

**X-Cali**

**Proposal Report**

Design Studio Instructor: Prof. Dr. Ali Özgür YILMAZ

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| --- | --- | --- |
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| **Project Duration:** | 8 Months |  |
|  | ***Company Partners:*** |  |
| **Göksenin Hande BAYAZIT** | 2093441 | hande.bayazit@metu.edu.tr |
| **Emre DOĞAN** | 2093656 | dogan.emre@metu.edu.tr |
| **Taha DOĞAN** | 2093672 | e209367@metu.edu.tr |
| **Burak SEZGİN**  **Oytun AKPULAT** | 2094456 | [burak.sezgin@metu.edu.tr](mailto:zekier@gmail.com) |

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# Executive Summary

X-Cali was founded to manufacture top quality robots with the best technology by five electrical and electronics engineering understudies. Due to our individual specializations, we are very keen robots of different types.

In today’s growing world, importing and exporting goods increase day by day. This cause and increase in need of transportation. However, every good may not be appropriate for simple carrying, like carrying with forklifts and so on. For this purpose, use of robots increase as technology allows us.

In our very first project, the focus is on how to carry a long object through edges and corners, that is normally the object does not fit for turning the corners. For this purpose, a maze environment is used. This project aims to write an algorithm for carrying a long object with two robots, which are they are not allowed to direct-communication.

Of course, there are tremendous amount of approach available to resolve that problem. Nevertheless, we need to find the one which is most suitable for our team members and the constraints. For example, we may not pick the best solution for our project since there is a budget limit as $200 to produce the robot. And also, our solution has to be innovative in order to be at the top among the similar products in this area. We will approach the project systematically in order to realize our goals. To simply put, we will proceed step by step while paying attention to every detail in this project. Major tasks to be considered in this project are movements of the robots in the maze, identifying the turns (such as U-turns and L-turns), subsequent move decision analysis, somehow indirect communication logic between robots. After designing and integration of these subsystem, sanguinely our maze robot fulfills all the necessary tasks, and get out of the maze with its partner.

# Introduction

As X-Cali, we have picked EE493 Engineering Design course as our very first project. We, first, voted several projects to pick suitable one for us. For that purpose, we used a “Criteria Weighted Voting” system. And “[Robots collaboratively carrying a long object through an open-top maze](http://users.metu.edu.tr/capstone/Projects17/#p4)” project was the winner by landslide. In this project, it is required to design and construct an autonomous robot, which can find the exit from the maze while carrying a long object with another robot.

If we divide the project into parts, the first part would be collaboration with other robot. The robots cannot communicate with each other. Sensors and algorithm can be utilized, for that aim, to understand when and which robot must take control. Maze solving algorithm is next part for such a robot project. To get out of the maze, a maze solving algorithm is an essential. This algorithm can be found and implemented with some modifications or a new algorithm can be written for our robot.

In the accompanying parts of the report, point by point clarification of the project is given. Firstly, the objectives and goals of the project are listed. At that point, standards of the project are clarified. Next, the team organizational structure is appeared and brief data about the individuals is given. Besides, a point by point solution procedure and our approach towards to project will be given with a prerequisite analysis. Finally, expected deliverables of our product are given.

# Project Goals and Objectives

## Requirements

## Objectives

### Company Objectives

### Project Objectives

# Standards Section

# Team Organizational Section

X-Cali is set up by five qualified senior year understudies. Each team member is well-equipped with both knowledge and practical experience on various fields that is interconnected to this project. Organizational structure of our organization can be observed from Fig.2.

Oytun Akplulat

* From Computer area
* Interested in Control Systems
* Dedicated team-member

His duties;

* + Signal processing
  + Coding the microprocessors

Göksenin Hande BAYAZIT

* From Power area
* Interested in Power Electronics and Control Systems
* Has great communication skills

Her duties;

* + Motor Controlling
  + Power Management

Emre DOĞAN

* From telecommunications area
* Interested in Signal Processing
* Has quick learning ability

His duties;

* + Communication systems
  + Finding maze algorithms

Taha DOĞAN

* From Computer area
* Interested in Digital System Design
* Has good analytical skills

His duties;

* + Sensors and controlling them
  + Integration of the system

Burak SEZGİN

* From Computer area
* Interested in AI and Programming Languages
* Has goal oriented working ability

His duties;

* + Finding maze algorithms
  + Coding the microprocessors

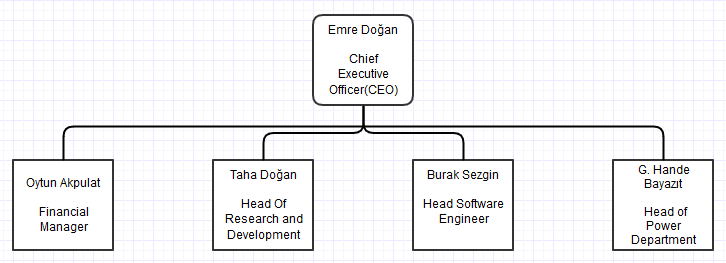


Figure 2: Organizational Structure of X-Cali.

# Solution Procedure

## Body Part and Movements

## Decision Making and Billiard Cue

## Power and Electronic Systems

# Expected Deliverables

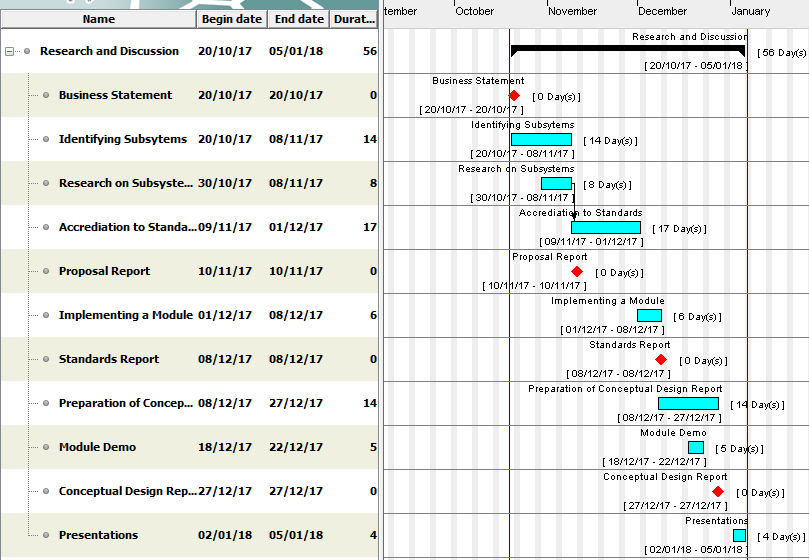
# Conclusion

# Appendices

## Appendix A-Criteria Weighted Voting



## Appendix B-Gantt Chart



## Appendix C-Cost Analysis Table