T.C. MARMARA UNIVERSITY

FACULTY of ENGINEERING

COMPUTER ENGINEERING DEPARTMENT

CSE4053 Information Systems Analysis & Design

Project #2: Planning

PARK IT

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System Request

1. Project Sponsor

The company we are working with is a parking lot company which has 5 parking lots nearby. Since they want to ease their problems with this system, the project sponsor is the manager of the parking lot company.

2. Business Need

This project has been initiated to create a system which allows them to keep track of the density of their parking lots, keep track of payments which include monthly memberships. Currently,

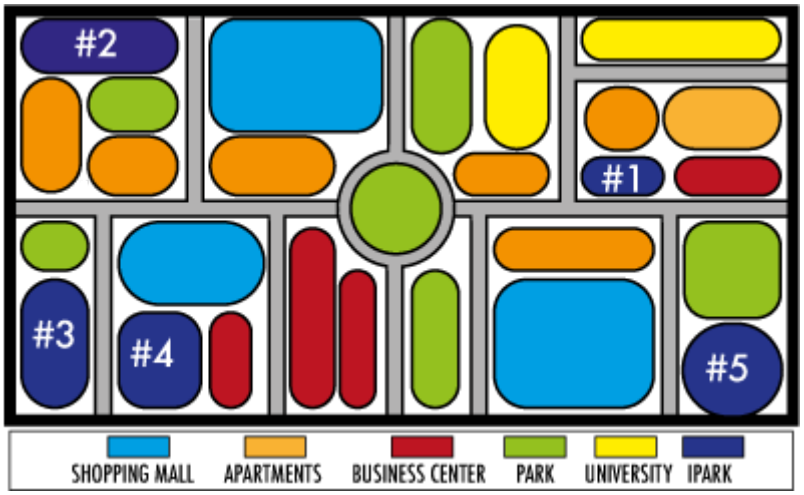
- The company does not know the density of their parking lots such that, when they are able to redirect the customers to nearby parking lots instead, they lose customers because the parking lot is full.
- The company keeps track of customers with a ticketing system. So, they have to write down all the payments instead of having them easily with the system.

3. Business Requirements

Using this system over Android or Ios, customers will be able to find the nearest available parking lot and check in the parking lot easily. The specific functionality that system should have include the following:

- Check the nearest available parking lots which the company has.
- Check in and check out the parking lot with a QR code system.
- Easy payment with an online payment system.
- Keep track of their payments.
- Establish a customer subscription into the parking lot for a monthly fee.

4. Business Value



Our mobile app is one example of inner entrepreneurship. Company has 5 parking lots. These parking lots have different capacities for cars. Their flagship parking lot #2 is nearby to a very famous shopping mall and other flagship parking lot #1 is on a very famous street. However this parking lot has the lowest capacity for parking among our parking lots. Average occupancy rate and capacities of our parking lots is below.

PARKING LOT	CAPACITY	DENSITY %	DAILY PRICE FOR NON MEMBERS	NON MEMBER PRICE (DAILY)	DENSITY (CAR)	MEMBERS HIP RATE %	MEMBERS HIP (CAR)	MEMBERS HIP PRICE
#1	100	%90	54	$30	90	%40	36	$300
#2	200	%60	84	$25	120	%30	36	$250
#3	300	%30	81	$20	90	%10	9	$200
#4	300	%20	54	$15	60	%10	6	$250
#5	400	%15	57	$10	60	%5	3	$150

Density is calculated by daily occupancy of parking lots.
Total parking lot capacity of the company is 1300 however density of occupancy is 420(%32,307). Total membership is very low overall. Company has 90 members and it is %6,923.
Our first goal is directing customers to empty parking lots. Thanks to app customers and members realize our other lots and park their car to our all parking lots. Our expectation is to increase members to around %30 of our total capacity. We will increase our members to 390 from 90. Our decided membership price for the Park It app is $250. Now from members, the company earns $23.100 per month. From our expectation, income from members increased around %422 ($97.500) per month. We believe that we can reach our goal within 6 month after releasing the Park It app. Daily income from non-members is $6720 per day. Our decided non-membership price per day for the Park It app is $20. Our expectation is for non-member

occupancy up to %40 from %25,384. Our income will increase to $10.399 (%154,761).
We will add loyalty awards for our customers such as Diamond membership (priority for parking), discounts etc. These will prevent our members from going to our opponents.

Special Issues or Constraints

The company we are working with is very excited with this idea. Thus, they want this project to be done as soon as possible.

