ANDROID BASED APPLICATION FOR PICKING ROUTE AND SEAT RESERVATION ASSIGNMENT IN PICK AND DROP AND EMPTY RUN SERVICE AT F-TRANS BANDUNG

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ABSTRACT

F-Trans is a public transportation company which is under the auspices of PT. FARISA GLOBAL TOURISTAMA (FGT Group) which stood since February 2015. F-Trans has fleet of more than 50 units from small cars, micro buses, bus medium, big bus with a capacity of 2-59 seats and has 8 provinces operating area of West java, Central Java, East Java, DKI Jakarta, Banten, Sumatera, DI Yogyakarta, and Bali. Based on questionnaire result of 30 F-Trans's costumer and company interview, obtained information that Pick and Drop And Drop and Empty Run reservation at F-Trans Bandung still used conventional method which is made costumer find it difficult to make a reservation because the costumer services is busy serving another costumer and made many costumer canceled their reservation, furthermore at Empty Run reservation, the company did not have a system that can promoting Empty Run service which is made costumer did not have an information about that fleet and F-Trans's driver too did not know which route he can pick up the costumer.

Based on these problems, can be concluded that it is required to make a software that can help reservation problems and to promoting empty run service at F-Trans Bandung that has been described above. Other than that, F-Trans's driver need to know information about costumers locations which is make this software using A-GPS technology as a media to determining of costumers locations.

Based on black box testing can be concluded that FtransApp software fulfill the requirements from costumers at making a reservation, promoting Empty Run service, and make driver easier in picking up costumers because they already known the location of costumers.

Keyword: Customers, F-Trans Bandung, Pick and Drop, Empty Run, Android

1. INTRODUCTION

One of the fastest growing transportation sector in Indonesia today is a public transportation company such as tourism transportation services which is one of the solutions for the community in determining their travel goals. F-Trans is a company engaged in the field of transportation services under the auspices of PT. FARISA GLOBAL TOURISTAMA (FGT Group) which was established in February 2015. F-TRANS provides various services such as pick and drop which is one way / point to point and empty run service which is one seat / While the fleet is in operation and luxury car rentals for executive car and wedding car. F-Trans has a fleet of more than 50 complete units of small cars, micro buses, bus medium, big bus with a capacity of 2-59 seats and has 8 provinces operating area of West Java, Central Java, East Java, DKI Jakarta, Banten , Sumatra, DI Jogjakarta and Bali.

Based on the survey through questionnaires that have been made and distributed to 30 respondents from customers F-Trans Bandung, gotten some problems that exist today, the current system running in the company is still using conventional methods, namely by making a reservation by phone to order pick and service Drop, this becomes a problem when many customers will make a reservation pick and drop but the customer service busy busy serving other customers and resulted in the customer canceled the service pick and drop.

The second problem that happens is that after the fleet completes the pick and drop, the fleet often experiences a subscriber vacuum or so-called empty run service. However, the company currently does not have a system that can promote the empty run service, which causes customers can not find out the availability of empty run service in the company F-Trans Bandung.

Another problem found in an empty run service is that customers are unaware of available fleet positions and fleet routes close to where customers are located, customers should contact the company to find out the fleets available for the empty run service

or to go to the fleet locations that are currently available to use Service empty run.

In addition to the Empty Run service based on survey results through questionnaires to 10 drivers F-Trans Bandung, that they do not know the customer who has made a reservation Empty Run because the admin must contact the driver first F-Trans to pick up to every customer who has done Reservation Empty Run .

*Based on the problems described above, the F-TRANS company needs a system that can facilitate the coordination between work sectors as well as facilitate the company when receiving a reservation from costumer entitled "**ANDROID BASED APPLICATION FOR PICKING ROUTE AND SEAT RESERVATION ASSIGNMENT IN PICK AND DROP AND EMPTY RUN SERVICE AT F-TRANS BANDUNG**".*

1.2 Purpose and Objectives

The purpose of this research is to build Application For Route Determination To Reserve Seats At Pick And Drop And Empty Run Services In F-Trans Bandung Based Android.

