



Bilkent University

Department of Computer Engineering

# Senior Design Project

*Project short-name: Pandora*

## Project Specification Report

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## 1. Introduction

Technology affected our lives in a way that playing game without technology is almost impossible. Technology brings much to gaming industry, most of the games are playing on computer which help playing many games without much effort and more immersive but it eliminates the real part, the player out of game. We intend to bring back the players to games while keeping the flexibility and passion served by technology. We design the Pandora as a small box that brings people together in any place and as the interface between players via their phones to track the games' progress. The Pandora will help players to communicate face-to-face while they play games.

### 1.1. Description

In this project, we tried to come up with an innovative and entertaining game portal for people who wants to increase the communication in real life. It seems that one of the most important issues is the dependency on computers and mobile phones while playing multiplayer games and lack of interaction among people due to that. In order to overcome this problem, we decided to build the Pandora box with a micro-PC called "Raspberry Pi Zero W"[1] to serve a wireless connection to the players within a small area. The reason we choose this micro-PC is because it is sold for an affordable price and we plan to sell this box with a reasonable price compared to board games.

Users will not see the chip from outside of the box since we will make the design as a closed system. Users will use the system from their web browsers which we provide with the help of the micro-PC. We plan to serve games with a nice user interface and fast connection. Moreover, the Pandora provides various games to draw most people with various game preferences. People can share their game experience with other players with the Pandora. This system will be possibly beneficial for people who wants to share their joy with other people so that they can play together with increased communication opportunities.

The most important feature of this system is that, there is no internet connection needed to connect with other players. In addition, no specific

application is needed to connect to the system and serving the game. The detailed technical system will be explained below. Pandora includes different features in addition to connecting users to each other with no internet connection. Moreover, by this system we wipeout the games played with cards and paper so that people can play those games with this innovative game box.

## **1.2. Closely Related Technologies**

We have made research on similar technologies and products to Pandora but we didn't encounter such products. Closest devices are gameboy[2] and PSP[3]. However Pandora can easily distinguished from these devices. In PSP and gamebox games both played and controlled in the virtual world. In Pandora, games playing in the real world and ruled in the virtual world. For instance the game "Truth or Dare"[4] in psp this game can play by entering the game even number of players, a bottle will be spinned by the game 2 players will be selected based on bottle spinning. Game automatically ask "Truth or Dare" and other player select one of them. Player will type the answer to a textbox and send it. In Pandora players will be face to face, in the same room. Even number of players will be log-in the Pandora through their phones. Pandora will direct them to browser. Bottle will be spinned and 2 player will be selected. In their screen a notification will appear as who will ask and who will answer. Player will ask "Truth or Dare" loudly and other player will select one of two options in his/her screen. Player who will ask will be notified by that selection and will ask his/her question when he/she receive the answer he will press next button in her screen and the game will continue. In pandora player will observe other player's reaction such as gestures, voice tone etc. and will be more sincere by the nature of Truth and Dare game.

## **1.3. Constraints**

### **1.3.1. Implementation Constraints**

- Pandora is the name of the box that has a chip(raspberry pi zero w) inside.

- We will install linux operating system in raspberry.
- There will be an admin interface to setup the game rooms and user interfaces for playing the games. The interfaces will be served from the box. To serve the html files a framework(//WHICH FRAMEWORK) will run on the linux.
- Admin and user interfaces will be implemented with Html5 , Css3, and Javascript.
- To provide a fine user experience, a captive portal will be set in the machine and user will be directed to game domain without explicitly entering url to browser.
- For the version control, GitHub and Git will be used in order to collaborate within our group.

### 1.3.2. Economic Constraints

- We will buy the raspberry pi zero w chip for the prototype.
- We will buy a power source to power the chip which will included in the box.
- The box that wraps the chip and the power source will be printed by a 3D printer for the prototype.
- The price of the product will be in range of the current board games. For now, the expected cost is 25\$( approximately 92 TL ) and target selling price is between 130 and 160 TL.
- The libraries and technologies that will be used in the system do not require any purchasing.

