



Business Requirements Document

4th May 2018

Morakane Kepa	19393652
Steph Goode	18977812
Jacques Jordaan	18977979
Pieter-Dirk Strauss	10625436

Contents

1. Version Control.....	1
1.1 Revision History	1
1.2 RACI Chart.....	1
1.3 RACI Chart Codes	1
2. Executive Summary.....	2
2.1 Overview	2
2.2 Background	2
2.3 Objectives	3
2.4 Requirements.....	3
2.5 Proposed Strategy	3
3. Scope	4
3.1 Included in scope	4
3.2 Excluded from scope.....	6
3.3 Constraints.....	7
4. Risk Analysis	7
5. Business case.....	8
5.1 Problem.....	8
5.2 Proposed Solution.....	8
5.3 Justification	9
5.4 Organisational Factors	9
5.5 Market Share Benefits.....	9
5.6 Project Assumptions	10
6. Timetable.....	10
7. Business use cases	11
7.1 Business Use Case Diagrams.....	11
7.2 Business Use Case Descriptions	12
7.2.1 Connect driver with passengers	12
7.2.2 Connect passengers with drivers.....	13
.....	13
8. Actors	14

8.1	Workers.....	14
8.2	Business Actors	14
8.3	Other Systems	14
8.4	Role Map.....	15
9.	User Requirements.....	16
9.1	Systems Use-Case Diagrams	16
9.2	Systems Use-Case Descriptions.....	17
10.	State Machine Diagrams	28
11.	Non-functional Requirements	38
11.1	Performance Requirements	38
11.2	Usability Requirements	38
11.3	Security Requirements.....	38
11.4	Safety Requirements.....	38
11.5	Volume and Storage Requirements	38
11.6	Configuration Requirements.....	39
11.7	Backup/Recovery Requirements.....	39
11.8	Scalability Requirements.....	39
11.9	Availability Requirements	39
12.	Business Rules.....	39
13.	State Requirements.....	41
13.1	Driver	41
13.1.1	Idle.....	42
13.1.2	Pending	42
13.1.3	Confirmed.....	42
13.1.4	Complete	42
13.2	Passenger.....	42
13.2.1	Idle.....	43
13.2.2	Pending	43
13.2.3	Confirmed.....	43
13.2.4	Complete	43
13.3	Trip.....	44
13.3.1	Pending	44

13.3.2	Confirmed	44
13.3.3	Cancelled.....	44
13.3.4	Transit.....	44
13.3.5	Complete	45
14.	Structural Model	45
14.1	Class Diagram.....	45
14.2	Entity Class Documentation	Error! Bookmark not defined.
15.	Test Plan	46
15.1	Requirements.....	47
15.2	Testing	48
16.	Implementation Plan.....	51
16.1	Training and Job Scheduling.....	51
16.2	Rollout.....	51
17.	End-User Procedures	52
18.	Post-Implementation Follow-up	52
19.	Glossary	52

1. Version Control

This section allows the development team and project manager to implement change control. It enables participants to track changes in requirements of the project, who made them and when they were made.

1.1 Revision History

Version #	Date	Authorization	Responsibility(Author)	Description
1.0	04/05	Morakane Kepa	Project Manager	Initial Draft

1.2 RACI Chart

This chart identifies team members who need to be consulted when certain changes are made to this document. It assists in assigning roles and responsibilities to project members.

The Huddle project team consists of 4 members with interlinking roles. Morakane Kepa is the chosen project manager. The team engages in constant collaboration and communication with equal involvement of all members.

RACI Chart Codes

R (Responsible)

A (Accountable)

S (Supports)

C (Consulted)

I (Informed)

Task	Morakane Kepa	Jacques Jordaan	Pieter-Dirk Strauss	Stephanie Goode	Mr. Warren
Gathering requirements	R	R	R	R	I
Changing requirements	R	S	S	S	I
Managing team	R				
Designing System	R	R	R	R	I
Testing System	S	R	S	S	I
Analysing market	C	C	R	C	I
Implementation planning	R	R	R	R	I
Final approval	C	C	C	C	R
Post-implementation procedures	R	R	R	R	I

2. Executive Summary

3. Overview

Huddle is a web based platform designed to enable ride sharing among people travelling to and from Stellenbosch and neighbouring towns. The aim being to reduce the number of vehicles on main roads causing traffic while ensuring that commuters reach their destination in a timely and efficient manner. To achieve this, Huddle allows drivers and passengers to request each other for trips.

3.1 Background

Mr. Warren is a successful entrepreneur with numerous businesses located all over the Western Cape. He travels to Stellenbosch from Somerset West twice a week to check on his businesses in Stellenbosch. On his journeys to Stellenbosch, he is consistently stuck in traffic, which results in him having to reduce the number of activities he can do in a day.

Mr Warren, frustrated by the traffic and it causing a decrease in his productivity on those two days a week, approached four young developers studying at Stellenbosch University

for a solution. The developers saw it fit to develop a web based service called Huddle to encourage ride sharing in Stellenbosch and neighbouring towns in order to reduce traffic.

3.2 Objectives

The main objective of Huddle is to reduce the number of cars on the road, by encouraging individuals to share rides with each other. Through encouraging carpooling, it is assumed that traffic going into Stellenbosch and from Stellenbosch will be reduced. Not only will Huddle reduce the number of cars on the road, it will also reduce emissions and encourage a sense of community among commuters.

3.3 Requirements

Huddle will allow users to provide information during sign up that users can later edit to suit the role they wish to play, which can be either driver or passenger. Passengers and drivers should be able to play any role provided they have the needed information. When a passenger requests a trip it is referred to as a passenger request and when a driver requests passengers, it is referred to as a driver opportunity. Both passengers and drivers should be able to approve companions. Once a trip is scheduled, travellers should be able to communicate with each other about the logistics of the trip in a group chat. The service will allow both passengers and drivers to rate each other and provide feedback about the service at the end of each trip.

To encourage people to use the service, passengers will make a monetary offer to drivers. To ensure efficient accounting in the service, each user will have an account. Each passenger will be expected to load a certain amount of money in their account before participating in trips. After the completion of a trip, the trip cost will be deducted from passenger accounts and deposited into the driver's account.

3.4 Proposed Strategy

Being that novice developers are developing Huddle, a large amount of time will be spent on understanding the requirements of the service. To bridge the knowledge gap, the Huddle team will study similar services and consult regularly with Mr. Warren. Based on the requirements that the team identifies, they will proceed to develop the service one feature at time. After the development of a feature, it will undergo user testing to ensure

that it works as intended and users are satisfied. The whole service will be tested after the implementation of a feature to ensure that features are well integrated.

Once the first version of Huddle has been developed, the Scrum methodology will be used to develop future versions. Sprint goals will be based on developments in similar services and user feedback on previous versions.

4. Scope

The project involves the design and development of a ride sharing application as a solution to reduce traffic in Stellenbosch. The business areas that are included and excluded in the scope of the project are mentioned below.

4.1 Included in scope

Users of Huddle include passengers and drivers. Before using the application, they will be able to create an account which specifies various personal details. A user's profile can be viewed by potential drivers and passengers before a trip begins, in order to provide a choice of who the user rides with.

Huddle will use a flexible payment system, thus providing an incentive for people to use the application. Users will be able to load money onto their account which they can then spend on trips or redeem. They can also view their account details such as their previous transactions and current balance.

Huddle makes use of specific pick up and drop off zones. These are visualised on a map that all users can view. When a driver wants to find passengers for their trip, they have to create an opportunity for passengers to join their ride. This opportunity specifies their starting and pick-up zones and the time that they are leaving. When passengers want to find a lift, they can create a request that specifies their pick-up, drop-off zones and time that they wish to leave. Drivers and passengers are matched by the system using details provided in these requests.

Passengers can also specify an offer, which is the amount that they are willing to pay for the trip. There is no minimum or maximum amount for the payment. Once the trip is complete, the passenger's payment will get transferred to the driver's account.

Passengers can specify how many people wish to take the trip. The driver can see this number and decide how many seats to fill up in their car.

Once a driver has created an opportunity, Huddle will provide a list of passengers that they have been matched with. These passengers are ordered with the highest offer at the top. Before they select their passengers and confirm the trip, they will be able to view all of the passenger's profiles and information.

Passengers seeking a driver will go through the same selection process. They will be able to view and select drivers that they have matched with.

The time specified in requests is flexible. The system will provide users with a list of trip companions wishing to start their trip an hour before and an hour after specified start times in order to provide the user with more options.

When the driver decides that they have enough passengers in their car, they can confirm the trip. This however has to occur an hour before the trip is set to begin. A notification will be sent to the driver an hour before the trip starts as a reminder, and if they do not confirm the trip will automatically be cancelled.

When a trip is confirmed, Huddle creates a temporary group chat for that specific trip. This allows the driver and all passengers to stay in contact before the trip begins. This group is deleted once the trip ends.

Huddle was designed with user safety in mind in order to make people more willing to use it. This is encompassed in the ability to view someone's profile before sharing a trip with them. There is also a panic button that users can press during a trip. This sends an email to the manager and the manager will handle it accordingly.

After each trip, the driver rates all the passengers and the passengers rate the driver. These ratings serve as a safety measure and can be used by other users as an indication of this person's ride sharing suitability. However, a driver's rating differs from a passenger's rating. A driver's rating is based on their driving abilities and how responsible they are when driving. Whereas a passenger's rating is based on their likeability and how safe the driver felt with them in their car.

To enhance driver and passenger comfort, users are also allowed to favourite drivers and passengers that they felt safe with and enjoyed sharing a ride with. When a driver or passenger is searching for trip companions, their favourites will appear at the top of the suggested options in order to make the selection process easier. All communication occurs within the application and sensitive information such as email addresses and cell phone numbers are kept confidential.

4.2 Excluded from scope

Although users can load money and pay for trips using the application, financial transactions are handled externally by PayFast, a secure online payment company. This external company conducts authorisation, confirms payments and communicates with the user's bank account.

Specific trips are not tracked by the application. In other words, a real time GPS location of the car will not be available to users. However, users on a trip group can still communicate their location through group messaging.

Once Huddle has been created, it has to be advertised in order to attract customers. This will be handled by an external advertising agency and therefore does not fall into the scope of the project.

If a criminal incident occurs during a trip, Huddle is not responsible. The affected party can simply give the perpetrator a bad rating or communicate the incident with the manager, who can then manually remove the criminal user from the system.

If riders wish to pay cash for their rides, they can do so independently of Huddle and can communicate to others through the use of the group chat feature.

Since Huddle Ltd is a non-profit venture funded by Mr Warren, he will communicate with the development team about estimated and ongoing costs of development and record them in his own separate document. The financial breakdown of the project is not relevant to this document.

4.3 Constraints

There are many constraints which can limit the success of this project. Time is a significant constraint as there are strict deadlines. The planning phase is limited to two weeks and has to be completed by 4 May 2018. The implementation phase is limited to 4 weeks and the final product has to be completed by 1 June 2018.

The creators are students and therefore have limited resources to create the application, even though adequate resources are supplied by Stellenbosch University. The development team only consists of 4 members. Since the creation of this application is for learning purposes, limits on programming ability exist.

5. Risk Analysis

Risk ID	Description	Likelihood Of Occurrence	Strategy
System Breach	Hackers trying to intrude the system	Low	Put security measures in place to avoid hacking from occurring and decrease access to outside users
Bugs	Bugs are programming errors which output incorrect information or perform incorrect processes.	High	Test at each level of development for bugs. This decreases the likelihood of bugs as well as integration problems.
Database error/ Information loss	The database can crash which will lead to mass loss of data. If information is lost the system can have major failures. Causing the system to crash.	Low	Ensure that backups of the data is made and the integrity of the database is strong enough to handle the data stored within it.
Competition	This is other systems which target the same user as our system. They can steal clients and render our system useless.	High	Ensure that other systems are constantly monitored and run updates and improvements regularly.

Data Breach	When sensitive data gets accessed by unauthorised hackers.	Low	Create safety protocols and encourage users to follow safe user information protection measures.
Online Storage	Storing information through an online provider requires major trust in that provider.	High	Select a well rated company and ensure that their policies are secure and that the data saved on their servers will be safe.
Heavy Design	This is UI and UX design. Designers play around with how the system will look and how users will interact with it.	High	Developers should focus on functionality first and then focus on the design at the end to ensure that the main features are built in time and a quality product can be delivered.

6. Business case

The aim of this project is to reduce traffic in Stellenbosch by providing a platform for ride sharing in the form of a web application. The business rationale for the project is described below.

6.1 Problem

Stellenbosch is a small town with a large population. Thousands of people drive into and around Stellenbosch every day to get to work or to the university. Whether these people live in Stellenbosch or commute from the surrounding areas, there is traffic throughout the day which many find to be inefficient and frustrating.

6.2 Proposed Solution

Huddle provides a solution to this traffic problem in Stellenbosch by providing a ride sharing platform. It connects drivers and passengers based on the routes that they will be taking. It allows these connected parties to plan a trip together and communicate safely through the use of a group chat. The application will be user friendly and safe. Various security measures are enforced such as a panic button and a rating system. Huddle will also enable users to meet new people and build a safe community based on trust.

Huddle adopts a free market approach of payment, where passengers specify how much they are willing to pay for a specific route and drivers can select passengers to join their trip based on this. The involvement of payments provides an incentive for people to use Huddle. This increased ride sharing will result in less cars on the road and thus alleviate Stellenbosch's traffic problem.

6.3 Justification

In today's society, people rely on their mobile devices and the internet for communication and everyday activities. It is therefore appropriate that Huddle is being created as a web application. It does not require user download or App Store compatibility. The absence of an App Store also results in a cost saving, since no App Store fees are required. Huddle can be used on a range of devices such as smartphones, iPads, laptops and desktop computers. Huddle will be easily accessible to anyone possessing these devices and an internet connection.

South Africa, when compared to the rest of the world, does not have a wide range of public transportation options. This is also the case in Stellenbosch, where traveling by car is the only option. Huddle presents a new transportation option that is easy to use and easy to access. It also benefits the environment by reducing the amount of harmful substances released by cars.

6.4 Organisational Factors

Huddle Ltd is a non-profit organisation created for the purpose of developing the Huddle web application. As previously mentioned, it is funded by Mr Warren, a private investor. Employees include the development team which consists of 4 members. A manager has also been hired to deal with non-technical aspects of the project. Because it is new, the organisation still has to develop operating norms, best practices and formal business processes.

6.5 Market Share Benefits

Huddle is a brand new product entering the market. The market for carpooling applications in South Africa is not yet mature and the companies participating in it are young (Accelerate Cape Town, 2018). Carpooling applications are not widely used

amongst the South African public, with only 2% of commuters adopting them country wide. Other significant South African carpooling applications include UGoMyWay, CarTrip and JumpInRides, but none of them are hugely successful ([Jackson](#), 2017).

The international giant, Uber, also presents some competition. They are however not a direct competitor since they are not a carpooling application. They are a profitable organisation where drivers are employed. This differs to Huddle where the core idea is more about sharing than employment and profit. In Huddle, the cost of a trip is lower and more of a tip than a petrol or profit compensation, as it is with Uber. A passenger can even ride for free using Huddle, if the driver accepts them.

Due to the low usability of carpooling applications in South Africa and the lack of competitor success, the state of the market is beneficial to Huddle. When Huddle launches, it will have an opportunity to gain a significant market share.

6.6 Project Assumptions

The following assumptions apply to Huddle:

- The application is only scaled to be applied to Stellenbosch and surrounding areas
- The software and technology used by the development team is suitable for building web applications
- Enough funds are provided by the investor to support the development team in building the application
- People in Stellenbosch are interested in ride sharing and reducing traffic

7. Timetable

This timetable is a planning mechanism for the development team that depicts all the relevant start and completion dates of each project phase. This is useful because it provides the developers with set goals.

