

Software Engineering

Homework 1

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System

Halil KOÇ Inc. is a company that performs human transportation by coaches and sells tickets online or over branch offices. The company has a number of coaches and each coach includes a driver and a host who manages the seat occupation in coaches. As a developer, you may refer to a real company that you used for traveling intercity and get the requirements.

Stakeholders

- **Passengers:** They buy tickets, give their luggage to coach hosts before getting onto the coach. Their information is stored in the system.
- **Company Manager:** Manages the company. Can buy/sell coaches, add/remove coach drivers, coach hosts, branches and branch managers to/from the system.
- **Branch Managers:** Manages the branches. Can add/remove ticket sellers to/from the system. Informs company manager about everything important for the branch(income, outcome, maintenance, etc.)
- **Coach Drivers:** Responsible for transferring passengers from one location to another.

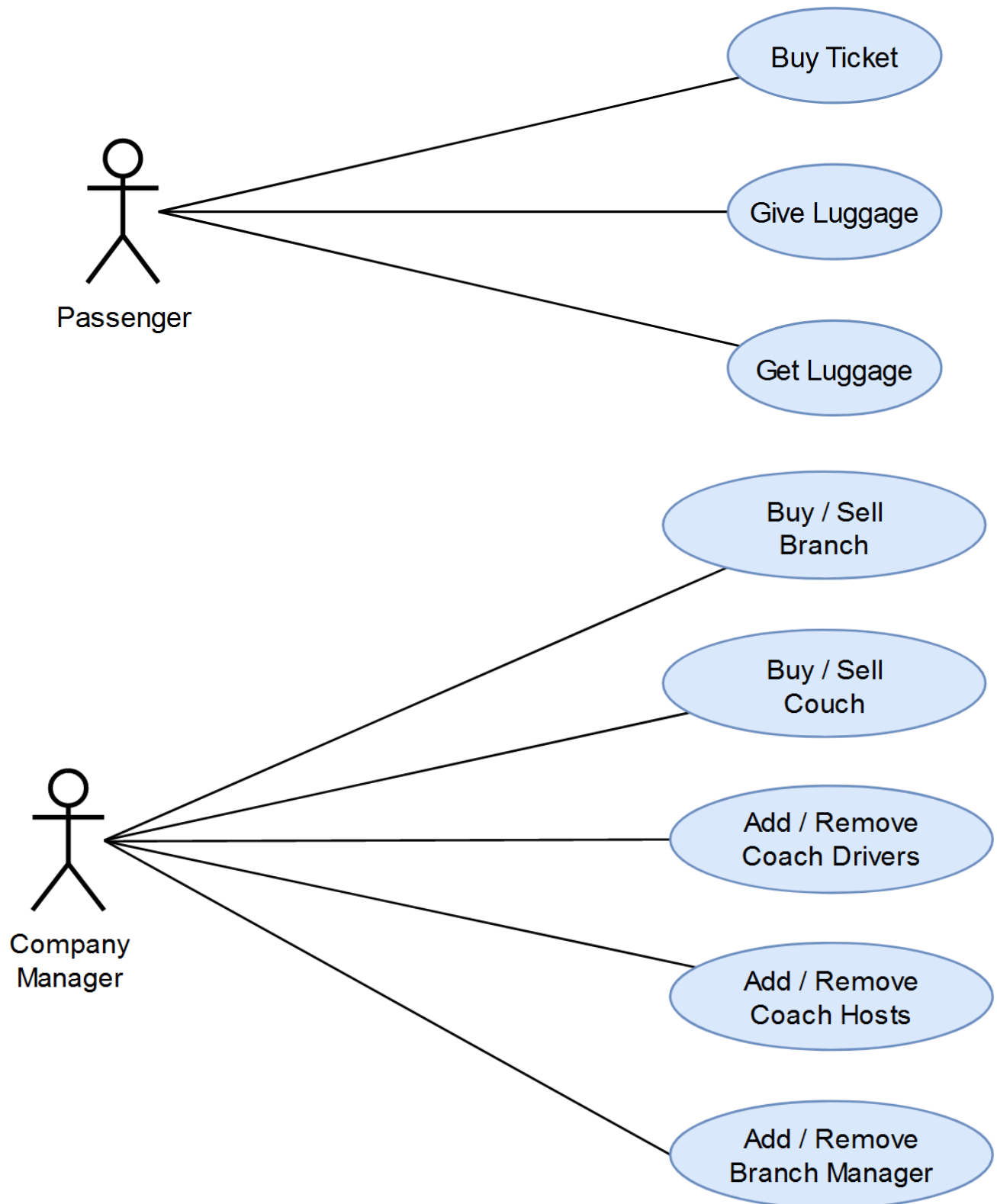
- **Coach Hosts:** They check passengers' tickets during the coach ride, help to transfer the luggage that passengers have on the coach. They also make sure everyone is on the coach before leaving the station.
- **Ticket Sellers:** They sell tickets to the passenger. They make sure the same place is not occupied twice
- **Service Drivers:** They transport passengers from branches to the station.
- **IT Staff:** They develop, install and maintain the online service of the system.

