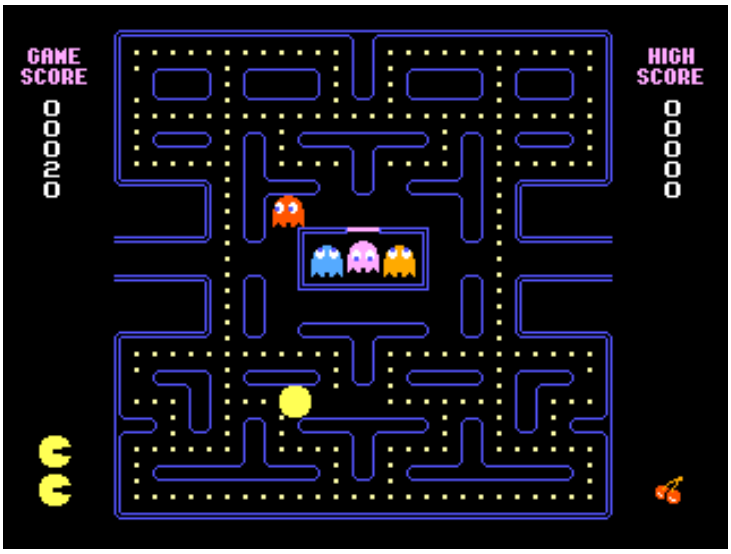
PAC-MAN PROPOSAL

By Kayen Giam

INTRODUCTION

This proposal is to propose improvements to the User Experience of Pac-Man, as well as a specially constructed and customized controller that can be used to play the game. The proposal will go in depth on the mechanics and history of Pac-Man, UI/UX research on game design, and gaming controllers.

PAC-MAN, originally called Puck Man in Japan, is a 1980 maze action video game developed by Namco for arcades. The game development started in 1979, with a creator named Toru Iwatani and a 9-man team.



The Player plays as Pac-Man, whose aim is to eat all the white dots in the maze while avoiding four colored ghosts, Blinky (red), Pinky (pink), Inky (cyan), and Clyde (orange). Eating large flashing dots called "Power Pellets" will temporarily turn the ghosts blue and vulnerable, allowing Pac-Man to eat them for bonus points. Eating all the white dots allows the player to advance to the next level. In each level, there are fruits for Pac-Man to collect, which grants extra points. If Pac-Man is caught by a ghost, he loses a life. The player loses when all lives are lost, which is indicated by the Pac-Man icon at the bottom left of the screen.

These are the fruits that can be collected at every level.

The **LOGO** that is seen above (blue background with a cherry), was one of the original logos made in 1979, for Pac-Man during the early stages of building the game. In 1980, two official logos were created, one for the Japanese market (Left) and another for the North American Market (Right).

Strengths

- The game is simple and easy to understand, making it a fun and addictive game for all ages.
- It has easy controls. Since the game only requires the up, down, left and right button, players are able to easily navigate the game.
- Pac-Man was successful in reaching its target audience which were arcade players. Back in the days, Pac-Man attracted a wide variety of people, essentially making it one of the most popular games of the time.

Weakness

- The gameplay is repetitive since it heavily revolves around the mechanics of running from the ghosts and eating white dots, which may seem monotonous for several players.
- The game struggles with maintaining long term players. While its simplicity is its greatest strength, it is generally suited for quick arcade games. Modern day players usually seek games that are more diverse in mechanics or storyline.
- Lack of variety. The game lacks interesting experience since its main gameplay is navigating through a maze.

