



Dhaka International University

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DIU Bus Management System

Group Name: Warcust

Presented By

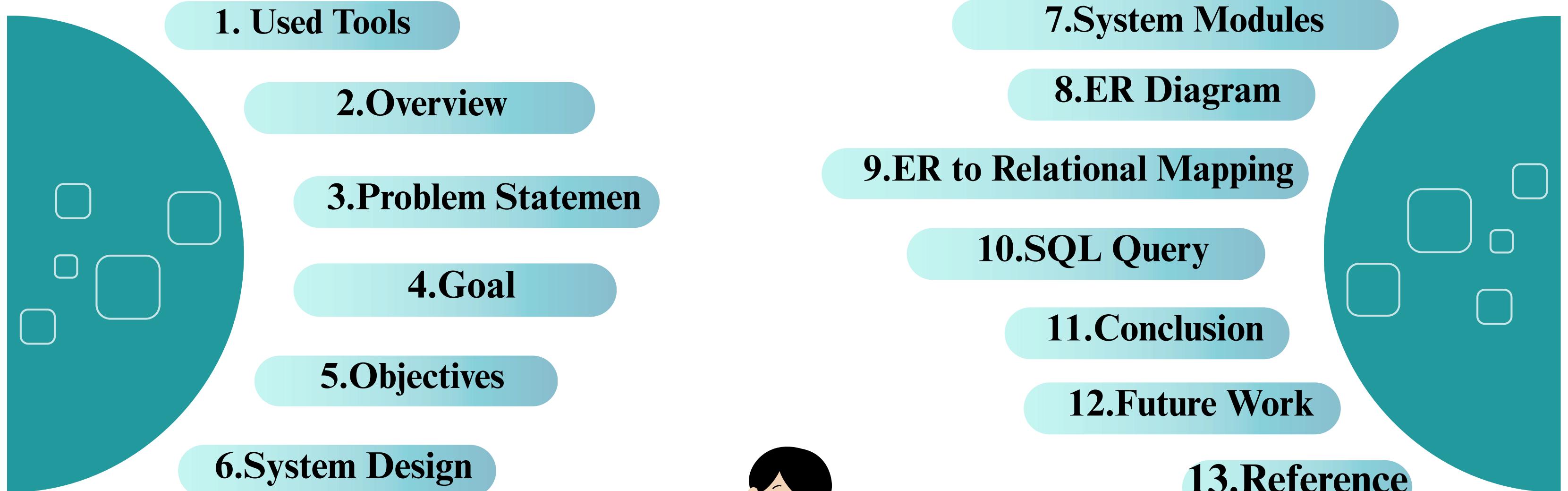
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Showrov Shahariar (11)