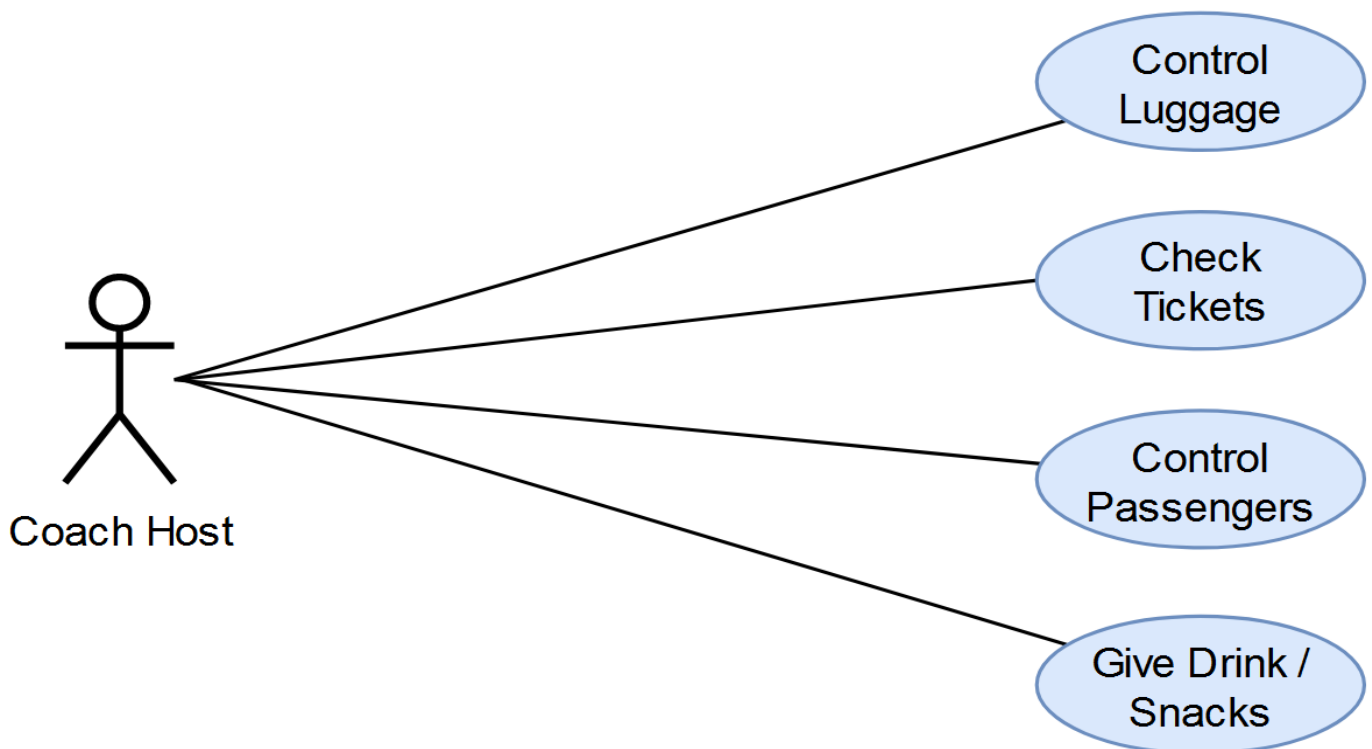
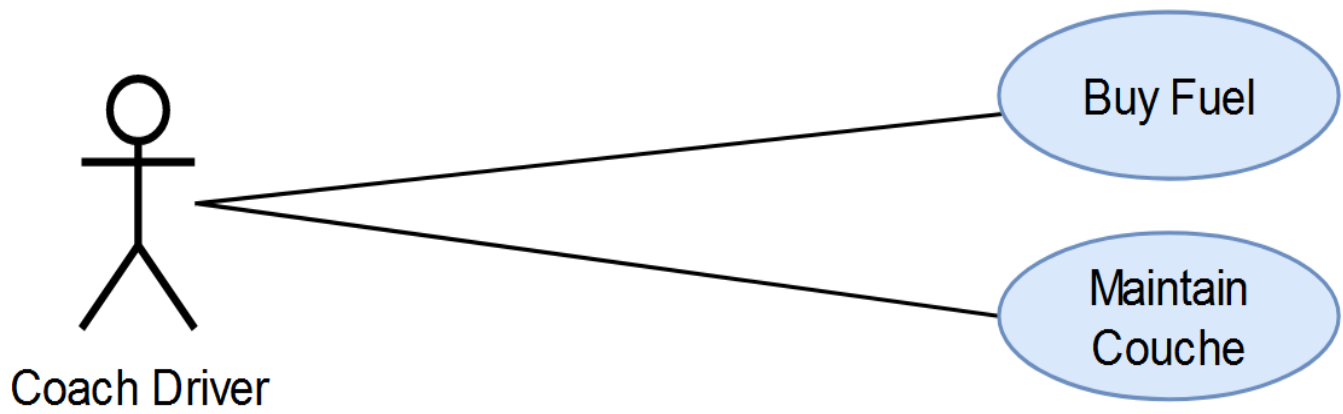
