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## Information Systems 01PDWOV

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Books, notes are not allowed. Write only on these sheets.

### *Car rental.*

Car rental companies own a number of cars and a number of sites where cars are parked when not in use. Customers rent cars for a period of time (having made a reservation, or not) and return them. We focus on company CARS.

The current process (AS IS), is as follows.

A customer may reserve a car, using the company web site, or the call center (this step is optional). A customer steps into the office close to the rental car parking site and completes the first step of the *check out*. The contract for the rental is defined (period of rental, name of driver, related ID document and driving license, insurances, damage deposit, partial and total fees, credit card), signed by both parties, and the payment for the rental is completed (payment has two parts, rental and damage deposit – the latter is normally returned at the end of the rental). Further, a specific car (identified by its tag) is assigned to the rental.

Then the customer walks to the car parking site. Here the second part of the check out happens. An employee checks with the customer the car and lists all visible damages on the car in an annex to the contract. Also this annex is signed by both parties. Then the employee hands the car to the customer (this of course includes the keys) and the rental starts.

The final step is *check in*. The customer drives the car to parking site. An employee receives the car and the keys, checks with the customer for new damages. If there are damages another process starts (we leave this process out of this analysis). At this point the rental ends. The company issues an invoice and possibly returns the damage deposit to the customer.

### TO BE process.

The idea is to improve the process by introducing the same innovations used by car sharing companies.

A customer has first to define an account with CARS. In this step the customer uploads his documents (ID, driving license) and a credit card. If all is right CARS approves and the customer can later rent cars. This step can be performed on a PC or smart phone. In any case the customer has to install the CARS app on her smartphone.

When a registered customer wants to rent a car she has to do a reservation (via app or PC).

Check out works as follows. The customer walks directly to the rental car parking, via the app she signals that she wants to start the rental. The app answers with position and tag of the assigned car. When the customer is close to the car she asks, via the app, to open the car. The system opens the car (the car needs to be modified via a device connected to the cellular network and capable of controlling some car functions, like door open/close). The keys are inside the car. The customer starts the car, and the rental.

The check in is similar. The customer parks the car in the rental car parking, stops the car, exits, and asks the app to close the car. At this point the rental is over.

Invoicing and payments proceed through the credit card.

Damage deposits and possibly damage reimbursements are avoided, introducing by default an insurance to cover all.

In the following model the TO BE situation.

1 IT Model / Technological model: describe the hardware architecture of the system

Client : PC or smartphone app for customer (account definition and update, reservations, check in checkout, invoicing and payments)

Server: back end for reservations, accounting, check in check out. Database of customers, accounts, contracts, reservations, cars.

2 Organizational model: list roles or organizational units involved

CARS (reservations, accounting, checkincheckout)

Customer

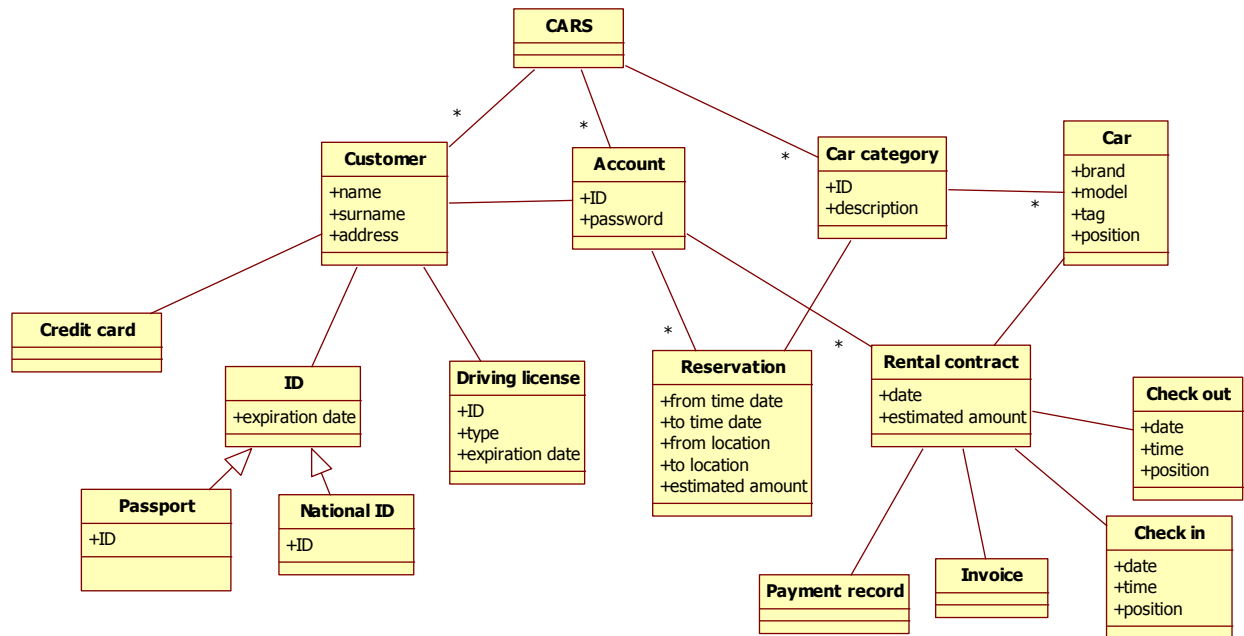
Credit card system

3 Business rule: write (in plain English, or in pseudocode) a business rule at your choice from the process described above.