Sidratul Montaha Ayshi (32)*

Content



Used Tools



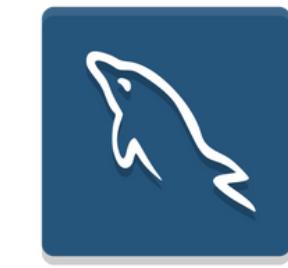
Canva



Xampp



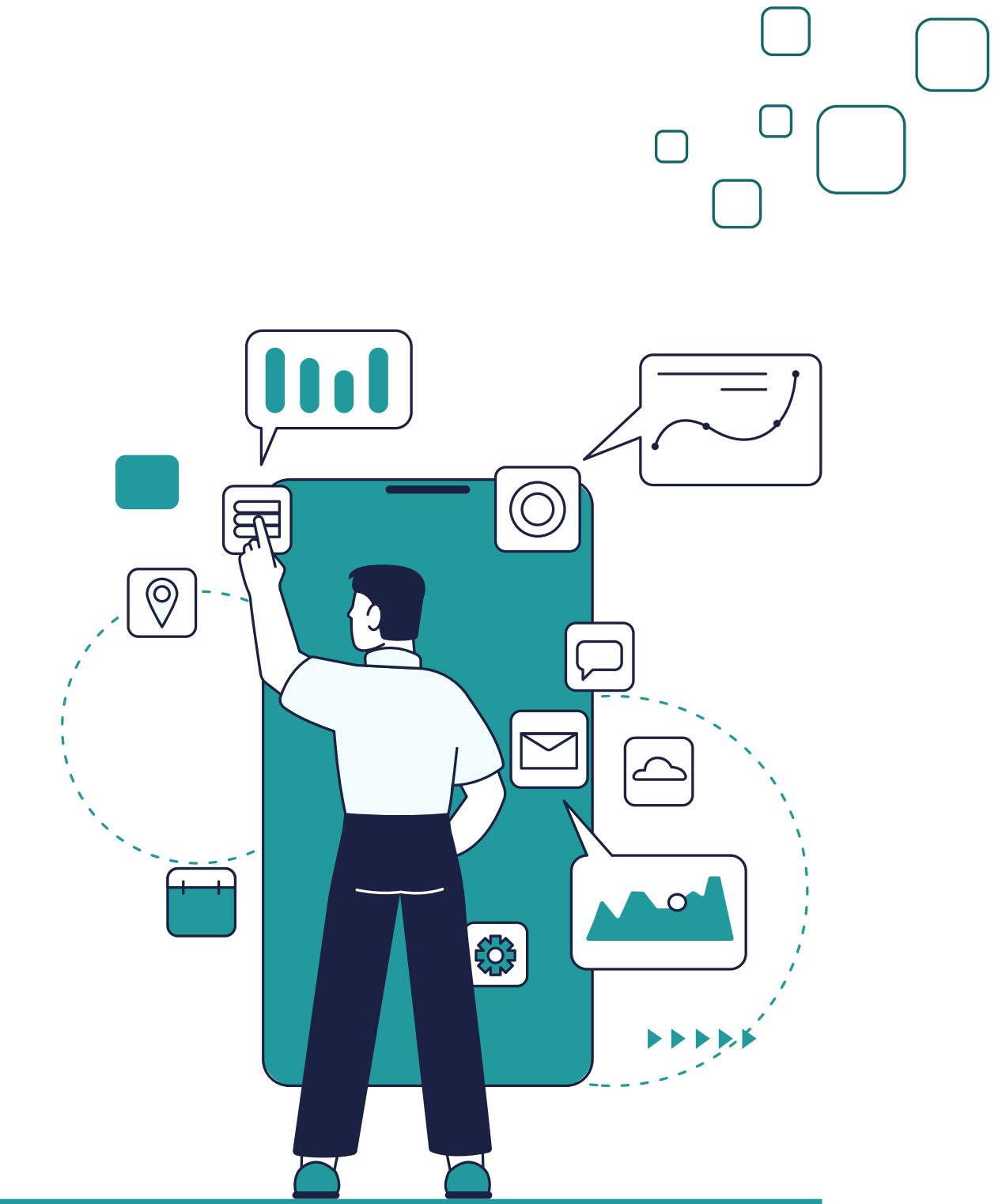
MS Word



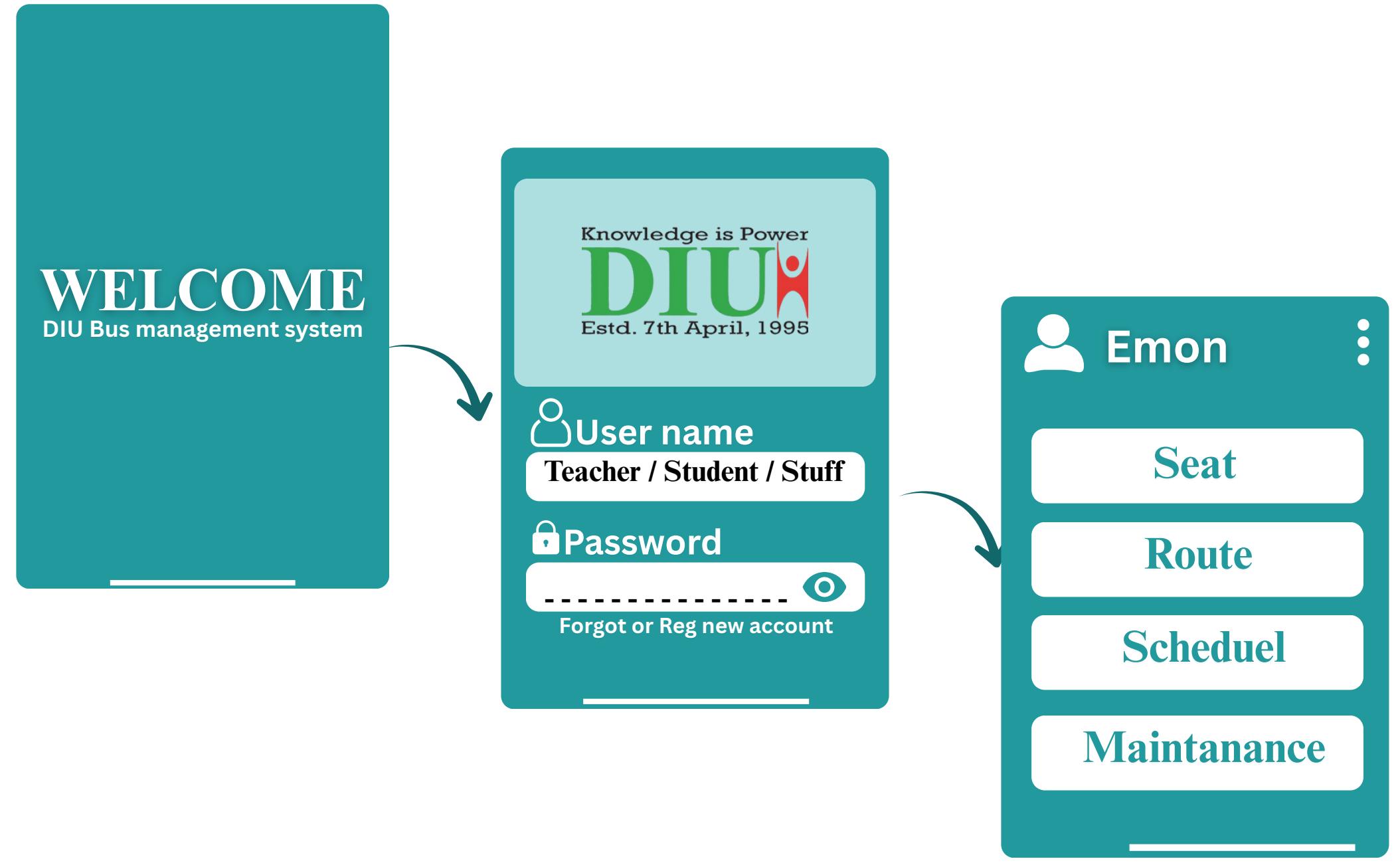
Workbench

Lucid

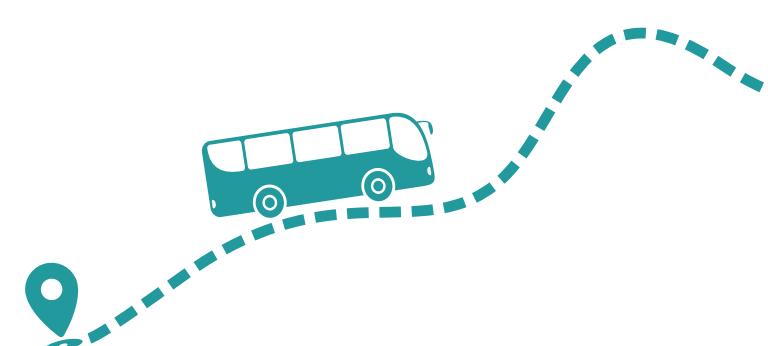
Lucid

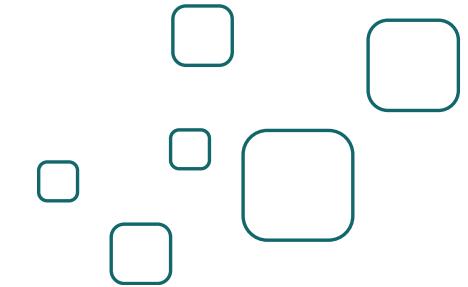


Overview



- This system provides a digital platform where university members can log in as a student, teacher or staff to access bus services.