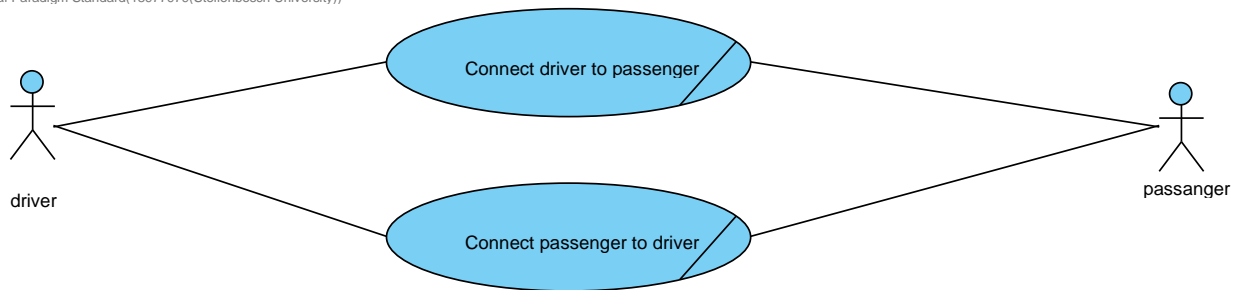
Phase	Start Date	Completion Date
Planning	23 rd April 2018	4 th May 2018

<ul style="list-style-type: none"> • Analysis of requirements • System design • BRD creation 		
Technology Stack Selection	7 th May 2018	11 th May 2018
Development	11 th May 2018	1 st June 2018

8. Business use cases

8.1 Business Use Case Diagram

Visual Paradigm Standard(18977979(Stellenbosch University))

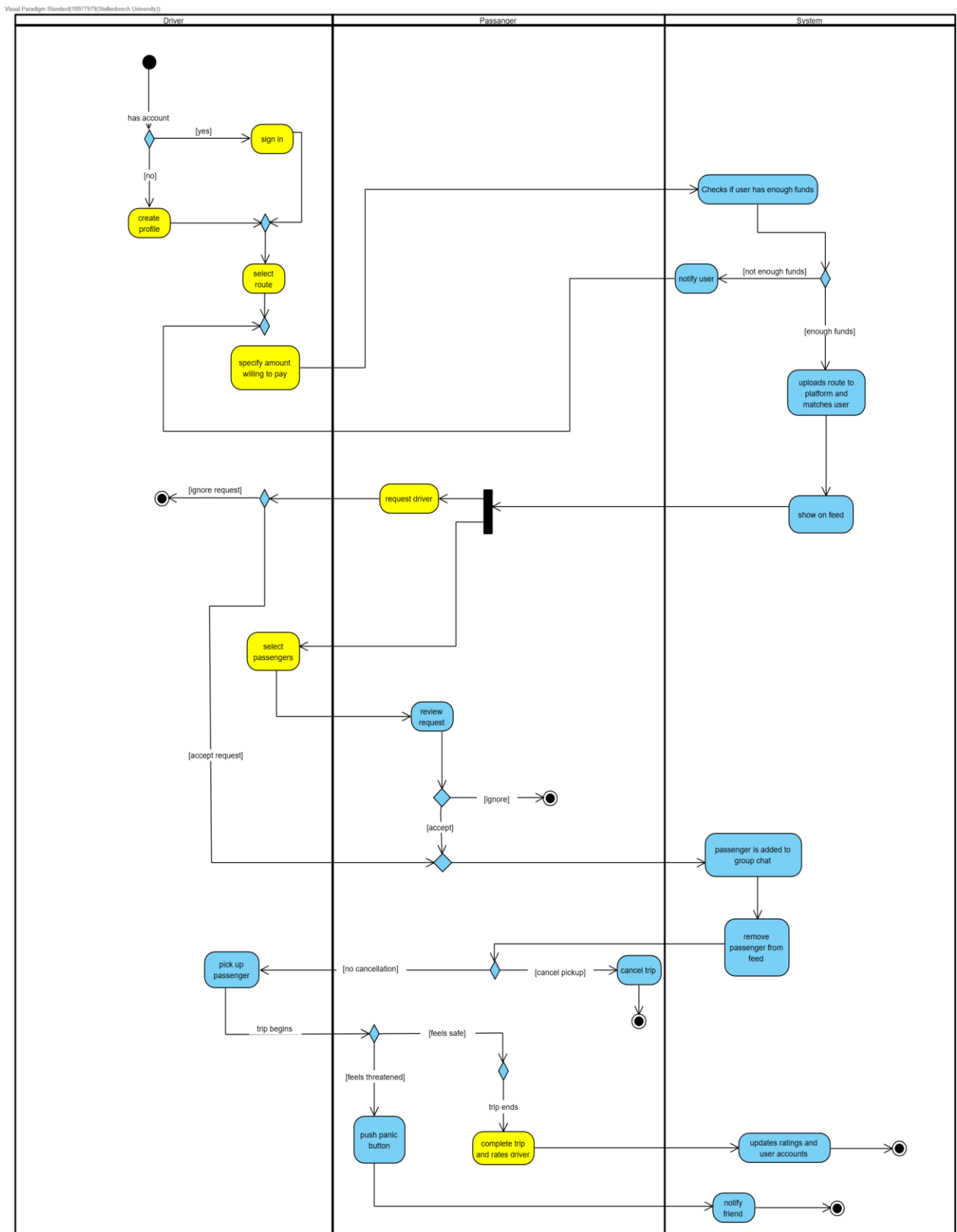


8.2 Business Use Case Descriptions

8.2.1 Connect driver with passengers

Visual Paradigm: Standard (1997/1998/2004/2008/2010/2012/2014/2016/2018/2020/2022/2024/2026/2028/2030/2032/2034/2036/2038/2040/2042/2044/2046/2048/2050/2052/2054/2056/2058/2060/2062/2064/2066/2068/2070/2072/2074/2076/2078/2080/2082/2084/2086/2088/2090/2092/2094/2096/2098/2100/2102/2104/2106/2108/2110/2112/2114/2116/2118/2120/2122/2124/2126/2128/2130/2132/2134/2136/2138/2140/2142/2144/2146/2148/2150/2152/2154/2156/2158/2160/2162/2164/2166/2168/2170/2172/2174/2176/2178/2180/2182/2184/2186/2188/2190/2192/2194/2196/2198/2200/2202/2204/2206/2208/2210/2212/2214/2216/2218/2220/2222/2224/2226/2228/2230/2232/2234/2236/2238/2240/2242/2244/2246/2248/2250/2252/2254/2256/2258/2260/2262/2264/2266/2268/2270/2272/2274/2276/2278/2280/2282/2284/2286/2288/2290/2292/2294/2296/2298/2300/2302/2304/2306/2308/2310/2312/2314/2316/2318/2320/2322/2324/2326/2328/2330/2332/2334/2336/2338/2340/2342/2344/2346/2348/2350/2352/2354/2356/2358/2360/2362/2364/2366/2368/2370/2372/2374/2376/2378/2380/2382/2384/2386/2388/2390/2392/2394/2396/2398/2400/2402/2404/2406/2408/2410/2412/2414/2416/2418/2420/2422/2424/2426/2428/2430/2432/2434/2436/2438/2440/2442/2444/2446/2448/2450/2452/2454/2456/2458/2460/2462/2464/2466/2468/2470/2472/2474/2476/2478/2480/2482/2484/2486/2488/2490/2492/2494/2496/2498/2500/2502/2504/2506/2508/2510/2512/2514/2516/2518/2520/2522/2524/2526/2528/2530/2532/2534/2536/2538/2540/2542/2544/2546/2548/2550/2552/2554/2556/2558/2560/2562/2564/2566/2568/2570/2572/2574/2576/2578/2580/2582/2584/2586/2588/2590/2592/2594/2596/2598/2600/2602/2604/2606/2608/2610/2612/2614/2616/2618/2620/2622/2624/2626/2628/2630/2632/2634/2636/2638/2640/2642/2644/2646/2648/2650/2652/2654/2656/2658/2660/2662/2664/2666/2668/2670/2672/2674/2676/2678/2680/2682/2684/2686/2688/2690/2692/2694/2696/2698/2700/2702/2704/2706/2708/2710/2712/2714/2716/2718/2720/2722/2724/2726/2728/2730/2732/2734/2736/2738/2740/2742/2744/2746/2748/2750/2752/2754/2756/2758/2760/2762/2764/2766/2768/2770/2772/2774/2776/2778/2780/2782/2784/2786/2788/2790/2792/2794/2796/2798/2800/2802/2804/2806/2808/2810/2812/2814/2816/2818/2820/2822/2824/2826/2828/2830/2832/2834/2836/2838/2840/2842/2844/2846/2848/2850/2852/2854/2856/2858/2860/2862/2864/2866/2868/2870/2872/2874/2876/2878/2880/2882/2884/2886/2888/2890/2892/2894/2896/2898/2900/2902/2904/2906/2908/2910/2912/2914/2916/2918/2920/2922/2924/2926/2928/2930/2932/2934/2936/2938/2940/2942/2944/2946/2948/2950/2952/2954/2956/2958/2960/2962/2964/2966/2968/2970/2972/2974/2976/2978/2980/2982/2984/2986/2988/2990/2992/2994/2996/2998/3000/3002/3004/3006/3008/3010/3012/3014/3016/3018/3020/3022/3024/3026/3028/3030/3032/3034/3036/3038/3040/3042/3044/3046/3048/3050/3052/3054/3056/3058/3060/3062/3064/3066/3068/3070/3072/3074/3076/3078/3080/3082/3084/3086/3088/3090/3092/3094/3096/3098/3100/3102/3104/3106/3108/3110/3112/3114/3116/3118/3120/3122/3124/3126/3128/3130/3132/3134/3136/3138/3140/3142/3144/3146/3148/3150/3152/3154/3156/3158/3160/3162/3164/3166/3168/3170/3172/3174/3176/3178/3180/3182/3184/3186/3188/3190/3192/3194/3196/3198/3200/3202/3204/3206/3208/3210/3212/3214/3216/3218/3220/3222/3224/3226/3228/3230/3232/3234/3236/3238/3240/3242/3244/3246/3248/3250/3252/3254/3256/3258/3260/3262/3264/3266/3268/3270/3272/3274/3276/3278/3280/3282/3284/3286/3288/3290/3292/3294/3296/3298/3300/3302/3304/3306/3308/3310/3312/3314/3316/3318/3320/3322/3324/3326/3328/3330/3332/3334/3336/3338/3340/3342/3344/3346/3348/3350/3352/3354/3356/3358/3360/3362/3364/3366/3368/3370/3372/3374/3376/3378/3380/3382/3384/3386/3388/3390/3392/3394/3396/3398/3400/3402/3404/3406/3408/3410/3412/3414/3416/3418/3420/3422/3424/3426/3428/3430/3432/3434/3436/3438/3440/3442/3444/3446/3448/3450/3452/3454/3456/3458/3460/3462/3464/3466/3468/3470/3472/3474/3476/3478/3480/3482/3484/3486/3488/3490/3492/3494/3496/3498/3500/3502/3504/3506/3508/3510/3512/3514/3516/3518/3520/3522/3524/3526/3528/3530/3532/3534/3536/3538/3540/3542/3544/3546/3548/3550/3552/3554/3556/3558/3560/3562/3564/3566/3568/3570/3572/3574/3576/3578/3580/3582/3584/3586/3588/3590/3592/3594/3596/3598/3600/3602/3604/3606/3608/3610/3612/3614/3616/3618/3620/3622/3624/3626/3628/3630/3632/3634/3636/3638/3640/3642/3644/3646/3648/3650/3652/3654/3656/3658/3660/3662/3664/3666/3668/3670/3672/3674/3676/3678/3680/3682/3684/3686/3688/3690/3692/3694/3696/3698/3700/3702/3704/3706/3708/3710/3712/3714/3716/3718/3720/3722/3724/3726/3728/3730/3732/3734/3736/3738/3740/3742/3744/3746/3748/3750/3752/3754/3756/3758/3760/3762/3764/3766/3768/3770/3772/3774/3776/3778/3780/3782/3784/3786/3788/3790/3792/3794/3796/3798/3800/3802/3804/3806/3808/3810/3812/3814/3816/3818/3820/3822/3824/3826/3828/3830/3832/3834/3836/3838/3840/3842/3844/3846/3848/3850/3852/3854/3856/3858/3860/3862/3864/3866/3868/3870/3872/3874/3876/3878/3880/3882/3884/3886/3888/3890/3892/3894/3896/3898/3900/3902/3904/3906/3908/3910/3912/3914/3916/3918/3920/3922/3924/3926/3928/3930/3932/3934/3936/3938/3940/3942/3944/3946/3948/3950/3952/3954/3956/3958/3960/3962/3964/3966/3968/3970/3972/3974/3976/3978/3980/3982/3984/3986/3988/3990/3992/3994/3996/3998/4000/4002/4004/4006/4008/4010/4012/4014/4016/4018/4020/4022/4024/4026/4028/4030/4032/4034/4036/4038/4040/4042/4044/4046/4048/4050/4052/4054/4056/4058/4060/4062/4064/4066/4068/4070/4072/4074/4076/4078/4080/4082/4084/4086/4088/4090/4092/4094/4096/4098/4100/4102/4104/4106/4108/4110/4112/4114/4116/4118/4120/4122/4124/4126/4128/4130/4132/4134/4136/4138/4140/4142/4144/4146/4148/4150/4152/4154/4156/4158/4160/4162/4164/4166/4168/4170/4172/4174/4176/4178/4180/4182/4184/4186/4188/4190/4192/4194/4196/4198/4200/4202/4204/4206/4208/4210/4212/4214/4216/4218/4220/4222/4224/4226/4228/4230/4232/4234/4236/4238/4240/4242/4244/4246/4248/4250/4252/4254/4256/4258/4260/4262/4264/4266/4268/4270/4272/4274/4276/4278/4280/4282/4284/4286/4288/4290/4292/4294/4296/4298/4300/4302/4304/4306/4308/4310/4312/4314/4316/4318/4320/4322/4324/4326/4328/4330/4332/4334/4336/4338/4340/4342/4344/4346/4348/4350/4352/4354/4356/4358/4360/4362/4364/4366/4368/4370/4372/4374/4376/4378/4380/4382/4384/4386/4388/4390/4392/4394/4396/4398/4400/4402/4404/4406/4408/4410/4412/4414/4416/4418/4420/4422/4424/4426/4428/4430/4432/4434/4436/4438/4440/4442/4444/4446/4448/4450/4452/4454/4456/4458/4460/4462/4464/4466/4468/4470/4472/4474/4476/4478/4480/4482/4484/4486/4488/4490/4492/4494/4496/4498/4500/4502/4504/4506/4508/4510/4512/4514/4516/4518/4520/4522/4524/4526/4528/4530/4532/4534/4536/4538/4540/4542/4544/4546/4548/4550/4552/4554/4556/4558/4560/4562/4564/4566/4568/4570/4572/4574/4576/4578/4580/4582/4584/4586/4588/4590/4592/4594/4596/4598/4600/4602/4604/4606/4608/4610/4612/4614/4616/4618/4620/4622/4624/4626/4628/4630/4632/4634/4636/4638/4640/4642/4644/4646/4648/4650/4652/4654/4656/4658/4660/4662/4664/4666/4668/4670/4672/4674/4676/4678/4680/4682/4684/4686/4688/4690/4692/4694/4696/4698/4700/4702/4704/4706/4708/4710/4712/4714/4716/4718/4720/4722/4724/4726/4728/4730/4732/4734/4736/4738/4740/4742/4744/4746/4748/4750/4752/4754/4756/4758/4760/4762/4764/4766/4768/4770/4772/4774/4776/4778/4780/4782/4784/4786/4788/4790/4792/4794/4796/4798/4800/4802/4804/4806/4808/4810/4812/4814/4816/4818/4820/4822/4824/4826/4828/4830/4832/4834/4836/4838/4840/4842/4844/4846/4848/4850/4852/4854/4856/4858/4860/4862/4864/4866/4868/4870/4872/4874/4876/4878/4880/4882/4884/4886/4888/4890/4892/4894/4896/4898/4900/4902/4904/4906/4908/4910/4912/4914/4916/4918/4920/4922/4924/4926/4928/4930/4932/4934/4936/4938/4940/4942/4944/4946/4948/4950/4952/4954/4956/4958/4960/4962/4964/4966/4968/4970/4972/4974/4976/4978/4980/4982/4984/4986/4988/4990/4992/4994/4996/4998/5000/5002/5004/5006/5008/5010/5012/5014/5016/5018/5020/5022/5024/5026/5028/5030/5032/5034/5036/5038/5040/5042/5044/5046/5048/5050/5052/5054/5056/5058/5060/5062/5064/5066/5068/5070/5072/5074/5076/5078/5080/5082/5084/5086/5088/5090/5092/5094/5096/5098/5100/5102/5104/5106/5108/5110/5112/5114/5116/5118/5120/5122/5124/5126/5128/5130/5132/5134/5136/5138/5140/5142/5144/5146/5148/5150/5152/5154/5156/5158/5160/5162/5164/5166/5168/5170/5172/5174/5176/5178/5180/5182/5184/5186/5188/5190/5192/5194/5196/5198/5200/5202/5204/5206/5208/5210/5212/5214/5216/5218/5220/5222/5224/5226/5228/5230/5232/5234/5236/5238/5240/5242/5244/5246/5248/5250/5252/5254/5256/5258/5260/5262/5264/5266/5268/5270/5272/5274/5276/5278/5280/5282/5284/5286/5288/5290/5292/5294/5296/5298/5300/5302/5304/5306/5308/5310/5312/5314/5316/5318/5320/5322/5324/5326/5328/5330/5332/5334/5336/5338/5340/5342/5344/5346/5348/5350/5352/5354/5356/5358/5360/5362/5364/5366/5368/5370/5372/5374/5376/5378/5380/5382/5384/5386/5388/5390/5392/5394/5396/5398/5400/5402/5404/5406/5408/5410/5412/5414/5416/5418/5420/5422/5424/5426/5428/5430/5432/5434/5436/5438/5440/5442/5444/5446/5448/5450/5452/5454/5456/5458/5460/5462/5464/5466/5468/5470/5472/5474/5476/5478/5480/5482/5484/5486/5488/5490/5492/5494/5496/5498/5500/5502/5504/5506/5508/5510/5512/5514/5516/5518/5520/5522/5524/5526/5528/5530/5532/5534/5536/5538/5540/5542/5544/5546/5548/5550/5552/5554/5556/5558/5560/5562/5564/5566/5568/5570/5572/5574/5576/5578/5580/5582/5584/5586/5588/5590/5592/5594/5596/5598/5600/5602/5604/5606/5608/5610/5612/5614/5616/5618/5620/5622/5624/5626/5628/5630/5632/5634/5636/5638/5640/5642/5644/5646/5648/5650/5652/5654/5656/5658/5660/5662/5664/5666/5668/5670/5672/5674/5676/5678/5680/5682/5684/5686/5688/5690/5692/5694/5696/5698/5700/5702/5704/5706/5708/5710/5712/5714/5716/5718/5720/5722/5724/5726/5728/5730/5732/5734/5736/5738/5740/5742/5744/5746/5748/5750/5752/5754/5756/5758/5760/5762/5764/5766/5768/5770/5772/5774/5776/5778/5780/5782/5784/5786/5788/5790/5792/5794/5796/5798/5800/5802/5804/5806/5808/5810/5812/5814/5816/5818/5820/5822/5824/5826/5828/5830/5832/5834/5836/5838/5840/5842/5844/5846/5848/5850/5852/5854/5856/5858/5860/5862/5864/5866/5868/5870/5872/5874/5876/5878/5880/5882/5884/5886/5888/5890/5892/5894/5896/5898/5900/5902/5904/5906/5908/5910/5912/5914/5916/5918/5920/5922/5924/5926/5928/5930/5932/5934/5936/5938/5940/5942/5944/5946/5948/5950/5952/5954/5956/5958/5960/5962/5964/5966/5968/5970/5972/5974/5976/5978/5980/5982/5984/5986/5988/5990/5992/5994/5996/5998/6000/6002/6004/6006/6008/6010/6012/6014/6016/6018/6020/6022/6024/6026/6028/6030/6032/6034/6036/6038/6040/6042/6044/6046/6048/6050/6052/6054/6056/6058/6060/6062/6064/6066/6068/6070/6072/6074/6076/6078/6080/6082/6084/6086/6088/6090/6092/6094/6096/6098/6100/6102/6104/6106/6108/6110/6112/6114/6116/6118/6120/6122/6124/6126/6128/6130/6132/6134/6136/6138/6140/6142/6144/6146/6148/6150/6152/6154/6156/6158/6160/6162/6164/6166/6168/6170/6172/6174/6176/6178/6180/6182/6184/6186/6188/6190/6192/6194/6196/6198/6200/6202/6204/6206/6208/6210/6212/6214/6216/6218/6220/6222/6224/6226/6228/6230/6232/6234/6236/6238/6240/6242/6244/6246/6248/6250/6252/6254/6256/6258/6260/6262/6264/6266/6268/6270/6272/6274/6276/6278/6280/6282/6284/6286/6288/6290/6292/6294/6296/6298/6300/6302/6304/6306/6308/6310/6312/6314/6316/6318/6320/6322/6324/6326/6328/6330/6332/6334/6336/6338/6340/6342/6344/6346/6348/6350/6352/6354/6356/6358/6360/6362/6364/6366/6368/6370/6372/6374/6376/6378/6380/6382/6384/6386/6388/6390/6392/6394/6396/6398/6400/6402/6404/6406/6408/6410/6412/6414/6416/6418/6420/6422/6424/6426/6428/6430/6432/6434/6436/6438/6440/6442/6444/6446/6448/6450/6452/6454/6456/6458/6460/6462/6464/6466/6468/6470/6472/6474/6476/6478/6480/6482/6484/6486/6488/6490/6492/6494/6496/6498/6500/6502/6504/6506/6508/6510/6512/6514/6516/6518/6520/6522/6524/6526/6528/6530/6532/6534/6536/6538/6540/6542/6544/6546/6548/6550/6552/6554/6556/6558/6560/6562/6564/6566/6568/6570/6572/6574/6576/6578/6580/6582/6584/6586/6588/6590/6592/6594/6596/6598/6600/6602/6604/6606/6608/6610/6612/6614/6616/6618/6620/6622/6624/6626/6628/6630/6632/6634/6636/6638/6640/6642/6644/6646/6648/6650/6652/6654/6656/6658/6660/6662/6664/6666/6668/6670/6672/6674/6676/6678/6680/6682/6684/6686/6688/6690/6692/6694/6696/6698/6700/6702/6704/6706/6708/6710/6712/6714/6716/6718/6720/6722/6724/6726/6728/6730/6732/6734/6736/6738/6740/6742/6744/6746/6748/6750/6752/6754/6756/6758/6760/6762/6764/6766/6768/6770/6772/6774/6776/6778/6780/6782/6784/6786/6788/6790/6792/6794/6796/6798/6800/6802/6804/6806/6808/6810/6812/6814/6816/6818/6820/6822/6824/6826/6828/6830/6832/6834/6836/6838/6840/6842/6844/6846/6848/6850/6852/6854/6856/6858/6860/6862/6864/6866/6868/6870/6872/6874/6876/6878/6880/6882/6884/6886/6888/6890/6892/6894/6896/6898/6900/6