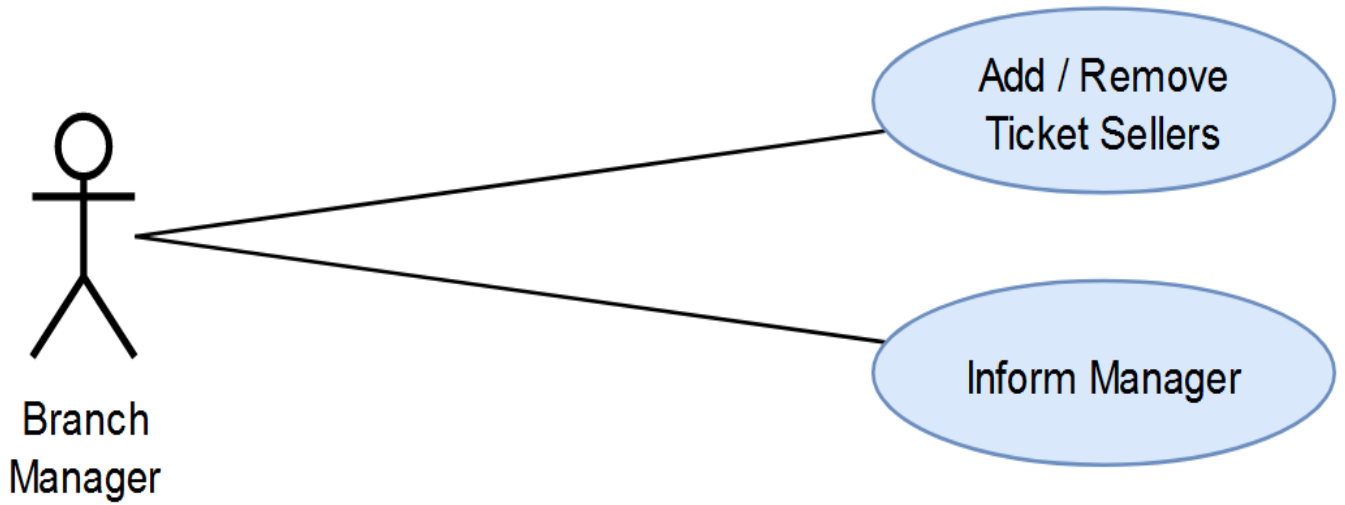
User Requirements