- After login, users can view and reserve seats, check assigned routes and see the scheduled bus timings.





Problem Statement

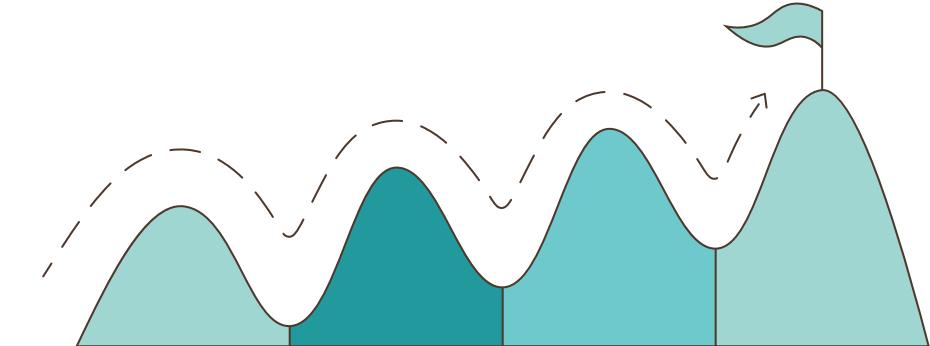


- Existing bus system is disorganized
- No proper schedules
- Students often stand due to lack of seats
- Teachers have no reserved seats
- Buses sometimes miss stops or are late
- Daily commuting causes stress and inefficiency
- Maintenance is not tracked systematically