8.2.2 Connect passengers with drivers



9. Actors

9.1 Workers

Workers are stakeholders who act within the business and carry out all business use cases.

Position	Impact on the Project
Developers	The developers have the largest impact as they will decide how the system will be built. The developers are in charge of creating the whole system from the specified BRD and will have little interaction with the manager of the system before the system is complete.
Manager	The manager does not have a big impact on how the system is built. This is due to the manager not doing much on actual system. They will be involved in gaining requirements from the business actors and running the application after it is complete.

9.2 Business Actors

Business Actors are parties that are external to the business but still interact with it.

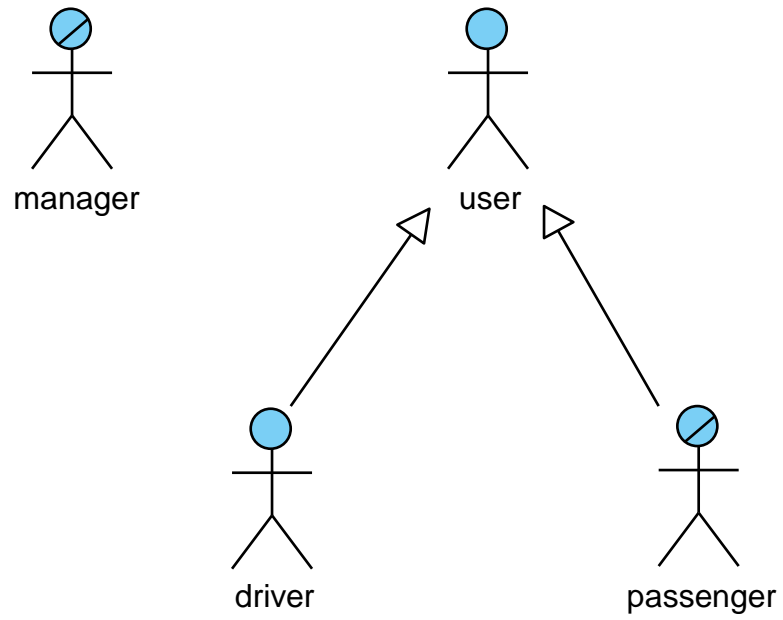
Actor	Impact on the Project
Driver and Passenger	The users of the system will have little impact on the project. They will only be asked about requirements and some features they would like to have in the system.

9.3 Other Systems

Other systems are any systems that are affected by the project or that are linked to the proposed system.

System	Impact on the Project
Operating systems	Operating systems need to be able to run the application. This requires the application to be designed in a manner which allows different platforms and web browsers to run the application.
Other carpooling applications	Other applications play a big role in how the system will be designed as the system will need to gain a competitive advantage over the other systems. These systems should be analysed to ensure extra functionality is created.

9.4 Role Map

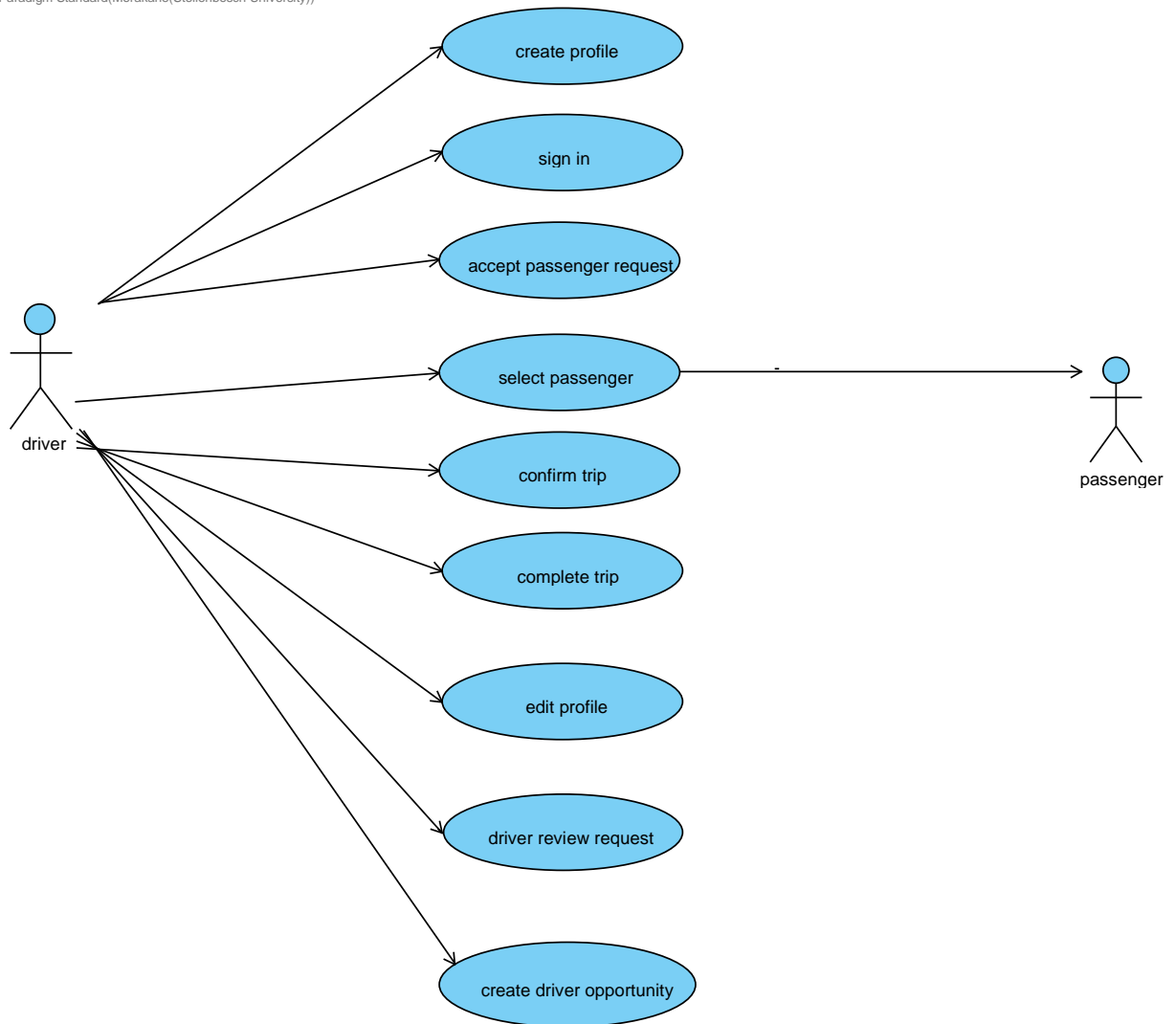


10. User Requirements

10.1 Systems Use-Case Diagrams

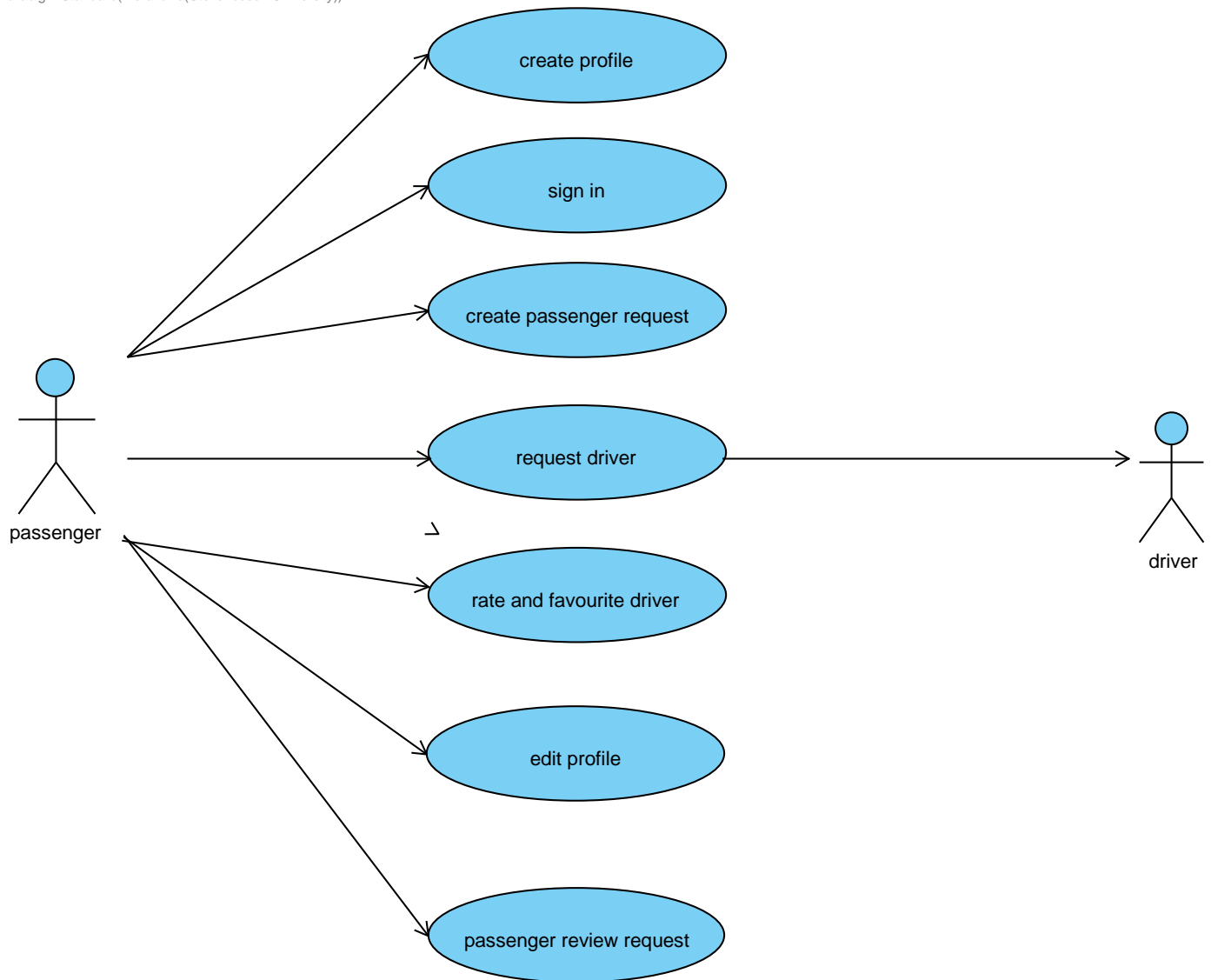
10.1.1 Connect driver with passengers

Visual Paradigm Standard(Morakane(Stellenbosch University))