Feasibility Study

1. Technical Feasibility

The Park It is a hybrid mobile application. The main technologies and tools that are associated with Park It are:

- Flutter
- Dart
- Firebase
- Figma
- Diagram drawing tools
    - Microsoft Project
    - Draw.io

Each of the technologies are freely available and the technical skills required are manageable. Time limitations of the product development and the ease of implementation using these technologies are synchronized.

The project size is relatively small. There are only 5 parking lots that we need to work with. Also the hybrid application that we are building will be developed with a framework called Flutter which means one platform developing. Therefore, the project can be done remotely with 2 software developers.

Initially, we will be developing our system with a free hosting server with firebase, but for later implementations, it will be hosted on a paid server with sufficient bandwidth. Bandwidth required in this application is very low, since it does not incorporate any multimedia aspect.

2. Economic Feasibility

Hybrid applications can be published on Play store for android version and App store for ios version. Publishing these require developer accounts which have fees.

Initially, a free database server called firebase will be used. On the later implementations, we will implement our database server which means there will be server cost for database storage.

To develop and implement the hybrid app, we need 2 mobile developers. Thus, the development costs:

- $25 for android developer account.
- $99 per year for an apple developer account.
- $20 per year server cost.
- $5.000 for the mobile developers.

There will be fee for technical support thus the annual Operating cost:

- $400 for technical support.

- #1 and #2 parking lots have great profit however #4 and #5 parking lots are in the red. Due to that, the company needs to make investment to make profitable use of their all parking lots.
- Our app will organise money flow too. Instead of cash, customers will use online payment. This situation decreases money theft from parking lots.
- Parking lots don't have enough technological infrastructure to check density. We can calculate total density but floor by floor or lot by lot density can not be calculated. due to that we need occupancy infrastructure. It is around $10-$13 per lot. For a total of 1300 lots, cost is around $13.000 - $16.900.

- In the long term, the company does not have to employ an accountant for all parking lots.
- In the long term, if the company makes investments for artificial intelligence applications, the company will decrease employees. Parking lots can be managed by remote control applications.

3. Organizational Feasibility

Once the project starts, there will be marketing strategies in the area which enable it to reach the users. Thus, the parking lot will be known by many car owners in the area.

Once the development is done, the analysis of the density of the parking lots by days will be available. So, the company may make discounts to take attention of the customers on the days when the density levels are really less.

When there is no available space in the parking lot, the customer could park elsewhere. Since, the customers can check the availability of the parking lots, they can park to the nearest available parking lot.

Methodology

We will be using Waterfall Development Methodology.

1. Why do you select that methodology?

First, we are planning this project. The next phase will be analysis of the project. Then, we will design the project. Lastly, we will implement our designed project and we will have the final system.

2. What are the advantages and the disadvantages of your methodology?

We have to be clear about all the requirements of this project. So, one disadvantage is if we want to change our requirements it will be hard to start over. On the other hand, it will be easier to make progress since the requirements are clear.

Also it will take a long time to take from the start to finish of the project. Since we are planning, analyzing, designing, and then implementing the project.

Work Plan

1. Time estimation

Planning	Analysis	Design	İmplementation
1 week	1 week	2 weeks	4 weeks

Total Project Length: 9.43 weeks

2. Task Identification

1. Design user mobile application - Mock.
2. Design admin mobile application - Mock.
3. Create NoSQL database.
4. Develop user mobile application frontend.
5. Develop admin mobile application frontend.
6. Connect database with user mobile application.
7. Connect database with admin mobile application.

3. Work Breakdown Structure

1. **Design user mobile application - Mock.**
    a. Design authentication screens
    b. Design available parking lots live screen.
    c. Design check in/out with QR code screen
    d. Design payments details screen.
    e. Design profile screen
        i. Design payment methods screen
        ii. Design monthly membership subscription and management screen

2. **Design admin mobile application - Mock.**
    a. Design authentication screens
    b. Design available parking lots live screen.
    c. Design available parking lots day by day screen.
    d. Design payment history screen.
    e. Design push notification screen.
    f. Design see memberships screen.

3. **Create NoSQL database.**
    a. Define the NoSQL database attributes.

4. **Develop user mobile application frontend.**
    a. Develop authentication screens
    b. Develop available parking lots live screen.
    c. Develop check in/out with QR code screen
    d. Develop payments details screen.
    e. Develop profile screen
        i. Develop payment methods screen
        ii. Develop monthly membership subscription and management screen

5. **Develop admin mobile application frontend.**
    a. Develop authentication screens
    b. Develop available parking lots live screen.
    c. Develop available parking lots day by day screen.
    d. Develop payment history screen.
    e. Develop a push notification screen.
    f. Develop see memberships screen.