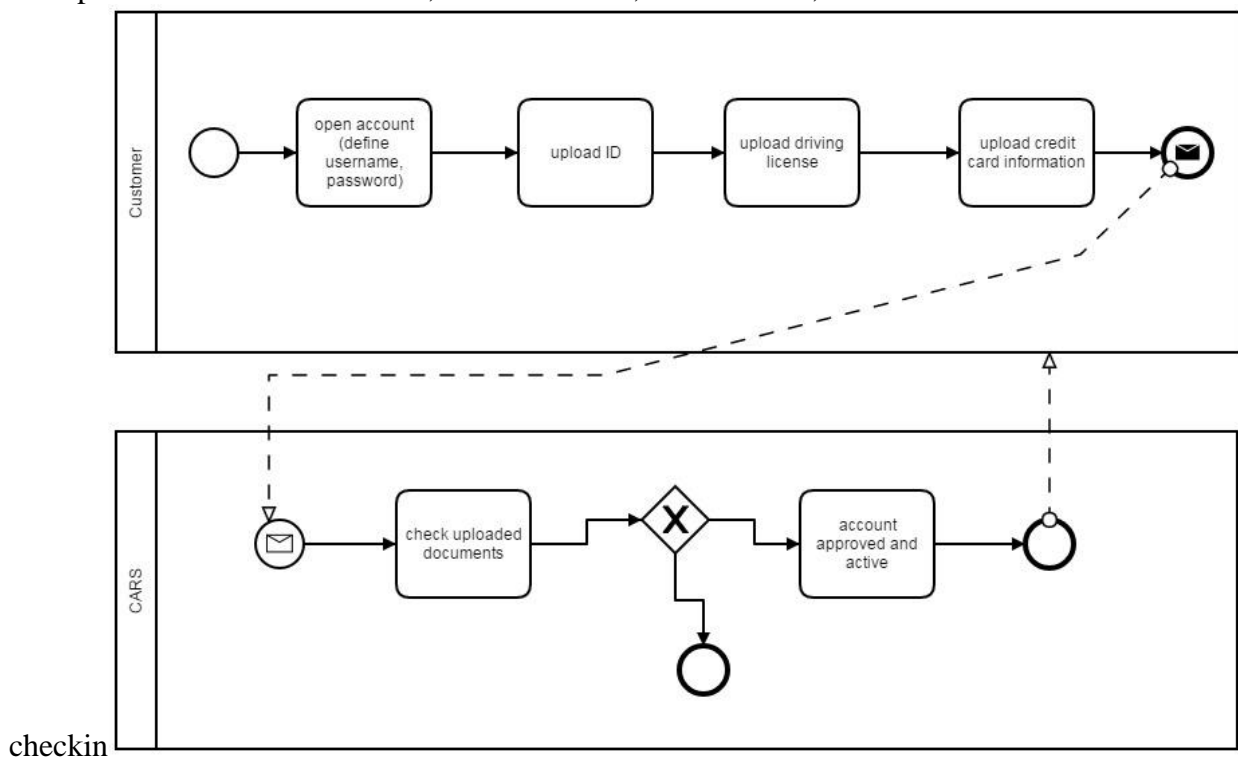
Account owner must provide valid ID and valid driving license

