CTIS411 Senior Project I

Initial Plan

Left-Over!

(T)hank (G)od (E)ast (O)ver

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Change History

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Project Details

Project Name	**Left-Over!**
Academic Advisor	**Neşe Şahin Özçelik**
Github URL	https://github.com/meliksahozceyhan/Senior-Project-LeftOver
WEB page	**-**

Executive Summary

This document will provide a brief information about the project Left-Over! In the sections of the document, the project purpose and scope are deeply explained. These sections will give a brief idea about what is the purpose of the project and also what the project will consist of. In Section 3 the requirements of the end product are provided. This section will give information about how the system will function when it is finished. The next section is giving information about the Software development process model that is going to be used by the project team and how it is customised according to project needs. Section 5 is mentioning the stakeholders and organizations that are relating and benefiting from this project. Furthermore, communication and change control tools that will be used during the project are explained. Also milestones, deliverables, assumptions and risks and other discussions are analyzed and defined in this document.

Changelog

- Table names deleted.
- Owner and receiver names are changed as Sharer and Recipient.
- The last 2 paragraphs of risks are deleted.
- Bullet points added to assumptions section.
- Product requirement points added as R1, etc.
- Work breakdown process model bulleted.
- Executive Summary Content changed.
- Discussion part has been changed.
- Milestones and deliverable sections changed.
- Abbreviations part is changed.
- Gantt Chart has been changed.

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Abbreviations

API	Application Programming Interface
CTIS	Information Systems and Technologies
GUI	Graphical User Interface
PM	Project Management
UML	Unified Modeling Language
WP	Work package

1. Project Purpose

Left-Over! is a project which creates a sharing platform among people for their idle goods and over produced consumables to be used and taken by others, and enhances recycling. The shared items are classified into three different categories which are reusable, consumable, and collectible. Under the reusable category, individuals may list wearables and books which are not needed by the sharer. The next one is called consumable which contains food and beverages that are near the expiration date to be shared by supermarkets, hotels, restaurants, groceries, and bakeries. Lastly, the collectible category gathers recycling companies and people who separate their garbage at home according to the material. It helps users to find recycling points for their recyclable waste such as used oil, paper, metal, and glass and allows users to interact with the related companies.

The product to be delivered is a web and mobile application to track the recycling points and also a platform for sharing disused items. The system will provide a messaging platform to create a channel between sharer and recipient. Furthermore, it offers a rating system to evaluate the sharers.

Even if there are similar projects in the market, competition is low and these applications are not popular among stores and not as extensive as Left-Over!. This project will bring most of competitors' features in a single application. It will help the project to take part in the low competitive market.

In brief, the main purpose of this project is to create a more sustainable environment and make use of our leftovers, so people do not create as much garbage as they did in the past. It helps to overcome the consumption frenzy that rules today's world.

2. Project Scope

One of the major activities in the project is allowing users to identify their leftover items and make them visible to people who are needing them. The user who wants to share their unused leftovers will enter the details of their leftovers to the system and the people in need can filter and see those items and make a request for getting them. Another major activity in the project is to show the drop points for recyclable waste or show the contact information of companies that gather recyclable waste. Although the project will not provide drop points for disposal of the recyclable garbage.

The end-product of the project will be an application that will help the users to make use of their leftovers via sharing option. The content of the project will be 4 applications which consist of 2 mobile applications for android and iOS, a backend server written in NEST.js which is a TypeScript framework, and also a frontend Vue.js application for administration purposes. However, users will use the mobile applications for both IOS and Android as the final product.

The goal of this project is to create a more sustainable environment via sharing the disused leftovers with the people who might need them.