The objectives to be achieved from this research are as follows:

1. *Make it easy for customers to make pick and drop reservations using android smartphone.*
2. *Facilitate customers in ordering Empty Run by using android smartphone.*
3. *Provide fleet availability information on the empty run service at F-Trans Bandung company for prospective customers.*
4. *Provide customer availability information and pick up route for driver to pick up customer on empty run service.*

2. THE CONTENT OF PAPERS

2.1 Android

Android is a Linux-based operating system designed for touch-screen mobile devices such as smart phones and tablet computers. Android was originally developed by Android, Inc., with financial support from Google, which was later purchased in 2005. The operating system was officially released in 2007, in conjunction with the establishment of the Open Handset Alliance, a consortium of hardware, software, And telecommunications that aim to advance the open standards of mobile devices. The first Android phone went on sale in October 2008.

2.2 TSP Method

Traveling Salesman Problem (TSP) is a problem where a salesman must go through all the designated cities with the shortest distance and every city may only be passed once. Completion in TSP is the path through which the salesman complies with the above limitations. The best solution is the path with the shortest distance.

Here are the rules that identify that the problem is TSP:

1. *The journey begins and ends in the same city as the home town of sales. The whole city must be visited without any city being missed.*
2. *The salesman shall not return to his hometown before all the cities are visited. The purpose of solving this problem is to find the optimum value by minimizing the total distance of the visited route by arranging the order of cities.*
3. *TSP problem is a problem that is easy to solve with Brute Force algorithm, but it can only be done with the number of cities or nodes that are not many. The complexity of the algorithm for TSP problems with the Brute Force algorithm is O (n!) With note n is the number of cities or nodes and each city or node is connected to all other cities or nodes. With as many as 20 cities, many Hamilton's possible circuits are 6 x 1016.*

2.3 Discussion

Route Determination To Reserve Seats At Pick And Drop And Empty Run Services In F-Trans Bandung Based Android is an application that is built to meet the needs of customers F-Trans Bandung in Reservation and fleet availability in F-Trans Bandung. But in its application there are still some problems. These problems include:

1. *Customers are very difficult when will make a reservation pick and drop.*
2. *Customers are very difficult when will make a reservation Empty Run.*
3. *Customers difficulty to find information on the availability of the empty run fleet at the company F-TRANS Bandung.*
4. *The F-Trans driver finds it difficult to know the customer pick-up route information for the empty run service.*

2.4 Method of Picking Route Determination

The method applied to provide pickup routes is the method of TSP (Traveling Salesman Problem) is a problem where a salesman must visit all cities where each city is visited only once, and he must start from and return to his hometown. The goal is to determine the route with the minimum distance or the minimum cost.

Implementation of TSP (Traveling Salesman Problem) Method on Application Determination of Pick and drop Seat Route In Pick and drop Service And Empty run in F-Trans Bandung is as follows:

1. *Determination of Pick and drop Pick Up Route*

a. *Customers make pick and drop reservations with fleet locations that is on Jl. Be measured with the goal to Monas.*
b. *Departure time at 07.00 WIB with estimated time to destination at 10.00 WIB, then the system will show that there is empty run service at 10.00 WIB.*

c. *With a distance to the destination of 154 Km In the above explanation Pick and drop pickup route can be seen in table 2.1 Examples of Route Determination At Empty Run Service and in Figure 2.1 Route Jl. Being taken to Monas.*

Table 1 Example Route Determination At Empty Run Service

No	Lokasi Penjemputan	Lokasi Tujuan	Jarak	Waktu Keberangkatan	Waktu Sampai Tujuan	Eptimasi Waktu
1.	Jl.Dipatiukur	Monas	154Km	07.00 WIB	10.00 WIB	2 Jam 45 Menit

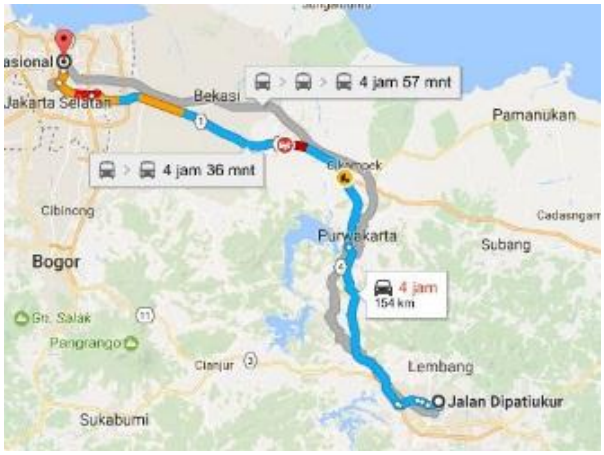


Figure 1. Route Jl. Dipatiukur taken to Monas

2. *Determination of Empty run location*

a. *Customer has finished pick and drop.*

b. *The empty run page on the system will display the F-Trans fleet that is closest to the customer's location.*

c. *With the estimated time until the destination to monas is at 10.00 am.*

d. *After that the customer can book the fleet based on the location of the nearest fleet. In the above explanation of Empty run location determination can be seen in table 3.2 Estimation of Pick and drop Time.*