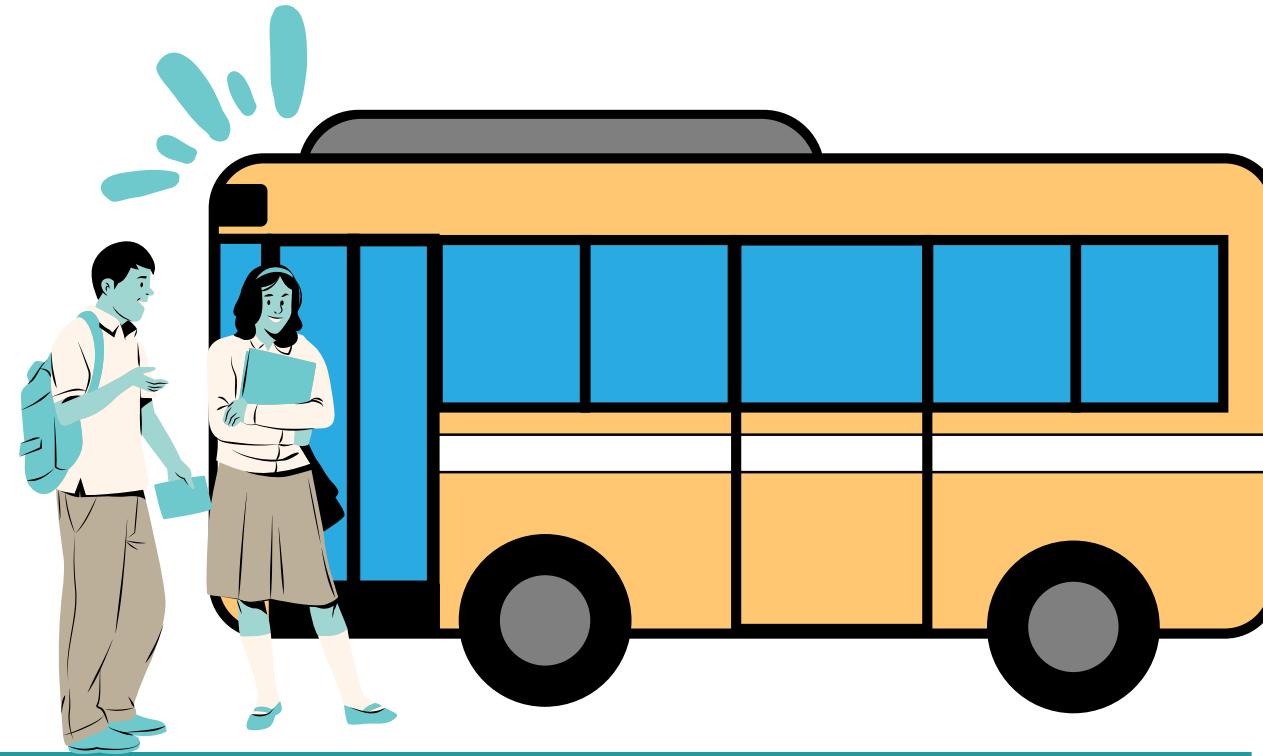


Goals

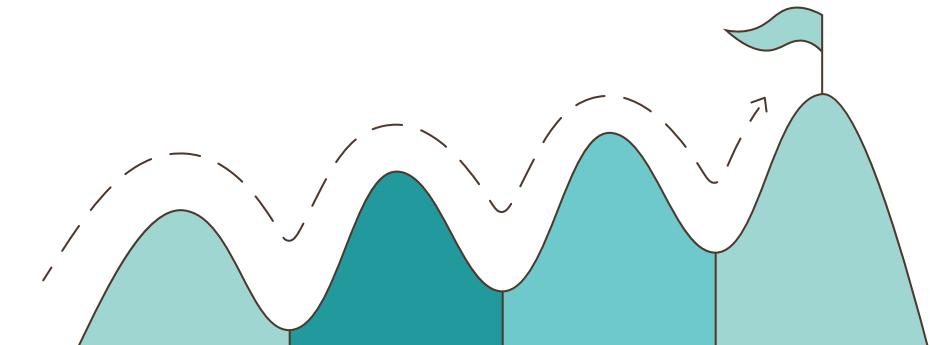
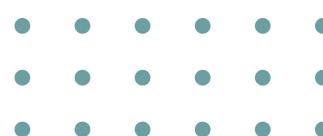
- Ensure a smooth and hassle-free bus experience for students and staff
- Reduce long waiting time and avoid standing during bus travel
- Help students reach class on time by improving bus time management
- Digitalize and organize the university transportation system