The work breakdown structure of Left-Over! project is listed below:

1. Deliverable 1 Initial Plan
2. Deliverable 2 Software Requirements Specification
   - 2.1 WP 1 Analyze and specify the requirements.
3. Deliverable 3 Software Project Management Plan
4. Deliverable 4 Software Design Description Document
   - 4.1 WP 1 Analyze the system and create UML Diagrams.
   - 4.2 WP 2 Analyze the system and define Use-cases and create a diagram.
5. Deliverable 5 Back-End Server Application
   - 5.1 WP 1 Create models that represent the Entities on the Database.
   - 5.2 WP 2 Create Repositories for data access.
   - 5.3 WP 3 Create Services for interaction with repositories and modification of the data.
   - 5.4 WP 4 Create Controllers and API endpoints for the mobile application to send requests.

6. Deliverable 6 Admin Panel

6.1 WP 1 Create an admin panel for setting parameters and entering information that the system is going to use.

7. Deliverable 7 Mobile applications

7.1 WP 1 Design GUI for mobile applications.

7.2 WP 2 Create Screens on the platforms.

7.3 WP 3 Connect Back-end Server with the Mobile applications.

3. Product Requirements

This part of the document will explain what features will be offered as the end product. Listed features are determined in team meetings. Also it will mention what the product will not include and limitations.

R1. The target group of the project is anyone with access to the internet and mobile phone.

R2. Everyone who wants to contribute to recycling and prevent waste can use the product.

R3. The project will not allow individuals under the age of 18 to register.

R4. Individuals shall create user accounts via the login system.

R5. Users may list their disused items depending on a specific category.

R6. Illegal products or items cannot be shared in the application.

R7. It shall enable users to search for products based on categories.

R8. Users may book items for a specified time based on product type.

R9. There will be a deadlock mechanism to prevent multiple requests for one product. A product can be requested only by one user, and the item will be removed from the list.

R10. Booked items will be listed again after the determined time if the delivery does not occur.

R11. Items' locations will be shown on the map.

R12. The project will not provide drop points for items to be collected. It will only show the existing ones that belong to companies or municipalities.

R13. This project will provide a rating system to show which user is more reliable about the donation.

R14. There shall be real-time messaging between sharer and recipient user types for a product.

The below figure is Context Diagram of the project consisting of how system will interact with user;