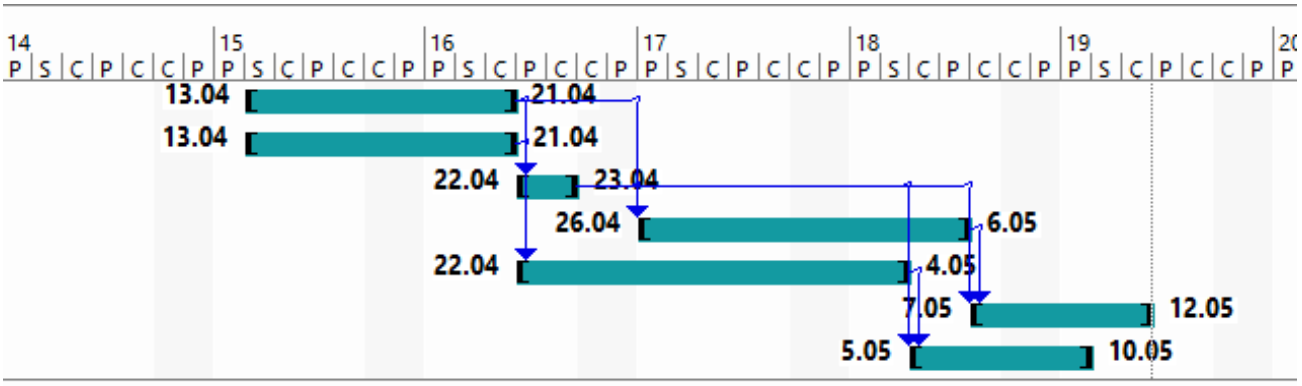
6. **Connect database with user mobile application.**
    a. Connect authentication screens
    b. Connect available parking lots live screen.
    c. Connect check in/out with QR code screen
    d. Connect payments details screen.
    e. Connect profile screen
        i. Connect payment methods screen
        ii. Connect monthly membership subscription and management screen

7. **Connect database with admin mobile application.**
    a. Connect authentication screens
    b. Connect available parking lots live screen.
    c. Connect available parking lots day by day screen.
    d. Connect payment history screen.
    e. Connect a push notification screen.
    f. Connect see memberships screen.

4. PERT chart

Kimlik	Ad	Öncüller	Optimistic	Most Likely	Pessimistic	PERT Estimate
1	Design user mobile application - Mock.		5 gün	7 gün	8 gün	6,83 gün
2	Design admin mobile application - Mock.		5 gün	7 gün	8 gün	6,83 gün
3	Create NoSQL database.	1	1 gün	2 gün	3 gün	2 gün
4	Develop user mobile application frontend.	1;3	7 gün	9 gün	11 gün	9 gün
5	Develop admin mobile application frontend.	2	7 gün	9 gün	11 gün	9 gün
6	Connect database with user mobile application.	3;4	3 gün	4 gün	5 gün	4 gün
7	Connect database with admin mobile application	3;5	3 gün	4 gün	5 gün	4 gün

5. Gantt chart



Staff

1. Assign your group members and other people to you tasks in your work plan.

1. Design user mobile application - Mock.
    a. Developer 1
2. Design admin mobile application - Mock.
    a. Developer 2
3. Create NoSQL database.
    a. Developer 1
4. Develop user mobile application frontend.
    a. Developer 1
5. Develop admin mobile application frontend.
    a. Developer 2
6. Connect database with user mobile application.
    a. Developer 1
7. Connect database with admin mobile application.
    a. Developer 2

Control and Direct Project

1. List all the software that you use for your project and give some explanation: development, database, code base, document base, versioning, communication, project management, etc.

1. Flutter for developing hybrid mobile and web applications.
2. Dart is needed because using the flutter framework requires coding language.
3. Firebase is to create our cloud database server which is free up to some limits.
4. Figma is to create our mockings of the screens.
5. Diagram drawing tools are needed to create our work plan, flow charts, maybe use cases etc.
    a. Microsoft Project is to create work plans.
    b. Draw.io is to create flow charts and use cases.

2. List and explain your risks in your project. Also, explain your remedies and plan B's for them.

The company already has profitable cash flow. Cost of the Park It app and technological infrastructure investment is affordable for the company. However if we want to hook new customers, we have to promote the app and the company. Advertising expenses can be very much from an affordable level of company. Parking lots have great locations but the company promoting team is insufficient. We have to deal with an advertising company.
If everything is going bad and we lose lots of money, we can make deals with nearby malls, business centers to rent our parking lots.
For #4 and #5 parking lots, we can rent buildings for activities and entertainments. This can be a very good way to make profit from the buildings.