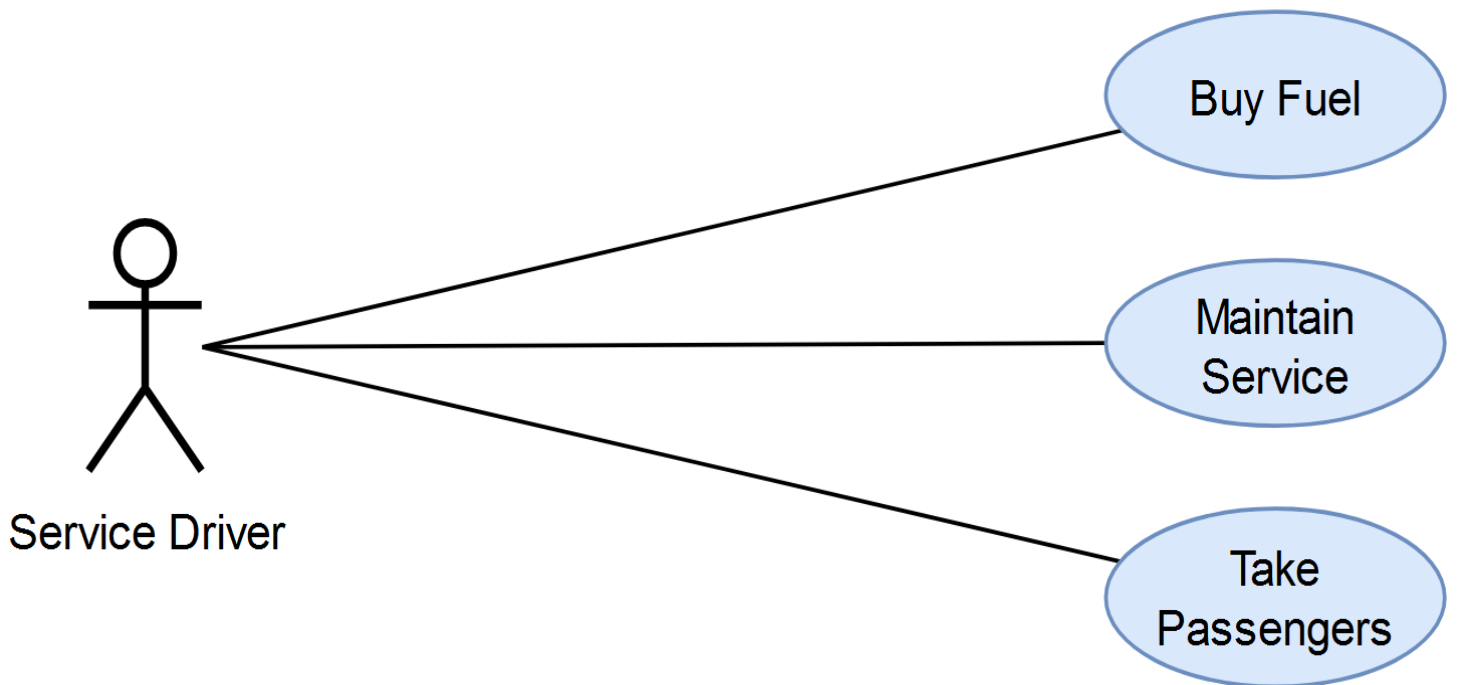
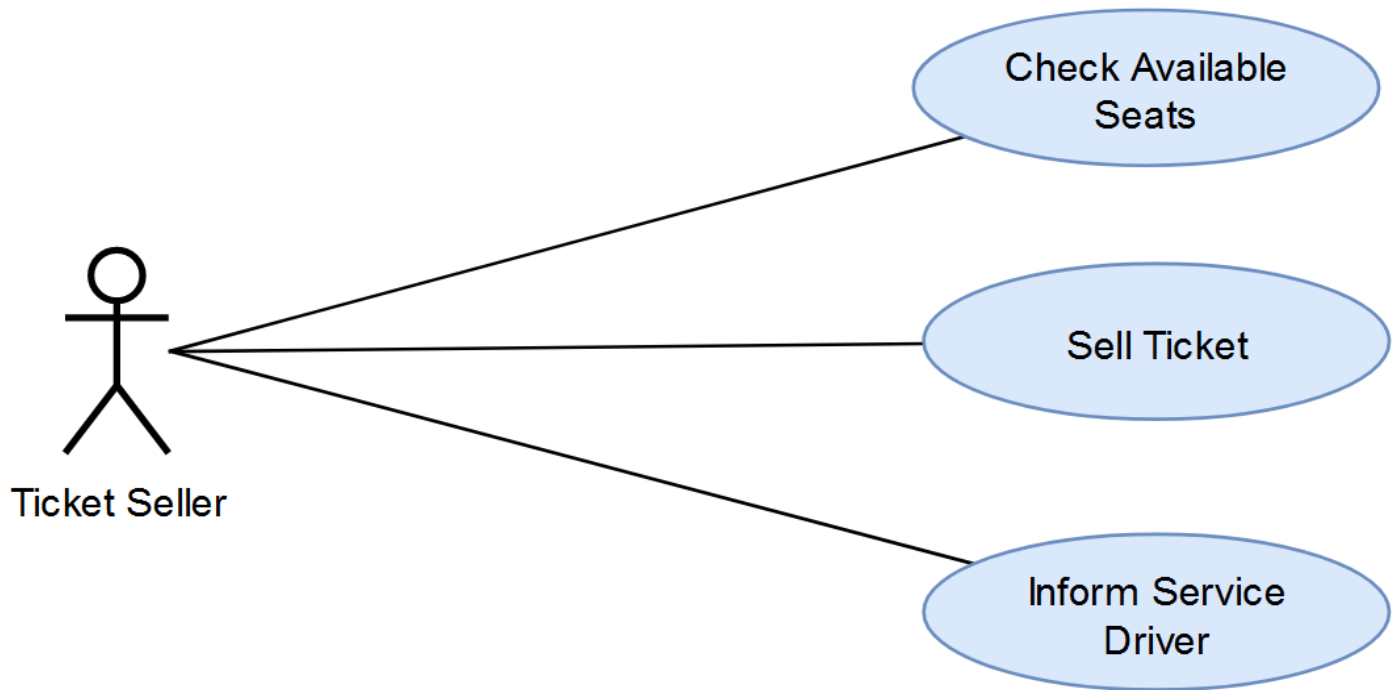
- **Passengers** shall be able to buy tickets from both online and offline(branches) platforms.
- **Passengers** shall be able to give their luggage to the coach hosts to store them on the coach.
- **Company manager** shall buy more branches to improve the income of the company.
- **Company manager** shall be able to buy/sell coaches to/from the system.
- **Company manager** shall be able to add/remove coach drivers to/from the system.
- **Company manager** shall be able to add/remove coach hosts to/from the system.
- **Company manager** shall be able to add/remove branch managers to/from the system.
- **Branch managers** shall be able to add/remove ticket sellers to/from the system.

