



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 Information Gathering Process

In order to understand the AS-IS system as much as possible, information gathering is crucial. This information was obtained from Mr. Azimi, a project shareholder, using the AS-IS system and the 32 of our respondents.

4.1 Method used

We used an interview and questionnaire with both closed-and open-ended design questions to gather more information about the Easytrack system. The survey is administered online using Google Forms. The queries, 32 respondent answers, and Mr.Azimi remarks are listed here.

QUESTION 1 : How important do you consider real-time location tracking of guests in a theme park environment?

On a scale of 1 to 5, how important do you consider real-time location tracking of guests in a theme park environment?

32 responses

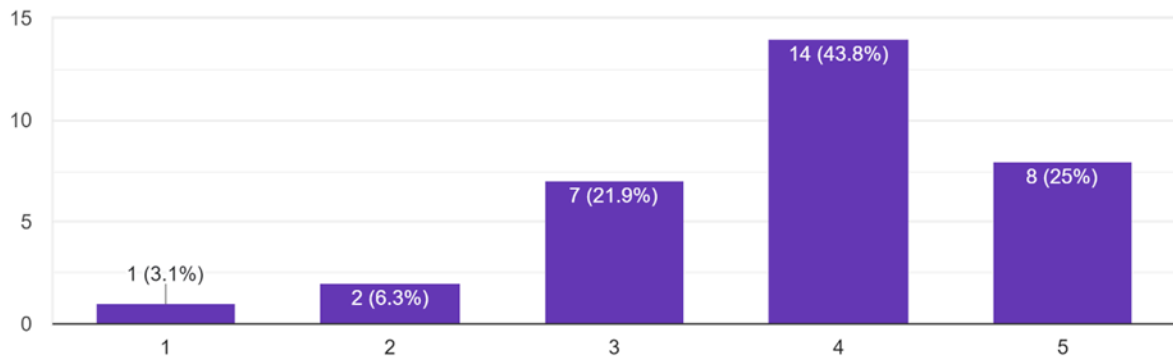


Figure 4.1.1: Bar Graph showing the 32 of our respondents

Based on data above, the majority of our 32 respondents state that real time tracking location of guests in theme parks is important but not absolutely critical. It suggests that a tracker of guests is of significant relevance or has a value, but it may not be essential or indispensable.

QUESTION 2 : Would you find it helpful to have a digital tool that provides personalized recommendations and suggestions based on your interests and location within the theme park?

Would you find it helpful to have a digital tool that provides personalized recommendations and suggestions based on your interests and location within the theme park?

32 responses

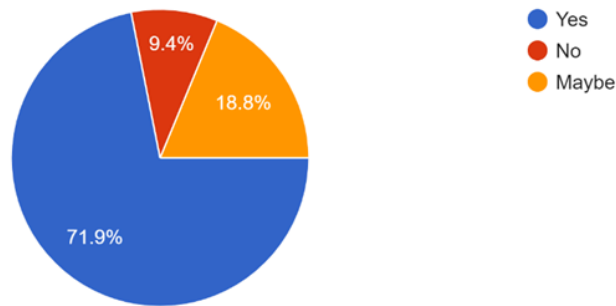


Figure 4.1.2: Pie Chart showing the 32 answers from our respondents

According to this data, 71.9% of 32 respondents find it helpful to have a digital tool that helps the guest in an open theme park. 9.4% states that it isn't very helpful to have a digital tool. The remaining 18.8% can't confirm if it is really helpful when a digital tool provides a feature that helps the guest in a theme park.

QUESTION 3 : Would you feel more secure and confident in navigating a theme park if there was an app that allowed you to share your location with trusted contacts for safety purposes?

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32 responses

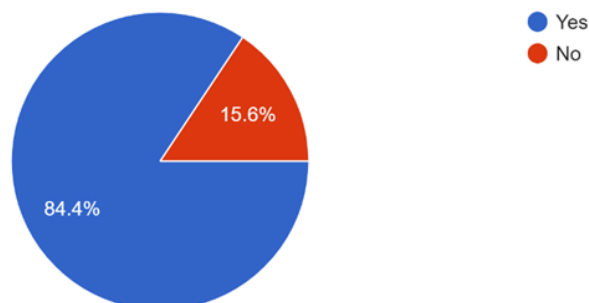


Figure 4.1.3: Pie Chart showing the 32 answers from our respondents

This pie chart shows that 84.4% of respondents boost their confidence and safety when they have an app that tracks the location of guests and the remaining of 15.6% state no. The reason behind this is because when we go to an open theme park, we will encounter a lot of people with different attitudes and probability to encounter an emergency situation. The existence of a track app can lower the probability of something bad happening to guests because it makes it easier for staff members to help if they encounter a tough situation.

QUESTION 4 : How would you rate the importance of privacy and security of your personal data when considering the use of a theme park tracker app.

QUESTION 5 : How much more likely would you be to visit a theme park that offers a tracker app.

QUESTION 6 : Based on your understanding about this app, how likely do you think it is that the EasyTrack app could be adapted for use beyond theme parks, such as in shopping malls, airports, or large events.

Please rate the following statements based on your level of Dislike or Like.

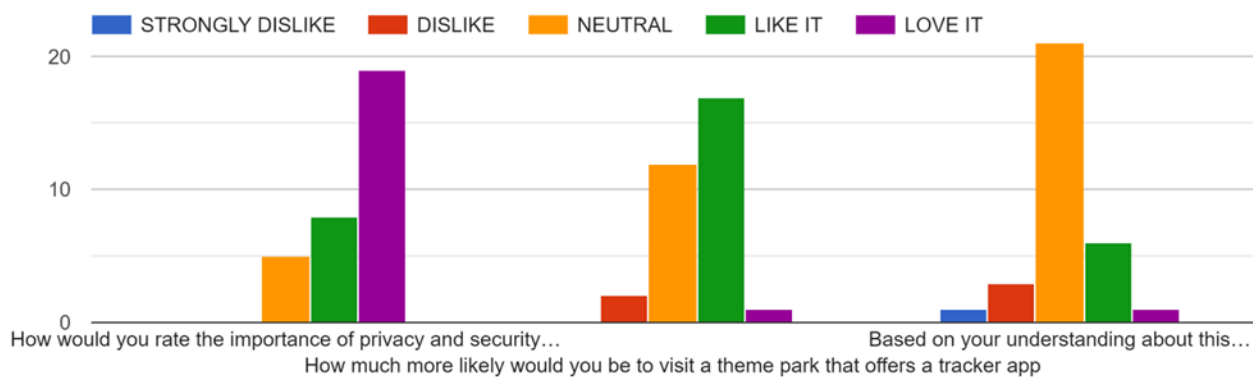


Figure 4.1.4: Bar Chart showing the 32 answers from our respondents

Based on these 3 questions and the answers of 32 respondents, we understand that the importance of privacy and security of guest's personal data when using this tracker app is a very crucial thing. It seems that the willingness of a person to visit a theme park is more likely when the tracker app can be used in it. By this data, we know that the expansion of this app to use by people in daily life can be accepted naturally..

QUESTION 7 : Imagine you're using a theme park tracker app and find yourself in a situation where you need immediate assistance (e.g., lost, feeling unwell). Would you feel more confident seeking help knowing that the app allows you to share your precise location with park staff?

