

Final Presentation

Project Conceptualization and Development

Project Title: Develop games to improve reaction time

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Practical assignment goal: Development of a VR application using a human-centered approach, specific devices and libraries.

Assignment 1

Project Conceptualization

Introduction

Develop games to improve reaction time

- Virtual and Augmented Reality
 - VR
- Different mini games



Project Vision

Develop games to improve reaction time

Providing a tool that mainly focuses on improving physical dexterity but can also provide entertainment.

Box of mini games based on reaction time.

Goal Areas:

- Athletes
- Patients
- Entertainment

VR in the future:

- + mainstream
- + convenient



Personas

Develop games to improve reaction time

Américo Fernandes

- 26 years old.
- Student, Table tennis player, Gamer.
- Engineering student who embraces the world of gaming.
- He enjoys various sports such as table tennis, martial arts and boxing.
- Some experience with VR.
- Wants to improve his reactions in the world of virtual games.



Personas

Develop games to improve reaction time

Jéssica Marlene

- 72 years old.
- Patient, Crochet enthusiast.
- Was involved in a car accident and had her attention and dexterity decreased.
- No previous experience with VR.
- Wants an easy-to-use tool that can help her rehab but also have fun doing it.



User Stories

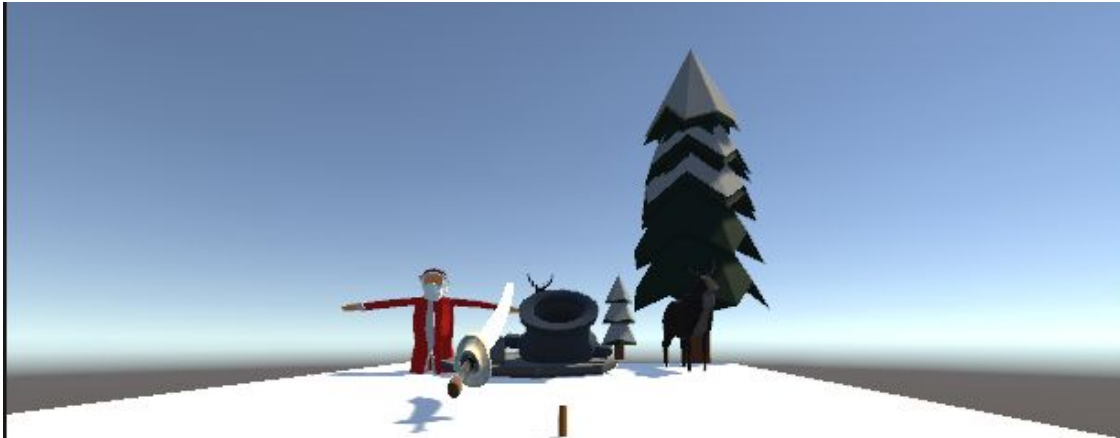
Develop games to improve reaction time

- As a user (**Américo**), I want to improve my reactions by touching the correct buttons as fast as I can.
- As a user (**Jéssica**), I want to start the game whenever I want.