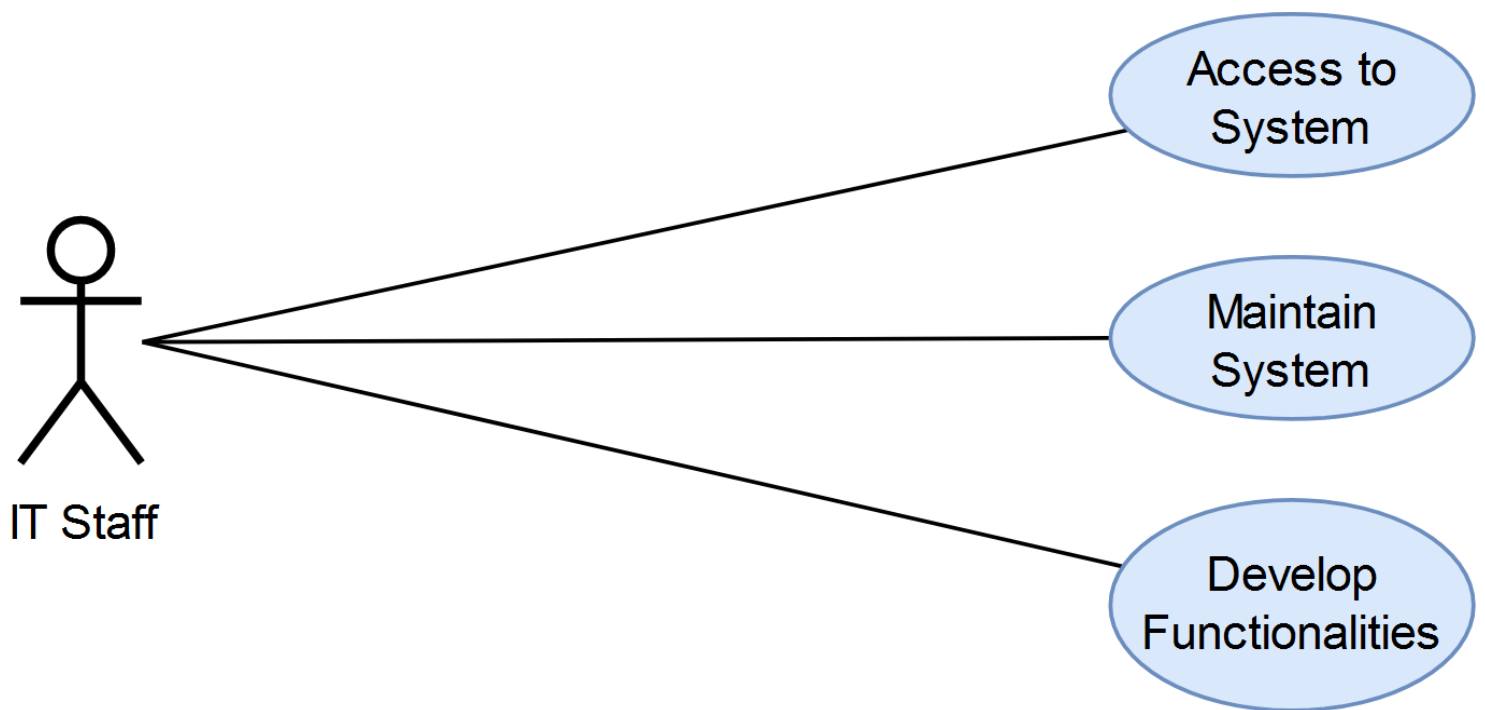
- **Branch managers** shall inform the company manager about everything important for the branch(income, outcome, maintenance, etc.)
- **Coach Drivers** shall have authority to drive couches.
- **Coach Drivers** shall be able to buy fuel when needed.
- **Coach Drivers** shall do daily/weekly/monthly and yearly maintenance of the coach.
- **Coach Hosts** shall help passengers to transfer their luggage to the couch
- **Coach Hosts** shall be able to check passengers' tickets
- **Coach Hosts** shall check if every passenger is on the coach or not before leaving the station.
- **Coach Hosts** shall give drinks and snacks to passengers
- **Ticket Sellers** shall be able to see available seats on every coach on the system.
- **Ticket Sellers** shall be able to sell any available seat on a coach to a customer.
- **Ticket Sellers** shall inform service drivers about how many passenger is waiting in the branch to go the station
- **Service Drivers** shall be able to know how many passenger is waiting in the branches
- **Service Drivers** shall get passengers from branches and arrive at the station before departure time
- **IT Staff** shall have access to system software and all the information about the company that is needed to develop system software
- **IT Staff** shall maintain the system