Game Link

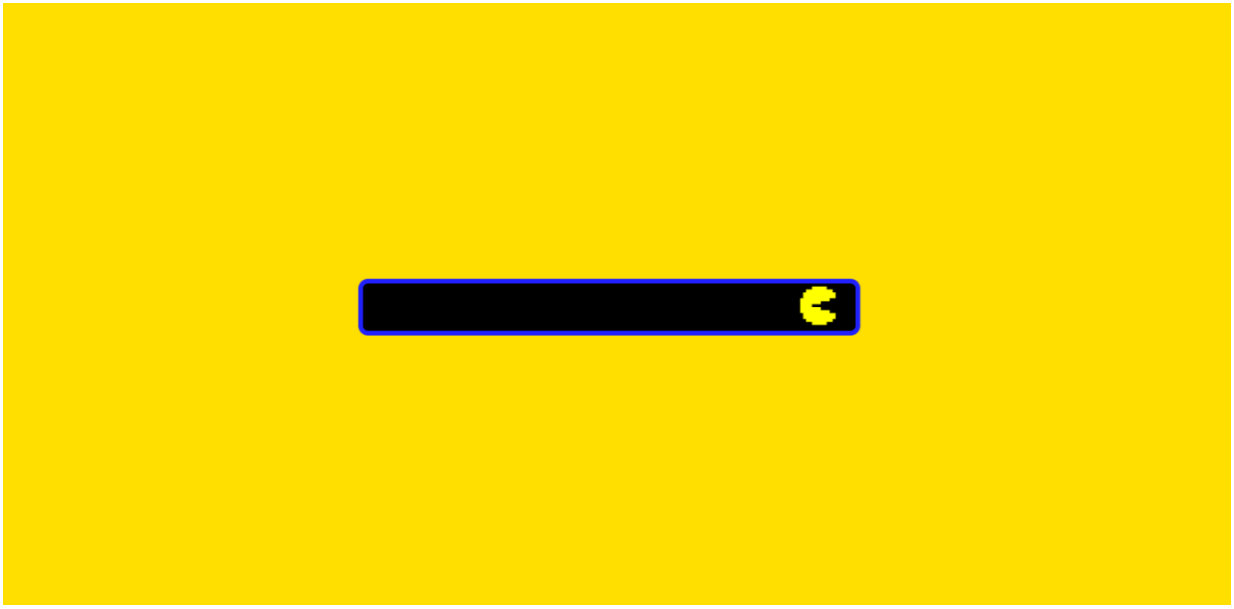
You can access the game link here:
https://freepacman.org/

Improve User Experience

Since Pac-Man was first made as an arcade, there are many different variations of the game made online. However, we will only be looking at the game taken from the website mentioned above.

Loading Screen

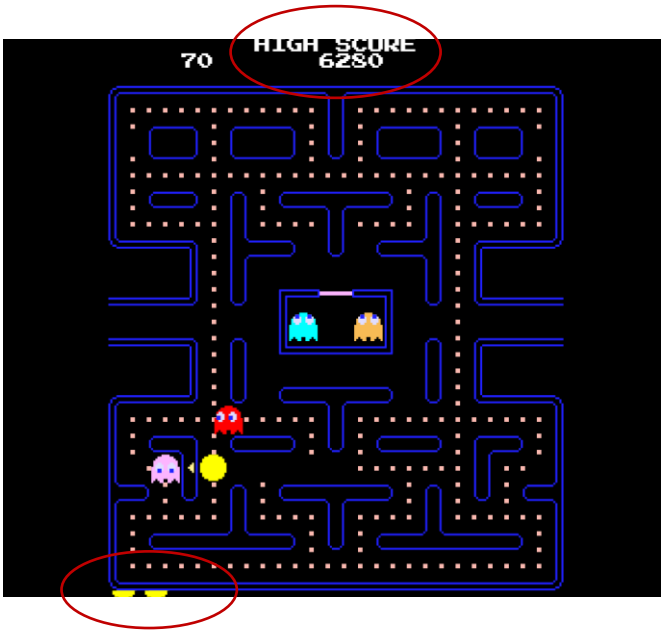
When you first enter the game, you will be greeted by a bright yellow loading page. Which right immediately after, starts the game. This is an issue as not all players are immediately ready before playing the game. Players should be given a choice to start the game when they want to. (e.g. start button)



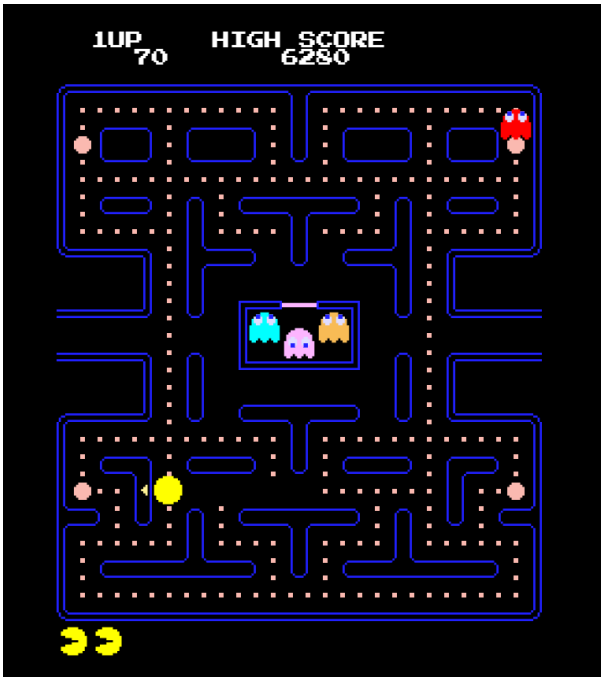
Strangely enough, they do have a “play screen”, but it isn’t shown unless the player loses the game (After the game over screen)

Game Screen

The game screen is not well scaled. For example, the picture on the left is how the game screen looks like when the player first enters. The first image below shows how it should look like. The second image below was gotten only after the website engine screen was zoomed out (from 100% to 90%).