Imagine you're using a theme park tracker app and find yourself in a situation where you need immediate assistance (e.g., lost, feeling unwell). Would you share your precise location with park staff?

32 responses

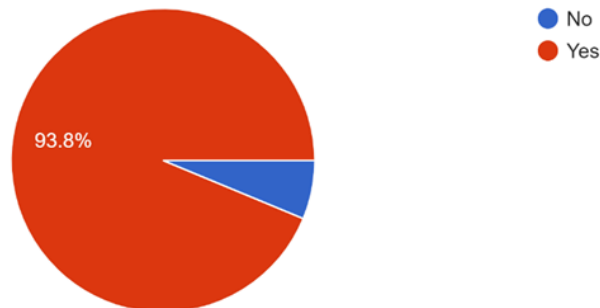
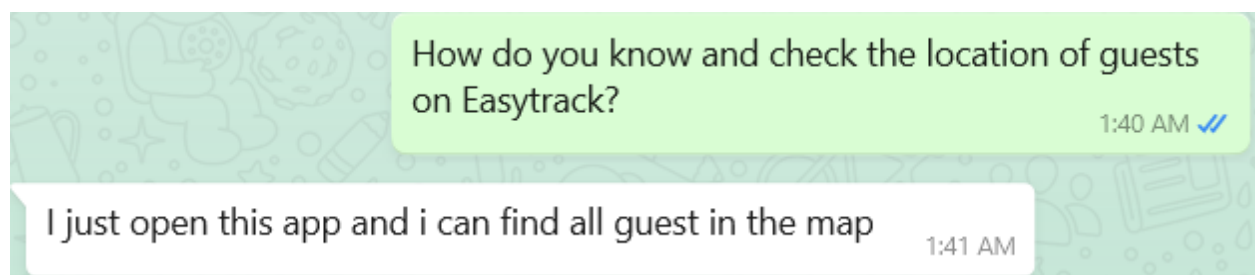


Figure 4.1.5: Pie Chart showing the 32 answers from our respondents

According to this pie chart, 30 from 32 of our respondents feel more confident to use this tracker app to ask for help when they need it. This shows the positive impact of this tracker app and time management for staff members.

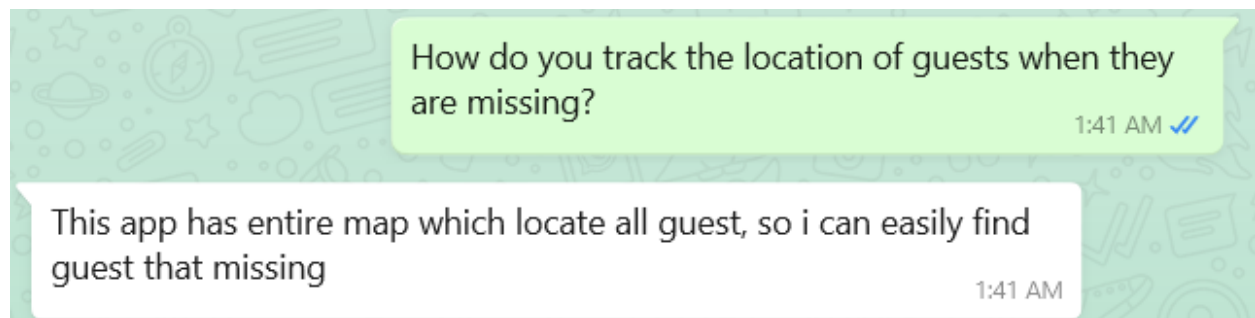
4.2 Interviewing

Question 1 : How do you know and check the location of guests on Easytrack?



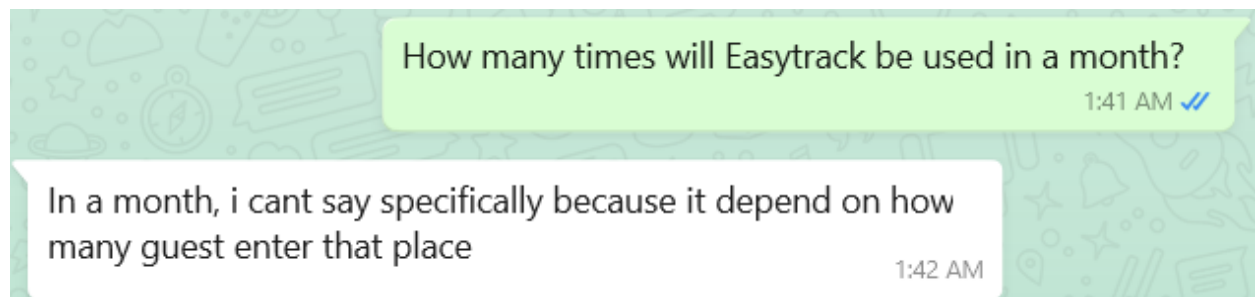
The interview shows that Mr. Azimi needs to open the app to check the location of guests. This means by open Easytrack Mr. Azimi can access all locations of guests in that area.

Question 2 : How do you track the location of guests when they are missing?



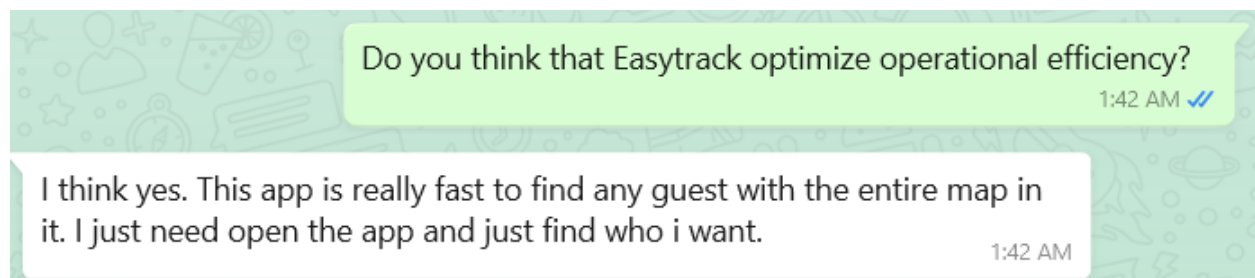
By the answer of this question, Mr, Azimi states that this app has the entire map on the specific area. He claims that when a guest is missing, he's gonna find that guest easily.

Question 3 : How many times will Easytrack be used in a month?



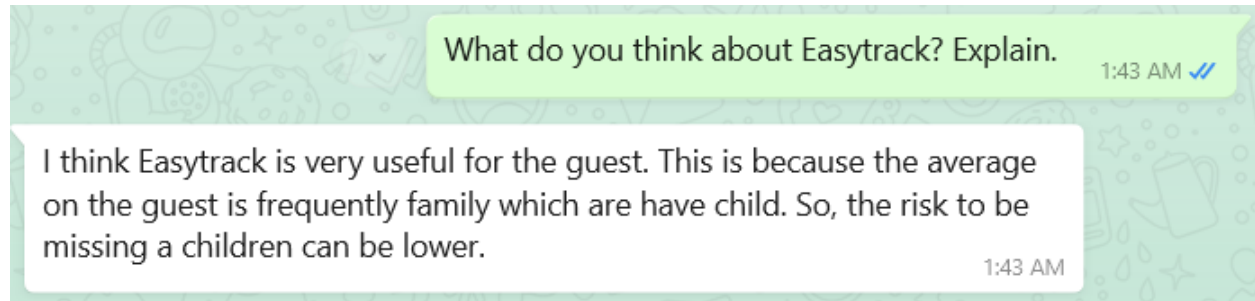
Mr. Azimi said that in a month he won't be able to confirm the usage of Easytrack. He states that the factor of usage on the app depends on how many guests at that area have been visited at that moment.