10.1.2 Connect passengers with driver

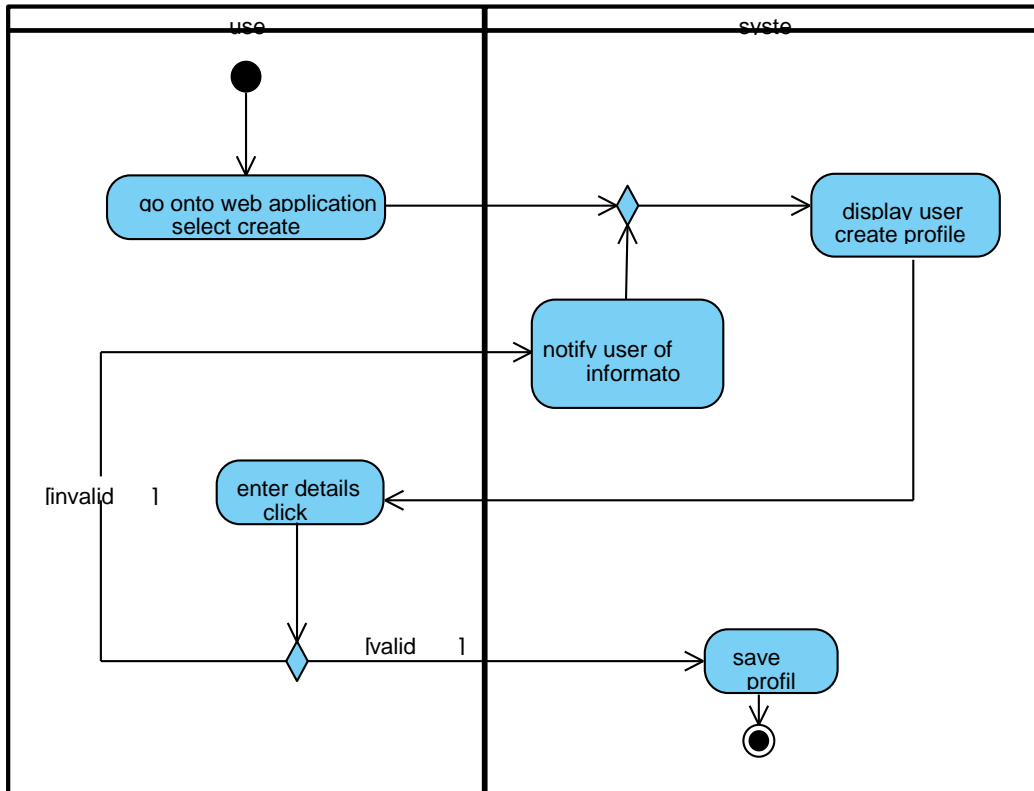
Visual Paradigm Standard(Morakane(Stellenbosch University))



10.2 Systems Use-Case Descriptions and Wireframes

Create Profile

Visual Paradigm Standard/18977979/Stellenbosch



huddle

huddle

Create account

First name	Surname
<input type="text"/>	<input type="text"/>
Email	Phone number
<input type="text"/>	<input type="text"/>
Password	
<input type="text"/>	
<input type="button" value="NEXT"/>	

PANIC BUTTON

This feature will send the details of your trip to a trusted person when you access it.

First name	Surname
<input type="text"/>	<input type="text"/>
Email	
<input type="text"/>	
<input type="button" value="NEXT"/>	

huddle

ADD CAR

Car Make

Car licence number

Car Model

NEXT

SKIP

huddle

Welcome to **huddle** Mr Sam Smith

continue

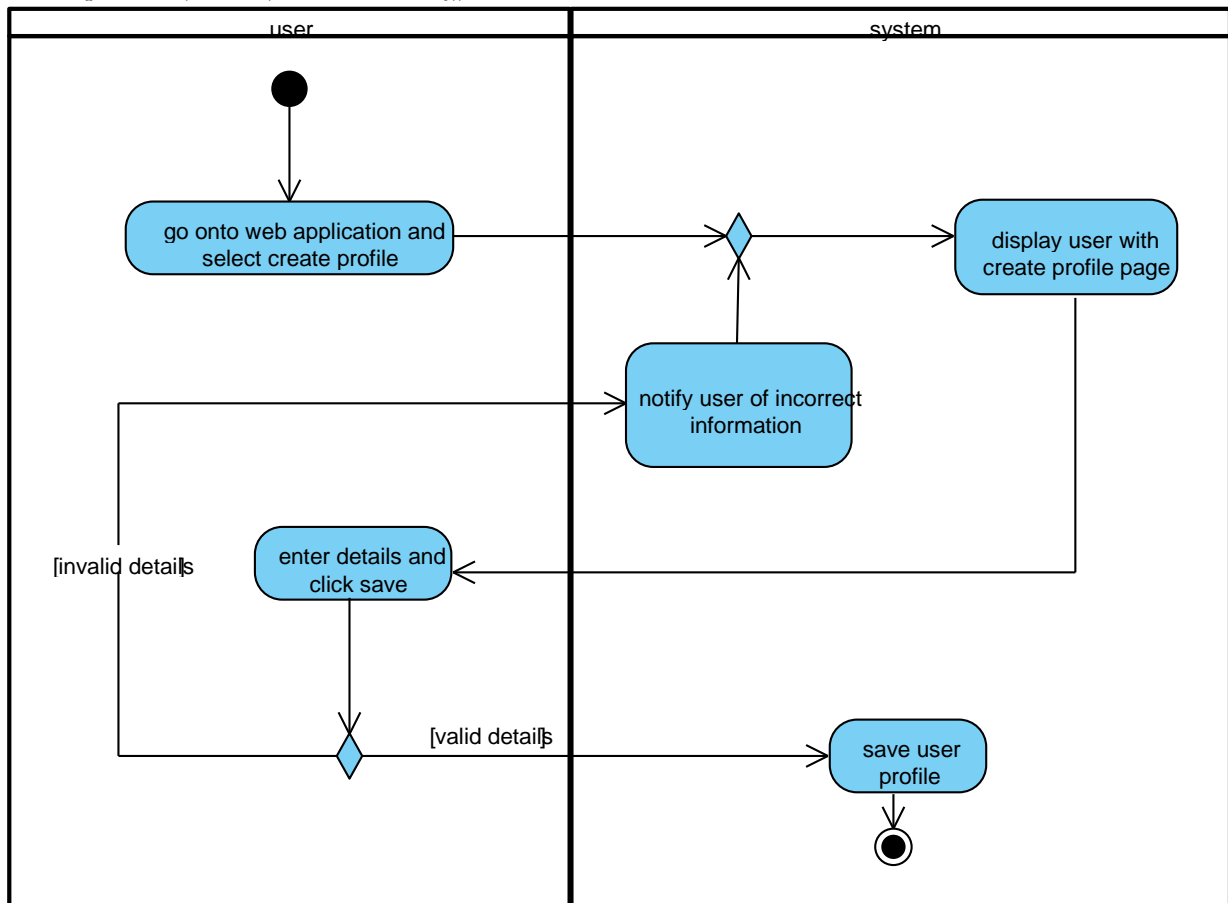
huddle

OFFER A RIDE

FIND A RIDE

Sign In

Visual Paradigm Standard(18977979(Stellenbosch University))



huddle

Sign in

User name

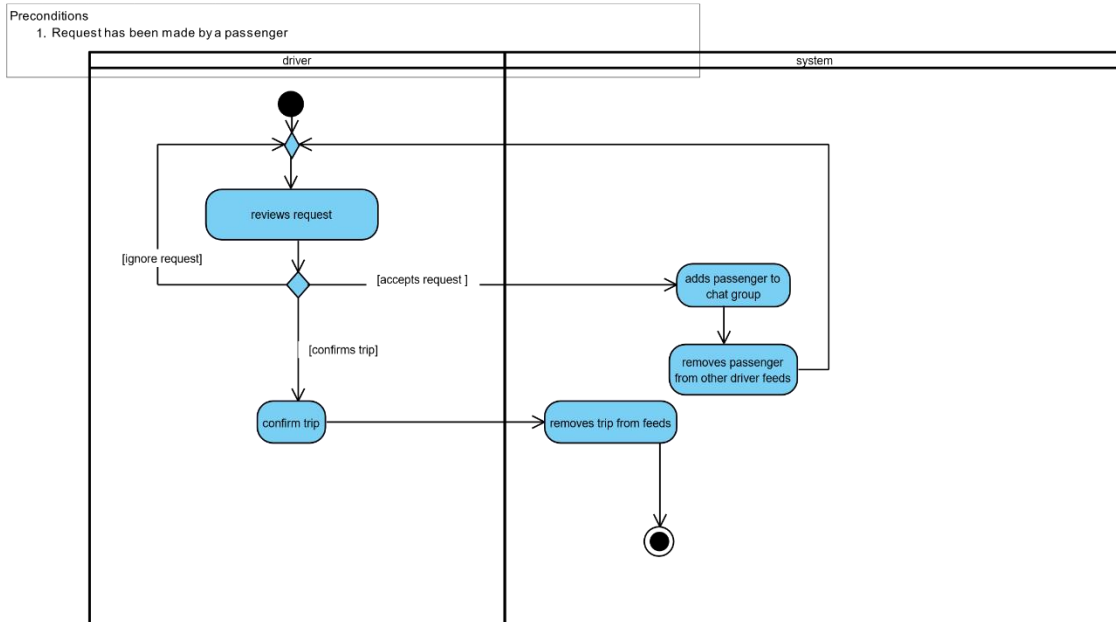
Password

HUDDLE

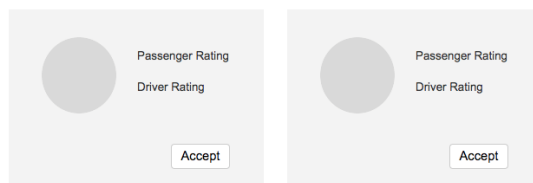
Don't have an account? Create one here.

Accept Passenger Request

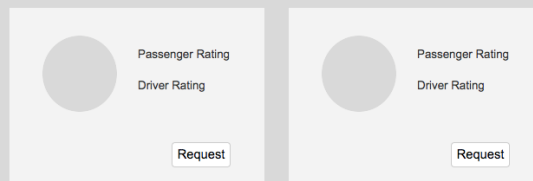
Visual Paradigm Standard(189779792(Stellenbosch University))



Requests



Matches

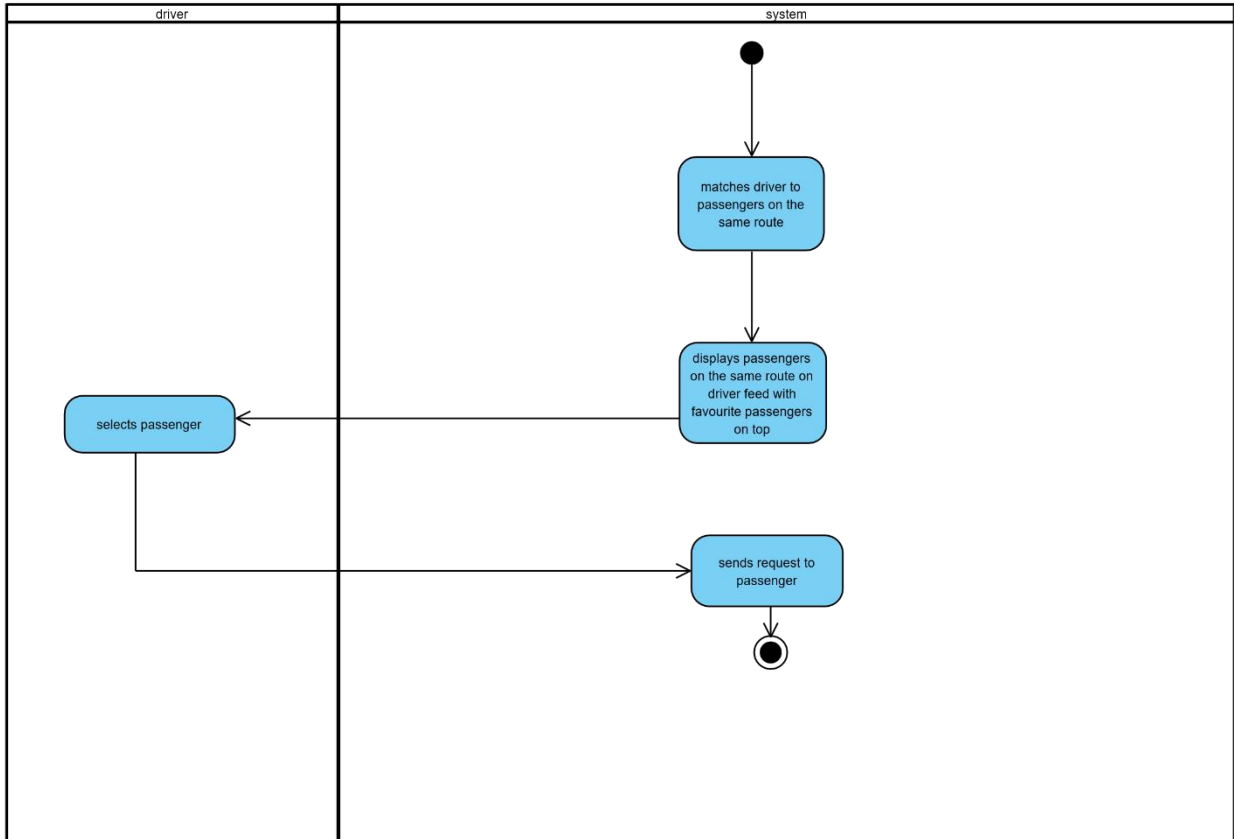


Select Passenger

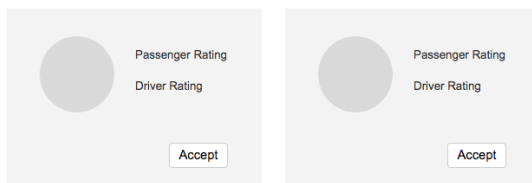
Visual Paradigm Standard(18977979(Stellenbosch University))

Preconditions

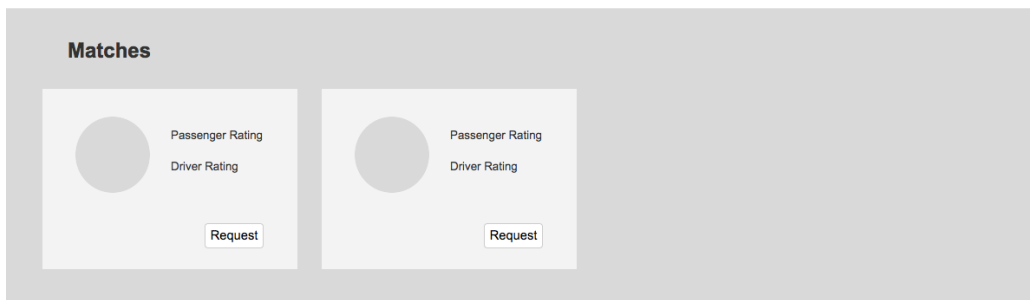
1. There are passengers for the route specified by the driver