Table 2 Pick and drop Time Estimates

No	Lokasi Tujuan	Estimasi Waktu	Jarak	Kode Armada
1.	Jl. Dipatiukur	Monas	154Km	D 9980 BX

3. *Determination of Customer Pickup Route*

a. *The customer has completed an empty run reservation on the system*

b. *F-Trans Bandung driver will pick up the customer based on the nearest route*

c. *The closest route determination is calculated based on driver's distance with customer by using Google API Directions to determine driver's distance with customer*

d. *The system will determine the shortest route for the driver to pick up the customer by TSP method (Traveling Salesman Problem). In the above explanation Determination of customer pick up route can be seen in table 2.3 Customer Details Ordering Service Empty Run and in Figure 2.4 Calculation of Fleet Distance With Customers.*

Table 3 Customer Details Ordering Empty run Service

No	Lokasi Pelanggan	Nama Pelanggan	Node	Lokasi Armada
1.	Jl.Perwira	F-Trans	A	Jl.Perwira
2.	Jl. Pasar Baru	Eva	B	
3.	Jl. Kepu Timur	Tina	C	
4.	Jl. Senen Raya	Aslan	D	
	Jumlah Pelanggan Keseluruhan	4	4	

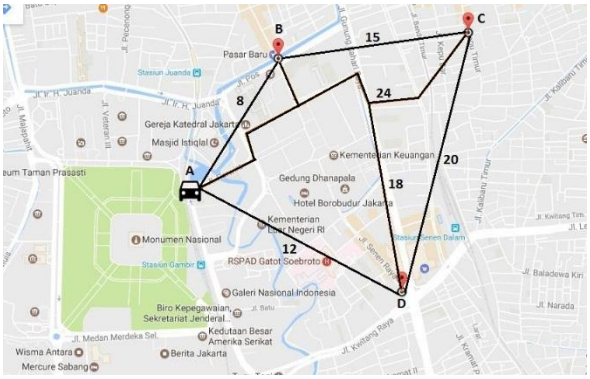


Figure 2 Calculating Fleet Distance With Customers

The graph above has 4! / 2 (4) = 3 circuits or 4 customer pick-up points. Suppose that node A is where the start of a fleet journey begins. Enumerate all circuits as follows:

So:

| 1 = (A, B, C, D, A) ➔Length = 8 + 15 + 20 + 12 = 55

| 2 = (A, C, D, B, A) ➔Length = 24 + 20 + 18 + 8 = 70

| 3 = (A, C, B, D, A) ➔Length = 24 + 15 + 18 + 12 = 69

Thus, the shortest circuit is I1 = (a, b, c, d, a) with the length of the circuit = 8 + 15 + 20 + 12 = 55.
From the above explanation can be concluded that the pick up of customers can be started from the place of origin Armada F-Trans, Jl. Pasar Baru, Jl.Kepu Timur then to Jl. Senen Raya and the fleet return to the starting point of the F-Trans fleet. In table 3.4 is the customer pickup table that must be passed first.

Table 4 Customer Pickup Table

No	Lokasi Pelanggan	Nama Pelanggan	Node	Lokasi Armada
1.	Jl.Perwira	F-Trans	A	Jl.Perwira
2.	Jl. Kepu Timur	Eva	B	
3.	Jl. Pasar Baru	Tina	C	
4.	Jl. Senen Raya	Aslan	D	
5.	Jl.Perwira	F-Trans	A	

2.2 System Architecture Analysis

System architecture analysis aims to identify the architecture to be built based on two web and mobile subsystems.