As seen from the red circles in the image above, the UI is cut off because of poor scaling.



This is how the game should look like with proper scaling.

This may affect players as they commonly use these UI elements to keep track of their points, or their number of lives left. Lacking this aspect may sometimes cause confusion in the player, which may affect the players' performance.

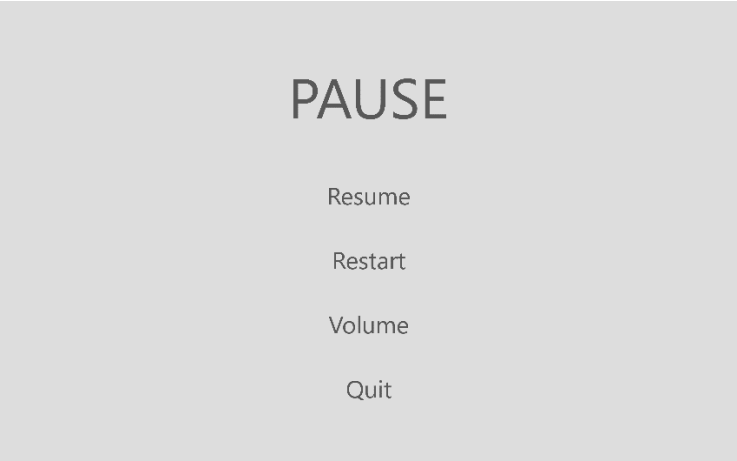
Pause Screen

The game's pause screen lacks elements too. In the game, the pause menu only pauses your game. However, pause menus usually should have other options such as volume adjustment, quit button, or a restart button.

Including features like these gives the users more freedom in the game. Volume adjustment is also one of the game freedoms. Currently, the game only allows players to enable and disable the volume. This is not recommended as there may be players who would want to listen to the game's music at a lower or higher volume instead of having it fixed at a certain level.

Having a restart button is essential too if the player wishes to start over. Without the restart button, players would have to resort to exiting the website and entering it again, which is a waste of time and very inconvenient.

Pause Screen – Improvement



The game could implement these other functionalities, to allow the user to have more options in the game.

UI Layout

Fortunately, the UI element used very well suits the game, the typography and the art style gives a very strong arcade vibe, which is essential when creating games such as this. However, in this website, the UI elements are not spaced out properly.

In the picture above, the distance between the first row and the second row is too small, the UI elements are almost touching each other, which makes it hard to see.

UI Layout – Improvement

In the picture above, the distance between the first and second row is greater, thus making it clearer to see the elements.

Persona • User Flow
User Journey

Persona

TIMOTHY LEONG

Age : 19
Gender : Male
Status : Single

ABOUT

Timothy is an avid gamer. He plays and appreciates all types of games. Since young, his favourite game has always been Pac-Man, but lately he has lost interests in Pac-Man because of how repetitive it gets.

What's life without game?

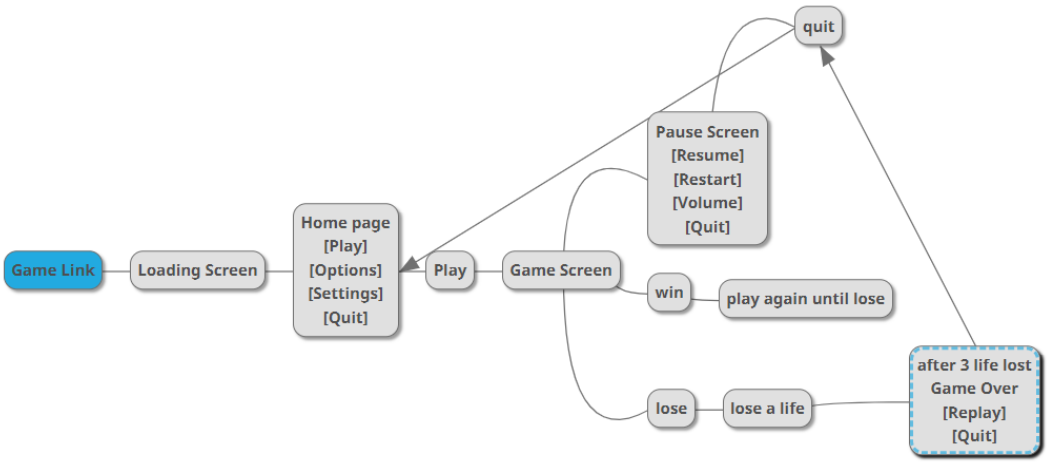
STRUGGLES

- Studies. He spends way too much time playing games, so he doesn't study much. His parents aren't happy with that
- Communication. Timothy loves solo games, he struggles to communicate well with other people