Requests



Matches

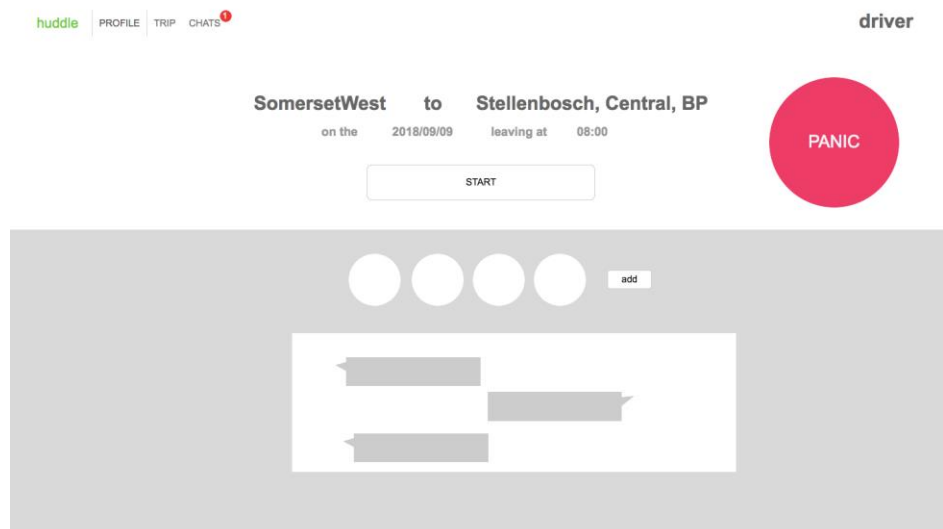
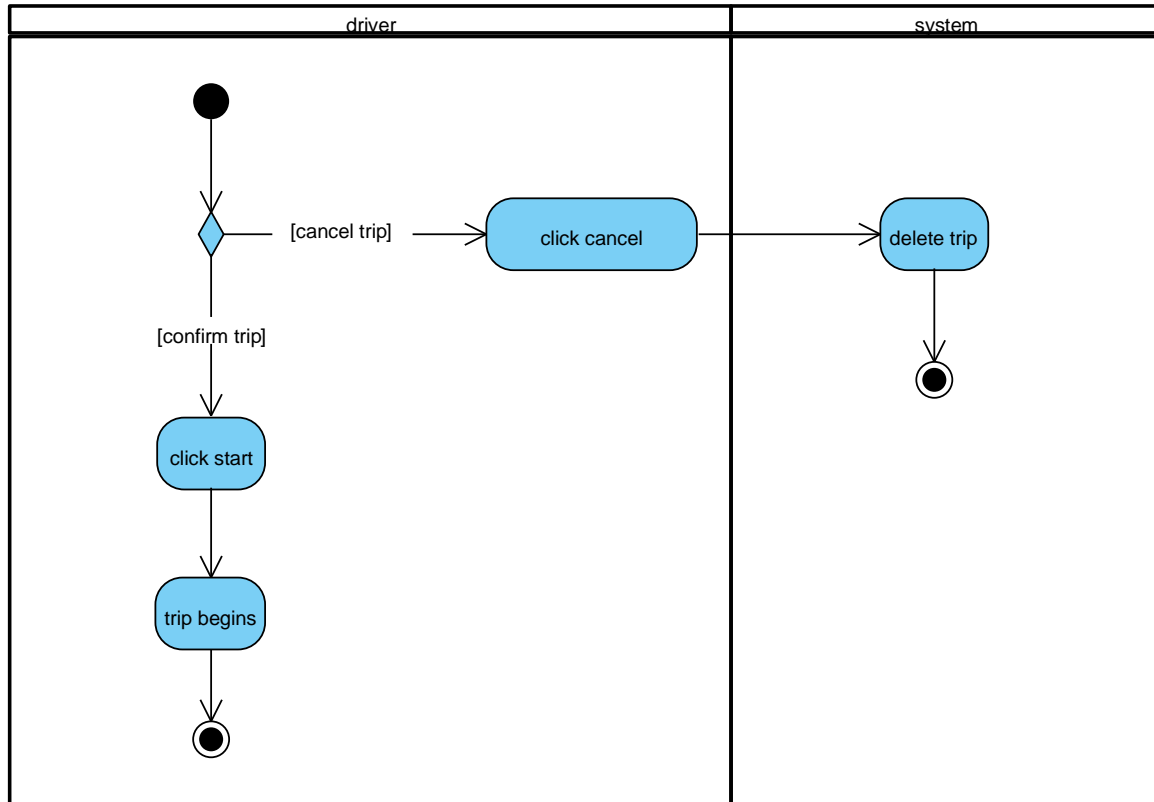


Confirm Trip

Visual Paradigm Standard(18977979(Stellenbosch University))

Preconditions

1. Driver has an account
2. Driver is logged into system
3. Passengers have been added to the trip

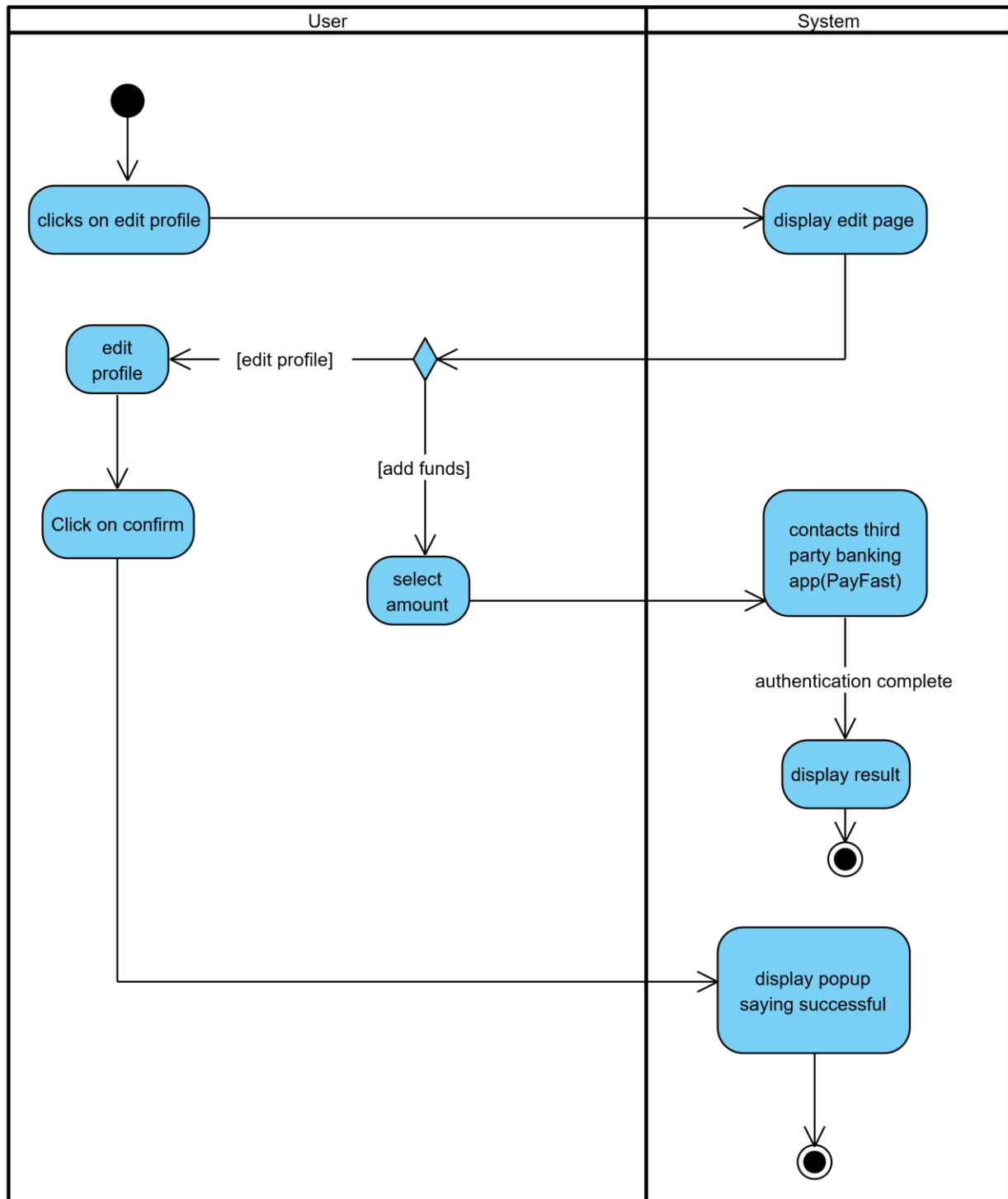


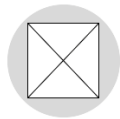
Edit Profile

Visual Paradigm Standard(18977979(Stellenbosch University))

Preconditions

1. User has a profile
2. User is logged in



**Sam Smith** ✕

BIO: driver, architect, husband, appreciates nature, #safe ✕
twitter/snapchat: @samsmith32

Create account

First name

Surname

Email

Phone number

Password

ADD CAR

Car Make

Car liscence number

Car Model

PANIC BUTTON

This feature will send the details of your trip to a trusted person when you access it.

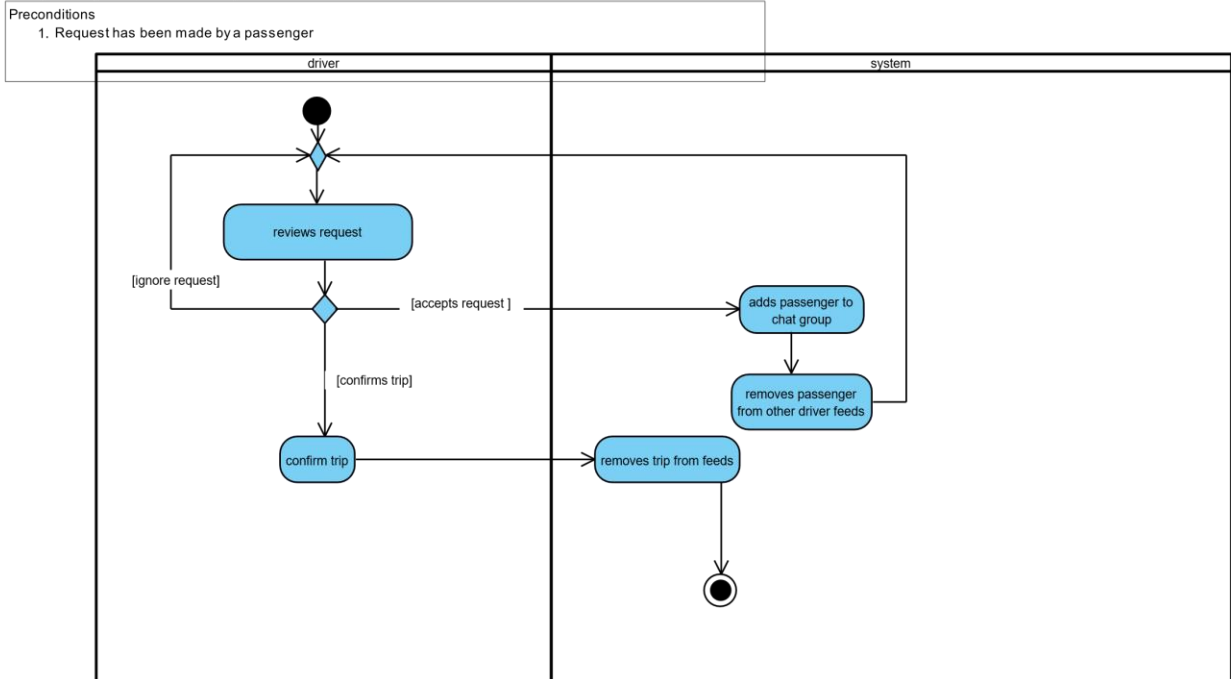
First name

Surname

Email

Driver Review Request

Visual Paradigm Standard(18977979(Stellenbosch University))



Requests

Passenger Rating

Driver Rating

Accept

Passenger Rating

Driver Rating

Accept

Matches

Passenger Rating

Driver Rating

Request

Passenger Rating

Driver Rating

Request



Sam Smith

Accept

4.2 as driver 2.5 as passenger 287 favourites

Sam Smith driver, architect, husband, appreciates nature, #safe twitter/snapchat: @samsmith32

comments

Pretty good...

OK

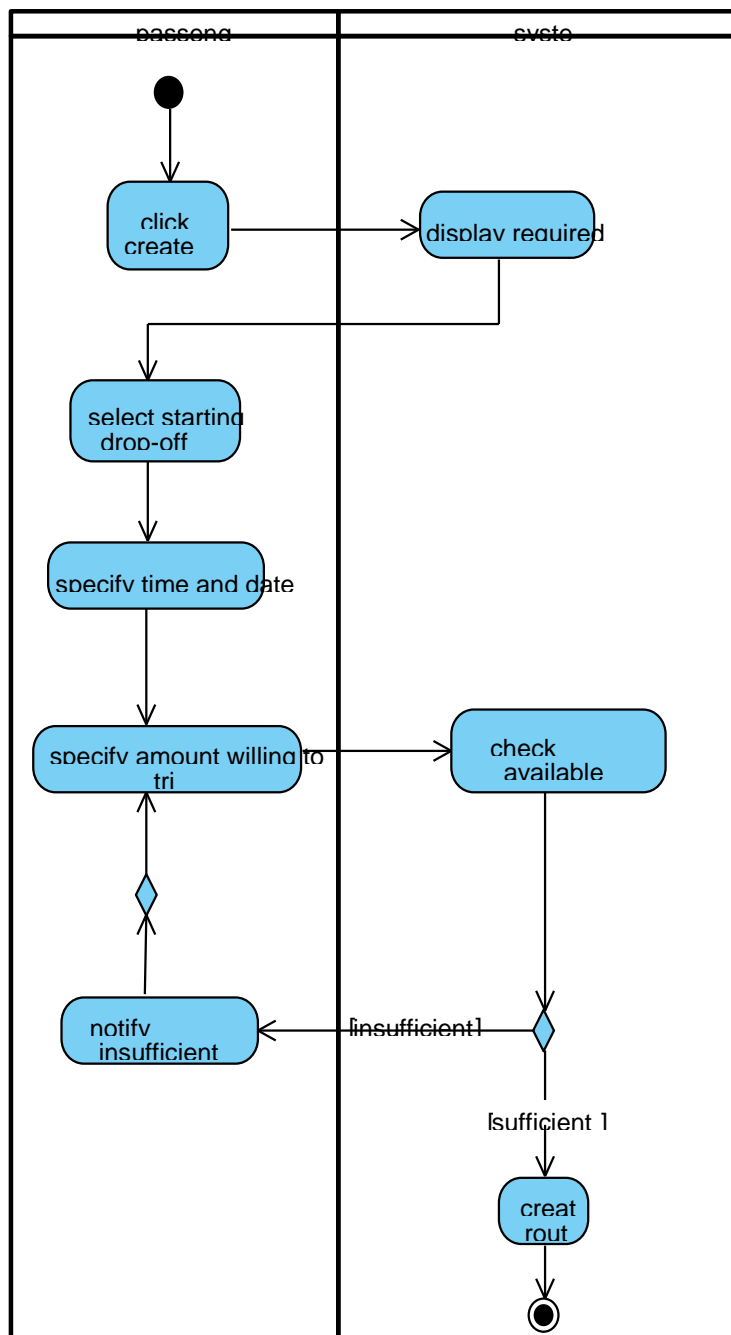
The BEst!!!