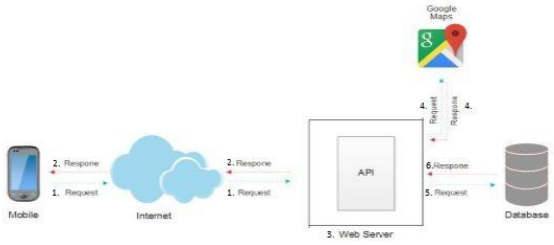


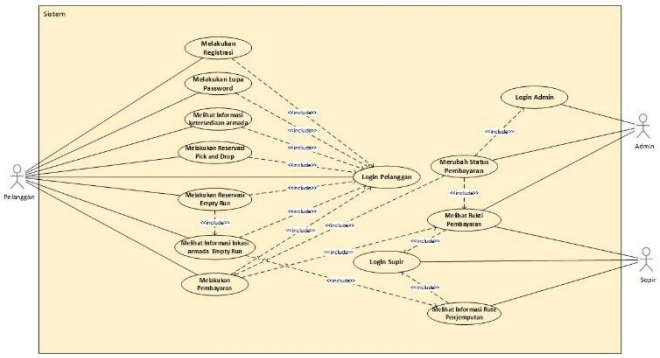
Figure 3 Software architecture on the mobile platform

Here is a description of the image above:

1. *Mobile device users request data to the web server through the API.*
2. *The Web server receives a data request and determines the type of request requested.*
3. *If the web server accepts the location request then the server calls the Google Maps URL to get the coordinates.*
4. *Google Maps sends the results of respone to the server.*
5. *If the web server receives a data request then the web server will retrieve the data in the database.*
6. *Once the web server receives the requested data, the data will be returned in the form of JSON for user-processed mobile device.*

2.5 Use Case Diagram

Use Case Diagram is a construction to describe the relationships that occur between actors with the activities contained in the system. From the analysis of existing application users then use case diagram on the mobile platform can be seen in the following figure.



Gambar 4 Use Case Diagram

2.6 Scheme Relation

Relation Scheme is a series of relationships between two or more tables in the database system. Figure 2.7 Relation Scheme is a description of the database sequence in the development of this application.

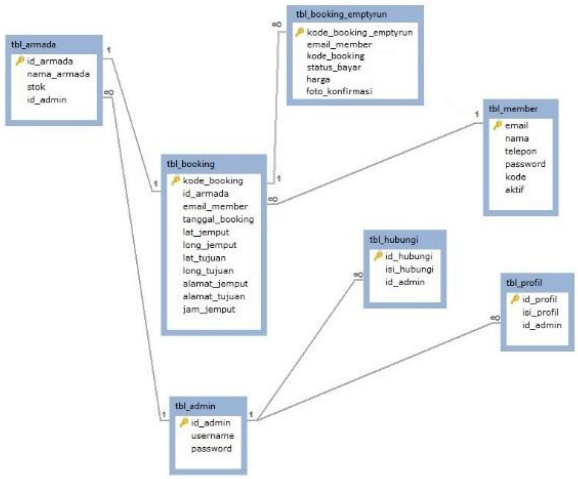


Figure 5 Relation Scheme

2.7 Menu Structure Design

The design of the menu structure that will be discussed in this section includes the design of the menu on the application F-Trans Bandung. Here is an explanation:

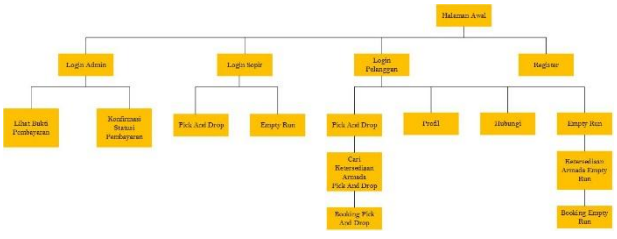


Figure 6 Menu Structure Design

2.8 Interface Design

Interface design describes the appearance of each form that will be used in the application display F-Trans Bandung. The user on this system is the customer. Here is the design of F-Trans Bandung application interface.

1. *Initial Interface Design*

The design of the initial interface is the first page of the application when the user opens the application.

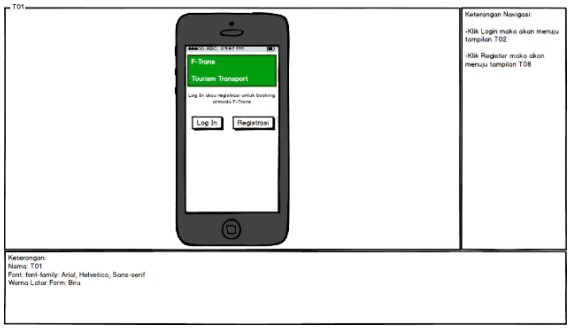


Figure 7 Initial Interface

2. *Login Interface Design*

The design of the log-in interface is the page when the user accesses the login page.