Storyboards

Develop games to improve reaction time

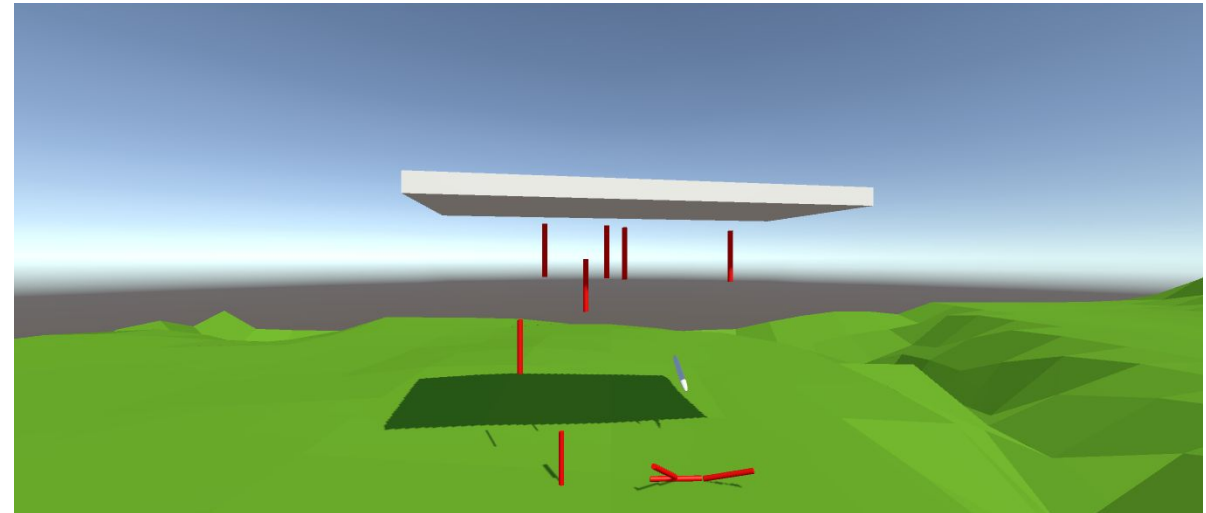
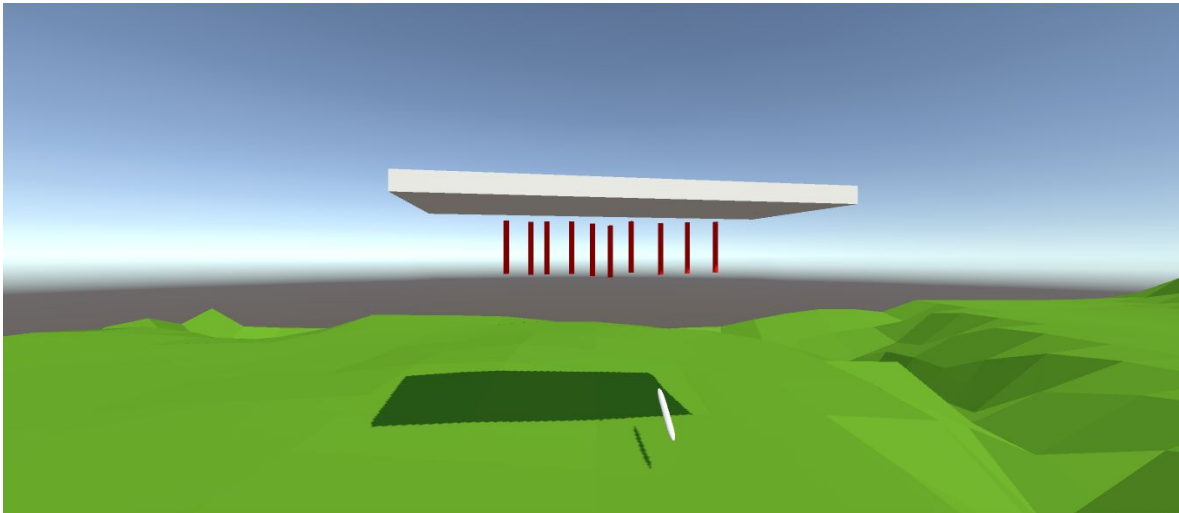
Button (start game) -> Hit object -> Score points



Storyboards

Develop games to improve reaction time

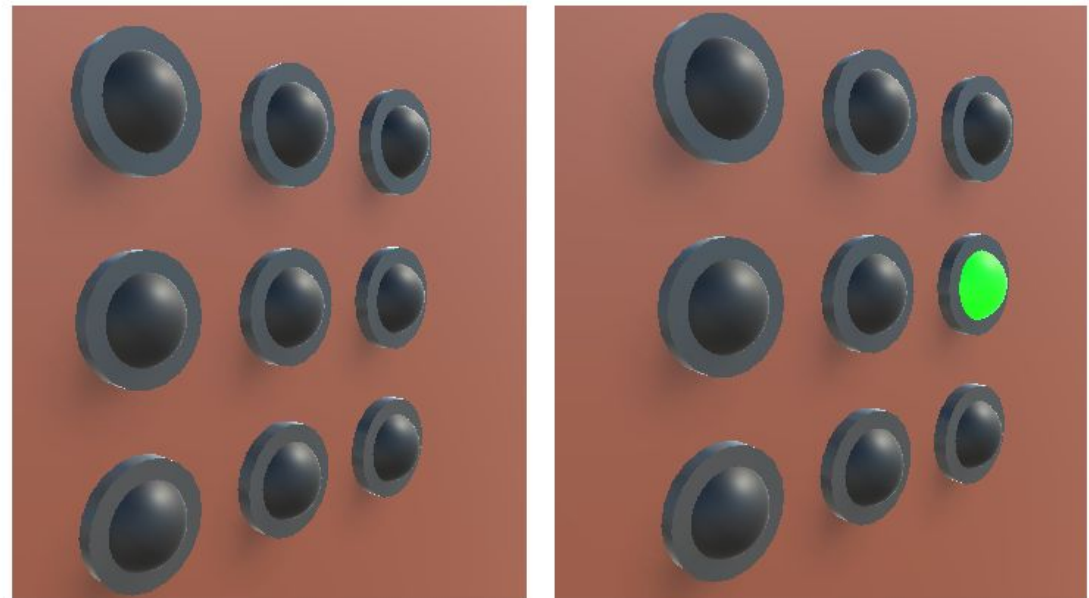
Wait for object to fall -> Grab that object -> Score points