Create Passenger Request

Visual Paradigm Standard(18977979(Stellenbosch University))

Preconditions

1. Passenger has an account
2. Passenger is logged into system



my trip

Pick up from **to**

on the **drop at**

offering

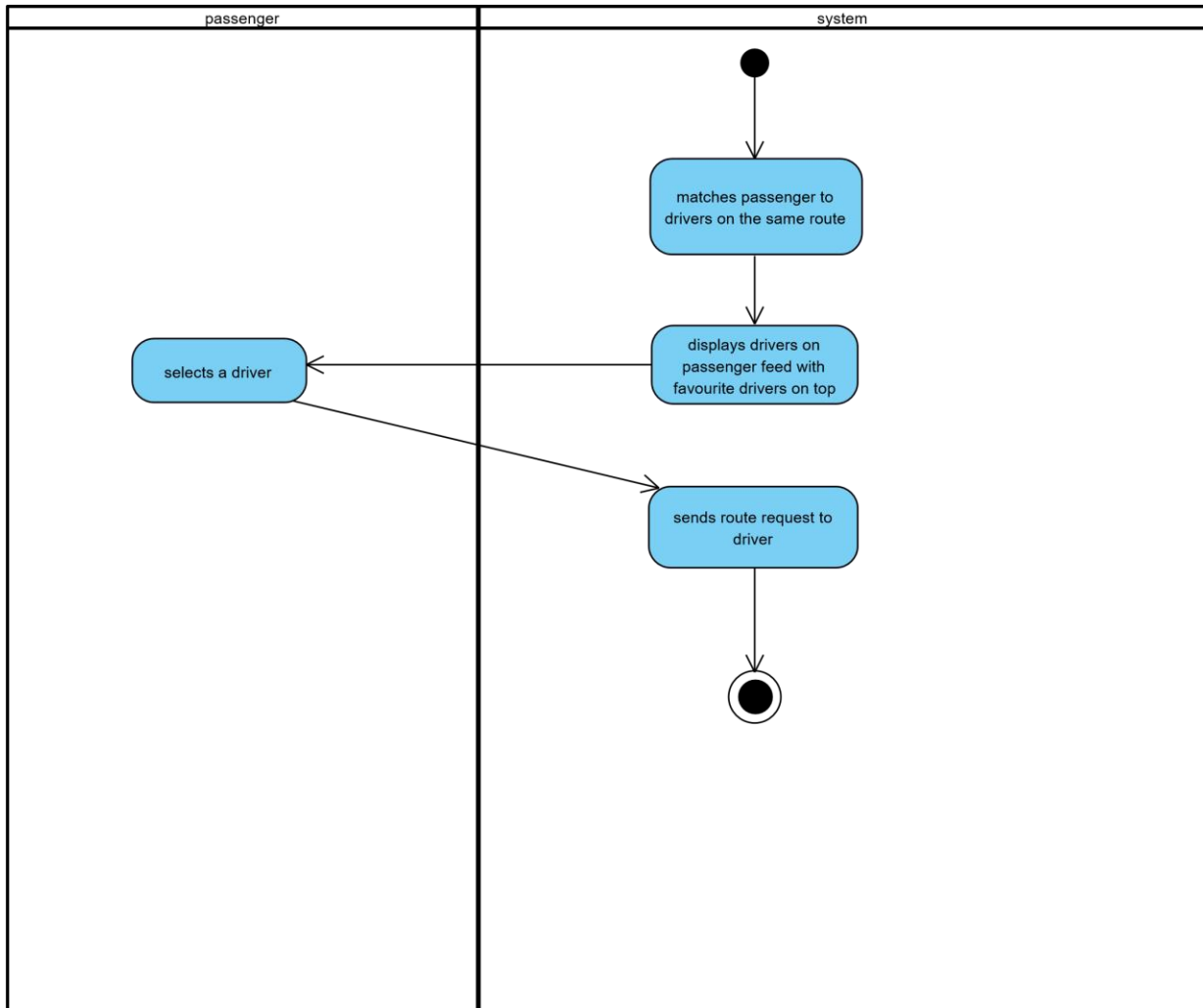
MAP

Request Driver

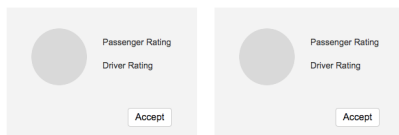
Visual Paradigm Standard(18977979(Stellenbosch University))

Precondition

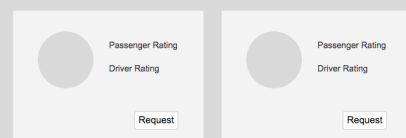
1. passenger has entered a route and there are drivers for that route



Requests



Matches

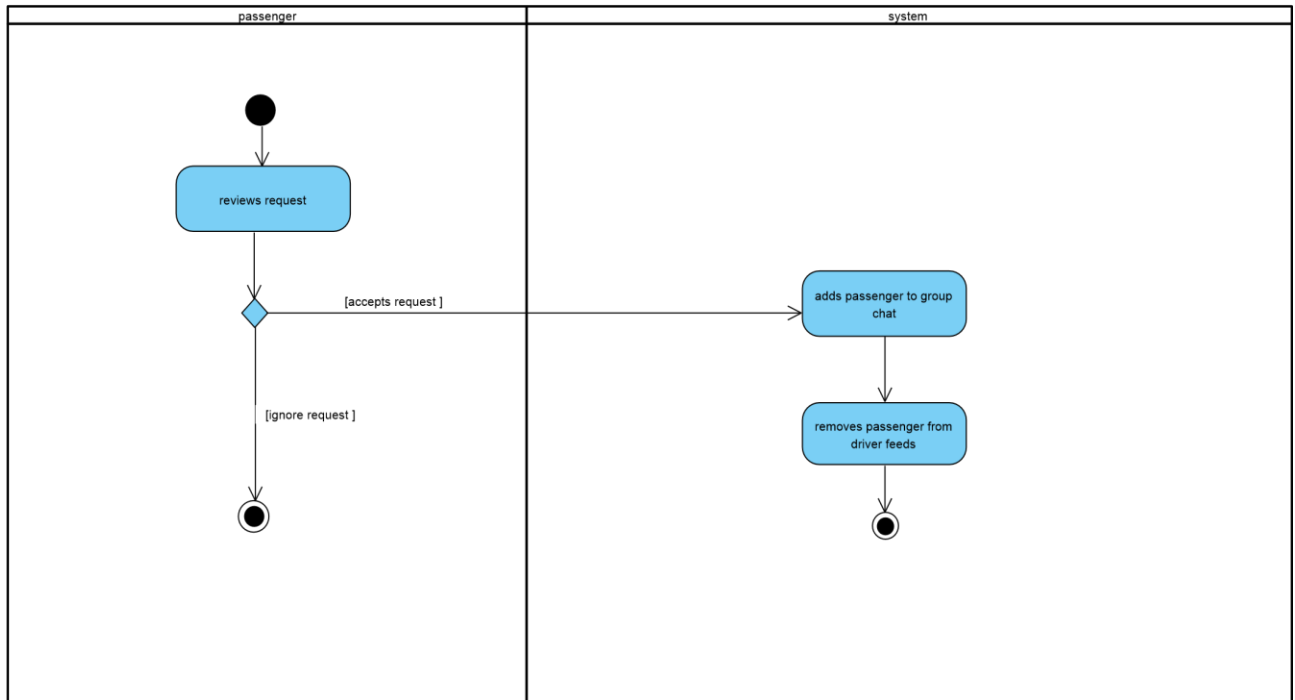


Passenger Review Request

Visual Paradigm Standard(Morakane/Stellenbosch University)

Preconditions:

1. Passenger is logged in
2. Passenger has a request from a driver



Requests

Passenger Rating
Driver Rating
Accept

Passenger Rating
Driver Rating
Accept

Matches

Passenger Rating
Driver Rating
Request

Passenger Rating
Driver Rating
Request



Sam Smith

Accept

4.2
as driver

2.5
as passenger

287
favourites

Sam Smith driver, architect, husband, appreciates nature, #safe
twitter/snapchat: @samsmith32

comments

Pretty good...

OK

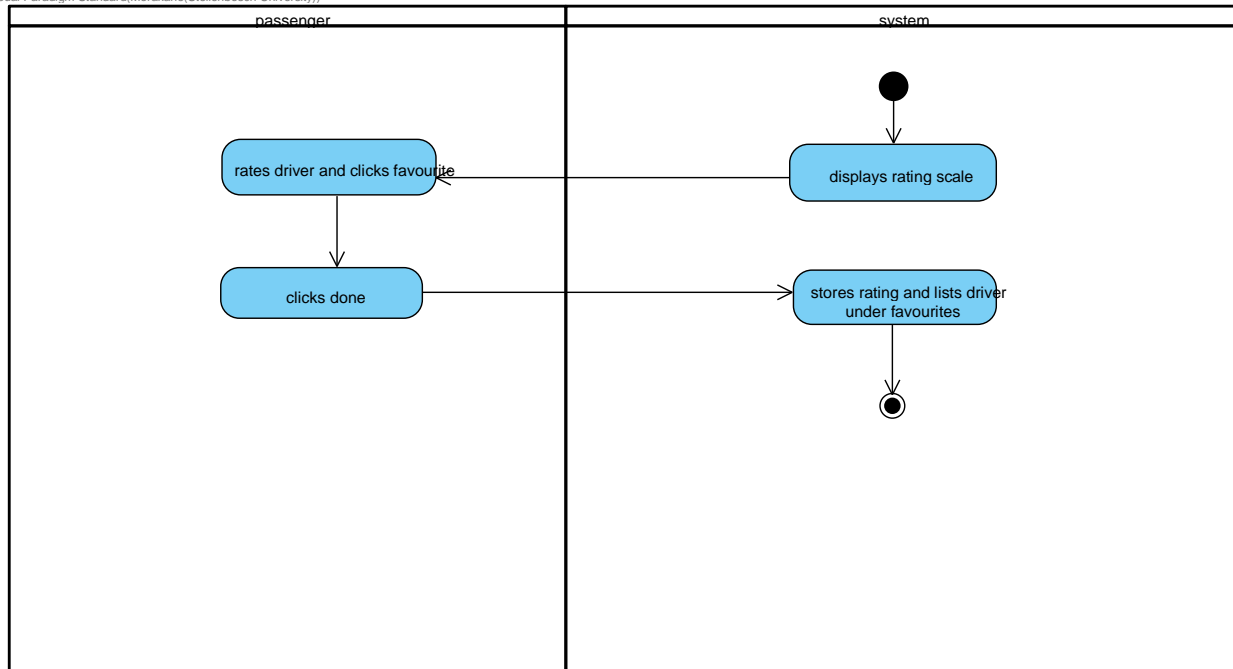
The BEst!!!

Rate and Favourite Driver

Preconditions:

1. Passenger is logged in
2. Trip is complete or trip has been cancelled

Visual Paradigm Standard(Morakane(Stellenbosch University))



huddle

Rate driver 1 2 3 4 5

DONE

FAVOURITE DRIVER

huddle

Rate Driver

User name

Sam Smith

Type something...

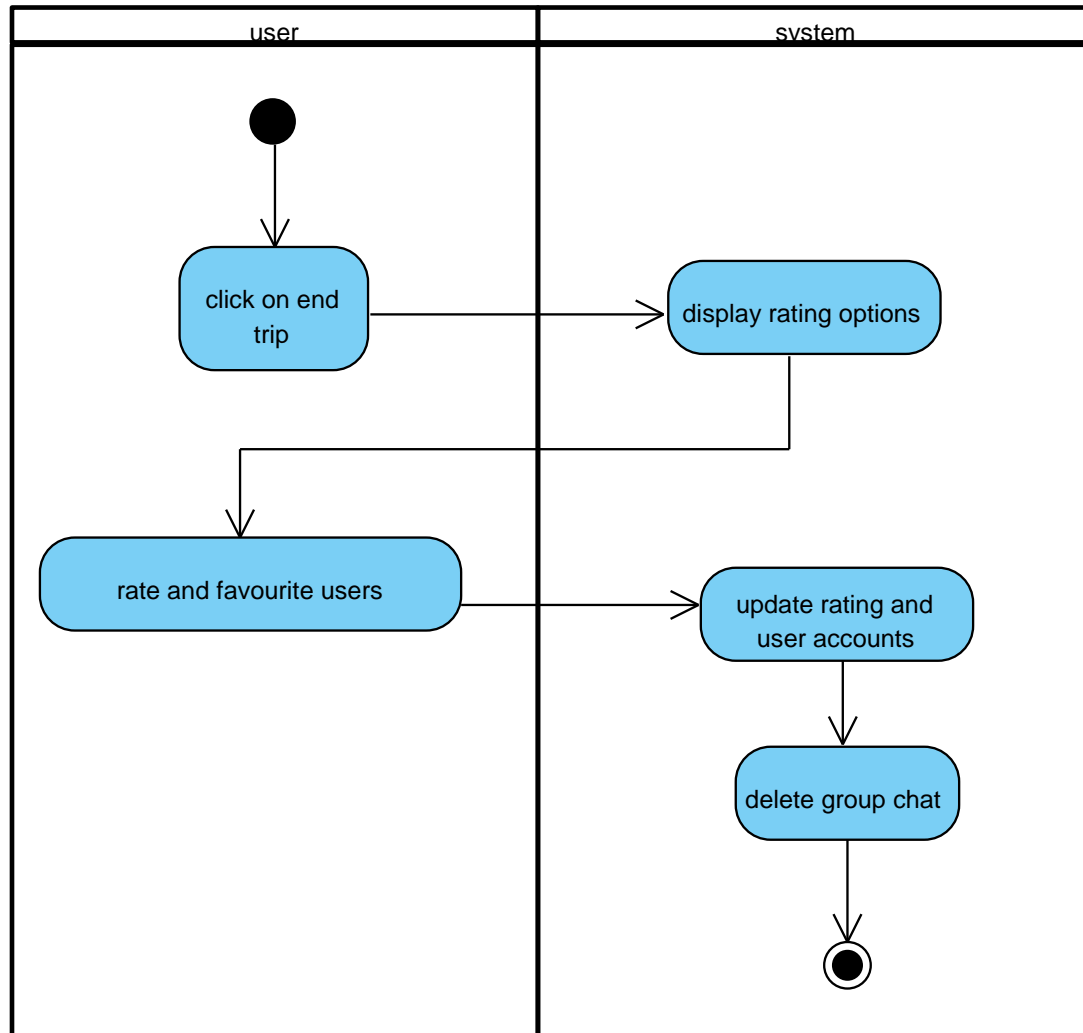
DONE

Complete Trip

Visual Paradigm Standard(18977979(Stellenbosch University))

Preconditions

1. Driver has an account
2. Driver is logged into system
3. Trip is completed



huddle

<input type="radio"/>	Rate Passenger	1 2 3 4 5	FAVOURITE PASSENGER
<input type="radio"/>	Rate Passenger	1 2 3 4 5	FAVOURITE PASSENGER
<input type="radio"/>	Rate Passenger	1 2 3 4 5	FAVOURITE PASSENGER
<input type="radio"/>	Rate Passenger	1 2 3 4 5	FAVOURITE PASSENGER

DONE

Comments

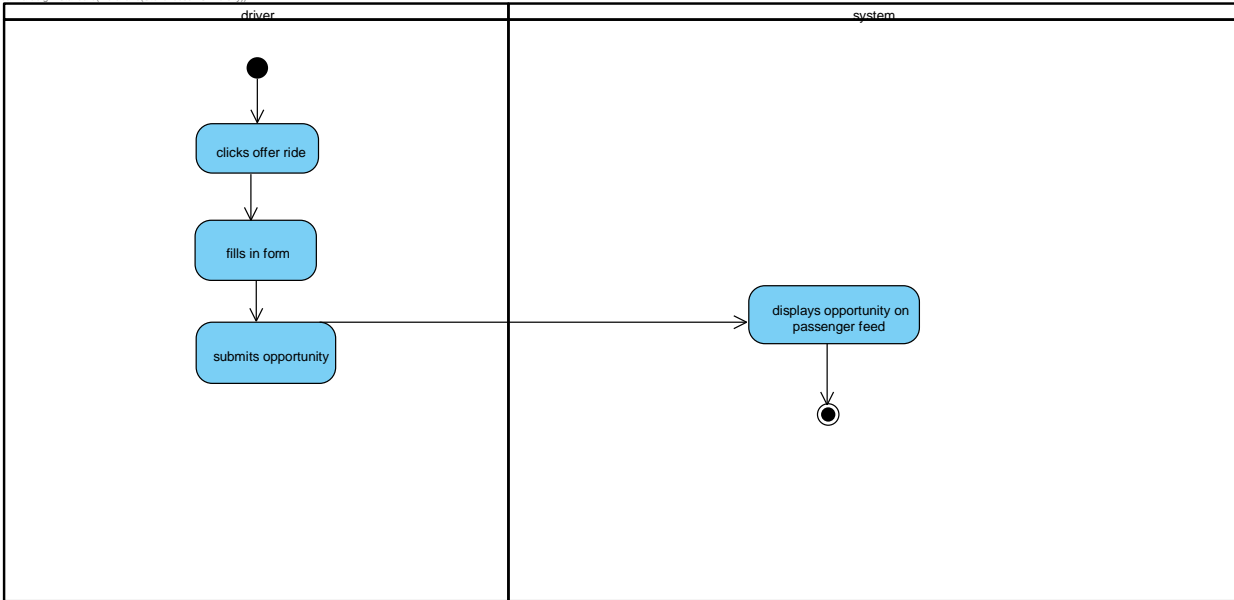
<input type="radio"/>	Sam Smith	Type something...
<input type="radio"/>	name	Type something...
<input type="radio"/>	name	Type something...
<input type="radio"/>	name	Type something...