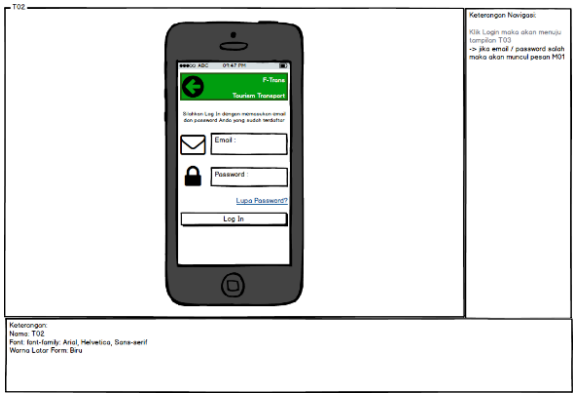


Figure 8 Login Interface

3. *Home Interface Design*

The design of the home interface is the page when the user accesses the home page.

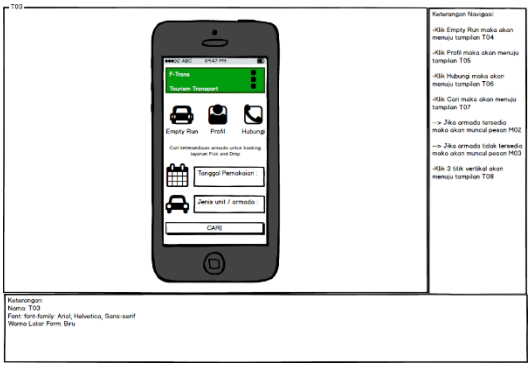


Figure 9 Home Interface

4. *Interface Design Empty run*

The design of the empty run interface is the page when the user accesses the empty run page.

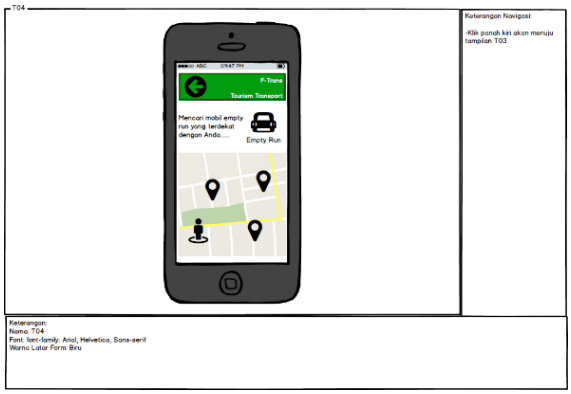


Figure 10 Home Interface

5. *Designing a Profile Interface*

The profile interface design is the page when the user accesses the profile page.

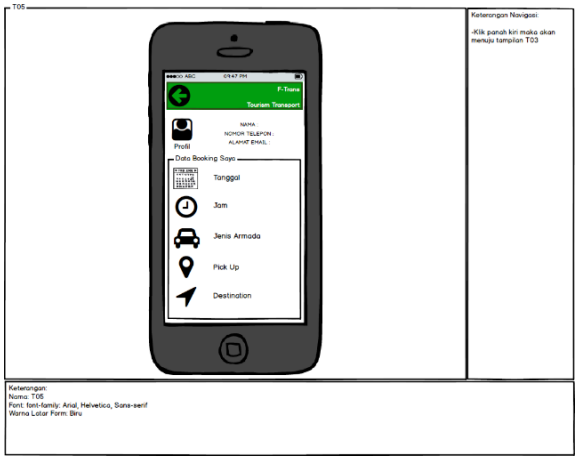


Figure 11 Profile Interface

6. *Contact Interface Design*

Contact interface design is the page when the user accesses the contact page.



Figure 12 Profile Interface

7. *Designing Fleet Booking Interface*

The design of the fleet search interface is the page when the user accesses the fleet booking page.



Figure 13 Armada Booking Interface

8. *Designing Interface Settings*

The design of the settings interface is the page when the user accesses the settings page.