Use Cases









Use Case Description

Passenger

System	Passenger
Use Case	Buy Ticket
Actors	Ticket Seller, Passenger, IT Staff
Data	<p>When a passenger decides to buy a ticket, he/she has two choices. One, passenger can choose buying online. In that case, passenger enters to the website which belongs to this company and chooses when he/she goes where. After giving personal data, passenger pays the ticket price. Ticket Seller will be informed if the passenger decides to go to the station with company service.</p> <p>Secondly, passenger can choose buying tickets from the branch office. In that case, the procedure is same but necessary data is entered by ticket seller. The</p>

	data ticket seller gets: passenger when he/she goes, where he/she goes, do passenger wants service to the station, etc.
Stimulus	Passenger sends ticket request
Response	Ticket sold if the price is paid and the seat which passenger wants is available
Comments	Usually passengers want company service to go to the station.

System	Passenger
Use Case	Give Luggage
Actors	Passenger, Coach Host
Data	Before passenger gets into the coach, first he/she will want to store his luggage. It is not possible for passenger to carry if there are a lot of luggage. To prevent someone stealing their luggage, coach host will mark and store them.
Stimulus	Passenger stands near the luggage storing part of the coach with his/her ticket until coach host arrives
Response	Coach host arrives and checks if that passenger is their customer or not by looking the ticket. After that, first marks the luggage and stores them in the coach.
Comments	It would be a better practice for passengers to know where coach host put their luggage so after trip is done, they can show their luggage and leave right away.

System	Passenger
Use Case	Get Luggage
Actors	Passenger, Coach Host
Data	After couch trip is done, passengers will go to luggage part to take their

	luggage, coach host will give them to passenger by looking their tickets.
Stimulus	Couch arrives at final destination and couch driver announce that trip is over.
Response	Couch host goes to luggage part and distributes the luggage to passengers
Comments	If a passenger's luggage deep inside of the coach, waiting in the coach is better than standing outside.

Company Manager

System	Company Manager
Use Case	Add / Remove Branch
Actors	Company Manager, Branch Manager, Ticket Seller
Data	<p>Add Branch: Company manager enters branch data to the system. Necessary informations; branch name, branch addres, time zones for service to the station, branch manager informations, ticket seller informations.</p> <p>Remove Branch: Company manager chooses branch name to remove from system. Removing branch also removes connection of branch manager and ticket seller to that branch.</p>
Stimulus	Company manager sends add or remove request to the system.
Response	A message shows up about if the request is accepted or not
Comments	Company manager shouldn't try to add branch with the same data or shouldn't try to remove a branch that doesn't exist

System	Company Manager
Use Case	Add / Remove Coach
Actors	Company Manager, Couch Driver, Couch Host

Data	<p>Adding Coach: Company manager sends data of the new coach: coach plate, vehicle's driver, vehicle's host, time intervals(when it leaves from which station and when it arrives to which station)</p> <p>Removing Coach: Company manager sends a request to system with the coach plate which he/she wants to remove. If request accepted, then coach driver and coach host of that coach won't be connected to any coach.</p>
Stimulus	Company manager sends add / remove request to the system
Response	<p>If add request accepted, then new coach will be added to the system with their coach drive and coach host.</p> <p>If remove request accepted, then the all data about that couch will be deleted from the system</p>
Comments	Company manager shouldn't try to add coach with the same data or shouldn't try to remove a coach that doesn't exist

System	Company Manager
Use Case	Add / Remove Coach Drivers
Actors	Company Manager, Coach Driver
Data	<p>Adding coach driver: Company manager sends add request for a new coach driver with necessary data (driver name, phone number, address, salary, coach plate that he/she will drive)</p> <p>Removing coach driver: Company manager sends remove request for an existing coach driver with necessary data (driver name).</p>
Stimulus	Company manager sends add / remove request to the system.
Response	<p>If add request accepted, then new coach driver will be added to the system.</p> <p>If remove request accepted, then all data about couch driver will be deleted from the system</p>
Comments	Company manager shouldn't try to add coach driver with the same data or shouldn't try to remove a coach driver that doesn't exist

System	Company Manager
Use Case	Add / Remove Coach Hosts
Actors	Company Manager, Coach Host
Data	<p>Adding coach host: Company manager sends add request for a new coach host with necessary data (host name, phone number, address, salary, coach plate that he/she will serve in)</p> <p>Removing coach host: Company manager sends remove request for an existing coach host with necessary data (driver name).</p>
Stimulus	Company manager sends add / remove request for coach host to the system.
Response	<p>If add request accepted, then new coach host will be added to the system.</p> <p>If remove request accepted, then all data about couch host will be deleted from the system</p>
Comments	Company manager shouldn't try to add coach host with the same data or shouldn't try to remove a coach host that doesn't exist

System	Company Manager
Use Case	Add / Remove Branch Manager
Actors	Company Manager, Branch Manager
Data	<p>Adding branch manager: Company manager sends add request for a new branch manager with necessary data (manager name, phone number, address, branch name that he/she will manage, salary)</p> <p>Removing branch manager: Company manager sends remove request for an existing branch manager with necessary data (branch manager's name).</p>
Stimulus	Company manager sends add / remove request for branch manager to the system.