GOALS

- He wants to create his own gaming company one day, that focuses on explorational games
- Learn more about game design so that he can utilize the knowledge when it comes to making his own games

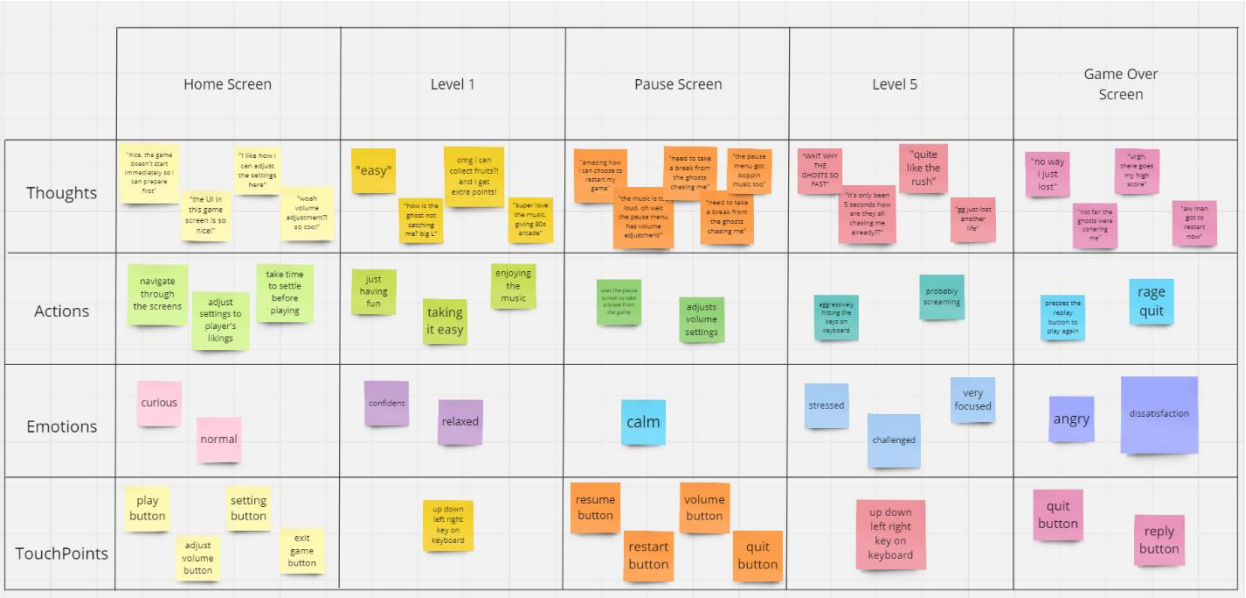
User Flow



In this User Flow, after the player clicks on the game link, the loading screen will appear, which should be followed by a home screen that gives players a few options before playing the game. This gives players some ample time to prepare before the game officially starts.

During the game, if the player pauses, there will be more buttons that give players the option to resume, restart, adjust volume and quit.

User Journey



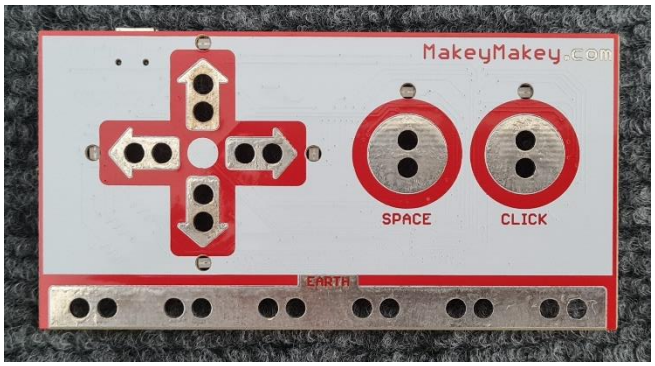
Pac-Man Controller

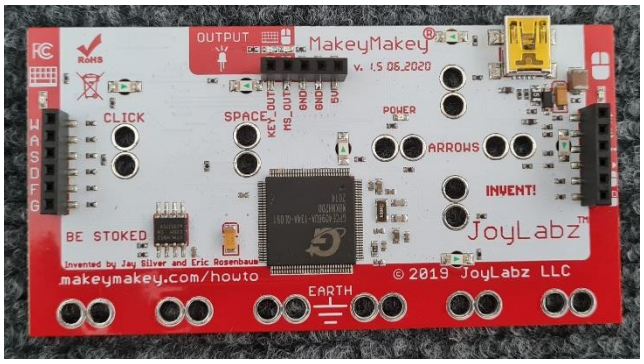
This section will be going in depth of how the Pac-Man controller was made, and instructions on how to set up.