Question 4 : Do you think that Easytrack optimizes operational efficiency?



We know that Easytrack provides the ability for users to reduce waste of time and effort. This is proved by word from Mr. Azimi states that Easytrack is optimizing its operational efficiency

Question 5 : What do you think about Easytrack? Explain.



By this answer, we know that Easytrack did a good job by finding missing children in that area. By statistics, many cases like missing children from their parents always occur. So, the existence of Easytrack really helps us to reduce the problem that we face.

4.3 Summary from method used

By collecting data from both open-ended and closed-ended questions, we can better understand by looking at the graph that Google Form provides us about what are the priorities when developing an app related to personal privacy. To gain user confidence, we must emphasize the security system, ensuring it is used solely for beneficial purposes. This approach will build user trust and increase our user base. Additionally, data that we receive by interviewing My.Azimi helps us identify features that enhance the app's operational efficiency, which is our primary goal. Ultimately, we aim to create an app that provides a comfortable and secure experience for guests visiting an open theme park.

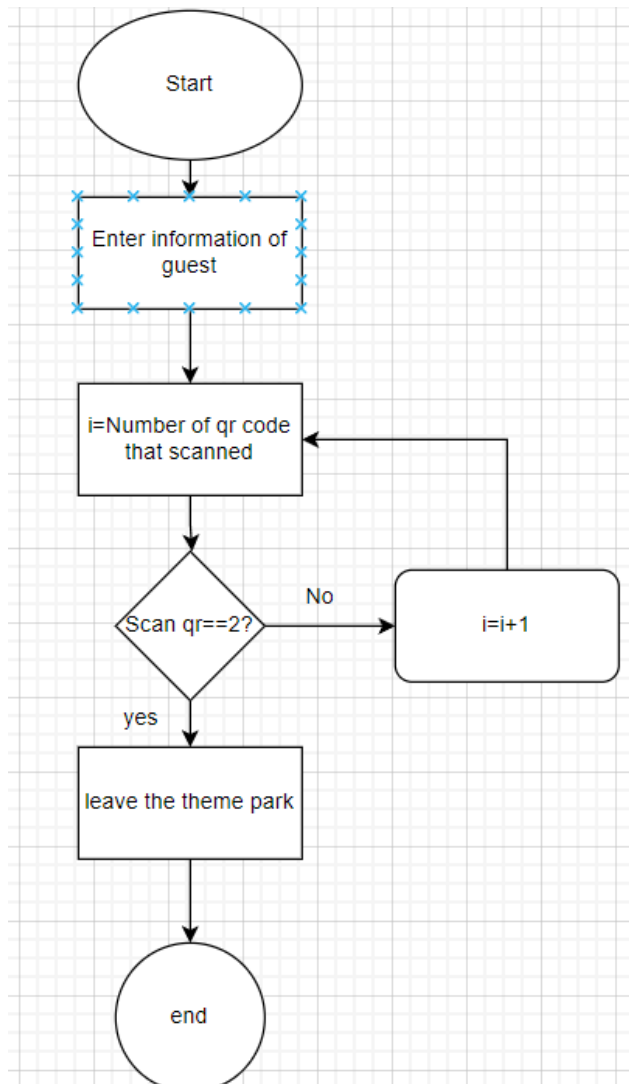
5.0 Requirement Analysis

5.1 Current business process

Current system

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 .

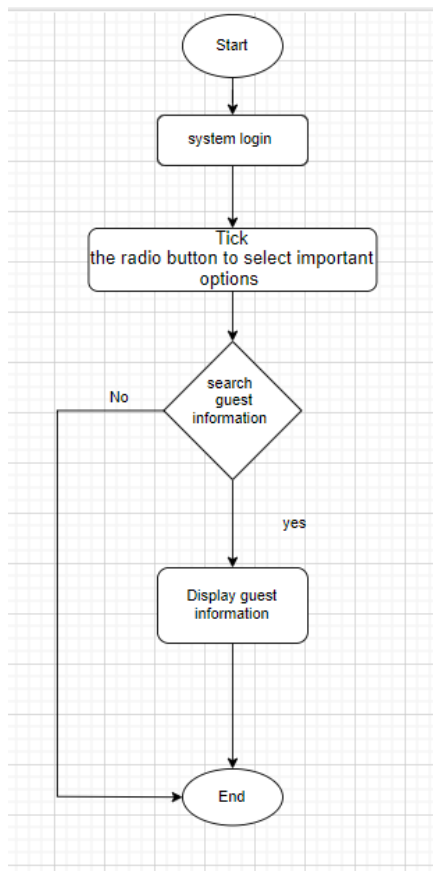
Option:

3.1 Name

3.2 Phone number

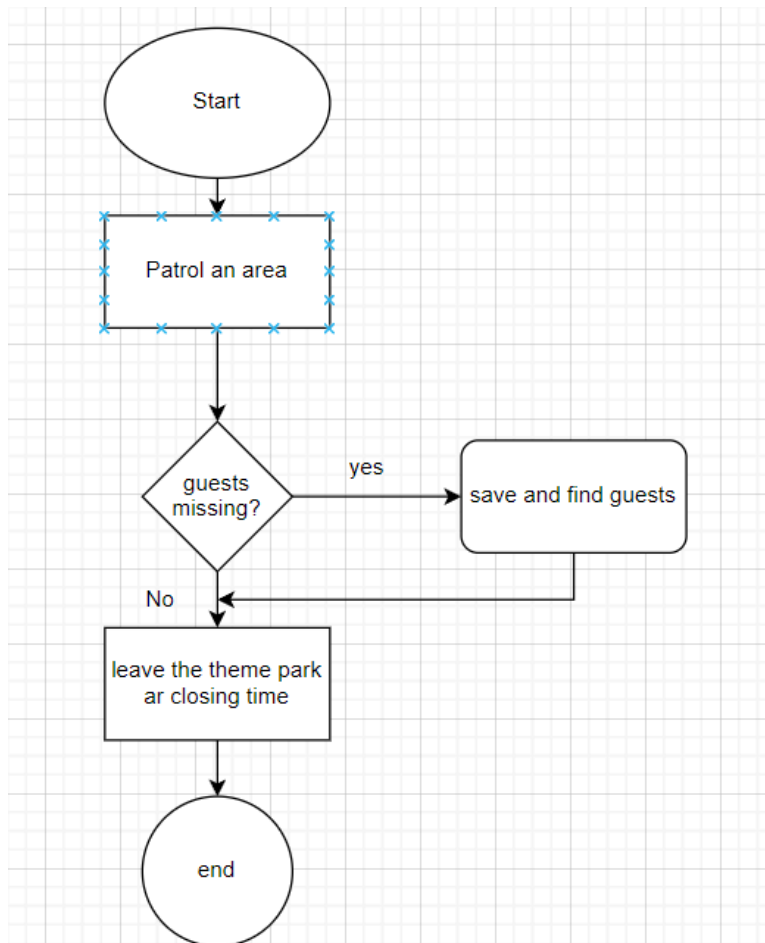
3.3 Date

- 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

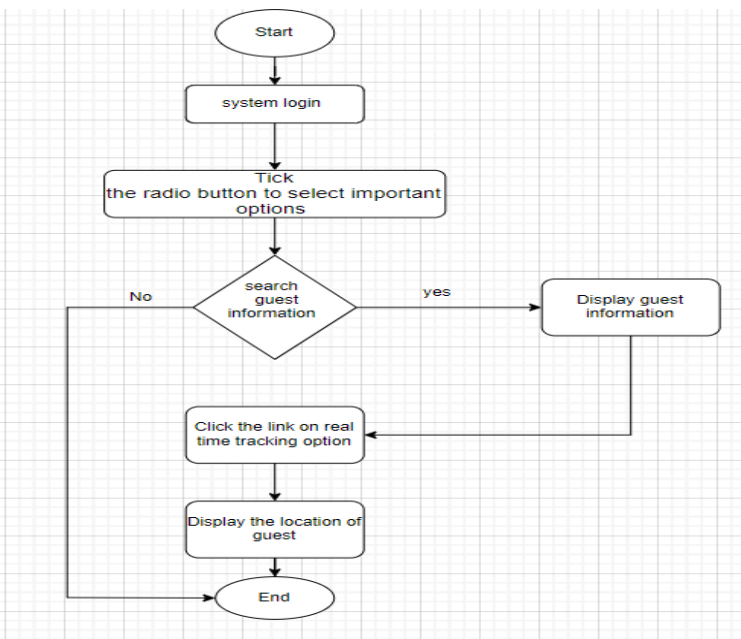
3.3 Date

3.4 Time record

3.5 real-time tracking

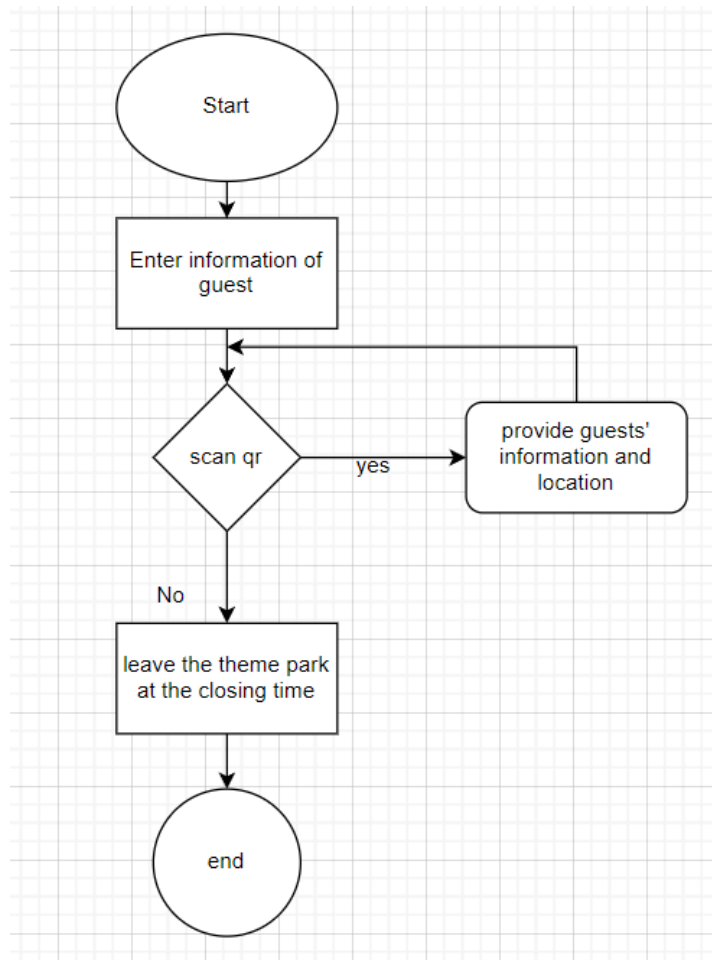
- 4) The guests' information will be displayed on the screen if you search the guests' information by typing specific information in the text box.
- 5) Option for real-time tracking

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



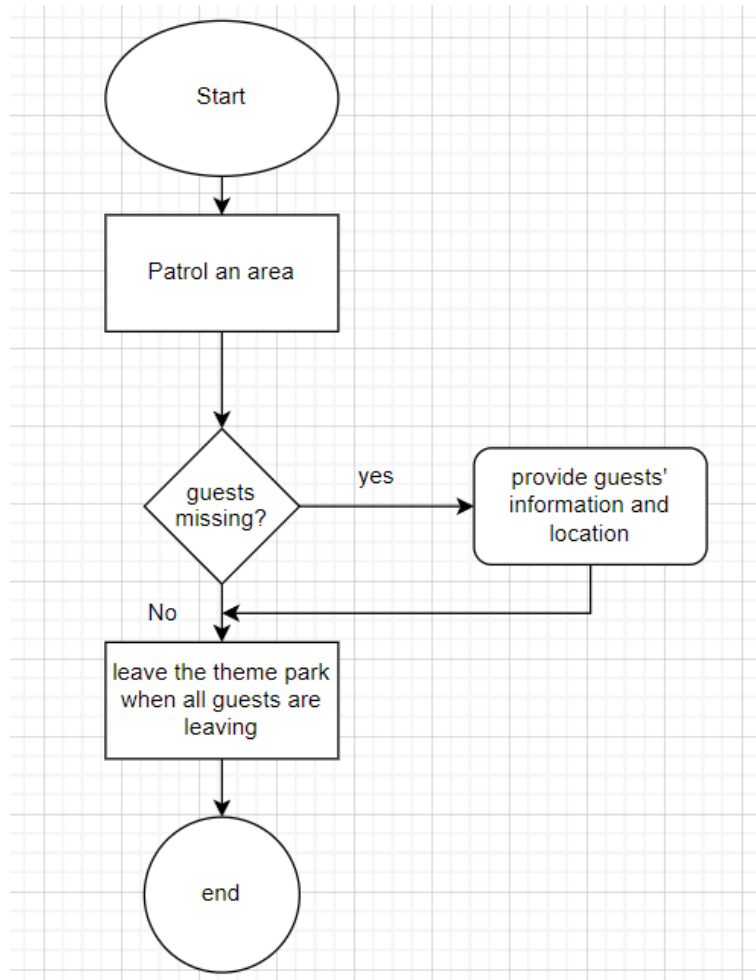
Scenarios and workflow of Easytrack for guest:

- 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.



5.2 Functional Requirement (Input, process, output)

PROCESS	INPUT	OUTPUT
Easytrack	guest	theme park management,rescue team

Input:

Guests provide their information, including name, phone number, and others, which are recorded into the Easytrack system upon entry. Guests scan their QR codes at designated areas within the theme park, allowing Easytrack to track their movements and record their location.

Process:

Easytrack processes the guest information provided upon entry, storing it securely within the system database for future reference. The system continuously processes the scanned QR codes to track guest movements within the park, updating their locations in real-time. Easytrack monitors guest movements and identifies any instances where a guest may be missing or unaccounted for based on their last recorded location.

