system to show how the logical processes will be implemented. In the system wireframe part, we provide images that we expect in the user interface from the point of view of the guest and the point of view of the management team member.

10.0 Prototype link

Guest view:

<https://www.figma.com/proto/qhGbpZZS1BxYp8jdXqTEEq/Easytrack?node-id=1-107&t=UE6IaNl3iFwiuIVH-0&scaling=min-zoom&content-scaling=fixed&page-id=0%3A1>

Rescue teams' view:

<https://www.figma.com/proto/qhGbpZZS1BxYp8jdXqTEEq/Easytrack?node-id=16-1019&t=UE6IaNl3iFwiuIVH-0&scaling=scale-down&content-scaling=fixed&page-id=10%3A2>

Management's view:

<https://www.figma.com/proto/qhGbpZZS1BxYp8jdXqTEEq/Easytrack?node-id=43-2&t=UE6IaNl3iFwiuIVH-0&scaling=min-zoom&content-scaling=fixed&page-id=10%3A3>

Guest's profile:

<https://www.figma.com/proto/M6X4SWBQiG9H2AEvUfb1IO/Untitled?node-id=2-2&t=WwfXJ7zR9FM9RIeo-1>

Demo video:

<https://drive.google.com/file/d/1SdvF4JDeEuuVHkaQcV5ycJFtSZ9jsbaV/view>