Each group must prepare a web page for their project and make their reports available on this page. Each report should be typed in accordance with the guidelines and must be spell checked (!) and adopt the department's standard layout (here is a Word template you may use). Three hard copies of each report is required. The hard copies of the reports must be handed in to the supervisor and the jury members by their respective due dates.
The team must email the following to the department secretary at sekreter@cs.bilkent.edu.tr by the end of the 4th week of the semester:
Name of the project
The URL of the project web page
Names of the team members
Names of the supervisor, innovation expert and jury members
One paragraph description of the project

The project specifications report gives a title to and brief description of the proposed project. The initial project requirements are also identified. This document must also contain a section that discusses the project constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability. In addition, discussion of the professional and ethical responsibilities relevant to the project must also be included in a separate section. Copies of the Project Specification Report must be returned to the project supervisor and the jury members.

1. Introduction
1.1 Description
1.2 Constraints
1.3 Professional and Ethical Issues
2. Requirements
3. References

# 1.Introduction

In a rapidly digitizing world, having technical skills is very crucial since, nowadays, almost everything requires some form of programming. As technology has been developing, we have become more dependent on it and use various technologies to accomplish specific tasks in our daily lives. Technology is being implemented in almost every section of our lives and business structures. This is the reason why, many countries such as England, Singapore, Estonia and US have started programming education in early ages, because the sooner a person learns how to create programs, the stronger their problem solving abilities get. This education also amplifies their computational and analytical thinking skills. For instance, UK made the most ambitious attempt to get kids coding, with changes to the national curriculum in 2013. ICT – Information and Communications Technology – is out and replaced by a new "computing" curriculum including coding lessons for children as young as five [1]. Such knowledge is important not only to individual students' future career prospects, but also for their countries' economic competitiveness and the technology industry's ability to find qualified workers [2].

However, it appears that Turkey is a little belated to educate children about programming compared to other countries. According to International Computer and Information Literacy Study (ICILS), who conducted among students between 6-15 years from all over the world in 2013, it has been acknowledged that only 1% of students from Turkey have advanced computer knowledge. On the other hand, 35% of students from Korea, 34% of students from Australia and 33% of students from Poland have advanced knowledge about computers and programming [3]. In order to offer an effective and simple solution for this problem, the project …. will be proposed. With …., we aim to teach children how to code while making them entertained by playing different kinds of games they like. …. creates a platform where children can interact with each other in an exciting way and improve their programming skills.

In this report, first a description of Neophyte will be provided. Then, an insight about the constraints regarding to this project will be given. Afterwards, the professional and ethical issues will be listed and discussed. Finally, the functional and non-functional requirements of our project will be included.

## 1.1. Description

Project Neophyte is a learning tool for children in elementary school and middle school ages. This tool helps children understand the concept of programming by teaching them the way of computer scientists and basics of simple algorithms. As it was discussed in the introduction, it is important for children to learn algorithm creation in early ages, as it will affect their problem solving skills and computational thinking skills.

This project aims to raise awareness among children about computer science topics by dragging their attention to these topics with games and fancy graphics. It is important for these games to be easy to understand as it should be challenging enough. Our baseline for these games will be psychological researches and pedological reports on child informatics.
Our application will consist of a number of small games (like flash games) and medium length scenarios that will contain many problems along the path of gameplay. For instance, the player will go through a parkour mission, and when players come to a point where they have to go up from stairs, there will be a sorting problem. If the player sorts the given container with success, the game will let the player go up from the stairs. This was of the more advanced examples of our project. Another example, which is easy enough for children, is that they will be tutored along the gameplay. First series of missions will let children conduct experiments on the system itself. They will be guided to create algorithms and make small game appliances. Then, according to their area of interest in real life, they will be directed to the games in these areas.

The language of this project is in Turkish and English for now. Normally, making these application in another language than English is not good for many students, because the keywords of programming languages are all in English. Studying on foreign language basics are sometimes complicating for programmers. On the other hand, we are making this project for children in early ages of education, as our main mission is to endear coding to children, we will have no such apprehension on language. Plus, many children in Turkey still do not get proper English education in Elementary and Middle school.

Finally, this project also helps psychologists and pedologs in many ways, such as, understanding a new way of children and a different way of communication with them. This project may take the initiative for a new research area as children will be motivated to use this system for both entertainment and educational purposes.

## 1.2 Closely Related Technologies

According to our market research, there exists applications offered in the market to teach children programming. These applications can be listed as follows:

**1. Blockly:** This web based application is Google's simplified programming platform. This application helps kids in early ages of understanding programing concept. The help they get on this topic is about defining the algorithms in a simpler manner with graphics objects (jigsaw puzzles)[4].