MakeyMakey

MakeyMakey, an inventive kit conceived by Jay Silver and Eric Rosenbaum, transforms ordinary objects into computer keys. Comprising a circuit board, alligator clips, metal wires, and a USB cable, the kit employs loops to transmit electrical signals across the circuit, connecting to specific keys on the computer. Essentially, MakeyMakey serves as a compact keyboard, allowing users to interact with the computer using a variety of unconventional items.

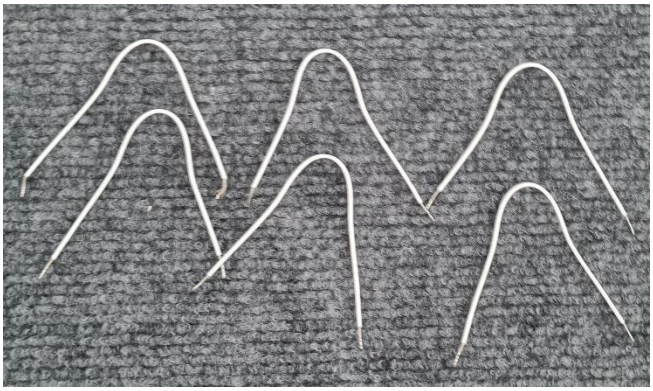
Initially funded through a successful Kickstarter campaign that raised over $50,000, MakeyMakey is rooted in research conducted at MIT Media Lab's Lifelong Kindergarten. It is built around the Atmel 32U4 microcontroller, utilizing all 12 analog input pins in conjunction with a pull-up resistor array to sense the low-voltage signals returned from conductive materials.

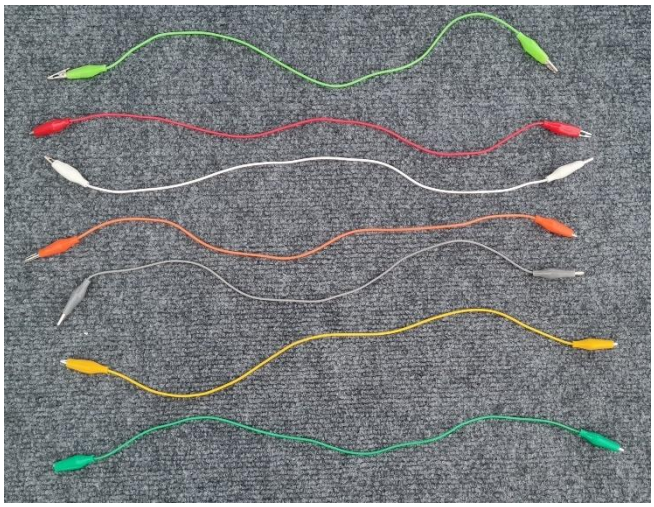




The images above show how the front (left) and back (right) of the MakeyMakey looks like. The holes in the kit facilitate the connection of crocodile clips to respective items, enabling users to create interactive experiences by completing electrical circuits. In the context of Makey Makey's functionality, the term "Earth" refers to the grounding connection that ensures the completion of circuits and enables the transmission of electrical signals, allowing users to engage with the computer in innovative ways.

The images here are the 3 other items that the MakeyMakey kit contains. A HDMI cable that is used to connect the MakeyMakey to the computer, 7 crocodile clips, and 6 white wires that is used to connect the W, A, S, D, F, G keys (as they do not have the crocodile clip holes)





Keys Used

Since Pac-man only requires movement in 2D, the controller only consists of the Up, Down, Left, and Right keys.