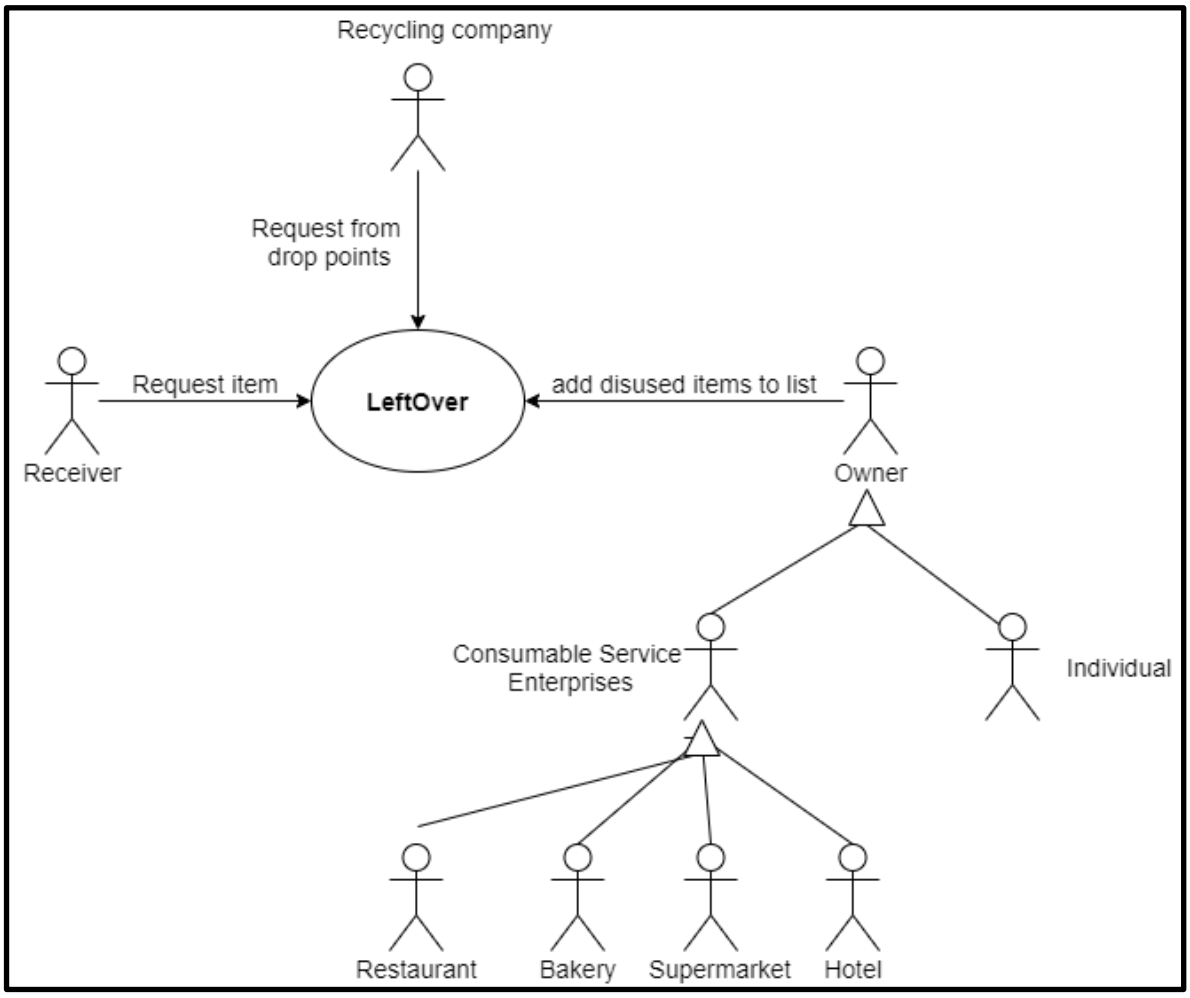

Figure 1: Context Diagram

4. Software Development Process Model

Software development process models provide guidance for planning and controlling the tasks. Scrum, which is an agile development methodology, will be used as a guide of the software development process. The main reason for choosing this method is being an iterative and incremental process thus it enables us to incrementally deliver the requested tasks throughout our project development process. Furthermore, being iterative and handling at specific work periods, make it easier for the team to focus on specific functions for each period. On top of all this, the scrum methodology is designed to adapt to changing requirements and this will make it easier for the team to make changes quickly. The higher quality software can be obtained with the help of the need for obtaining a functional version after each iteration. The scrum meeting will keep the team informed about the project stages of the project and so team members will always be involved in the project development process. Scrum is undoubtedly one of the most popular agile methods in use today [1]. Many companies use scrum as the software development process. Since there is no physical office to meet, team members will use Trello web application to perform backlog online. As a result of the usage of scrum in the Left-Over project, team members will be experienced in scrum methodology. Considering all this, the scrum methodology will fit our project.

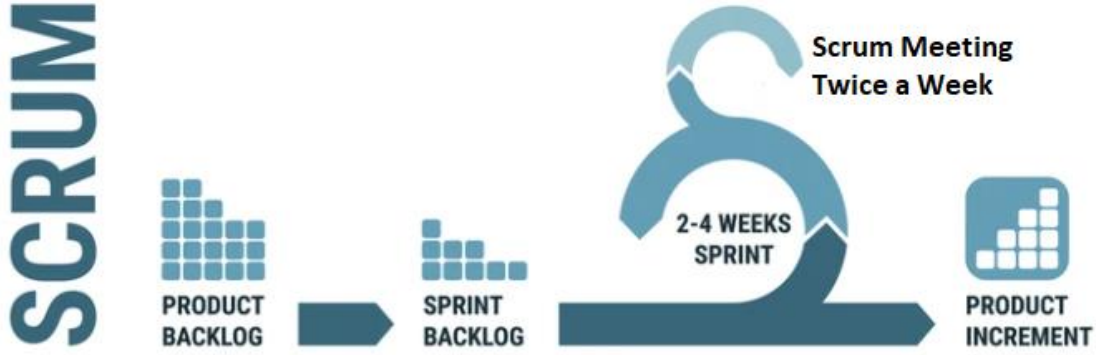

Figure 2: Scrum PM

5. Project Stakeholders and Organization

The stakeholder word represents the individuals, teams, and organizations who are involved in the development process of a project and are affected by the product [4]. In this manner, for the Left-Over! project stakeholders are listed below:

- The CTIS department,
- The team advisor (Neşe Şahin Özçelik),
- The developer team (M. Özceyhan, F. Kılıç, D. Bilgihan, Y. Gürkan),
- Possible end-users,
- Competitors

All of them have different roles during the development process. The initial roles, which are assigning the project and determining the general requirements settled by the CTIS department. Then, the given requirements' sketch is specified by the developer team considering various kinds of user expectations. The role of the team advisor is to control the project progress, check team decisions and decide on milestones of the project with the developer team. The developer team is directly responsible for all steps of the project. There is no specific hierarchy in the software team. Necessary roles are distributed to team members temporarily for essential conditions only. They all prepare required documentation, decide on requirements considering competitors and possible end-user expectations, develop the application and present the project. Basically, the developer team leads the project at all steps. There are applications that have a similar purpose, sustainability of clothes. The competitors of the Left-Over! are the base points for deciding on the functional features for a better understanding of customer needs to gain marketing advantage among them. The project aims to have more than one customer group: individuals and organizations. Thus, requirements are determined considering each group separately.

When the project is released, outcomes will affect stakeholders. There are two possible outcomes: success or failure. If the Left-Over! Project is successful, then the developer team will profit from it in money and career, the CTIS department will be able to advertise the success of the department, the team advisor will have great feedback for future teams, customers will get a useful application, and customers will have a reason

to develop themselves more. However, if the project fails, then the developer team get an experience and feedback to do better, the department will not be proud a lot for the project, the advisor may not be affected so much, however, the future teams may be prejudiced for the advisor, customers may not even hear about the application and competitors will not be affected by the Left-Over! project.

6. Project Communication

Developer team members use WhatsApp messaging and discord to be in touch and share project-related resources and documents. Also, they get together twice a week to see where they are at and plan what the goals are till the next meeting. The notes are taken during the meeting, then at the end of the meeting, notes are shared with the participants via WhatsApp for easy access.

Developer team members and the advisor use mail for more formal communication and WhatsApp for fast messaging. Also, almost once a month there are formal team meetings to gather the team advisor and the developer team. Every participant takes notes during formal meetings, they are merged and addressed in project documentation in more formal language.

The developer team presents the project to the department twice a semester to inform the department about the final product.

There is no certain customer for the project, so there is no customer and team communication. However, the developer team represents customers during the development process. Also, possible customers are analyzed from competitors' customer profiles.

There is no direct communication between the team and the competitors, however, they can be analyzed from existing applications.

7. Project Change Control

Change control is a methodology used to manage any project progress or plan changes thus it will ensure that project process and changes are easily followed by the whole team [2].

GitHub will be used to monitor and manage changes in codes of the project in real-time. When a new task or feature is required for the project, an issue will be created. Each team member will do the code development in a new branch. After the development and test process, the codes in that branch will be included in the master branch of the project. Thus, each member will publish the assigned task on the GitHub repository and others can check the changes. The GitHub repository can be accessed by team members, project instructor Neşe Şahin Özçelik and course instructor Oumout Chouseinoglou from the https://github.com/meliksahozceyhan/Senior-Project-LeftOver link.

Google Docs will be used to store versions of project documents. In every project document, a new document will be created in Google Docs and all team members will be authorized to make changes. Document version records will be taken after the completion of a determined part of the project document. Every team member will be able to monitor version records of the document.

All members of the group will use these tools during the project development process so that the project process will be followed in detail.

8. Milestones & Deliverables

1) **Process Model Decision - 07.10.2021**

   The software process model of the project is decided by the team.