Response	<p>If add request accepted, then new branch manager will be added to the system for given branch.</p> <p>If remove request accepted, then all data about branch manager will be deleted from the system. Branch will still exist but it won't have any manager.</p>
Comments	Company manager shouldn't try to add branch manager with the same data or shouldn't try to remove a branch manager that doesn't exist

Branch Manager

System	Branch Manager
Use Case	Add / Remove Ticket Sellers
Actors	Branch Manager, Company Manager, Ticket Seller
Data	<p>Adding ticket seller: Branch manager sends add request for a new ticket seller for their branch with necessary data (ticket seller name, address, phone number, branch name that he/she will work, salary)</p> <p>Removing ticket seller: Branch manager sends remove request for ticket seller with necessary data (ticket seller's name). For every operation company manager will be informed.</p>
Stimulus	Branch manager sends add / remove request for ticket seller to the system.
Response	<p>If add request accepted, then new ticket seller will be added to the system for given branch.</p> <p>If remove request accepted, then all data about ticket seller will be deleted from the system. Branch will still exist but it won't have any ticket seller.</p>
Comments	Branch manager shouldn't try to add ticket seller with the same data or shouldn't try to remove a ticket seller that doesn't exist

System	Branch Manager
Use Case	Inform Company Manager

Actors	Branch Manager, Company Manager
Data	Data about branch office will be sent to the company manager(periodically) Data: Any operation(adding/removing ticket seller), branch income, how many tickets sold for in that day/week/month/year
Stimulus	All data is sent over website of the company
Response	Company manager gets data from the branch manager and returns to him/her about what needs to be done.
Comments	Branch managers probably don't inform their company manager's daily. It mostly happens weekly.

Coach Driver

System	Coach Driver
Use Case	Buy Fuel
Actors	Coach Driver, Company Manager
Data	Fuel is a necessity for a coach company. Coach drivers get fuel and data about how many liter of fuel is bought, what type of fuel is bought, time between the last refuel is sent to the company manager.
Stimulus	The credit card that coach drivers use is connected to system so when they bought any fuel, company manager will automatically get data
Response	Company manager response back to coach driver when something is wrong with the fuel bill
Comments	Since coaches work everyday, they probably refuel the coaches almost everyday. It means this data is very important and refueling is one of the biggest expense of the company

System	Coach Driver
Use Case	Maintain Couch

Actors	Coach Driver, Company Manager
Data	If any part of the coach is not working properly company manager will be informed. Company managers also get data from coach drivers about daily/weekly/monthly and yearly maintenance of the coaches. The cost of the maintenance, which coach makes the biggest expense, etc.
Stimulus	Coach driver sends data about maintenance to company manager over company website
Response	Company manager response back to coach driver when something is wrong with the maintenance over company website
Comments	Some coaches work for 10-20 years. In that time interval, these vehicles cause a lot of maintenance problems and this will be a big expense for the company

Coach Host

System	Coach Host
Use Case	Control Luggage
Actors	Coach Host, Passenger
Data	Data(which luggage is belong to whom) is stored on the luggage itself. These data is written by the coach host. Passengers show their ticket to coach host and coach host places their luggage to the coach after marking them.
Stimulus	A mini ticket is pasted on the luggage which stores passenger data
Response	Coach host give passengers to their luggage when the trip is over by looking if the passenger data on the mini ticket belongs to them or not
Comments	This part works fine but sometimes coach hosts make mistake and give a luggage to someone else.

System	Coach Host
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Use Case	Check Tickets
Actors	Coach Host, Passenger
Data	When coach departed from the station, coach host starts to control passenger tickets. If the data on the ticket is true and belongs to that passenger, he/she moves to the next passenger. Data on the ticket(name of the passenger, coach plate, time interval that passenger will travel, seat number)
Stimulus	Coach host controls tickets by matching the passenger with inside of the system
Response	Passenger stays on the couch if ticket is valid
Comments	These type of control is no longer exist. Nowadays coach hosts already have list of people will get on to the coach for that trip. If passenger name is the same with on the list, then it is okay.

System	Coach Host
Use Case	Control Passengers
Actors	Coach Host, Passenger
Data	Coach host controls passenger list, data on the list (passengers' name, seat number, time interval that passenger will travel)
Stimulus	If passenger is not on the coach, before leaving the station, coach host shouts out the name of the passengers
Response	If passenger is there couch leaves station after passenger gets in.
Comments	Most of the time everyone is on the coach when couch will departure. But sometimes they will call passenger if passenger is missing.

System	Coach Host
Use Case	Give Drink / Snacks

Actors	Coach Host, Passenger
Data	After some time passes from departure, coach host serves drink(coffee, tea, wate) and snacks(eticin, topkek, etc.)
Stimulus	Coach host asks to a passenger if they want any drink or snacks
Response	Passengers get some drink or snack if they want
Comments	As the time passes, like everything, quality of the snacks and drink dropped a lot.