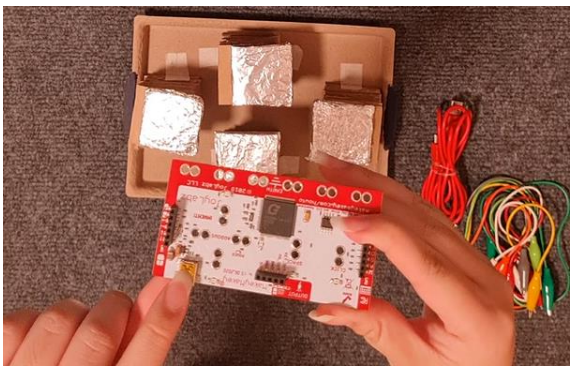
Instructions

Items you will need:

- MakeyMakey hardware
- 5 crocodile clips
- HDMI cable

Step 1

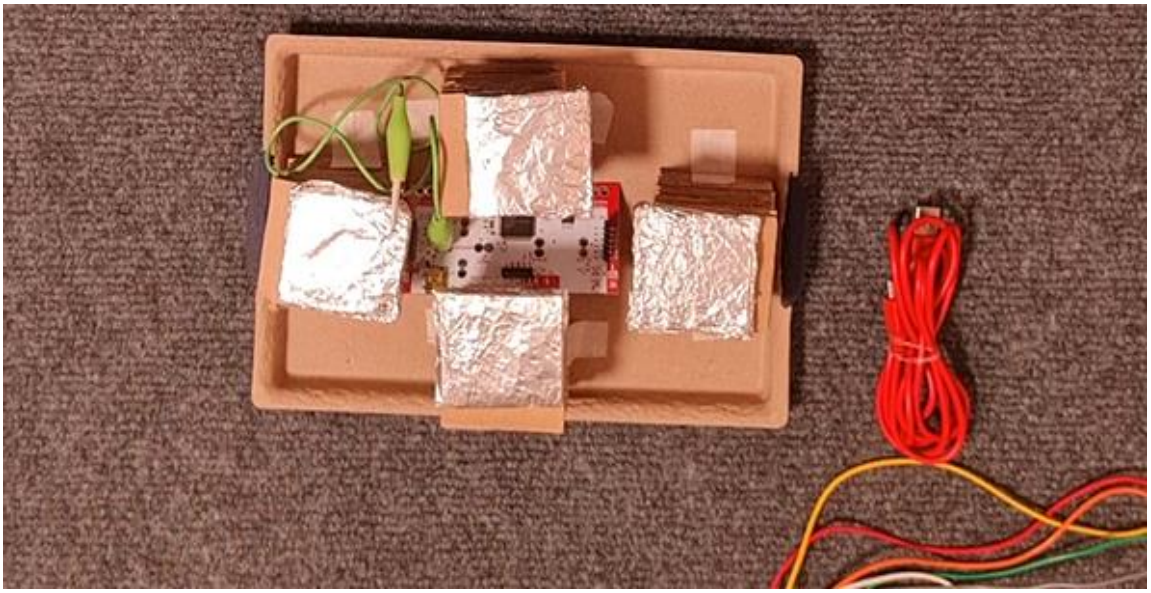
Open the Pac-Man Controller, place the MakeyMakey hardware upside-down in the middle of the set, with the HDMI insert area facing you



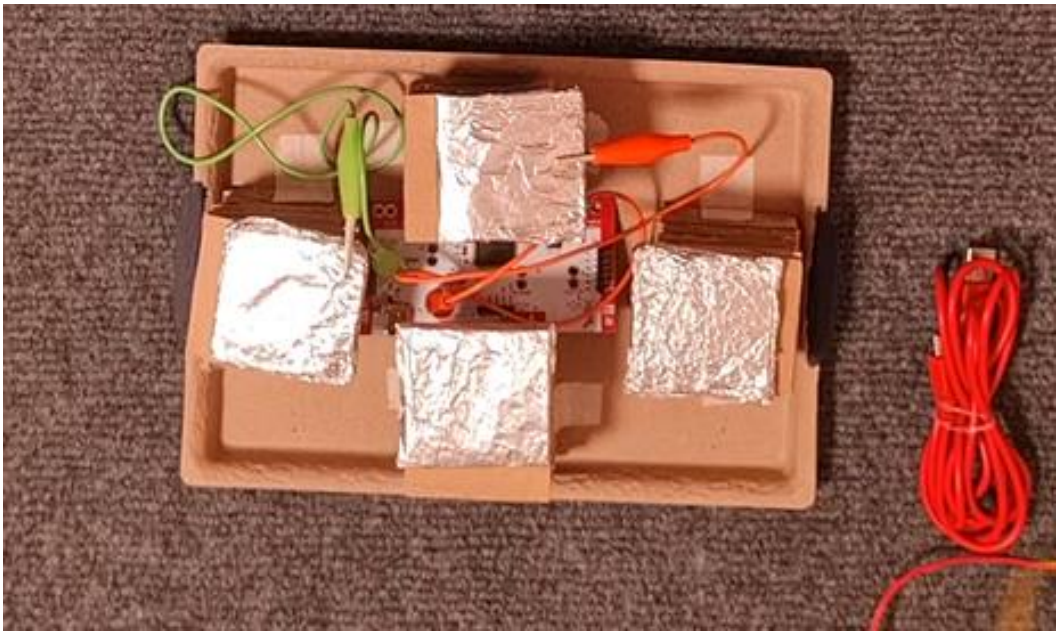
Step 2

Now, connect one side of the crocodile clip to one on of the aluminium. The aluminium acts as a base for the buttons to touch.