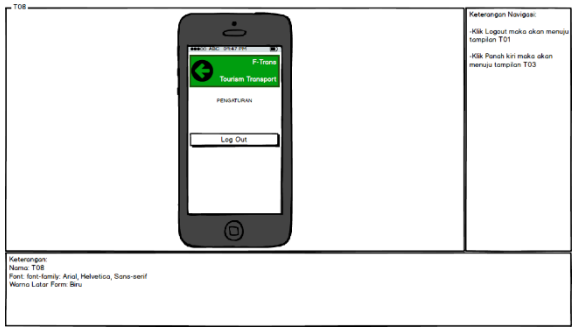


Figure 14 Interface Settings

9. *Designing Interface Registration*

The design of the registration interface is the page when the user accesses the registration page.



Figure 15 Registration Interface

10. *Designing Interface Booking Empty Run*

The design of the Empty Run Booking interface is the page when the user accesses the Empty Run Booking page.



Figure 16 Empty Run Booking Interface

11. *Upload Payment Proof Upload Design*

The design of the Upload Proof of Payment interface is the page on which the user accesses the Proof of Payment Upload page.

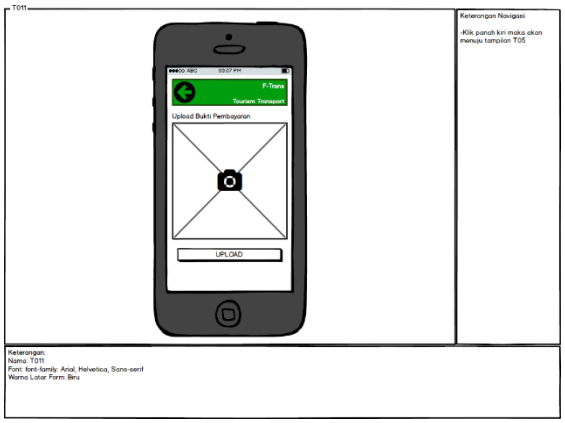


Figure 17 Upload Proof Payment Interface

12. Driver Login Interface Design

Designing the Login interface The driver is the page when the user accesses the Driver Login page.

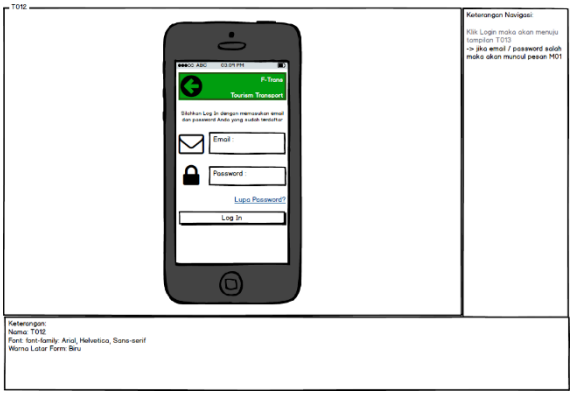


Figure 18 Driver Login Interface

13. Designing the Driver Home Page Interface

Designing the Main Page interface The driver is the page when the user accesses the Main Page of the Driver page.

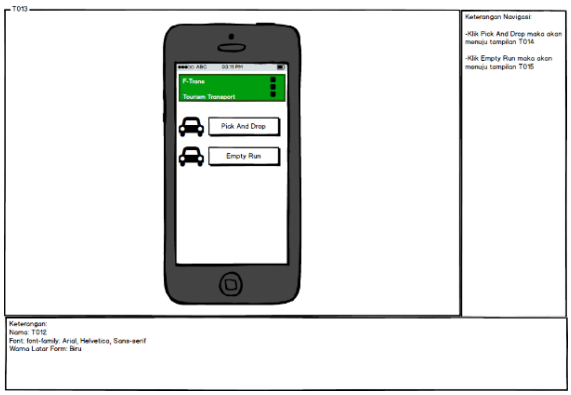


Figure 19 The Driver Home Interface

14. Page Interface Design See Empty Run Pickup Route

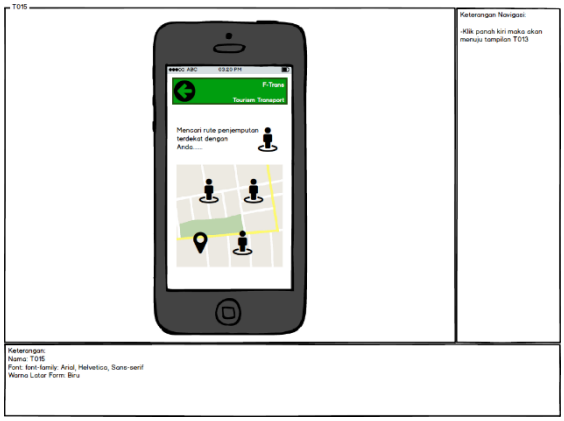


Figure 20 Interface View Empty Run Pickup Route

15. Interface Design Admin Login

The design of the Admin Login page is the page when the user accesses the Admin Login page.