2) **Version 1 of Initial Plan Document - 13.10.2021**

   Inter team delivery deliverable 1 of initial document.

3) **Version 2 of Initial Plan Document - 19.10.2021**

   Inter team delivery deliverable 1 of initial document.

4) **Submission of Initial Plan Documents - 20.10.2021**

Project purpose, requirements, process model, communication channels, and project change control tools will be determined and delivered in that task. The general scope of the project will be documented.

5) **Version 1 of Software Requirements Specification Document - 09.11.2021**

   Inter deliverable 1 of software requirement specification document.

6) **Version 2 of Software Requirements Specification Document - 10.11.2021**

   Inter deliverable 2 of software requirement specification document.

7) **Version 3 of Software Requirements Specification Document - 12.11.2021**

   Inter deliverable 3 of software requirement specification document.

8) **Version 4 of Software Requirements Specification Document - 13.11.2021**

   Inter deliverable 4 of software requirement specification document.

9) **Submission of Software Requirements Specification Document and Requirements Prototype - 15.11.2021**

The software requirements of the project will be determined in detail. These requirements will be considered during the whole project and software development process.

10) **Submission of Software Project Management Plan Document - 03.12.2021**

This task will describe how the project will be managed, monitored, and controlled. Thus, this document will outline the scope of the project as an official point of reference for the course instructor, project advisor, and the project team.

11) **Submission of the Software Design Description Document - 30.12.2021**

The software design description document will focus on the "how". It will explain how the project will be designed to meet the software requirements.

12) **Presentation of project and product to the jury - 31.12.2021**

The documents and tasks that were prepared during the first semester will be presented. Also, the %20 percent of the final product will be coded and completed, and it will be displayed to the jury.

13)Presentation of the project - 21.03.2022

The %60 percent of the final product will be coded and completed, and it will be presented.

14)Submission of User Manual and Test Documents - 12.05.2022

The user manual will be prepared to guide users of the application. Also, the application will be tested, and these results will be shared in the delivered document.

15)Presentation of the project - 13.05.2022

The entire project will be completed and presented to the jury.

Following figure is the gantt chart of the project;

	Submission of Initial Plan Documents.	21 days	Wed 22/09/21	Wed 20/10/21	Yes	Nevin Didem Bilgihan, Yağmur Gürkan, Melikşah Özceyhan,Furkan Kılıç
	Process Model Decision	0 days	Mon 11/10/21	Mon 11/10/21	Yes	Furkan Kılıç,Melikşah Özceyhan, Nevin Didem Bilgihan,Yağmur
	Version 1 Of Initial Plan.	0 days	Wed 13/10/21	Wed 13/10/21	Yes	Furkan Kılıç,Melikşah Özceyhan, Nevin Didem Bilgihan,Yağmur
	Verison 2 Of Initial Plan	0 days	Tue 19/10/21	Tue 19/10/21	Yes	Furkan Kılıç,Melikşah Özceyhan, Nevin Didem Bilgihan,Yağmur
	Submission of Software Requirements Specification Document and	18 days	Thu 21/10/21	Mon 15/11/21	Yes	Nevin Didem Bilgihan, Melikşah Özceyhan, Yağmur Gürkan, Furkan Kılıç
	Version 1 of SRS Document	0 days	Tue 09/11/21	Tue 09/11/21	Yes	Furkan Kılıç,Melikşah Özceyhan, Nevin Didem Bilgihan,Yağmur
	Version 2 of SRS Document	0 days	Wed 10/11/21	Wed 10/11/21	Yes	Furkan Kılıç,Melikşah Özceyhan, Nevin Didem Bilgihan,Yağmur
	Version 3 of SRS Document	0 days	Fri 12/11/21	Fri 12/11/21	Yes	Furkan Kılıç,Melikşah Özceyhan, Nevin Didem Bilgihan,Yağmur
	Version 4 of SRS Document	0 days	Sat 13/11/21	Sat 13/11/21	Yes	Furkan Kılıç,Melikşah Özceyhan, Nevin Didem Bilgihan,Yağmur
	Submission of Software Project Management Plan Document	17 days	Tue 16/11/21	Wed 08/12/21	Yes	Furkan Kılıç,Melikşah Özceyhan, Nevin Didem Bilgihan, Yağmur Gürkan
	Submission of the Software Design Description Document	20 days	Thu 09/12/21	Wed 05/01/22	Yes	Furkan Kılıç,Melikşah Özceyhan, Nevin Didem Bilgihan, Yağmur Gürkan
	Presentation of project and product to jury	1 day	Thu 06/01/22	Thu 06/01/22	Yes	Furkan Kılıç,Melikşah Özceyhan, Nevin Didem Bilgihan, Yağmur Gürkan
	Presentation 60% of the project	1 day	Mon 21/03/22	Mon 21/03/22	Yes	Furkan Kılıç,Melikşah Özceyhan, Nevin Didem Bilgihan,Yağmur
	Submission of User Manual and Test Documents	9 days	Mon 02/05/22	Thu 12/05/22	Yes	Furkan Kılıç,Melikşah Özceyhan, Nevin Didem Bilgihan, Yağmur Gürkan