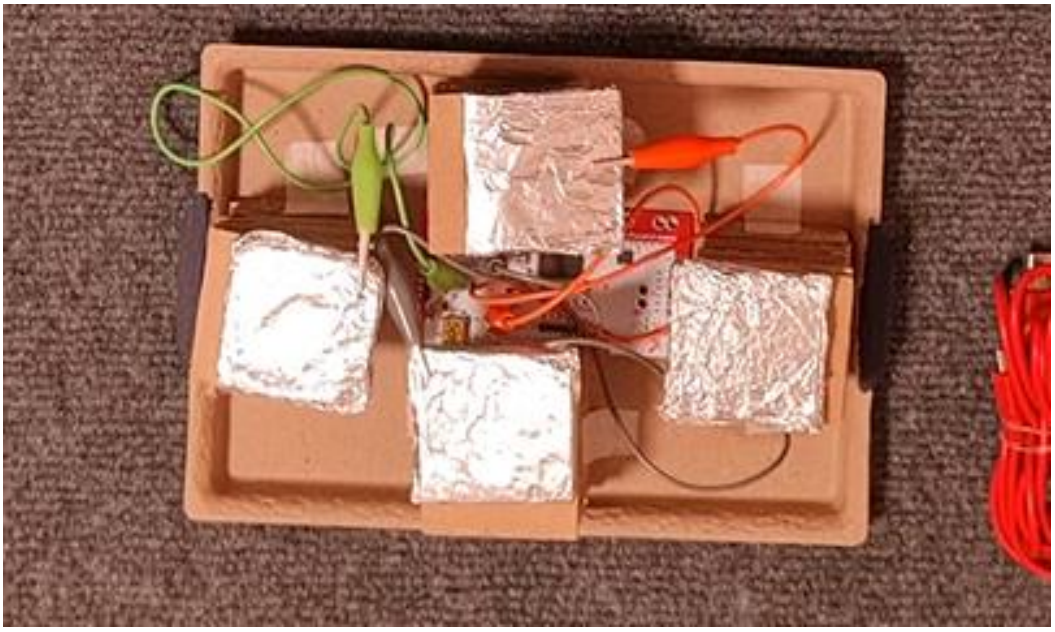
Left (Green):



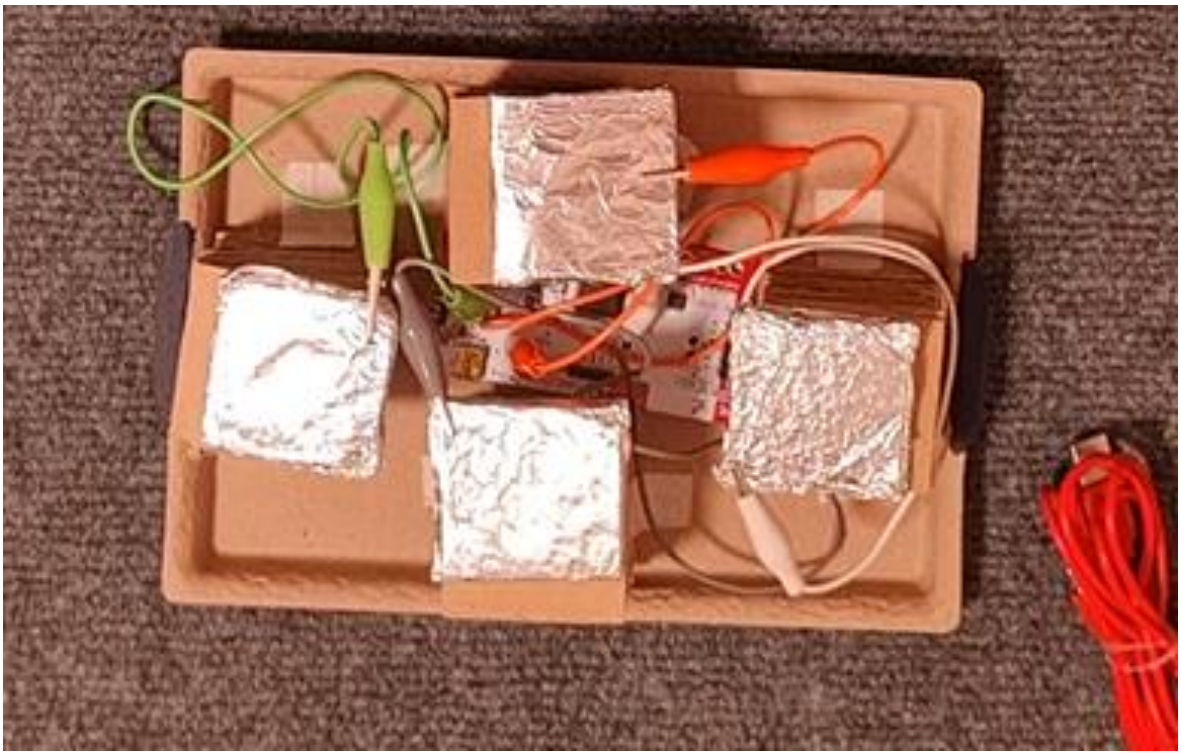
Up (Red):



