

**Project 2**

# **Cerebral Training Game**

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## Artistic vision

The *Cerebral Training Game* will consist of several mini games which will test different skills, such as short-term memory, mathematical abilities and focus.

My aim with this project is to entertain as well as “train” the brain in innovative ways using machine learning and voice recognition. I think that the game will be much more interesting with these new ways of interacting, such as the voice and the hands instead of only using the mouse and the keyboard.

I was inspired by *Brain Age*, a game on Nintendo DS that I loved to play in my childhood. I took inspiration from some of the exercises and expanded them to make them more difficult or to use new technologies.

The sum of the scores of each mini game will give a final result, and the user could try to improve it by playing again.

Visually, I am headed towards a simple and minimalistic style so that the user can focus on the important aspects of the interface. There will be a lot going on in the non-digital world and the user could get lost.

## Libraries and technologies

I will be using [p5.js](#), [ml5.js](#) and [annyang](#).

Phaser seems to be a very powerful tool, but I do not think it would be relevant to use it in this particular game.

## Plans for the technical challenges

The technical challenges that I expect to face are related to the hand detection. I will need to do a lot of testing to verify what can and can not be done. I have already looked into the Handpose documentation of ml5.js and MediaPipe Handpose, but I did not find a ton of information on which movements can be recognized. I will have to experiment by myself. If there are limitations that will affect the fluidity of the game, I could find alternative ways of playing by combining the movement of the hand as a whole without poses along with vocal commands.

So far, I have noticed that ml5.js slowed down the computer at times, which slowed down the speed of the moving elements as well. To keep a constant speed even when the game is lagging, I have calculated their movement in relation to the time when they were created and the current time. This kind of solved the problem.

The other obvious issue is that when the background behind the hand is not clear, ml5.js has trouble detecting the hand. I could include a section explaining how to optimize the conditions for playing the game in order to have an enjoyable and non-frustrating experience.

# Visual sketches

## Game 1

### Instructions

**Say out loud the colour of the words**

blue ← this is pink

black ← this is purple

START

When playing the game

**Say out loud the colour of the words**

red

You said pink CORRECT ✓

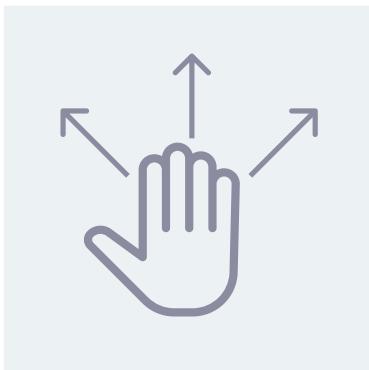
# Visual sketches

## Game 2 (This is the game in the prototype)

### Instructions

**Push away the equations that are not equal to the number in the center of the screen.**

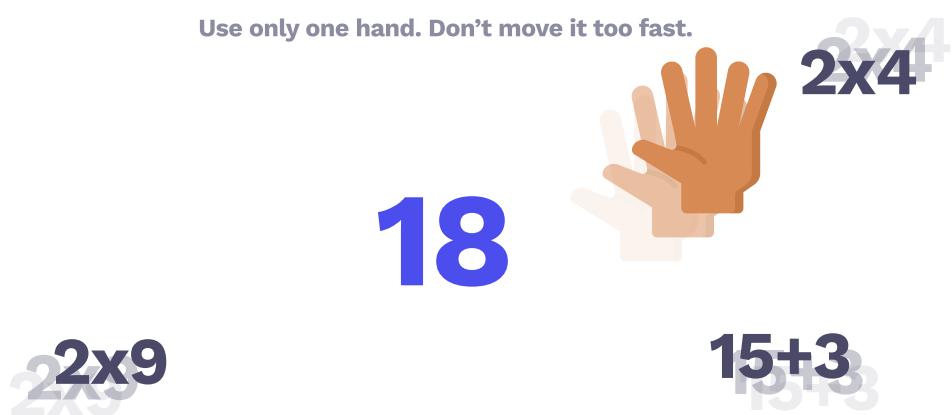
Use only one hand. Don't move it too fast.



When playing the game

**Push away the equations that are not equal to the number in the center of the screen.**

Use only one hand. Don't move it too fast.



# Visual sketches

## Game 3

### Instructions

**Grab the numbers and order them ascendingly.**

Close your hand on a number to grab it and open your hand to release it.

1

458

62

75



START

When playing the game

**Grab the numbers and order them ascendingly.**

Close your hand on a number to grab it and open your hand to release it.

2124

412

14

214



START

# Visual sketches

## Game 4

### Instructions

Try to remember the words that will appear on screen.

We will ask you to repeat them shortly after.

START

When playing the game

00:05

car

neck

tire

xylophone

finance

knife

salt

webcam

product

Say out loud 5 words that you remember.

car

neck

tire

knife

salt

# Visual sketches

## Setup

X

**Select your language**

ENGLISH

FRENCH

X

**Allow access to microphone and camera**

To play this game, I have to access your microphone and camera. Your data will only be used as part of the game and is never going to be seen by anyone else.

LET ME THINK ABOUT IT

OKAY!