**2. Scratch:** This is another web based application from Massachusetts Institute of Technology (MIT), that helps children build games with, again, using jigsaw puzzle parts with different tasks. (i.e. a puzzle's job is to create a for loop and another puzzle is for boolean operations) This application is also good for building games for fun but it lacks a mission. Without a mission, children are pointlessly wandering around the application, trying to find a purpose for their appliances [5].

**3. CodinGame:** This is the last web based application that we have found on our area of interest. This application is for more advanced coders, maybe around last years of high school or university age. This application is also useful but not for children [6].

Although these applications have similar functionalities to our system, Neophyte will have different and improved features than existing applications. First of all, Neophyte allows users to play the game in multiplayer mode. There will be tournaments based on completing time of the given tasks. Moreover, Neophyte provides children a platform in which they can follow each other and send direct messages. Therefore, this project will offer an improved and engaging environment where children may not only learn to program, but also have opportunities to be creative using programming.

## 1.3. Constraints

### 1.3.1. Implementation Constraints

- The application will run on Windows and will be developed in Java. ??
- Unity Game Enginee will be used as Game Engine.

### 1.3.2. Economic Constraints

- Our application can be accessed from application's own website and requires one time purchase.
- We are planning to charged some prices for specific in game modes, shortly in game purchasing.

### 1.3.3. Ethical Constraints

- In our system, we will store every personal information (name, e-mail address, location, company, school etc.) therefore we will not share the personal information of the users with any third-party applications.
- Through authentication, the actual user's information will be protected.

### 1.3.4. Sustainability Constraints

- We provide rating chance our application for users and users can give feed-back about application.
- Users can rate in game features after end of milestone assignments.

### 1.3.5. Professional & Ethical Issues

- There will be an authentication for users whether the software is suitable for them. To handle this problem, an end user agreement will be provided.
- In order to prevent social issues, we will provide a community,in which users can interact each other.

# 2. Requirements

## 2.1. Functional Requirements

### 2.1.1. System Functionality Requirements

- The system should contain a help menu which explains how the game is played, where to and how to write code.
- The system should display the name and the total score of a user to another users.

- The system should pause the game and should stop all movements when the pause button is pressed.
- The system should be able to show credits.

#### 2.1.2. User Functionality Requirements

- The user should be able to sign in via filling signup form with credentials.
- The user should be able to log in with registered e-mail address and password.
- The user should be able to edit personal information (name, e-mail address, password, location, company and school) in his/her profile whenever he/she wants.
- The user should be allowed to play single player or multiplayer.
- The user should be able to access the help menu that consists of information about how to play the game.
- The user should be able to pause the game whenever he/she wants.
- The user should be able to save the game whenever the game is paused.
- The user should be able to load the game whenever he/she wants.
- The user can toggle music on and off.
- The user can change game language between Turkish and English.
- The user should be able to view other user's profiles consisting of their personal information.
- The user should be able to follow other users.
- The user should be able to send direct messages to other users.

### 2.2. Non-Functional Requirements

#### 2.2.1. Usability

- The user interface must exhibit conceptual integrity and simplicity.
- The user interface will be pleasing to eye of the children users mostly.(çocuk userların gözüne hoş gelicek şekilde)??
- The user interface should be user-friendly in this way, users can spend their time enjoying programming rather than struggling to figure out how to play the game while writing code segments.

Since …. is a game whose main focus is to teach children how to write code and in which users play active roles, the system should not have complicated functionalities. Instead, we will focus on the ways which make our coding game easy to use. That is, a user-friendly interface will be one of our concerns while working on this project. In this way, users can spend their time enjoying programming rather than struggling to learn how to write codes while playing the game.

### 2.2.2. Performance

- The system should react to user's input as soon as possible.
- Load time should be minimal.
- Controls should contain the minimum delay possible.

It is crucial how quickly the system reacts to input from users. Our game will provide an immediate response to users' actions in order to maintain users' interests. For example, load time should be minimal and controls should contain the minimum delay possible.

### 2.2.3. Extensibility

- The application should be able to include and support new features with ease in order to maintain the excitement and interest of the user, so it should be developed in a way that makes it easy to update.

### 2.2.4. Security

- The system should ensure security of personal data of the users.

### 2.2.5. Realibility

- In game compiler will be kept up-to-date in SDK terms.
- Coding assignments are strongly related with gameplay.(Oyun içndeki kodlama oyunun oynayışıyla direkt oalrak ilişkili? HE AMK İLİŞKİLİ HE

- ---ALİ!

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[i] Blockly refference

[ii] Scratch refference

[iii] CodinGame refference