# FindMeAParkingSpace

As many other cities around the world, Tartu has not been designed with a layout to hold large parking supplies. It is therefore important to design policies that serve to find a balance to encourage a smooth traffic and secure conditions for pedestrians, particularly in the historical center of the city. Aligned with this vision, the city government has engaged your team for implementing a system for managing of parking spaces in Tartu.

Paid parking in Tartu concerns only a small zone around town center. Clearly, that zone is the one that shows a large concentration of pedestrians (e.g. tourists and University students) and is also the one with important space restrictions. In fact, we will take as reference the parking zones currently used by the city government, defining the street segments for on-street and off-street parking and the corresponding fees. Note that off-street parking provided by the City government is free but time restrictions may apply. On the other hand, on-street parking is always paid.
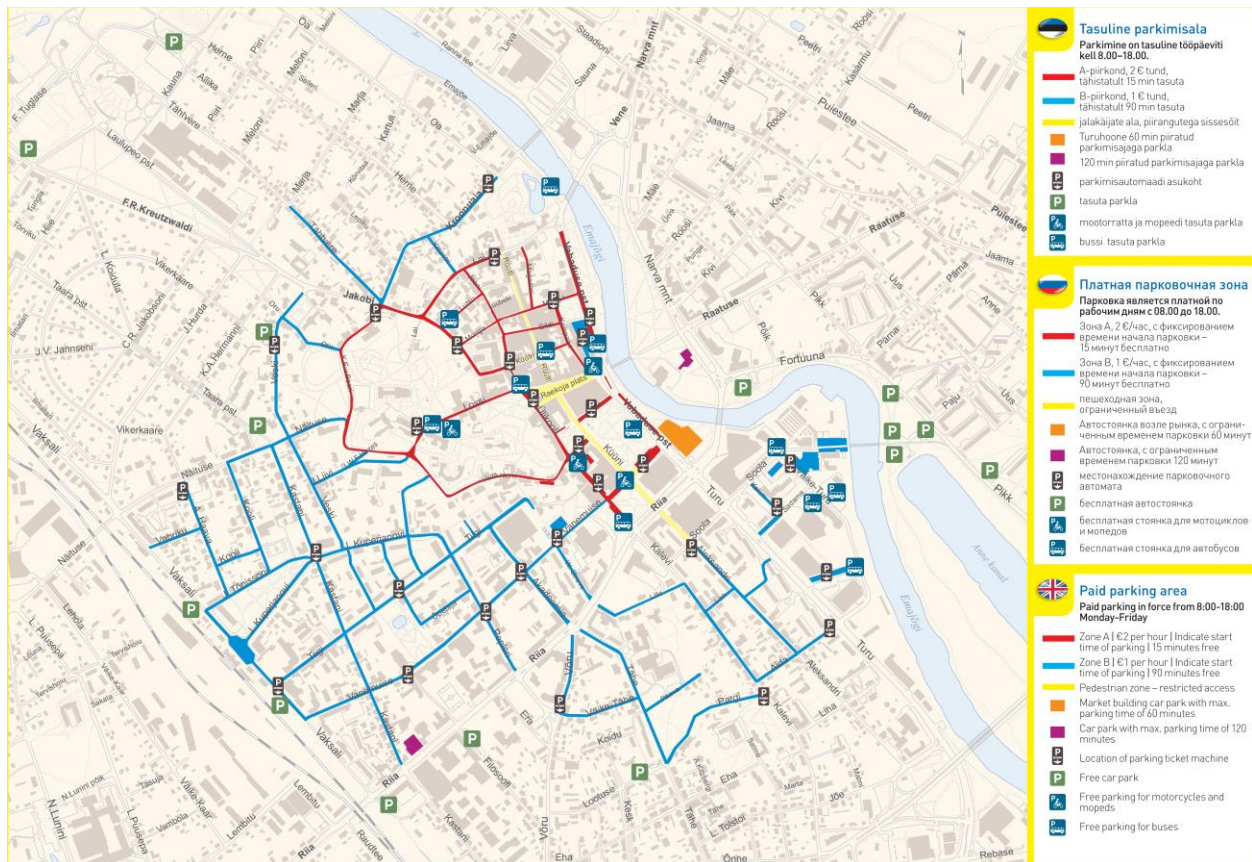
As you can see in the map above, Tartu city government provides zones for free parking without time limit, free with time limits (maximum of 60 and 120 minutes) and two paid zones (zones A and B). Up to now, paid parking in Tartu uses an hourly fee scheme: the total amount to be paid must be calculated based on the number of started hours that the car stays in the parking space. However, we would like to extend the policy to provide a "real-time parking fee": the amount to be paid would computed using a fixed fee per 5 minutes periods.

Hourly payment

Zone A:  2 euros per hour
Zone B: 1 euro per hour

Real-time payment

Zone A: 16 cents per 5 minutes
Zone B: 8 cents per 5 minutes

In this project, a parking management system with both backend component (parking space availability, account management) and an application for smart phones for car drivers. The system must provide the following functions:

Interactive search of parking space.

- When you enter a destination address (e.g. restaurant, cinema, etc.) the system must present a summary of available parking space around that address. The information about parking space availability must be presented overlaid over a map, including information about the price that applies (Zone A vs B)
- If the user enters additionally the intended leaving hour, the system must also provide an estimation of the fee to be paid (per zone, hourly vs. real-time payment)

Parking payment

- The system must allow a car driver to select between hourly or real-time payment
- The system must allow a car driver to submit a start and end of parking time. Using the geolocation capabilities of the smart phone, the system must identify the parking space been used by the car. The backend must then block the corresponding parking space and update the availability of such parking space (e.g. that implies that the information displayed in the mobile devices must be updated accordingly).
- If the car driver selected an hourly payment scheme, the system must notify the driver 10 minutes before the end of the period already paid. If the driver does not extend the period, the system would start advertising the parking space 2 minutes before the end of the paid period.

Billing/Invoicing

- The user (car driver) may pay according to one of the following options:
    o Just before starting a parking period or when extending the parking period, for hourly-based payment.
    o At the end of a parking stay, for real-time payment
    o At the end of each month (the application would provide then a configuration section, where the customer could configure this option), only for real-time payment

The requirements above are just given as a source for inspiration. You would be free to add or change features as you find convenient.