Figure 3: Gantt Chart

9. Assumptions

The following are the assumptions and major external dependencies that the project must rely upon for success.

- The people involved in that project will not infect Covid-19 and be available throughout the project life cycle.
- Team members will schedule their time accordingly to be fully efficient for that project and upload required tasks before the deadline. They will not be disturbed by other courses, exams, and assignments.
- The target user of that application has a smartphone with an IOS or Android operating system.
- The application is considered to be a sharing and recycling platform. Some environmentally friendly companies and foundations support the application to enhance awareness and decrease environmental issues.
- For the oil collection feature, the soap manufacturers and the companies which recycle the oil will collect the oils from specific points that users will accumulate.
- Users will use the application honestly and securely. When an idle item is booked for a specific person at a time, it will be taken by that person from the sharer. It is assumed that users will be in need, or they are willing to donate their goods.
- The donated consumable goods will be in a good condition in order not to jeopardize people's health.
- Left-Over! will boost the awareness about recycling among people. This can attract some organizations such as Greenpeace and Global Recycling Foundation attention. With their help, the application can play a noteworthy role to decrease environmental issues.
- Crucial technologies which are Flutter, Stack Overflow, GitHub, and WhatsApp of that project will not halt the services from the market of Turkey throughout the project.
- The project will follow the requirements of the Scrum agile development methodology during the life cycle.

10. Risks

Risk analysis plays a crucial role to ensure that the minimum number of surprises occur while the project is underway. Since the future cannot be predicted, some risky possibilities can be estimated to enhance the success of a project. Several risks are listed below.

Left-Over! is decided to be developed by a software development kit called Flutter. Any group member does not have previous knowledge about that technology. Because of the exams and other assignments, some team members may not learn Flutter before the planned development date of the application. This leads to constructing a major part of the project by two or three people and it can take more time than planned. In order to reduce the probability, the team can schedule the subjects and share their understanding during the weekly meetings. If the person did not catch up with the topics that were shared throughout the meetings, this is the signal to be warned by the team members. Briefly, to prevent the outcomes of that problem, team members should be aware of each other and communicate openly.

Communication issues are the most common problems that project teams can face. Lack of communication results in low performance, lagging behind the project, and a decrease in performance. With the aim of diminishing the impact of these events, there are several solutions. Rather than complaining about each other, members should be transparent and clear about their feelings and understandings. There are numerous technologies which are messaging platforms, email, and video communication tools that help to connect both team members and advisors. Lastly, not just meeting regularly about the project, the team should spend time establishing intimacy. For the purpose of understanding the signals of the outcome, some points can be considered. Lack of trust can cause problems about unwillingness to meet and talk, irresponsible behaviors, and not asking for assistance when the person needs help. Furthermore, there may be unresolved issues that lead to missed deadlines and splitting the project group. On the other hand, team members may become too comfortable with each other, and this creates similar perspectives which decrease the success of a project. In brief, these signals help to take action beforehand.