Storyboards

Develop games to improve reaction time

Light comes on
-> Press the lit button
-> Wait for next light



Requirements

Develop games to improve reaction time

- **Quality requirements** - Usability, reliability, testability
- **Functional Requirements** - how to play the game, start game, score, highscore...



Project Constraints

Develop games to improve reaction time

- Random game sequence but fair
- Difficulty needs to be a setting
- Separate statistics by difficulty
- Goals that are easy to understand
- Simple hand movements
- Overall ease of use from the get-go



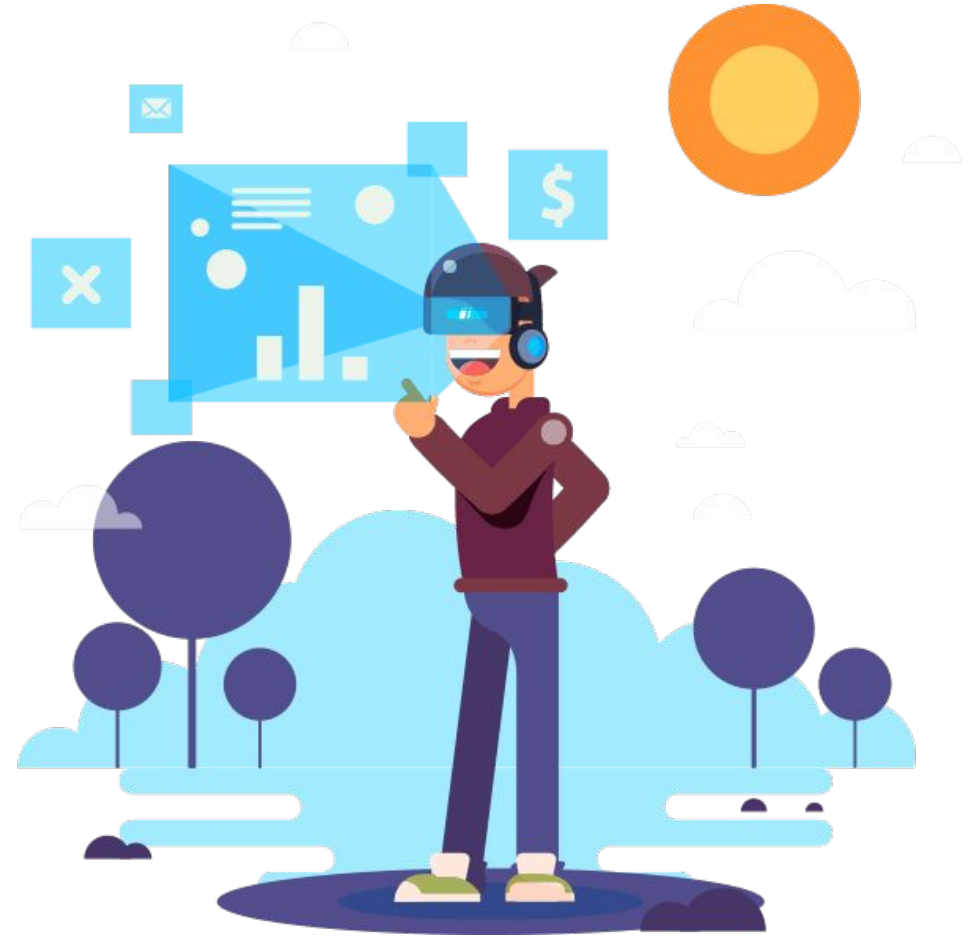
Assignment 2