Ticket Seller

System	Ticket Seller
Use Case	Check Available Seats
Actors	Ticket Seller, Branch Manager, Passenger, IT Staff
Data	On the website, ticket seller can see available seats for selected(needed data: time interval that passenger will travel, to where) couch.
Stimulus	Ticket seller sends the needed information to the system
Response	Website shows available seats for given data
Comments	It is the same thing as doing it online. But some people doesn't prefer doing it online.

System	Ticket Seller
Use Case	Sell Ticket
Actors	Ticket Seller, IT Staff, Passenger, Branch Manager
Data	On the website, after ticket seller shows available seats to the customer, gets passengers data(name, phone number, when to go where, seat number that passenger wants, does passenger want service to the station).

Stimulus	Ticket seller enters passenger data to system.
Response	The seat is booked for that passenger.
Comments	Most of the passengers prefer using service to the station.

System	Ticket Seller
Use Case	Inform Service Driver
Actors	Service Driver, Ticket Seller, Passenger
Data	After booking a seat for a passenger, service driver will be informed. The data given to the service driver: How many passenger will use which branch to go to the station.
Stimulus	Online or over branch offices, service driver gets data over phone before they arrive to that branch
Response	Service driver arrives to the branch, gets passengers and drops them on the station.
Comments	Service cars a lot smaller than couches, because of that sometimes using taxi rather than service would be ideal.

Service Driver

System	Service Driver
Use Case	Buy Fuel
Actors	Service Driver, Company Manager
Data	After service driver buys fuel for the service car, the data about how many liter of fuel is bought, what type of fuel is bought, time between the last refuel is sent to the company manager.

Stimulus	The credit card that service drivers use is connected to system so when they bought any fuel, company manager will automatically get data
Response	Company manager response back to service driver when something is wrong with the fuel bill
Comments	Since service cars work everyday, they probably refuel the service cars almost everyday. It means this data is very important and refueling is one of the biggest expense of the company

System	Service Driver
Use Case	Maintain Service
Actors	Service Driver, Company Manager
Data	If any part of the service car is not working properly company manager will be informed. Company managers also get data from service drivers about daily/weekly/monthly and yearly maintenance of the service cars. The cost of the maintenance, which coach makes the biggest expense, etc.
Stimulus	Service driver sends data about maintenance to company manager over company website
Response	Company manager response back to service driver when something is wrong with the maintenance over company website
Comments	They are not problem as much as couches means of expense, but they also important too

System	Service Driver
Use Case	Take Passengers
Actors	Service Driver, Passenger, Ticket Seller
Data	How many passenger will be waiting on a branch office is necessary data for service driver before arriving to that branch

Stimulus	Ticket sellers inform service driver about number of passenger waiting on that branch, by calling them.
Response	Service driver gets passengers from the branch, and drops them at the station
Comments	Service drivers usually don't wait for the passenger if they didn't arrive branch in time.

IT Staff

System	IT Staff
Use Case	Access to the System
Actors	IT Staff, Company Manager
Data	Needed data to access: System files repo password and authorization, database password and it's authorization.
Stimulus	Company manager gives authority to IT Staff to access system or database
Response	IT staff can add, remove, edit the system files and database
Comments	Since I don't know how big companies solve this problem, I assume this is how it's work.

System	IT Staff
Use Case	Maintain System
Actors	IT Staff, Company Manager, Branch Manager, Ticket Seller, Passenger
Data	To maintain the system, IT Staff needs data from the users. These data includes: Company manager requests(adding/removing couches, couch drivers, etc.), branch manager requests(adding/removing ticket sellers), ticket

	seller requests(asking for available seats, selling tickets), passenger requests(asking for available seats, buying tickets), etc.
Stimulus	IT Staff examines the data coming from different users
Response	IT Staff solves any problem that occurs. If they don't solve users can't use the system because of that.
Comments	This is probably one of the hardest task for the IT staff

System	IT Staff
Use Case	Develop new Functionalities
Actors	IT Staff, Company Manager, Branch Manager, Ticket Seller, Passenger
Data	IT staff get requirements from the users, ask them what they want, how it works, what is the outcome, etc. After they got all user and system requirements they start to develop.
Stimulus	Users ask for new features and IT Staff starts to get all requirements, then they develop
Response	New feature is published and ready to use for users
Comments	Hardest part for the IT Staff, because most of the time users don't know what they want.

Challenges I Faced When Extracting Use Cases

To be able to extract use cases, first you have to know what company is doing, how it is doing it, what problems they are facing with, what is the use of tools and technologies that they use, etc. And the only way to know all of these thing is beeing inside of that company, or whatever they are doing.

For this subject, I was a bit lucky. Because I have used a lot of intercity transportation during my education at Ege University. I bought online tickets, used services to go to the station, bought tickets from branch offices, talked with couch hosts, etc. And I did this so many times. So I already knew how their cycle works. But IT Staff part was by far the most difficult part for me. Because I never looked what they do, how they do it, what are the problems they face, how they maintain this kind of company, etc. However, after successfully finishing this lecture I hope I will know more.