### 1.3.3. Ethical Constraints

- We will not share users' information with any third-parties.
- Users will get a unique ID with the box at purchase. After they can change or continue with the id to access admin settings of the Pandora box.

#### **1.3.4. Sustainability Constraints**

- In the future, we are planning to set up a update server to connect the Pandora box to a computer and update box software or download new games.
- After making the prototype, we are planning to buy parts of the product as bulk to decrease the cost of the box.
- We are planning to implement custom game tools for specific genres to give users ability to design and play their games.

#### **1.3.5. Social Constraints**

- The box will be released in English and Turkish languages.
- The system will be designed such a way that users will interact with each other more than the interfaces of the game to provide a fun and distinctive experience compared to other gaming platforms.

### **1.4. Professional and Ethical Issues**

The Pandora box contains a collection of card games and verbal games. A small issue can occur when we implement some of the most known games because of the licensing. We may need to contact with some trademark game companies to get the permission of publishing them within our box.

Another candidate for a professional issue can be the cyber security of the Pandora box. Since we are not so familiar with the systems that we are building, we may struggle with the wireless connection security between players and the admin user. To avoid that we will contact with domain experts and collect information from similar applications in real-life.

## **2. Requirements**

### **2.1. Functional Requirements**

- The owner of the box required to enter the unique ID to access admin privileges.

- Admin should be able to change the password of the wifi to prevent strangers to connect to the game.
- Users and admin can connect to the wifi of the box to participate in the game.
- Users will be redirected to the game interface after admin selects a game and creates a game room.
- The game logic will be provided by the box to extend that users can interact each other and keep track of the game by their phones.
- Users will be able to act according to their roles from their phones.
- Games will be saveable and loadable to give users ability to take a break or continue their games after some time.

## 2.2. Non-Functional Requirements

- **Compatibility:** The box should be connectable by iOS and Android phones. Moreover, interfaces should support Chrome and Safari browsers.
- **Robustness:** Our product should be able to handle at least 3-4 different connections without any delay or disconnection problems. Game interfaces will be responsive without putting too much work to the mobile browsers.
- **Performance:** System should run fast and pages should load quickly. Framework that runs in the box's should handle at most 10 people , which is a relatively small number compared the servers that run in web.

- **Maintainability:** There will be a web service for Pandora box owners to update their boxes' software and download new games. The update service will give us the ability to solve the future problems that users reported.
- **Portability:** Size of the box should be as small as possible to be easy to carry. Moreover, battery life of the box of the should be long enough to play several hours.
- **Documentation:** A well documented user guide should be provided with the box for owner to understand how to use box's features. Moreover, there should be printed game guide contains descriptions of the games(included in the box) and online version of the game guide for users to read online.
- **Usability:** The system must provide a captive portal to prevent user to request other websites from the browser while connected to the Pandora box's wifi.
- **User-friendliness:** We will develop nice-looking user interface to provide a better experience to the user. Matching themes and designs should be used for different games. Interfaces would be easy to read and track to minimize time that user looks at the screen.



### 3. References

[1]“Raspberry Pi Zero W.” Raspberry Pi,  
[www.raspberrypi.org/products/raspberry-pi-zero-w/](http://www.raspberrypi.org/products/raspberry-pi-zero-w/).

[2]“Game Boy.” Nintendo, Nintendo, [nintendo.wikia.com/wiki/Game\\_Boy](http://nintendo.wikia.com/wiki/Game_Boy).

[3]Silvester, Niko. “What Is a Sony PlayStation Portable (PSP)? A Detailed Look.” Lifewire, 19 Oct. 2016, [www.lifewire.com/what-is-a-psp-2792807](http://www.lifewire.com/what-is-a-psp-2792807).

[4]“How to Play Truth or Dare?” Truth or Dare! Free Online Game,  
[www.playtod.eu/how-to-play-truth-or-dare/](http://www.playtod.eu/how-to-play-truth-or-dare/).