Output:

The recorded guest information is accessible within the Easytrack system, allowing theme park management to retrieve and review guest details quickly when needed. Based on the recorded guest information, rescue teams can coordinate search and rescue efforts effectively, providing assistance to missing or injured guests as necessary.

Current system

Context Diagram

PROCESS	INPUT	OUTPUT
Ticket scanning system	Personal info	Guest info
	Qr code scanning	Guest time in and out

Level 0 Diagram

PROCESS	INPUT	OUTPUT
Login ticket scanning system	Personal info	Guest info
	Qr code scanning	Entry and exit time
		Guest list updated
Search and view guest info	Guest list updated	Emergency status
		Missing guest info
Send rescue team	Emergency status	Guest safety status
	Available rescue team	

Child Diagram

Process 1: login to ticket scanning system

PROCESS	INPUT	OUTPUT
Customizing according to preference	Guest login info	Preference info Selected preference info

Process 2: search and view guest information

PROCESS	INPUT	OUTPUT
Send out closing time notification	Closing time	Available patrol team
Patrol team guide all team to leave	Available patrol team	Safe departure status

Proposed system

Context diagram

PROCESS	INPUT	OUTPUT
Easytrack	Personal information QR code scanning Guest information	Realtime tracking Current location

Level 0 Diagram

PROCESS	INPUT	OUTPUT
Login to Easytrack	Personal info	Guest info Guest list updated
Search and guest information	QR location info Guest list updated	Location info Updated location
Tracking real time location	Update location	Real time location Latest location info
Send nearest rescue team	Latest location info Nearby rescue team location	Guest safety status

Child Diagram

Process 1: login to ticket scanning system

PROCESS	INPUT	OUTPUT
Customizing according to preference	Guest login info	Preference info Selected preference info

Process 3: search and view guest information

PROCESS	INPUT	OUTPUT
Send out closing time notification	Closing time	Exit map info from current location
Leave the park	Exit map info from current location	Safe departure status

5.3 Non-functional Requirement

5.3.1 Security

- The Easytrack system must implement strong encryption methods to securely store and transmit guest information, ensuring protection against unauthorized access
- Access to guest information should be restricted based on defined roles and permissions, ensuring that only authorized personnel can retrieve or modify data.

5.3.2 Performance

- The system should be capable of processing guest information and updating location data in real-time, with minimal latency, to support efficient tracking of guests throughout the theme park.
- The response time for retrieving guest details or tracking their movements should be optimized to provide timely information to park management and staff.

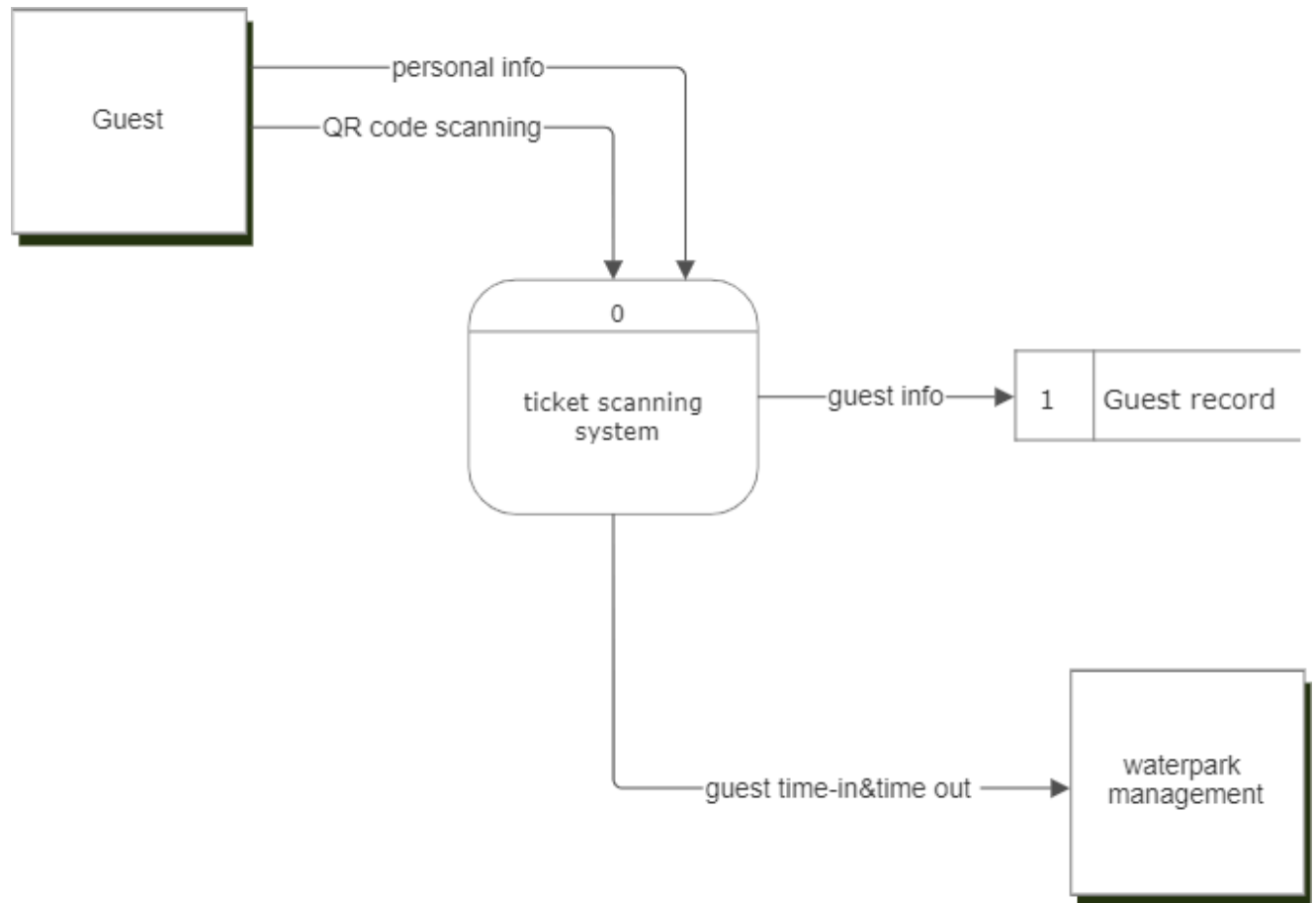
5.3.3 Scalability

- The Easytrack system should be scalable to accommodate peak visitor loads during busy periods (e.g., holidays, weekends), ensuring consistent performance and responsiveness even with high user traffic.
- The database architecture should support the storage and retrieval of large volumes of guest data without degradation in performance.