11. Discussions

1. Limitations and Constraints

As in every project, basic constraints, which are schedule, budget, and scope, are identified and analyzed for Left-Over!. Scheduling is the most significant constraint that should be considered accordingly. With the help of the software development process model, the team must plot out the achievable timeline to complete each phase of the project. Since the project developed with the methodology of Scrum, incremental deliveries will be processed on a specific period. This project is self-employed therefore, there is no budget to handle technical and commercial issues. For example, the team cannot provide project specified drop-take points for users. Also, Left-Over! users will be limited to experienced users and their connections only. In terms of scope, security issues and budget are the most affecting factors. For instance, since it is only a mediator application for end-users, controlling the delivery process is not possible, which causes age limitation in the project.

2. Applicability of the project under real-life situations

The lack of a physical office for the development team will cause difficulties when tracking the work done. Also in a real life situation when a company starts a new project they hire people who have experience in the area since this is a student project we will learn new technologies and frameworks during the development process. Furthermore, as there is no upper manager, the inter deliverables' dues are determined by the developer team. Moreover, since the project is not related to a company, team members will follow the project process by themselves.

3. Health and Safety Issues

Covid still exists and the project meetings are outside, so being infected is a possibility for the development process, which causes delays on deliverables. Moreover, during the development of the project, all members are working on computers. Therefore, if computers are stolen or project related scripts are damaged, losses may not be recovered.

4. Legal Issues

Since there is no legally binding contract for the project team with any company or customer there are no legal obligations for the project.

5. Economic Issues and Constraints

Left-Over! is a mobile sharing application which gathers users who have disused items and who need them. In this manner, the project does not require any extra hardware, which means the team does not have any extra hardware related expenses. However, AWS services will be purchased and there will be application store fees for both IOS and Android markets. All the technology related spending of the project will be shared by the developer team since there is no sponsor for Left-Over!. In addition, there will be personal consumption expenses which will be handled by consumer's self during the development process as the development team will have meetings outside. Briefly, Left-Over! project costs can be listed as:

- AWS service,
- IOS/Android Market fees,
- Personal spending

6. Sustainability

The project is not assigned by a company, it is a self employed project so after release there will not be any need for updating and sustaining the project. The last day of the project's life cycle is already set by the submission date of the senior project.

7. Producibility-Manufacturability

Left-Over! does not serve a tangible product directly. Hence, there will not be continuous production. It will be released just for once, then it may be developed for new features which are determined by customer analyses and for the maintenance. In short, the end-product can be advanced at any time needed without any manufacturing limitations.

8. Social, Political, and Ethical Issues

Many businesses do not participate in recycling efforts. The Left-Over! application will provide a way for them to avoid waste and contribute to recycling. In countries where

the Left-Over! is used and popular, there will be a significant increase in recycling and waste prevention, so that the country will appear to have followed a more environmentally friendly stance politically. Also, considering that many people are experiencing famine and misery, it would be more ethical and humane not to waste food and goods.

9. Multidisciplinary Collaboration

Multidisciplinary collaboration is a huge opportunity for all team members to broaden their knowledge [3]. Interacting with people who have different skills and ideas will help the team members to gain a new perspective and learn about the approaches of different disciplines to events. During the project, instead of looking at the events from one side, all aspects will be handled, and a better product will be produced. It is planned to consult the Bilkent University Faculty of Law students in order to observe the legal compliance of the project. In addition, with the help of Bilkent Graphic Design students', UI/UX design advice will be taken. Finally, for the advertisement purposes Bilkent Business Administration and Management students are consulted by the team. Thus, team members will learn to think and evaluate from different perspectives.

10. Environmental Issues

During the development of the project, documents will be prepared on the computer to decrease paper usage. However, since all members use computers, there is an increase in electricity consumption.

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