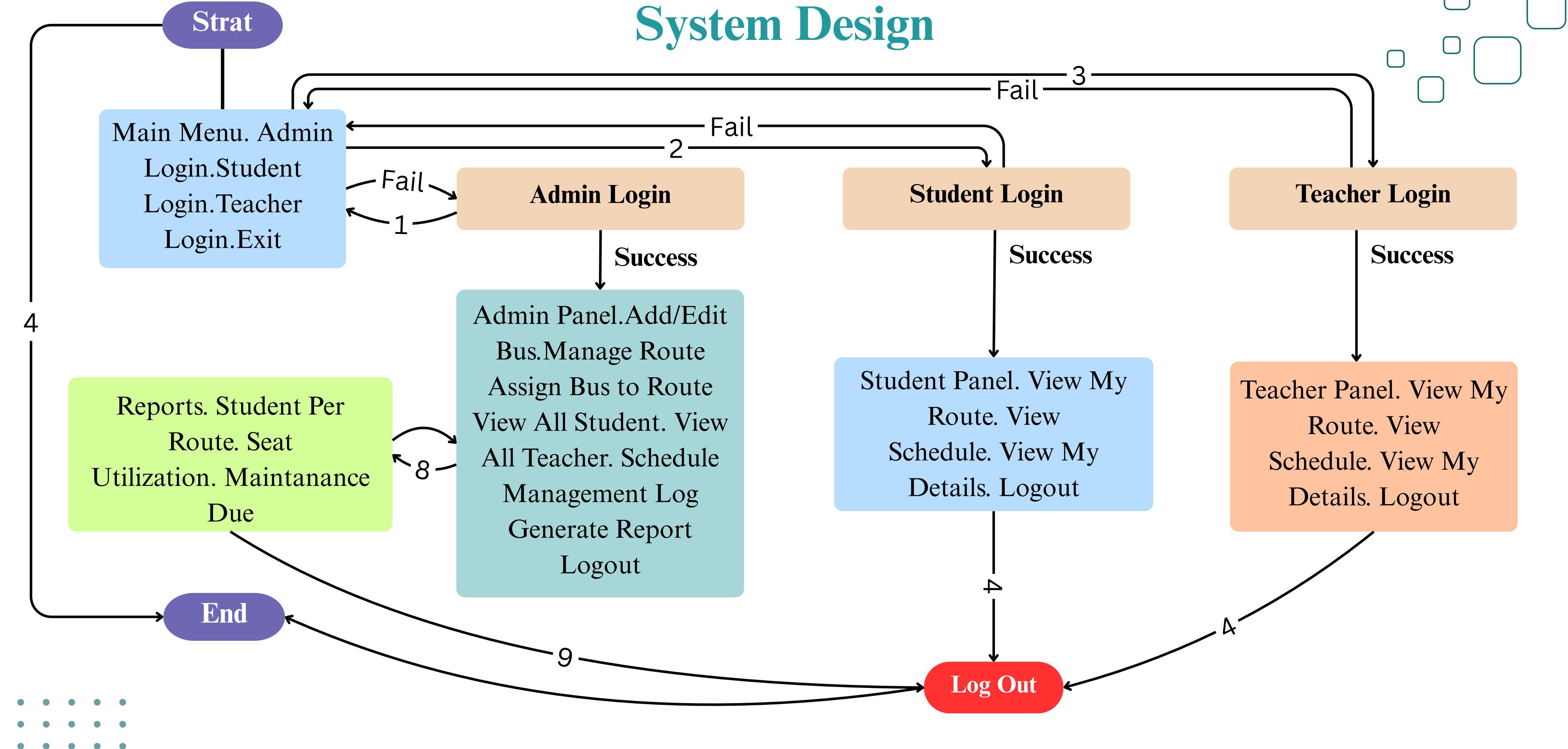
Objectives



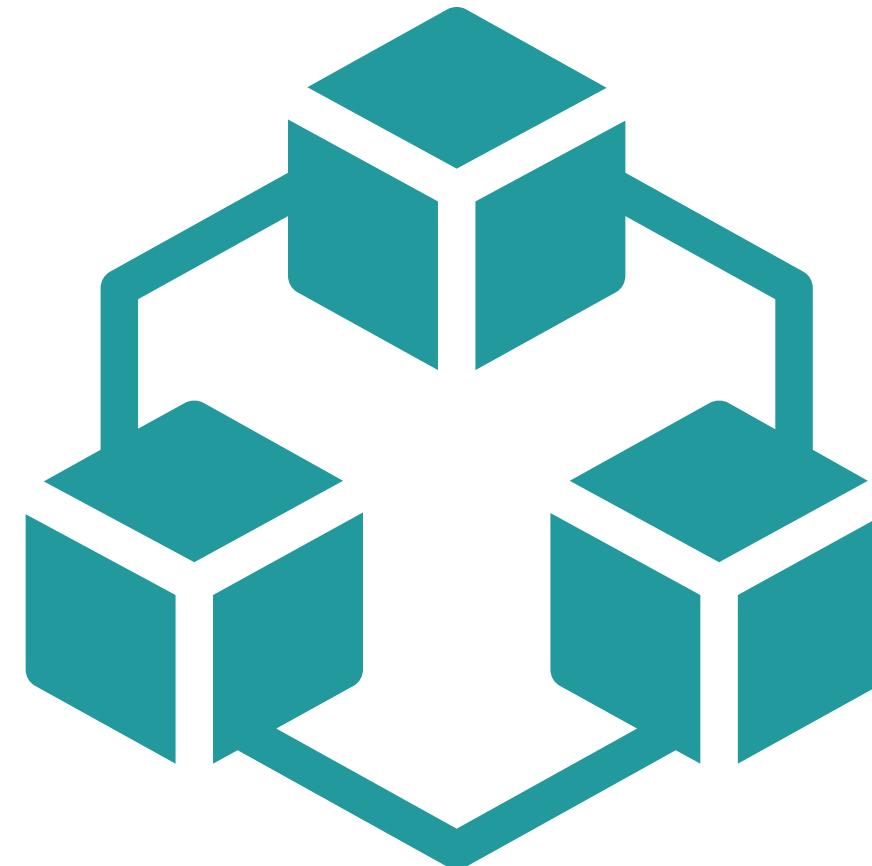
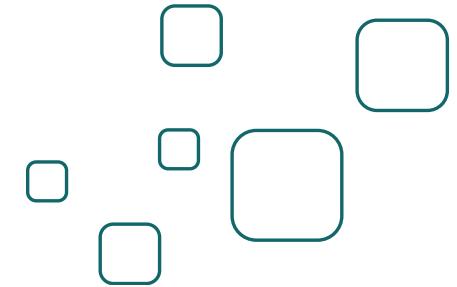
- Provide proper seat allocation for students, teachers and staff
- Allow users to check seat availability before boarding
- Maintain accurate bus schedules for timely pickup and drop-off
- Organize route information for easy bus selection
- Record bus maintenance history to avoid breakdowns
- Reduce confusion, overcrowding and last-minute rush



System Design



System Modules