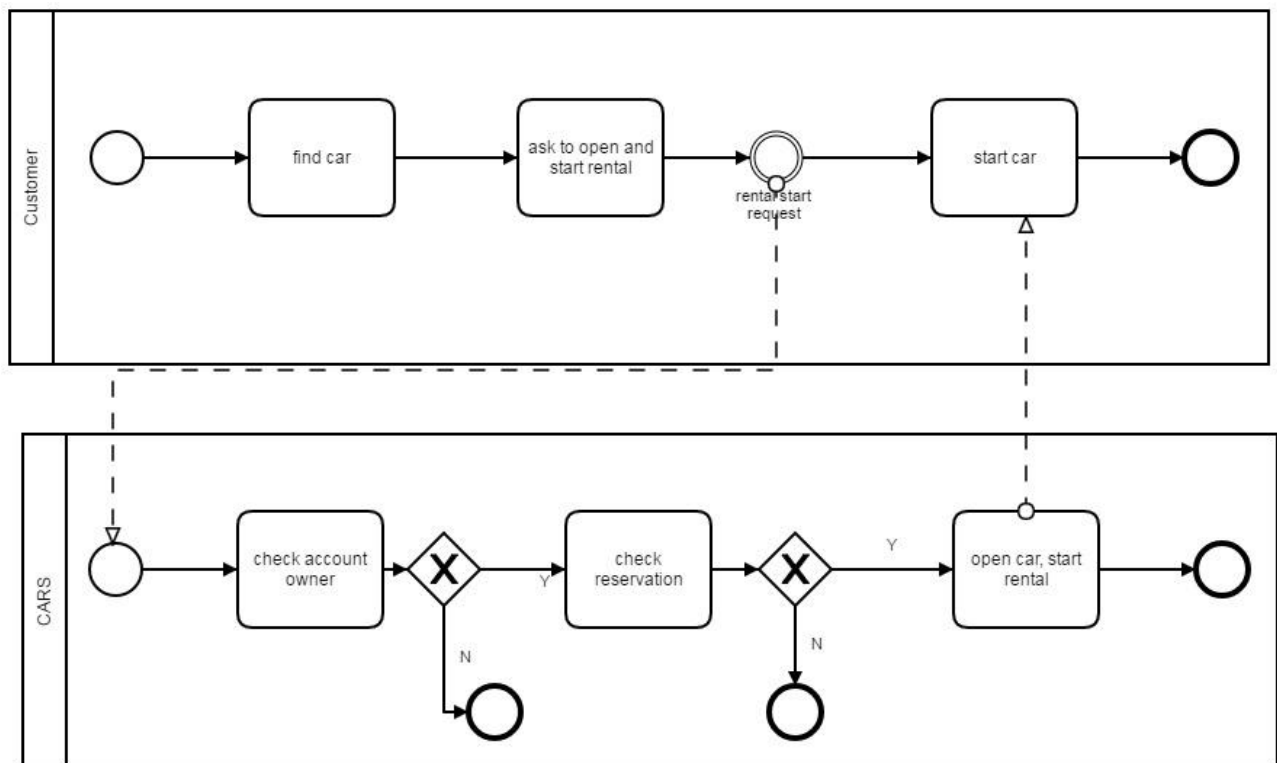
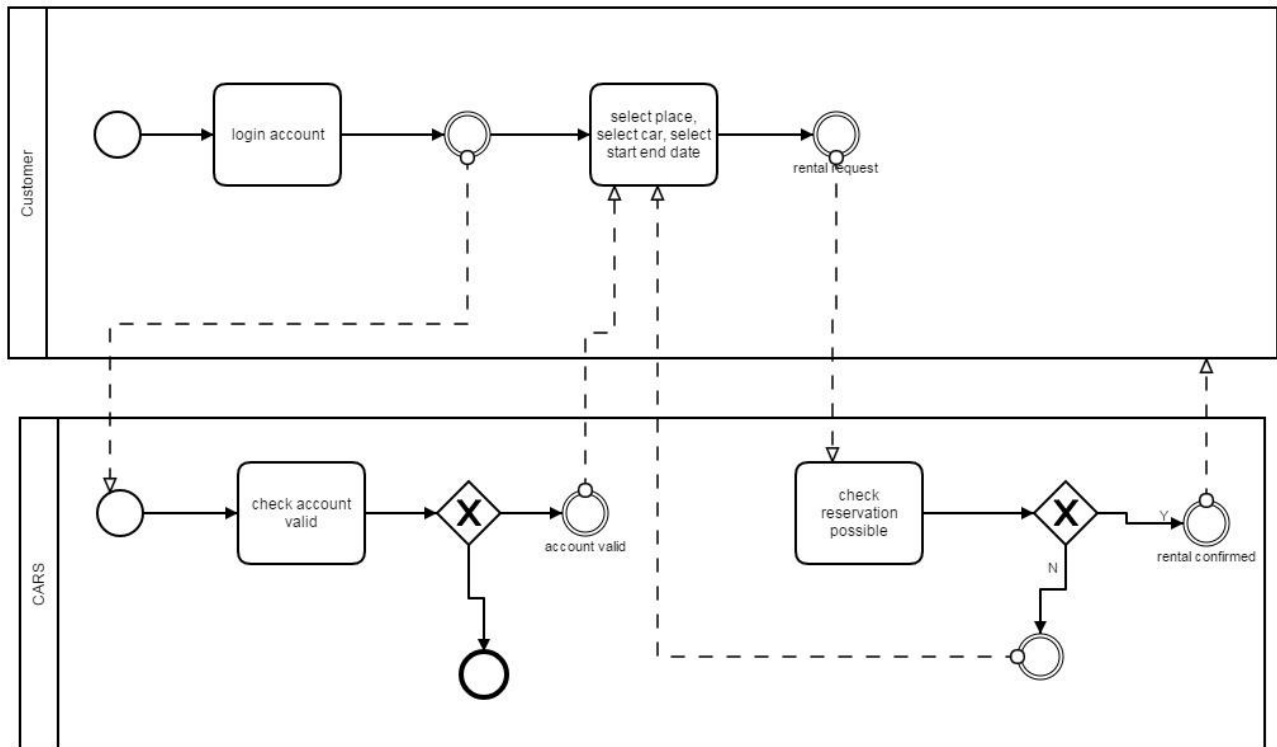
Driving license is valid if expiration date  $>$  today + 30 days