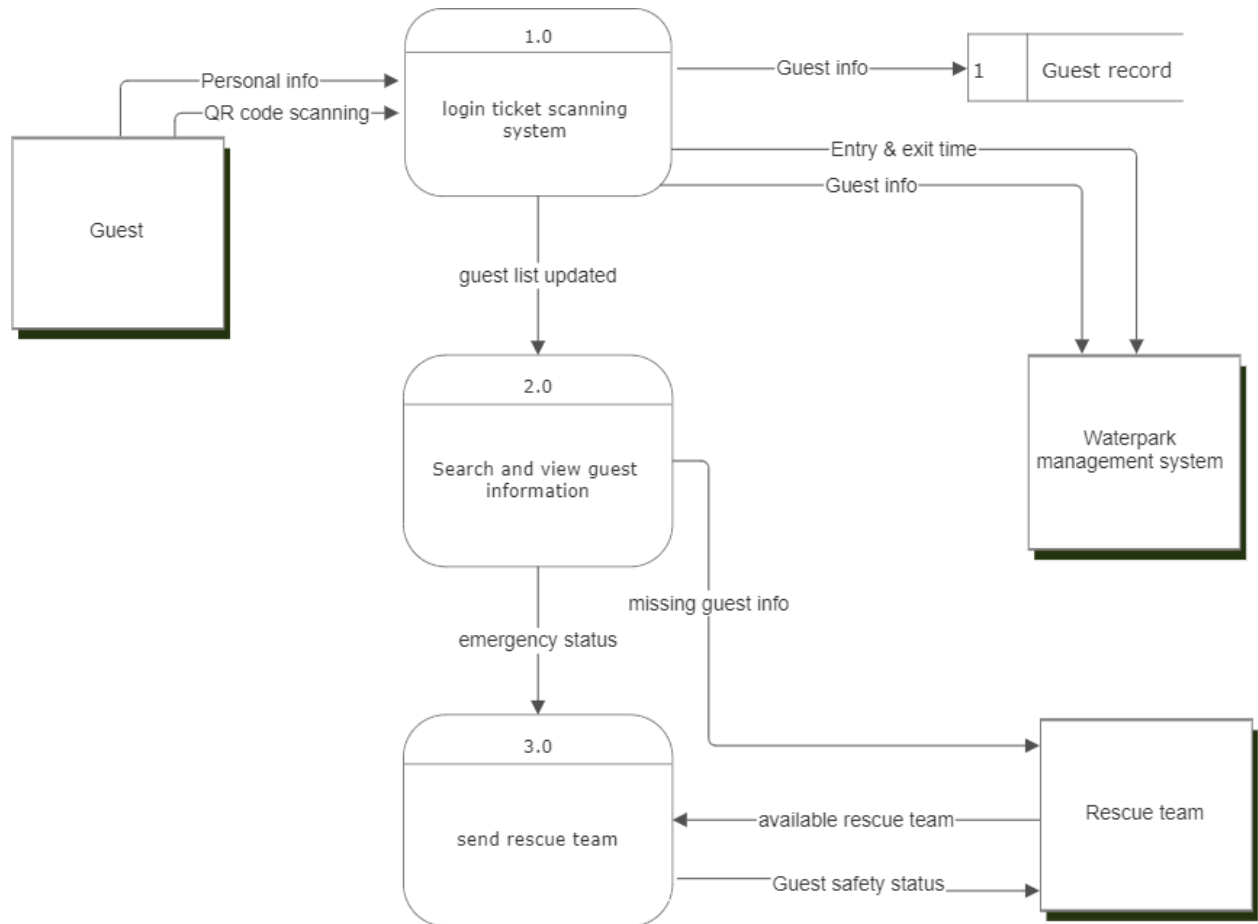
5.3.4 Compatibility

- The Easytrack system should be compatible with a range of hardware devices commonly used in theme parks, including barcode scanners, QR code readers, and mobile devices (e.g., smartphones, tablets) for guest interactions.
- Ensure compatibility with different models and versions of hardware to support diverse operational scenarios within the theme park.

Current DFD system
Context diagram



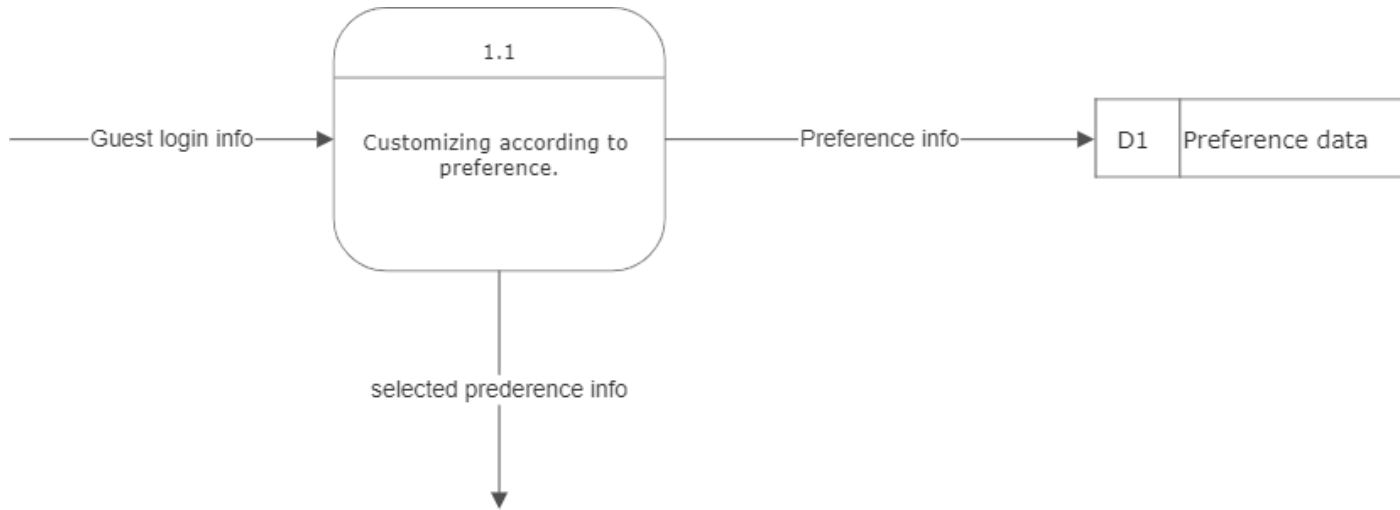
Current DFD system
Diagram 0



Current DFD system

Child diagram

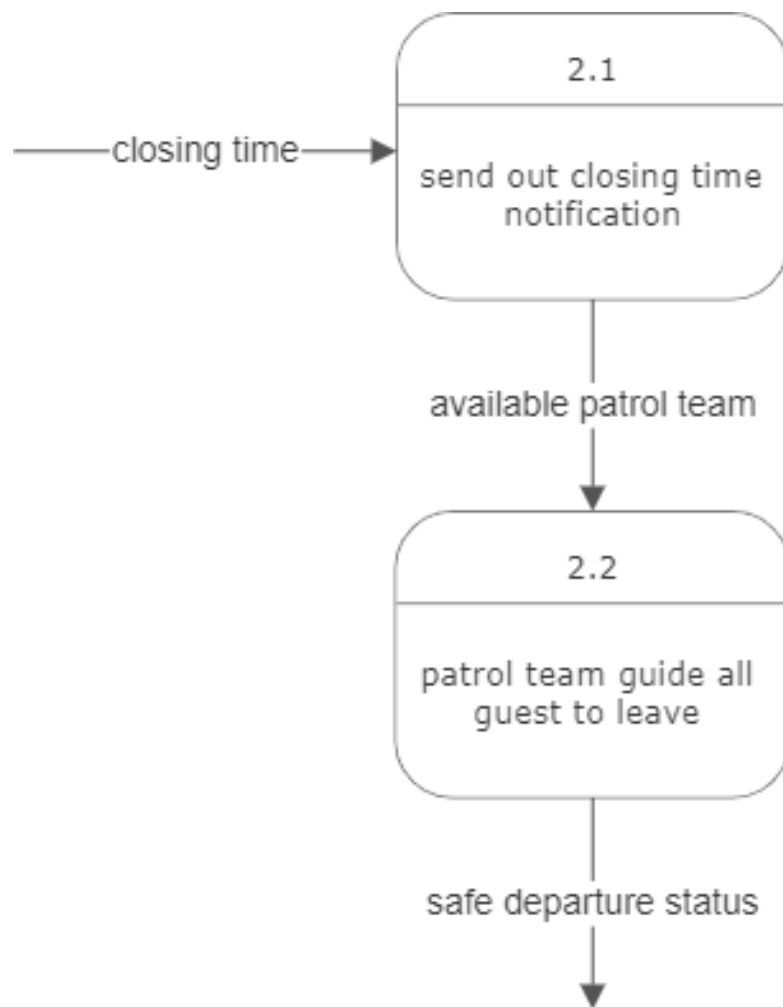
Process 1: login to ticket scanning system