1. Authentication and Security Module.
2. User Management Module.
3. Bus and Route Management Module.
4. Seat Capacity and Priority Module.
5. Schedule and Time Management Module.
6. Maintenance and Report Module.



System Modules Cont...



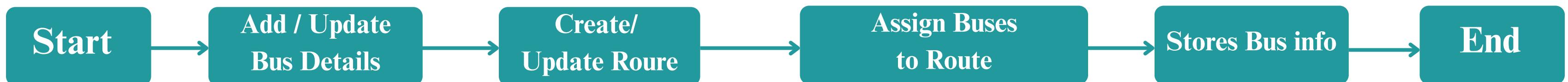
1. Authentication & Security Module.



2. User Management Module.



3. Bus & Route Management Module.



System Modules Cont...

4. Seat Capacity & Priority Module.



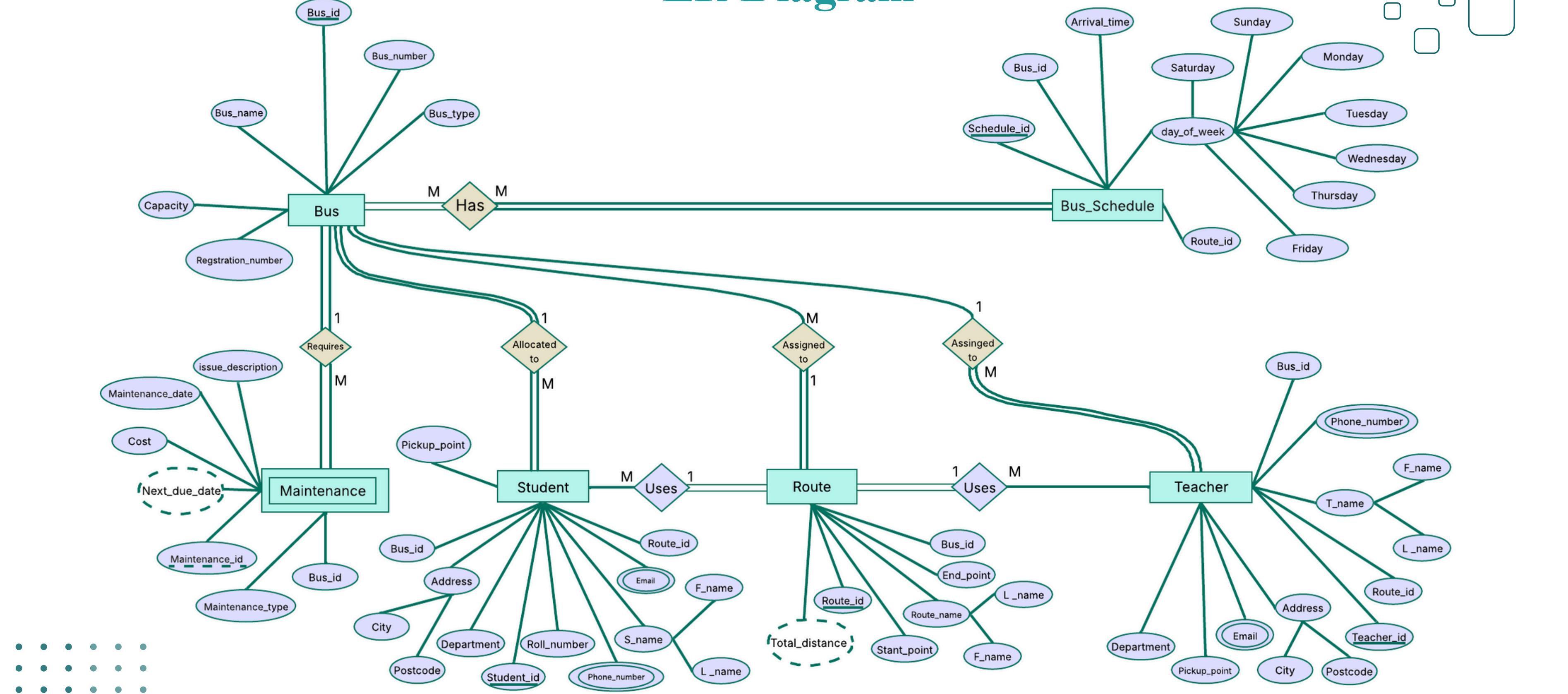
5. Schedule & Time Management Module.