4 Functional model: Design and model (using BPMN + UML class diagram) the process (subdividing it as needed in subprocesses)



4 subprocesses: account creation, car reservation, car checkout,





5 Define the KPIs, considering these high level business goals (or CSF), CSF1 increase customer satisfaction, CSF2 reduce the cost of the process. In the table below show the correspondence CSF – KPI

CSF name	KPI Category (General, cost ..)	KPI Name	KPI Description	Unit of measure
	General	NR	Number of rentals per year	
	Service	LT check out	Lead time for doing a checkout, customer side (on BPMN from 'ask to open' to 'start rental')	t
	Service	LT check in	Lead time for doing a check in, customer side	t
	Efficiency	UC	Unit cost for one rental (company side) = employee effort for check out and checkin + infrastructure cost	
		CD	Average car damage in one rental	Euro
		DI	Damage insurance	Euro
		Customer fidelity	% of customers who come back	
	Quality	Q	Errors per rental (car not available, customer data wrong..)	

6 Compare the previous and the current situation, using the KPIs defined above

KPI	AS IS	TO BE
LT checkout		Decreases, no queue in office, no delay to check car status
LT checkin		Decreases, no delay to check car status
UC	Employee effort >0	employee effort ==0, but infrastructure cost increases (device installed on car)
CD		May increase, due to no controls
DI		May increase
Customer fidelity		Could increase, due to app and mandatory registration
Q		Should decrease, less data entry thanks to customer registration

Define the TCO to shift to the TO BE situation

Phase	Cost
Construction C	App development Car device purchase, IT infrastructure upgrade
Deployment D	Install device in each car
Op, maintenance OM	It infrastructure operation, car device maintenance
Dismissal DS	

- 7 Considering a 5 years period, define costs and savings (ROI analysis) by adopting the TO BE situation

Year/ cost or saving	Year 1	Year2	Year3	Year4	Year5
Cost	C+D				
Cost	OM	OM	OM	OM	OM
Saving	S	S	S	S	S

$$TCO = C+D+5*OM+5S$$

$$S = (\text{Cost\_personnel\_after} - \text{cost\_personnel\_before})$$

S is negative (saving) if cost personnel decreases

UC\_after = TCO / 5 / NR (assuming NR is the same every year)

This analysis does not consider DI and CD, that should be considered in a wider analysis

- 9 Considering the KPIs and the ROI, is the TO BE situation better? (answer Yes or No): yes

Why?

LT checkin and LT checkout improve a lot, especially in peak hours. Also UC decreases. An issue is CD, that could increase. This could be covered by the insurance, but this implies a cost DI, that could be charged fully to the customer, or not.

Another issue is the registration process. Effort is required to convince customers to do it. The potential huge benefit side effect is fidelity, customers who have registered likely will come back. In summary this innovation is potentially useful, details about it should be tuned.

10 In the context of digital marketing, describe the digital marketing funnel

See slides

11 Considering company strategies and the Porter model about company strategies, discuss in which quadrant of the model CARS could position itself, and why.

Mass market, cost leadership

12 Sketch here the BM canvas for CARS (2 points).

Key partners: car manufacturers, airlines,

Key activities: customer relationship, car maintenance, car selection and allocation

Key resources: cars, parking lots, reservation system (IT)

Value proposition: car rental with best service and low prices

Cost structure: cars (purchase and maintenance) , personnel, IT

Customer relationship: self service,

Channels: web, call center, (office)

Customer segmentation: businessmen, tourists, ..

Revenue stream: rental fees, car resell

13 The CARS company operates in Italy. The headquarters are in Rome. They deal with reservations, commercial policies, accounting, HR, IT, and they monitor the fleet of cars (purchases, resales). Throughout Italy are offices. Each office manages interaction with customers, and maintenance of car (cleaning, simple maintenance). What kind of organizational structure is this?

Functional + geografic

14 Describe the 'Service operation' processes according to ITIL v3,

See slides