Current DFD system

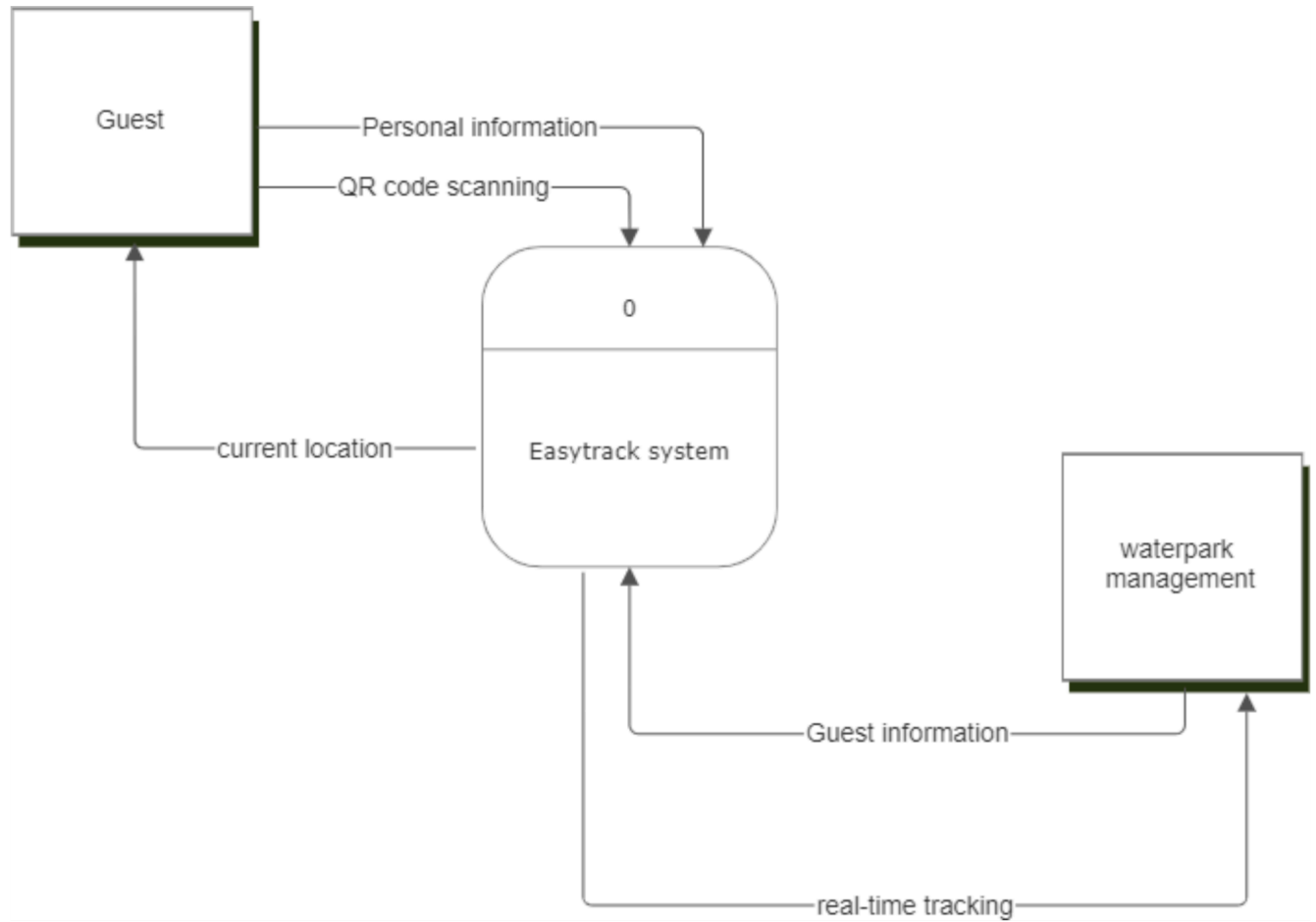
Child diagram

Process 2: search and view guest information

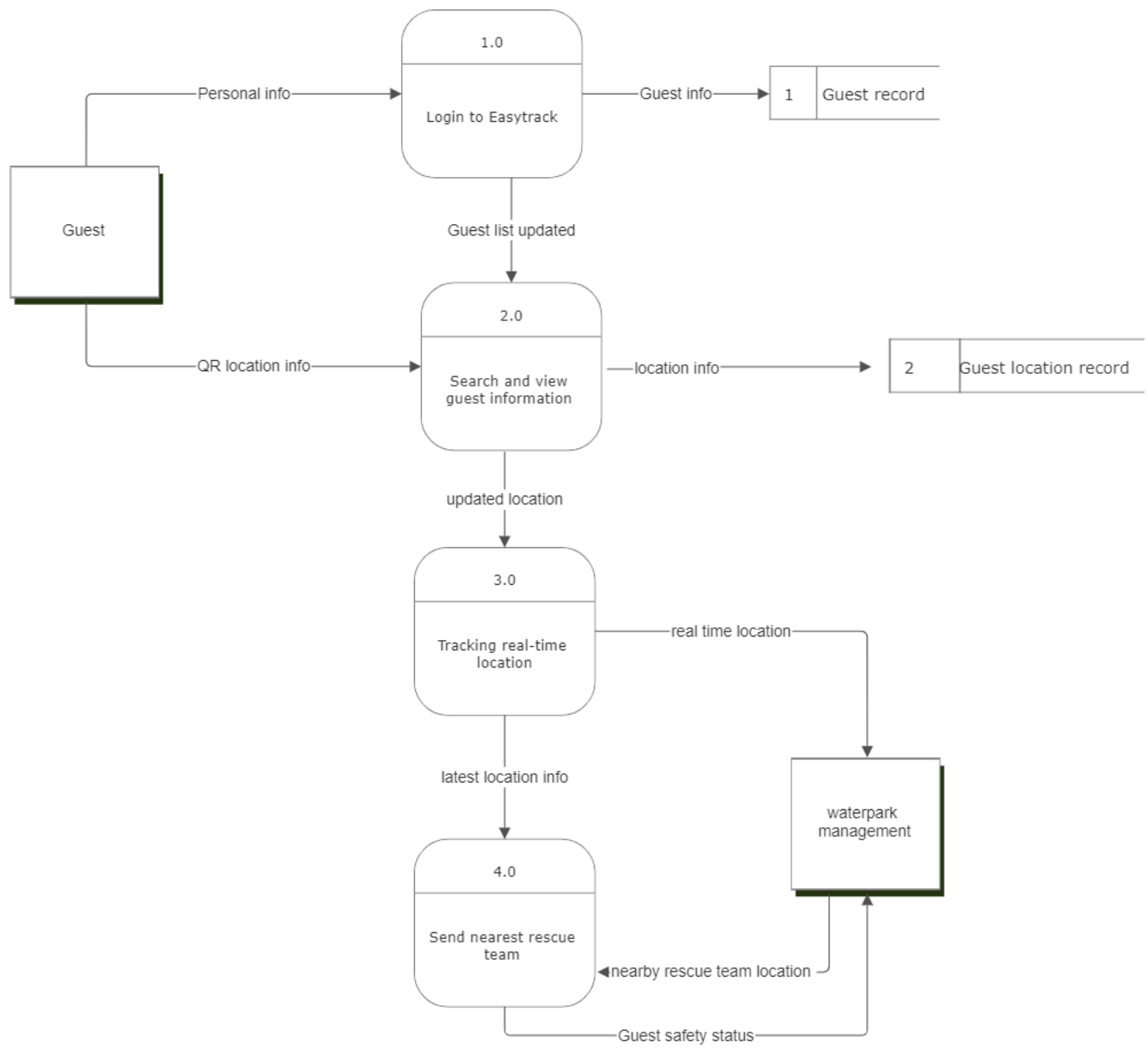


5.4 Logical DFD AS-IS system

5.4.1 Context Diagram

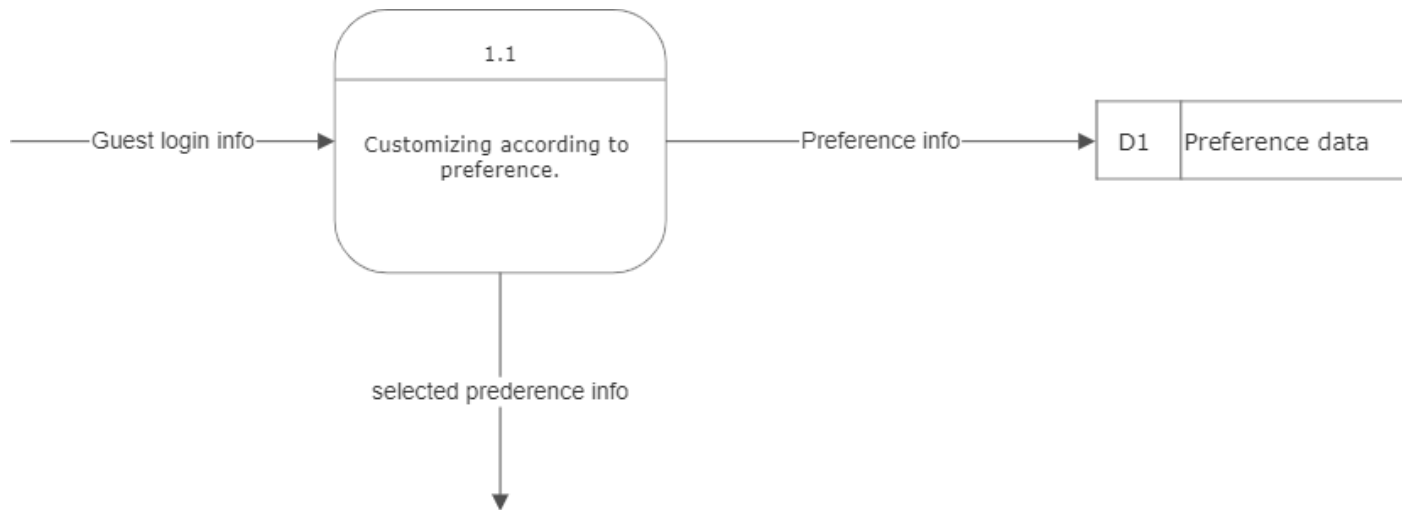


5.4.2 Diagram 0

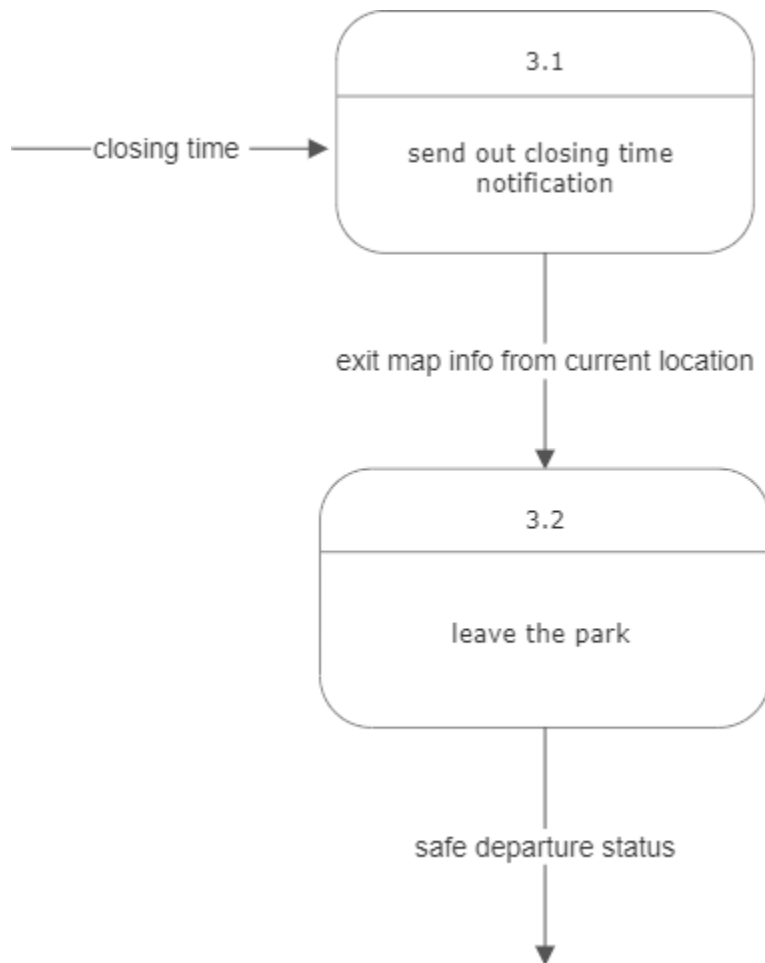


5.4.2 Child diagram

Process 1: Login to Easytrack



Process 3: Tracking real-time location



6.0 Summary of Requirement Analysis process

The Easytrack has several parts that are done manually. Guests provide their personal information to login to the Easytrack to have real-time tracking. They have to scan the qr code of the ticket to the time recording machine when they enter every station in the theme park. This is to make sure Easytrack can detect guests' location and to avoid disappearances and serious injuries in the theme park.

The function of the Easytrack system are as follows:

1. Database for guest's information
2. Improve system security, so that guests' information will not be leaked
3. Optimized the response time
4. Make the system operate with consistent performance and responsiveness even with high user traffic.
5. Ensure compatibility with different models and versions of hardware access to the system