Project Development

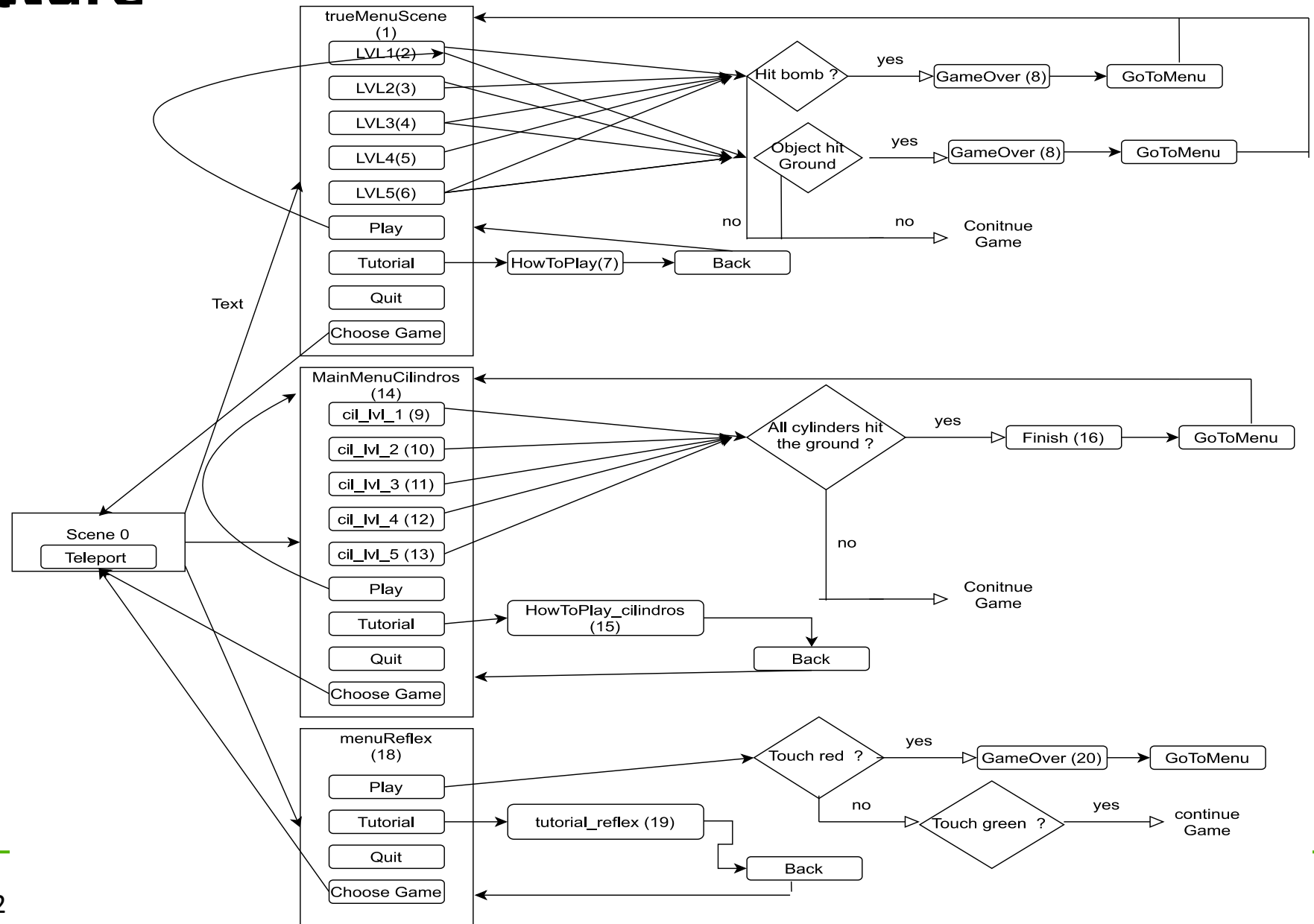
Prototype Developed

Develop games to improve reaction time

- Navigate between menus
- Sound
- Collision
- Grab objects
- Teleport
- Controllers buttons



Project Structure



Tools Used

Develop games to improve reaction time

XR Interaction Toolkit

- Interaction System
- 3D and UI interactions from Unity input events
- Visual feedback (line rendering)
- VR Camera

Free assets from Unity's Asset Store

Hand Prefab

- [VR-Hands-with-Unity-XR/Hand.fbx at main · Novaborn-dev/VR-Hands-with-Unity-XR \(github.com\)](https://github.com/Novaborn-dev/VR-Hands-with-Unity-XR)