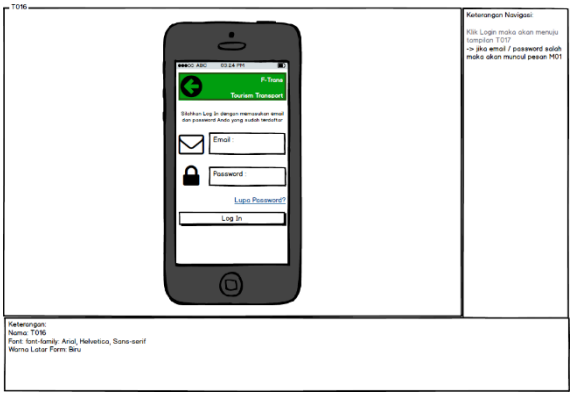


Figure 21 Admin Login Interface

16. Interface Designing Admin Home

Interface Design Admin page is the page when the user access the Admin Main page.

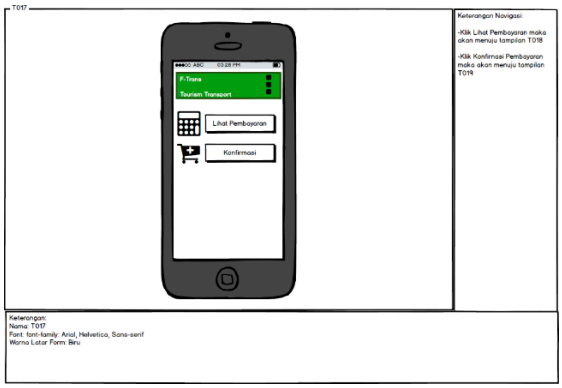


Figure 22 Interface Admin page

17. Interface Design View Payment

Designing the View Page View Payment interface is the page when the user accesses the View Payment page.

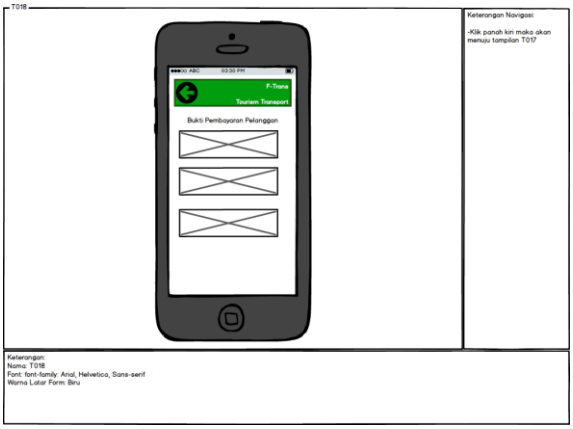


Figure 23 View Payment Interface

2.9 Semantic Network Design

Semantic network design is a picture of graphical knowledge that shows the relationship between various objects, consisting of circles associated with arrows that show objects and information about these objects. The following is a semantic network on the F-Trans Bandung app:

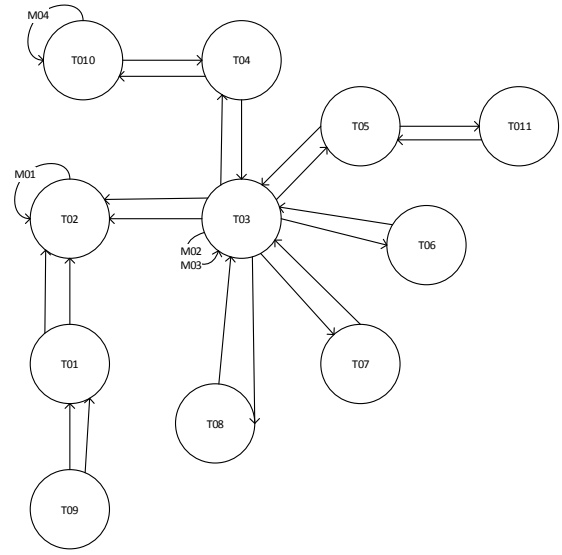


Figure 24 Customer Semantic Network

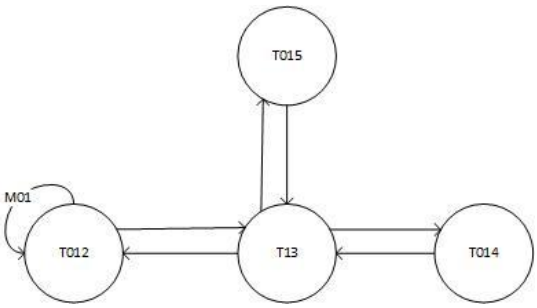


Figure 25 Semantic Network Driver

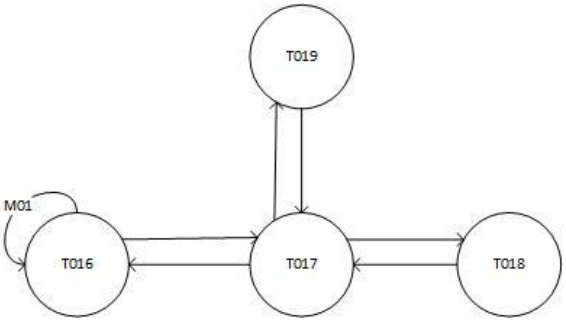


Figure 26 Semantic Network Admin

Table 5 Description of Display Network Semantics

Display Code	*Description*
T01	*Initial Interface*
T02	*Login Interface*
T03	*Home Interface*
T04	*Empty Run Interface*
T05	*Profile Interface*
T06	*Interface Contact*
T07	*Interface Booking Pick And Drop*
T08	*Interface Settings*
T09	*Registration Interface*
T010	*Interface Booking Empty Run*
T011	*Upload Proof of Payment Interface*
T012	*Driver Login Interface*
T013	*Driver Home Interface*
T014	*Interface Page View Pick And Drop Driver*
T015	*Interface Page View Empty Run Driver*
T016	*Admin Login Interface*
T017	*Interface Admin Home Page*
T018	*View Payment Interface*
T019	*Payment Confirmation Interface*
M01	*The design of the failed login message*
M02	*Fleet Message Design Available*
M03	*Fleet Message Design Not Available*
M04	*Message Design Successful Fleet Empty Run Order*

2.10 Conclusion Alpha Testing

Based on the results of software testing conducted it can be concluded that the FTransApp software on the built android platform is running as expected both in terms of validation and error handling process.

2.11 Conclusion Beta Testing

Based on the results of beta testing, it can be concluded that:

1. *Customers strongly agree Application FTransApp can help to make reservations Pick And Drop at F-Trans Bandung.*
2. *Customers strongly agree FTransApp application can help to make reservation Empty Run in F-Trans Bandung.*
3. *Customers strongly agree FTransApp application can help to obtain information availability Empty Run in F-Trans Bandung.*
4. *Customers strongly agree FTransApp application can help to obtain information on the availability of fleet Pick And Drop in F-Trans Bandung.*
5. *Customers strongly agree FTransApp application can help to get information about the fleet of the nearest Empty Run in F-Trans Bandung.*
6. *The F-Trans driver strongly agrees The FTransApp application can help to find out customer information.*
7. *The F-Trans driver strongly agrees FtransApp Application can help to simplify F-Trans driver knowing the customer's location to pick up.*

3. CLOSING

3.1 Conclusions

Based on the results of Application Determination Penempatan Pick And Drop And Seat Route On Pick And Drop Service And Empty Run In F-Trans Bandung Based Android this then obtained the following conclusion:

1. *Software built to help customers to make reservations Pick And Drop in F-Trans Bandung without having to come to the place of F-Trans Bandung company.*
2. *The software built to help customers to make reservations Empty Run in F-Trans Bandung without having to contact the F-Trans Bandung.*
3. *The built software can help customers to find out the availability information of Empty Run fleet in F-Trans Bandung.*
4. *The built software can help F-Trans driver get customer availability information and pickup route for Empty Run service.*

3.2 Suggestions

Suggestions that can be given to the development of systems that have been made for further system development are:

1. *Applications for users can only run on one platform, namely android. We recommend that apps can also be developed on other platforms in order to expand users in using this software.*
2. *Improving the ease in the use of software so that more user friendly.*
3. *Develop software in terms of performance to improve access from users to applications.*

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