6. Maintenance & Report Module.



ER Diagram



ER to Relational Mapping

Step 3: Mapping Binary 1:N relationship

Bus Schedule:

Schedule_id	Bus_id FK	Arrival_time	Saturday	Sunday	Monday
Tuesday					
Wednesday					
Thursday					
Friday					
	Route_id FK				

Student:

Student_id	Bus_id FK	City	Postcode	Department	Roll_number	F_name
						L_name

F_name	L_name	Route_id FK	Pickup_point

Bus:

Bus_id	bus_name	Capacity	Registration_number	Bus_number

Bus_type	Route_id FK

Teacher:

Teacher_id	Department	Pickup_point	City	Postcode	Route_id FK	F_name
						L_name

Step 4: Mapping Binary N:M Relationship

Has:

bus_id FK	schedule_id FK

Step 5: Mapping multivalued attributes

Student - Phone Number:

Student_id	S_phone_number

Student - Email:

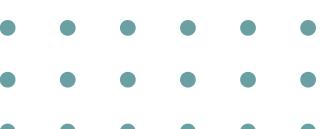
Student_id	S_email

Teacher - Phone_number:

Teacher_id	T_phone_number

Teacher - Email:

Teacher_id	T_email



Step 1: Mapping regular entity types

Bus:

Bus_id	bus_name	Capacity	Registration_number	Bus_number	Bus_type

Bus Schedule:

Schedule_id	Bus_id FK	Arrival_time	Saturday	Sunday	Monday	Tuesday

Wednesday

Thursday

Friday

Route_id
FK

Wednesday	Thursday	Friday	Route_id FK

Tuesday	Wednesday	Thursday	Friday	Route_id FK

Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Route_id FK

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Route_id FK

Monday	Tuesday	Wednesday	Thursday	Friday	Route_id FK

Tuesday	Wednesday	Thursday	Friday	Route_id FK

Wednesday	Thursday	Friday	Route_id FK

Thursday	Friday	Route_id FK

Friday	Route_id FK

Route_id FK

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SQL Query

1. Find buses that are used by both students and teachers.

```
SELECT  
    b.bus_id,  
    b.bus_name,  
    COUNT(DISTINCT s.student_id) AS student_count,  
    COUNT(DISTINCT t.teacher_id) AS teacher_count  
FROM Bus b  
JOIN Student s ON b.bus_id = s.bus_id  
JOIN Teacher t ON b.bus_id = t.bus_id  
GROUP BY b.bus_id, b.bus_name;
```

Output:

	bus_id	bus_name	student_count	teacher_count
▶	1	Shugondha	36	3
...
...
...

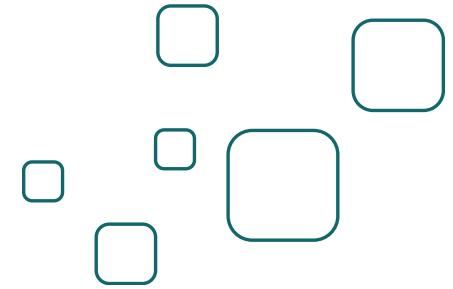
2. Find the route with the highest total bus capacity.

```
SELECT  
    r.route_name,  
    SUM(b.capacity) AS  
    total_capacity  
FROM Route r  
JOIN Bus b ON r.bus_id = b.bus_id  
GROUP BY r.route_name;
```

Output:

	route_name	total_capacity
▶	Route-1	90
	Route-2	80
	Route-3	95
	Route-4	80
	Route-5	100

SQL Query Cont...