User Evaluation

Develop games to improve reaction time

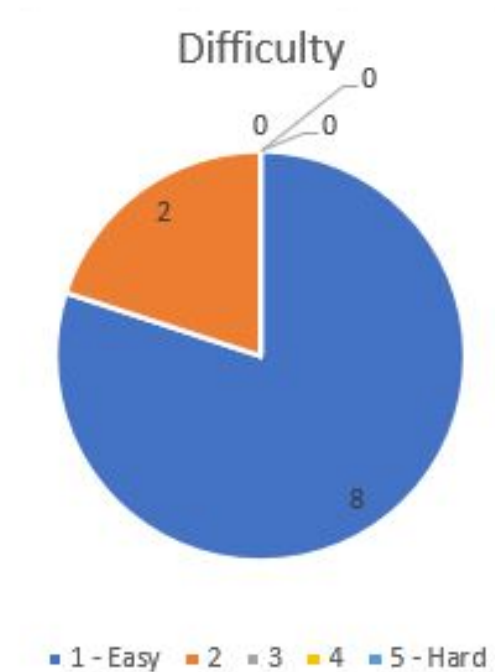
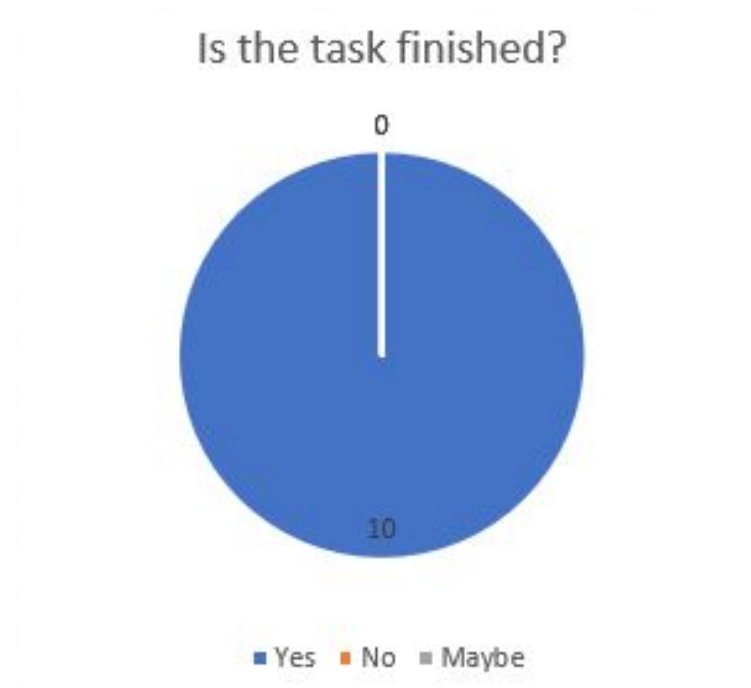
- Different tasks evaluated
- Family, friends, classmates
- 10 participants

Tarefa 1	Navegar entre mini-jogos	Nada Fácil	1	2	3	4	5	Muito Fácil
Tarefa 2	Tutorial de cada mini-jogo	Nada Fácil	1	2	3	4	5	Muito Fácil
Tarefa 3	Menus interativos	Nada Fácil	1	2	3	4	5	Muito Fácil
Tarefa 4	Dificuldade dos níveis	Nada Fácil	1	2	3	4	5	Muito Fácil