DONE

Create Driver Opportunity

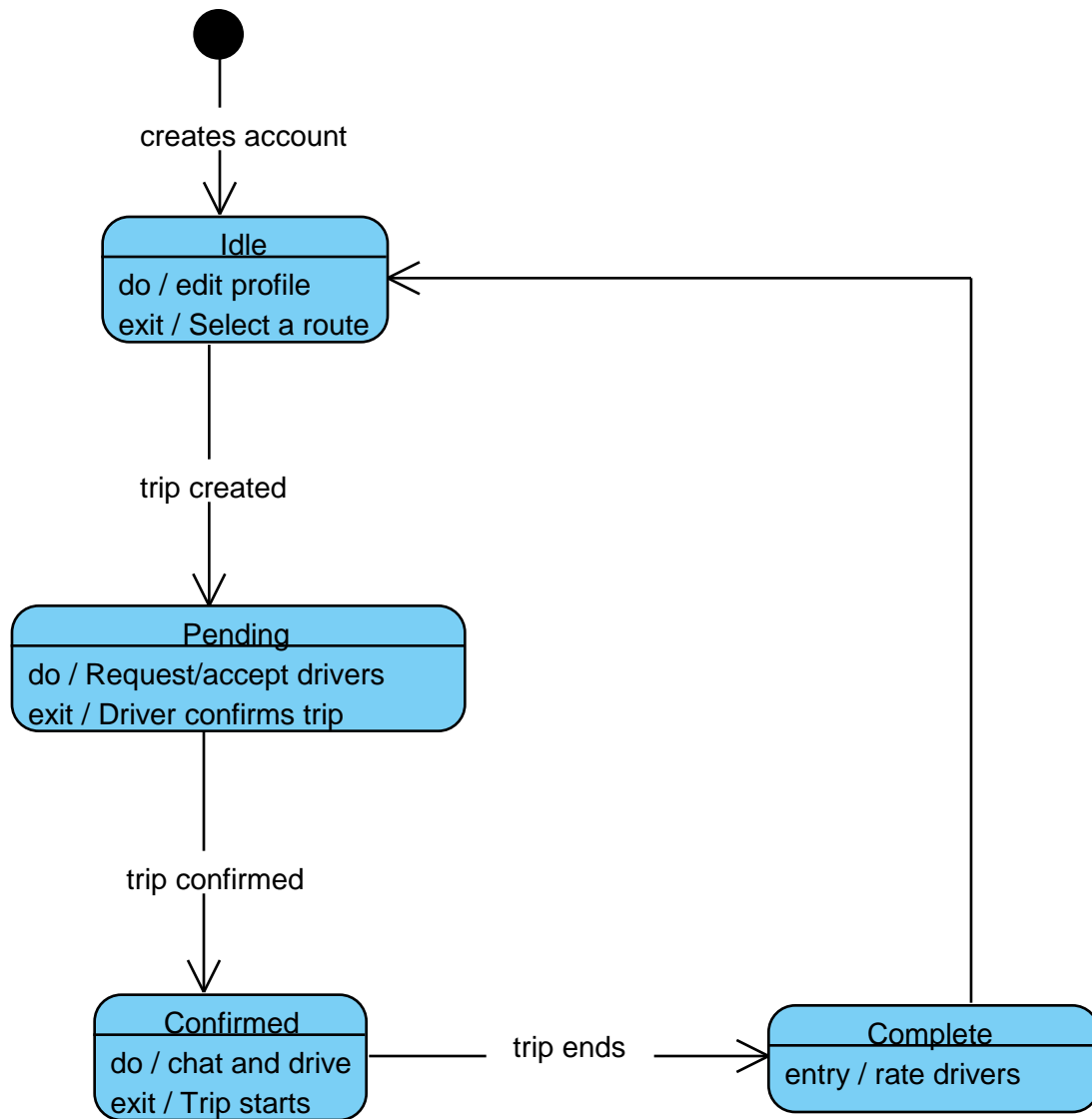
Preconditions:

1. User is registered to be a driver
2. User is logged into system

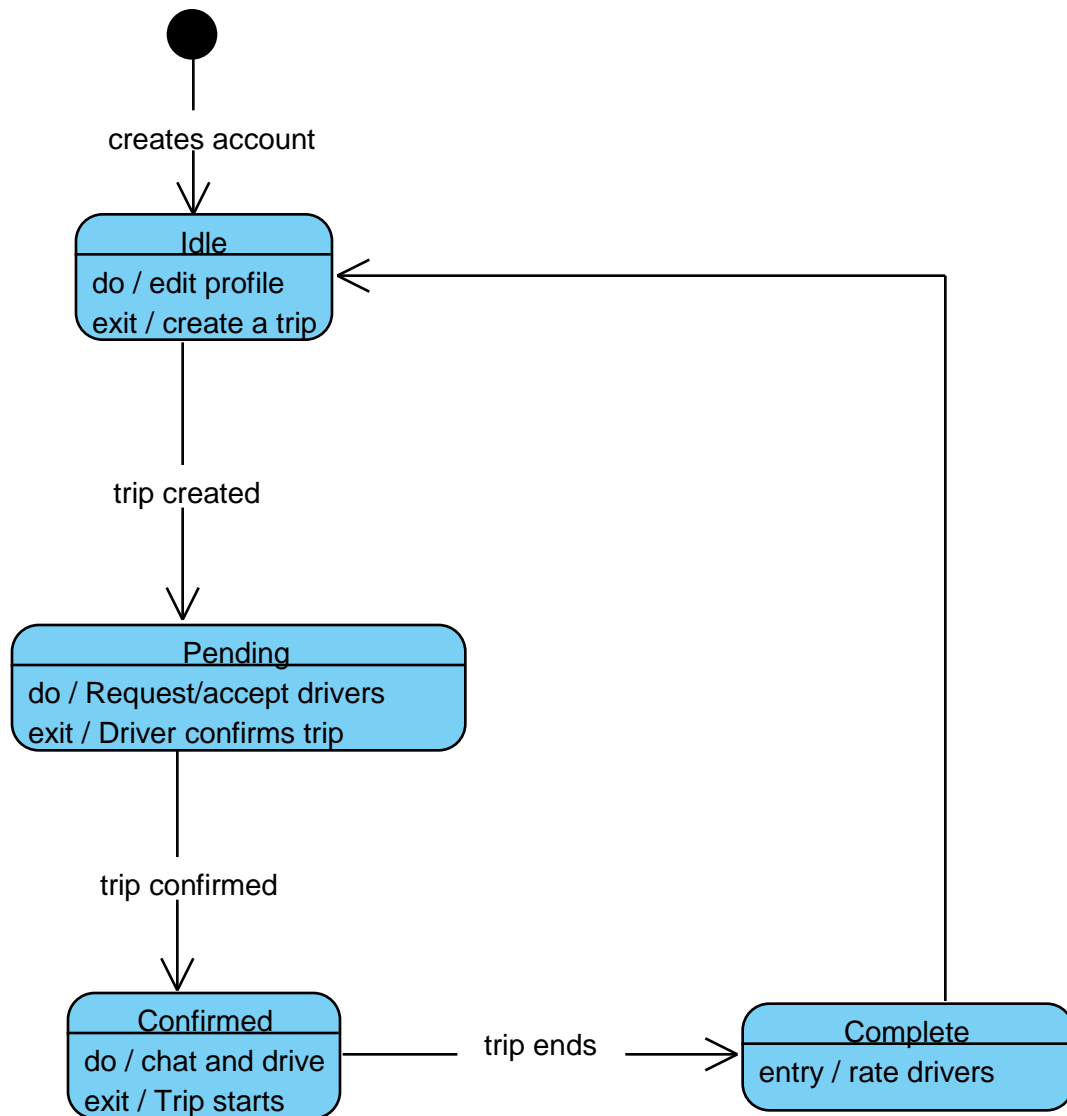


11. State Machine Diagrams

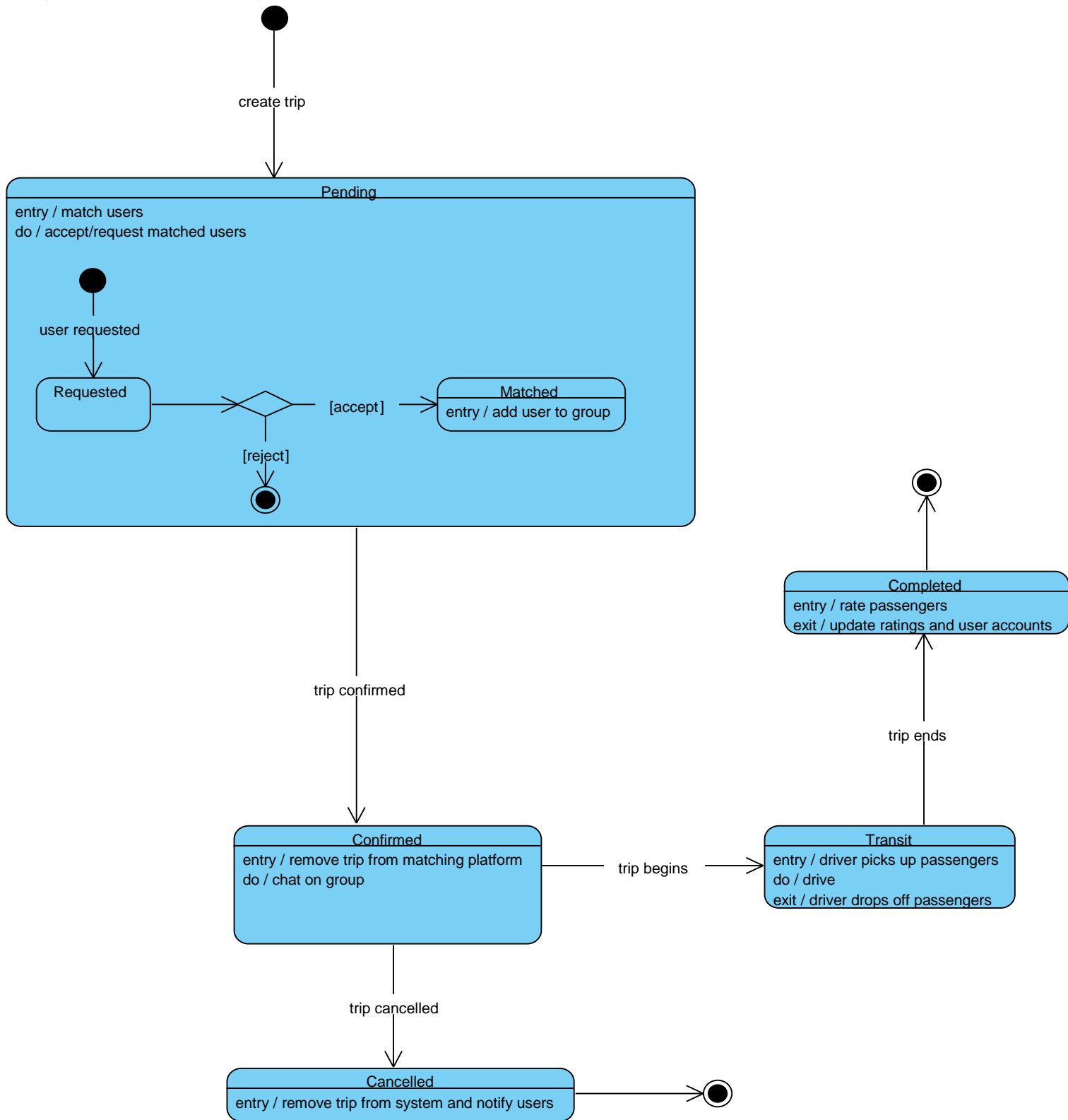
Passenger States



Driver States



Trip States



12. Non-functional Requirements

12.1 Performance Requirements

- **Stress requirements**

Huddle must be able to be used by 1000 users at the same time.

- **Response-Time requirements**

Huddle should match drivers and passengers within 60 seconds of a passenger or driver searching for a trip.

- **Throughput requirements**

Huddle must be able to process 100 transactions per 30 seconds.

12.2 Usability Requirements

A new user must be able to sign up effortlessly and with little direction in a duration of less than 10 minutes. A passenger must be able to fill in a trip request in 2 minutes and get suggested drivers within 60 seconds of submitting their trip request. A driver must be able to create a trip opportunity in 2 minutes and get suggested passengers within 60 seconds of submitting the trip opportunity.

12.3 Security Requirements

Personal information provided by users during signups will be stored on Firebase. No other user will have access to another user's information. Firebase authentication will be used to ensure that a user only sees information connected to their unique user id after being authenticated using their password and email address.

12.4 Safety Requirements

The user will have a panic button that emails management should they feel in danger. The email will send management an email with the subject line in danger and the body of the email will consist of a user's emergency contacts and trip details.

12.5 Volume and Storage Requirements

In the first year of deploying Huddle, the platform will support 1000 user accounts.

12.6 Configuration Requirements

Huddle is web based and will be used within a browser. This allows users to use the platform on various devices independent of the operating system on the device. Huddle supports the following browsers Chrome, Microsoft Explorer, Firefox and Safari.

12.7 Backup/Recovery Requirements

Personal information provided during signups by users will be stored in Firebase. Group chats will also be stored in Firebase. This will ensure that the information is available to users when servers are down at Huddle LTD.

12.8 Scalability Requirements

Being that Huddle will be used on various devices, it will display according to the device screen.

It is anticipated that after a year more people will use Huddle due to increased knowledge about the service therefore, the service will move from handling 10 000 users to 100 000 users. Due to the predicted future growth, the platform will in future support more device specific browsers such as Samsung Internet.

12.9 Availability Requirements

Huddle will be available to users 24 hours a day. The server will have a downtime of 1 hour a year.

13. Business Rules

1. People using Huddle should be able to sign up and use the service, provided that they fill in their information correctly.
2. Users should be able to make a trip request by filling in a start zone, end zone and time for departure. Passengers can fill in an offer as part of their requests. Drivers will be able to view passenger requests in their feeds and accept passenger requests based on offers if they wish to do so.
3. Passengers will be able to view driver opportunities in their feed for drivers with the same start zones and end zones as them.

4. The drivers should be able to accept passenger requests if their start and end zones match. They will also be able to see passengers that have specified the same start zone and end zone but have not requested the particular driver.
5. The driver should be able to see the passenger's full profile which includes a rating and some comments.
6. Passengers should be able to see the driver's full profile which includes a rating and some comments.
7. The system will confirm the trip an hour before it is set to depart.
8. The passengers and driver will be put in a temporary group. This group will then have a chat interface so that the group can communicate.
9. Trip groups are deleted after each trip
10. Once the driver has picked up all passengers the passengers will have a panic button on the platform. Should the passengers feel in danger at any time during a trip, they can press the button and it will send the driver's profile and trip information to the manager of the platform.
11. Once the trip is done the passengers will have the option to rate the driver and the driver will have the option to rate the passengers.
12. At the end of each trip, provided a passenger made an offer to be part of the trip, the offer amount will be transferred from the passenger's account to the driver's account.
13. Users will be able to view and edit their profiles. This will indicate their profile information. Name, Car, Number Plate, Rating, Comments, and their account balance and account transfers.
14. Users can favourite different users. A user's favourites will show at the top of their feed of possible travel companions.
15. A user must register a car for them to be allowed to play the role of driver.
16. Passengers should not be able to offer more than their available funds for a trip.
17. *Users should be able to cancel requests at any time before they are added to a trip. Once they are added to the trip the driver is allowed to cancel a trip provided is more than an hour before the trip starts. Passengers are allowed to cancel any time before a trip starts.*

18.

19. *Passengers can specify how many people wish to take the trip. The driver can see this number and decide how many seats to full up in their car.*

14. State Requirements

Different properties and users take on different states at different times. These states have defined rules that have to be ensured when the specified property or user is in a specific state. The following states all have restrictions that need to be adhered to.

14.1 Driver

While the driver is in any state they can see and edit their profile and they can switch to play the role of the passenger.

Driver	Idle	Pending	Confirmed	Complete
Edit Profile	x	x	x	x
Create Request	x			
Request passengers		x		
Accept Passengers		x		
Communicate on group chat		x	x	
Rate Passengers				x
Favourite Passengers				x
Switch to Passenger	x	x	x	x

14.1.1 Idle

When the driver is in the idle state they have the ability to edit their profile and create a new request. When the role of driver is selected the user can only create new trips if the user is in the idle state.

14.1.2 Pending

Once the request is created the driver can then accept passenger requests as well as request passengers. Once the driver is satisfied with how many passengers they have they can then confirm the trip. When the driver is in this state they cannot create new requests. Only one request can be active at a time.

14.1.3 Confirmed

In this state the driver can communicate with the passengers in the trip on a group chat. In this state the driver can only chat on the group, cancel the trip and start the trip.

14.1.4 Complete

In the complete state the driver can rate passengers, comment on passengers and favourite them if they want. Once this is complete the driver goes back to the idle state.

14.2 Passenger

While the passenger is in any state they can see and edit their profile and they can switch to play the role of the driver if they have registered a car.

Passenger	Idle	Pending	Confirmed	Complete
Edit Profile	x	x	x	x
Create Request	x			
Request passengers		x		
Accept Driver		x		
Communicate on group chat		x	x	
Rate Driver				x
Favourite Driver				x
Switch to Driver	x	x	x	x

14.2.1 Idle

When the passenger is in the idle state they have the ability to edit their profile and create a new request. When the role of passenger is taken the user can only create new requests if the user is in the idle state.