3. Show buses that are almost full (less than 5 seats available):

```
SELECT b.bus_name, b.capacity, COUNT(s.student_id)  
AS filled_seats,  
      (b.capacity - COUNT(s.student_id)) AS  
available_seats  
FROM Bus b  
LEFT JOIN Student s ON b.bus_id = s.bus_id  
GROUP BY b.bus_name  
HAVING available_seats < 5;
```

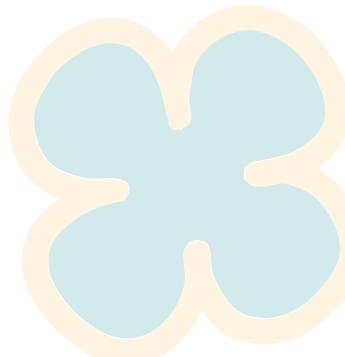
Output:

	bus_name	capacity	filled_seats	available_seats
▶	Shugondha	40	36	4

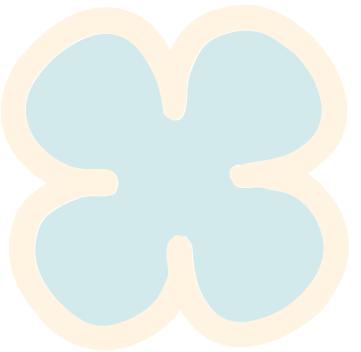
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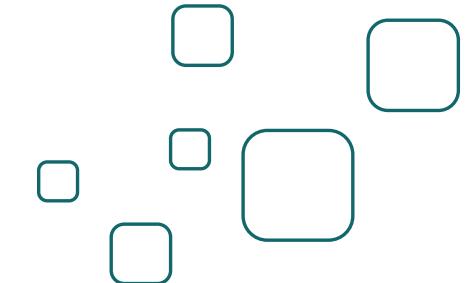
Conclusion

- The system solves major transportation issues by organizing routes, seats, and schedules digitally
- Helps reduce overcrowding, confusion, and delays during university bus travel
- Ensures fair seat allocation for students, teachers, and staff with proper priority rules
- Tracks bus maintenance and usage to prevent breakdowns and improve safety
- Makes university transportation faster, smarter, and more reliable for daily users



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Future Work

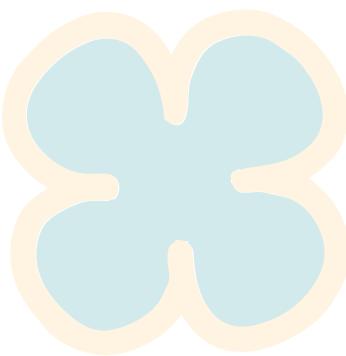
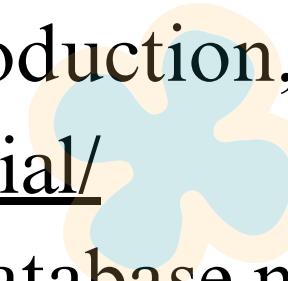
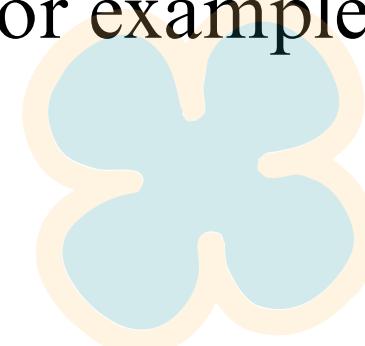
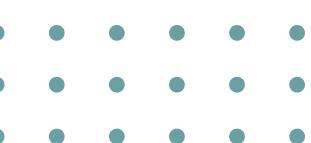


- Mobile App with live tracking (GPS)
- Push Notifications for delays
- QR Code Boarding
- Feedback System per trip
- AI Route Optimization

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Reference

- 1. W3Schools:** MySQL Tutorial. Retrieved from <https://www.w3schools.com/mysql/>
(Used for creating databases, tables, and understanding MySQL data types and commands.)
- 2. GeeksforGeeks:** MySQL Tutorial – Introduction, Commands, and Examples. Retrieved from <https://www.geeksforgeeks.org/mysql-tutorial/>
(Used for practical examples of MySQL database management and relational queries.)
- 3. MySQL Documentation:** MySQL Reference Manual. Oracle. Retrieved from <https://dev.mysql.com/doc/>
(Used as a primary reference for MySQL syntax, functions, and database administration.)
- 4. TutorialsPoint:** MySQL Tutorial. Retrieved from <https://www.tutorialspoint.com/mysql/index.htm>
(Used for examples on table creation, foreign keys, and SQL relationships.)



**THANK
YOU**