User Evaluation

Develop games to improve reaction time

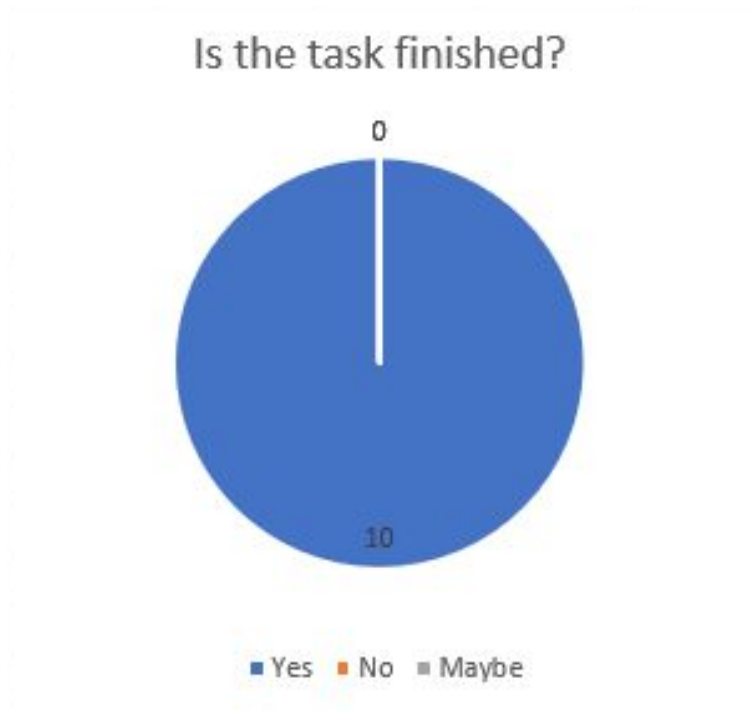
Navigate between mini-games



User Evaluation

Develop games to improve reaction time

Tutorial of each mini-game

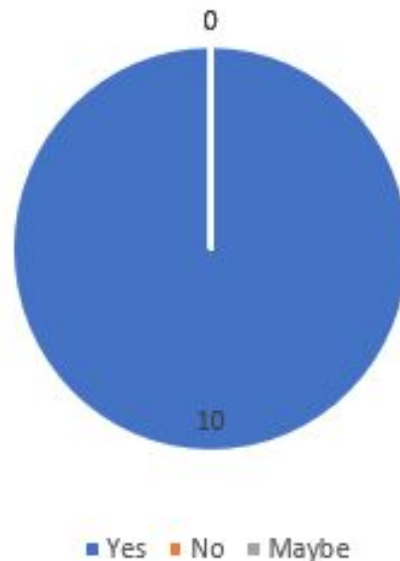


User Evaluation

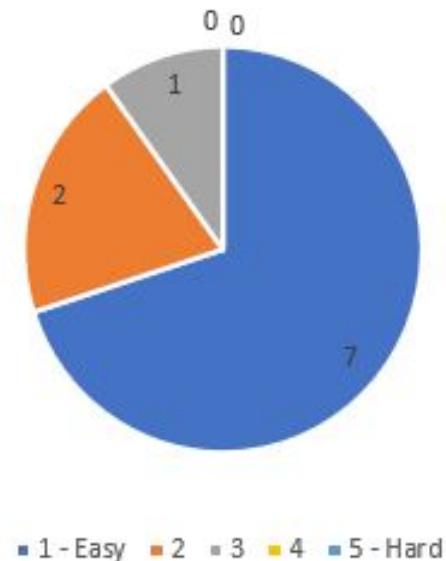
Develop games to improve reaction time

Interactive Menus

Is the task finished?