14.2.2 Pending

Once the request is created the passenger can then accept driver requests as well as request drivers. When the passenger is in this state they cannot create new requests. Only one request can be active at a time.

14.2.3 Confirmed

In this state the passenger can communicate with the passengers and driver in the trip on a group chat. In this state the passenger can only chat on the group and cancel the pickup.

14.2.4 Complete

In the complete state the passenger can rate the driver and favourite them if they want. Once this is complete the passenger goes back to the idle state.

14.3 Trip

Trip	Pending	Confirmed	Cancelled	Transit	Complete
Match users	x				
Add users to trip	x				
Create chat group	x				
Notify users of cancelation			x		
Communicate on group chat	x	x		x	
Users rate each other					x

14.3.1 Pending

When the trip is in the pending state users are matched according to request starting and ending points as well as the time and date of the request. Users can then request users to join the trip and accept these requests. When a user is requested they can either be ignored or they can be accepted. When they accepted they will be matched to the trip and added to that trips group chat. The driver needs to confirm the trip to move out of this state.

14.3.2 Confirmed

In this state users involved in the trip and the trip itself is removed from the feeds and users within the trip can communicate with one another till the driver starts or cancels the trip.

14.3.3 Cancelled

The trip is cancelled and removed from the platform after notifying all users within that trip that the trip was cancelled.

14.3.4 Transit

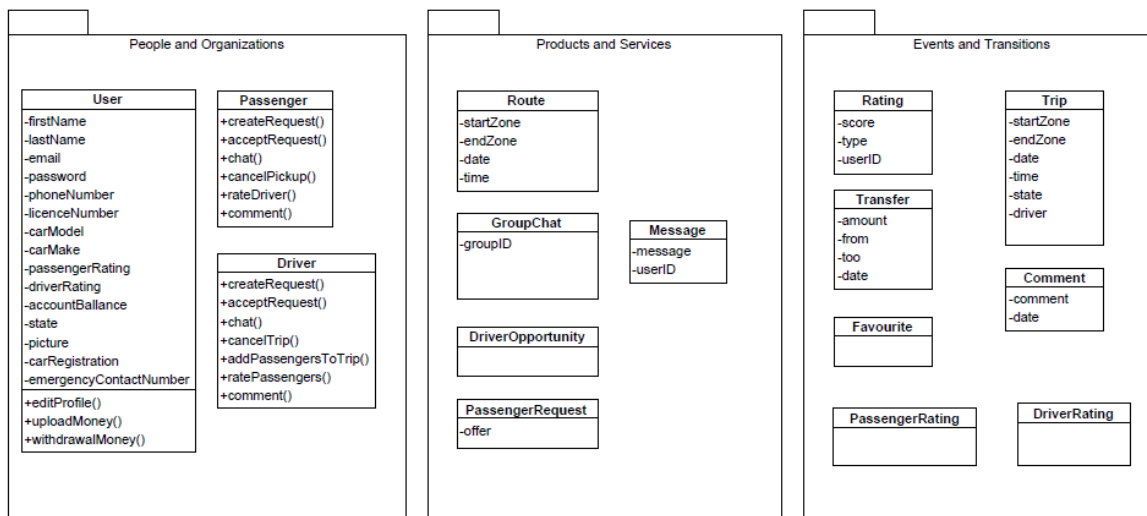
In this state the trip has begun, and the driver picks up passengers and then drops them off at the end of the trip. The users can then end the trip as they get out the car.

14.3.5 Complete

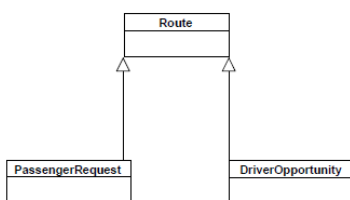
In this state users can rate each other and favourite passengers or drivers in the trip if they want. Once this has been completed the trip is complete and the trip states end.

15. Structural Model

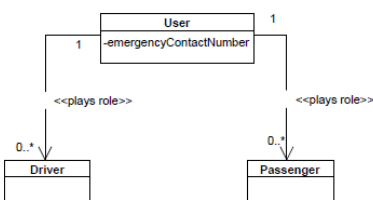
15.1 Class Diagram



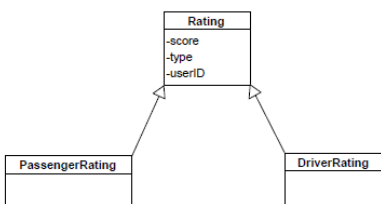
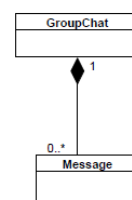
Generalization

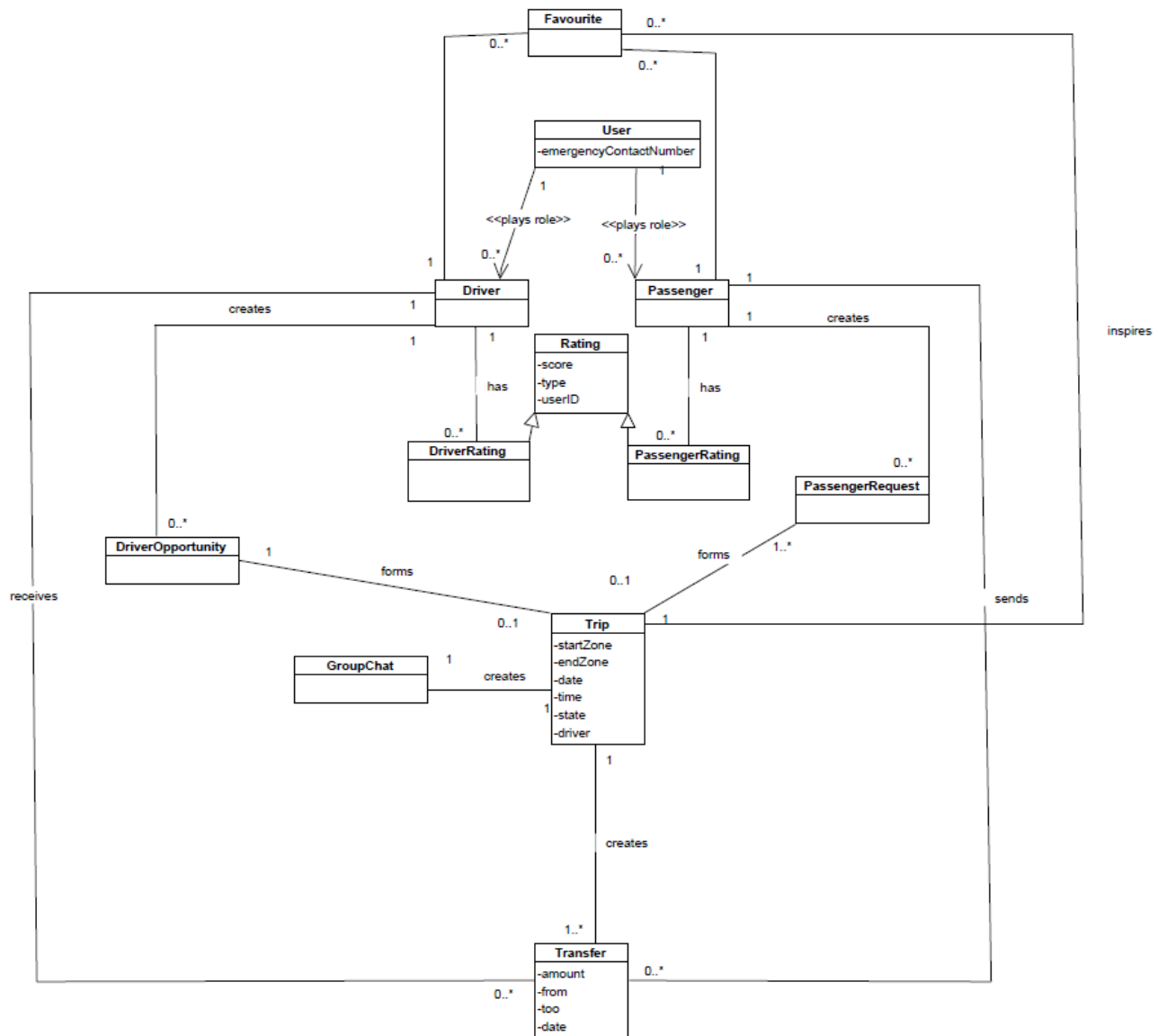


Transient Roles



Composition





Assumptions

1. A trip can only take place when a driver is available for a trip. Therefore, a single trip is associated with a single driver request. However, it is not necessary to have passengers for a trip, as a result a trip can be associated with no passenger requests or many passengers' requests.
2. When a driver accepts a passenger request, a group chat is created for the driver and passengers. Being that the group chat is only for a specific trip, the messages

in that chat are temporary. When the group chat is deleted, the messages are also deleted and therefore the message entity is a part of the group chat.

3. When a user is impressed by the service provided by another user they can favourite the other user. A passenger cannot favourite another passenger and a driver cannot favourite another driver. Therefore, favourite is associated with passenger and driver.
4. Users will rate each other after a trip. Passengers will rate drivers, drivers will rate passengers.
5. A user, after having a pleasant trip, can feel inspired to favourite another user who was part of the trip. Therefore, a favourite can be associated with a trip.
6. A driver will favourite a passenger and a passenger will favourite a driver.

16. Test Plan

All features within the project need to be tested in order to create a quality product. White box testing will commence in phases depending on when certain requirements are complete.

16.1 Requirements

- P1: Sign up page
- P2: Sign in page
- P3: Editing profile
- P4: Uploading credits
- R1: Creating driver requests
- R2: Creating passenger requests
- R3: Matching the requests
- R4: Creating trip matches
- R5: Group chat
- R6: Starting and ending the trip
- R7: Rating and favouriting users
- R8: Comments
- R9: Transferring funds

16.2 Testing

Each phase will require testing when the requirement is complete. When P1 is complete it will be tested the same goes for the rest of the requirements. The order above is how the requirements will be built and tested.

P1 – Sign up

Testing the sign up page needs to include testing field requirements. Test email input to ensure only emails are valid, test phone numbers to ensure they are valid length and only numbers, ensure that all fields that are required are filled in. Profiles then need to be created in a database for later use.

P2 – Sign in

The sign in page needs to be tested with incorrect user names and passwords as well as one correct user name and an incorrect password and a correct password but incorrect username. Some SQL injection should also be tested. The correct user should be logged in when that user's information is used to log in.

P3 – Edit Profile

When a user is logged in they should be able to edit their profile. Test this by clicking on the edit button. This should take you to the edit page. This should then be tested by trying to change the user information to invalid characters or properties. The system should check the properties and then inform the user that incorrect values have been inputted. Once the edit is complete the information needs to be updated in the database.

P4 – Uploading credits

Uploading credits needs to be tested according to amount requested. The system should then contact a third party and get an authentication. If the authentication is positive and the cash is transferred to the company account, the user account should be updated with a positive amount according to what was requested. The same goes for withdrawals. The withdrawal amount is requested, and the system then must check if available funds allows for that withdrawal before completing the transaction. Test this by inputting amounts more

than the user has in their account as well as inputting incorrect characters or values in the amount field.

R1 - Creating driver requests

This needs to create a request with defined starting zones and drop off zones. The request needs a time and date in order to complete the request creation. Test this by only filling in half the required details and trying to submit the request. The test must involve trying to select dates that are in the past and incorrect times as well as invalid zone selection. When the request is created a database with the correct information needs to be populated.

R2 - Creating passenger requests

This needs to create a request with defined starting zones and drop off zones. The request needs a time, date and offer in order to complete the request creation. Test this by only filling in half the required details and trying to submit the request. The test must involve trying to select dates that are in the past and incorrect times as well as invalid zone selection. The offer can be tested by trying to offer more money than is available in the users account. When the request is created a database with the correct information needs to be populated.

R3 - Matching the requests

Once R1 and R2 are complete the system needs to match these driver requests and passenger requests together. This needs to happen according to the set pickup, drop-off zones, the date and time and if the user has favourited someone. Test to see that all requests with the same zones do match. Then check if the filter is working and the user's favourites are at the top of the list. Then make sure that the second filter works and that the list is in order of who is willing to pay the most for the trip.

R4 - Creating trip matches

Once all the requests are matched users can request drivers and passengers as well as accept requests. This needs to be tested to see if a user requests a driver or passenger that that user receives the request. If a request is ignored nothing should happen. If a

request is accepted the system should add them to the trip group and remove them from the feed if they are a passenger. The driver can accept passengers till they confirm the trip. Test to make sure that this happens. The users can cancel the trip at this point as well. Test to see if a passenger cancels that only they are removed from the trip and if a driver cancels the entire trip is removed and the passengers are notified.

R5 - Group chat

After R4 if there is no trip cancelation the users part of the trip should be able to freely communicate on the group. Messages must be able to be sent from each user and seen by all other users in the trip.

R6 - Starting and ending the trip

The driver should be able to start the trip. Once they have started the trip users should be able to end the trip by a button that becomes available. When the trip has started the users should also have a panic button that they can use. If the panic button is used a friend needs to be notified of the request the driver/passengers profile and car registration.

R7 - Rating and favouriting users

Once the end button in R6 is pressed the following should happen. The user should get a rating option to rate the driver or passengers they should also have an option to favourite the users. If a user is rated the rating of that user needs to be updated accordingly and a new average rating needs to be calculated. If a user is favourited that user needs to appear in the favourites table for that specific user. Once that is complete the user should go back to the idle state where they can create a new trip.

R8 – Comments

Once the users have finished R7 they will be able to create comments if they like. Test this by writing comments and ensuring they appear on the correct users comments feeds. Skip this step as well to ensure that nothing changes and a blank comment is not created.

R9: Transferring funds

Once R8 is complete the funds specified by the passengers needs to be transferred to the driver. Test to see if the correct amount is being transferred to the correct people.

17. Implementation Plan

The implementation plan involves launching Huddle onto the market for the first time and specifies how it will occur and who is involved.

17.1 Training and Job Scheduling

Users of the application include:

- Passengers
- Drivers
- Manager

It is the manager's responsibility to conduct the administrative activities associated with Huddle such as communicating with the advertising agency, communicating with PayFast and handling customer queries. The manager will be trained by the development team on how to use the application so that they can assist users.

Passengers and drivers can refer to the help section of the application for instructions on how to use it. If they have any issues with regards to payment and usability, they can contact the manager through contact details supplied on Huddle.

The development team manages and constantly updates the system. The manager is the only internal worker and provides the communication channel between the development team and the customers.

17.2 Rollout

Once the application is running, the advertising plan will be executed. This will be done by an external advertising agency. It is the advertising agency's role to convince customers to use the product and provide them with information on how it works.

18. End-User Procedures

To ensure that users are utilising the service in a legal and safe manner they will be required to agree to rules stipulated in an end user agreement. Rules for users will be that they provide information about themselves that is factual. Drivers will have to agree to only using roadworthy cars for trips with valid car disks.

Should users have any problems while using the service, Huddle will have a help page where they can report any problem they experienced. Huddle LTD will work on resolving problems submitted by users through the help page.

19. Post-Implementation Follow-up

From the second version onwards, we will consider increasing the amount of zones available to the users. We can expand Huddle and make it available to the whole of the Western Cape and then to the whole of South Africa.

20. Glossary

Start zone

The physical location a user would like to depart from.

End zone

The physical destination the user would like to end their trip.

Time

The time in Central African Time the user would like to depart from the start zone.

Offer

A monetary amount that a passenger is willing to pay a driver for sharing a ride with them.

Sharing a ride

When two or more people travel in the same vehicle.

Request

When a user indicates a start zone, end zone and time for a journey they would like to share a ride for.

Driver Request

A request made by a driver to a passenger that indicates start zone, end zone and time.

Passenger Request

A request made by a passenger to a driver that indicates start zone, end zone, time and offer.

Trip

When a passenger and driver agree to travel in the same car, at the same time, from the same start zone to the same end zone.

21. References

Accelerate Cape Town. 2018. *Corporate Cape Town launches Carpooling Pilot to ease traffic congestion* [Online]. Available: <http://acceleratecapetown.co.za/carpooling/> [2018, May 1].

Jackson, T. 2017. *JumpIn Rides latest entrant to SA carpooling space* [Online]. Available: <http://disrupt-africa.com/2017/03/jumpin-rides-latest-entrant-to-sa-carpooling-space/> [2018, May 1]