Difficulty

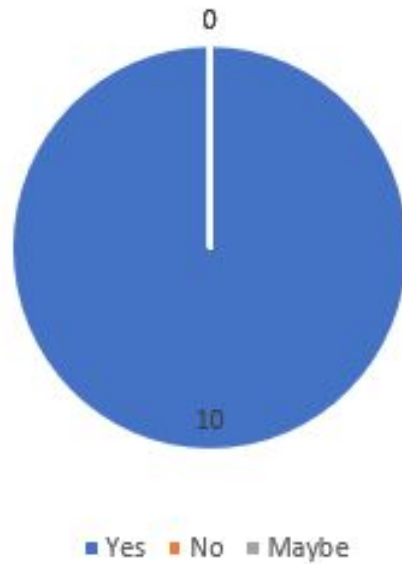


User Evaluation

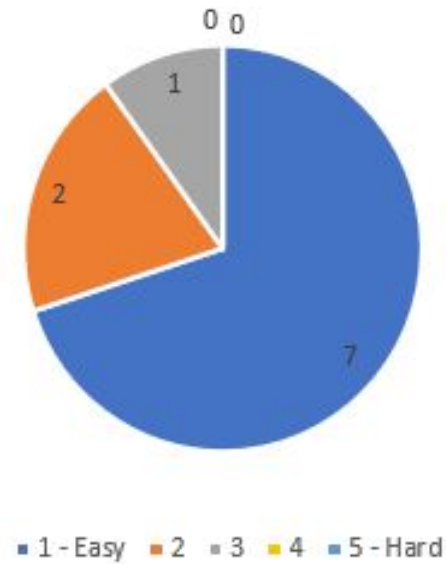
Develop games to improve reaction time

Difficulty of level 4

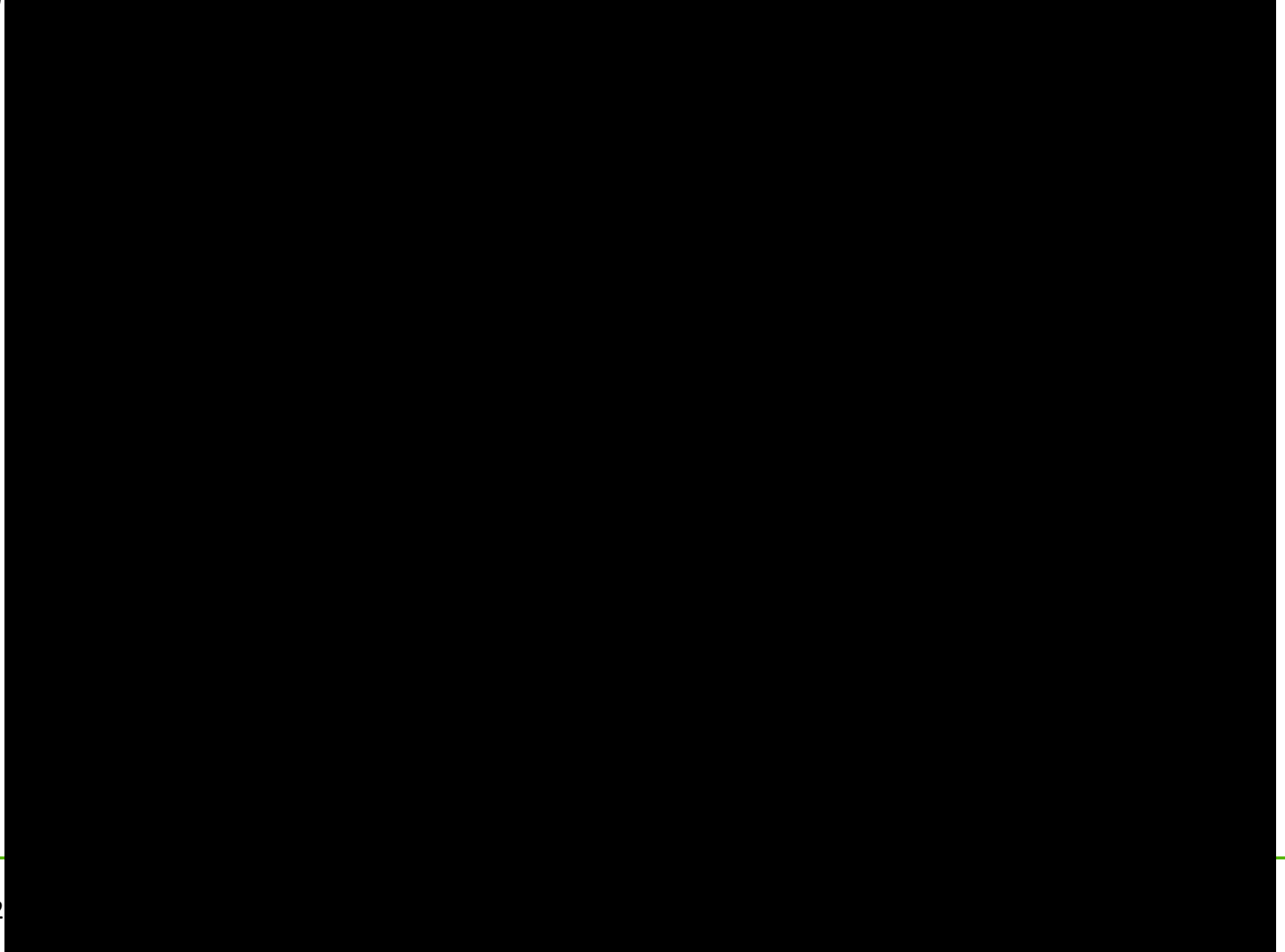
Is the task finished?



Difficulty



Demo Video



Expectation vs Reality - Project Objectives

Develop games to improve reaction time

- Happy with final results
- Number of games
- Different functionalities



Main difficulties

Develop games to improve reaction time

- Equipment - oculus quest 2
- Computer requirements
- Camera position
- Scene management



Future work

Develop games to improve reaction time

- Statistics Page
- Development of more games
- Different levels in Re Flex Game