Down (Grey):

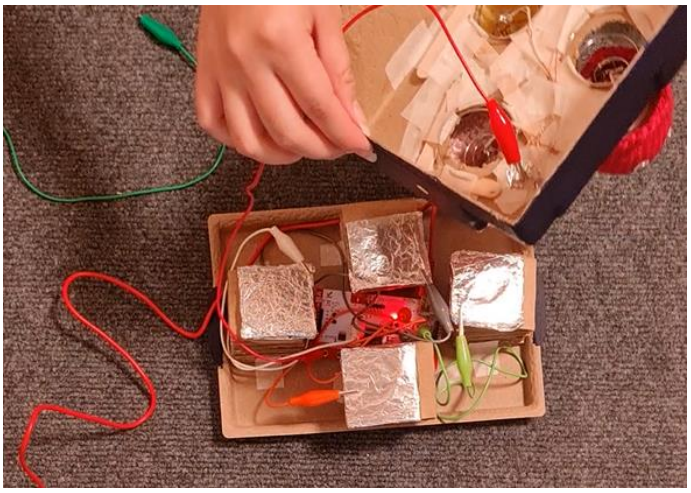


Right (White):



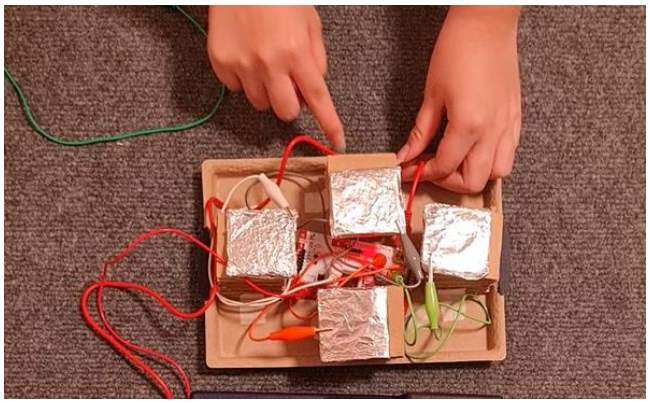
Step 3

Connect one end of the crocodile wire to the earth, and the other to the aluminium at the bottom of the cover.



Step 4

Connect the HDMI wire to your computer. Be careful when pushing in the wire into the MakeyMakey and tuck the wire within the box to prevent difficulty when closing.



Step 4

Close the box! Be sure not to have any wires covering the aluminium, as it may interfere with the pressing of buttons. Also ensure that the wires do not go outside of the box as it may cause difficulty to close.

Still unsure how to connect it? Watch the video below that goes through a step-by-step tutorial on how to set up.

How to Set Up – https://www.youtube.com/watch?v=zCOn1ouJacY

Game Demo - https://www.youtube.com/watch?v=mcY_c5QTUIc

Design Rationale

The image above shows my final design for my Pac-Man game controller. This was inspired by the 4 colored ghosts featured in the game, Namely Blinky (red), Pinky (pink), Inky (cyan), and Clyde (orange). Unfortunately, I had no red or orange, so I had to settle with yellow and a pinkish-purplish-red which still did the job just fine. The color of the box is dark blue, which was meant to represent the background of the game screen. In Pac-Man, the background of the game is black, and the color of the maze is blue. I did not wish to make the box black as it was overwhelmingly dull, and I felt that dark blue resonated well with the ghost colors. And last but not least, the yellow Pacman and pellets around the box as it is one of the most iconic scenes in Pac-Man.

Pac-Man and the Ghosts

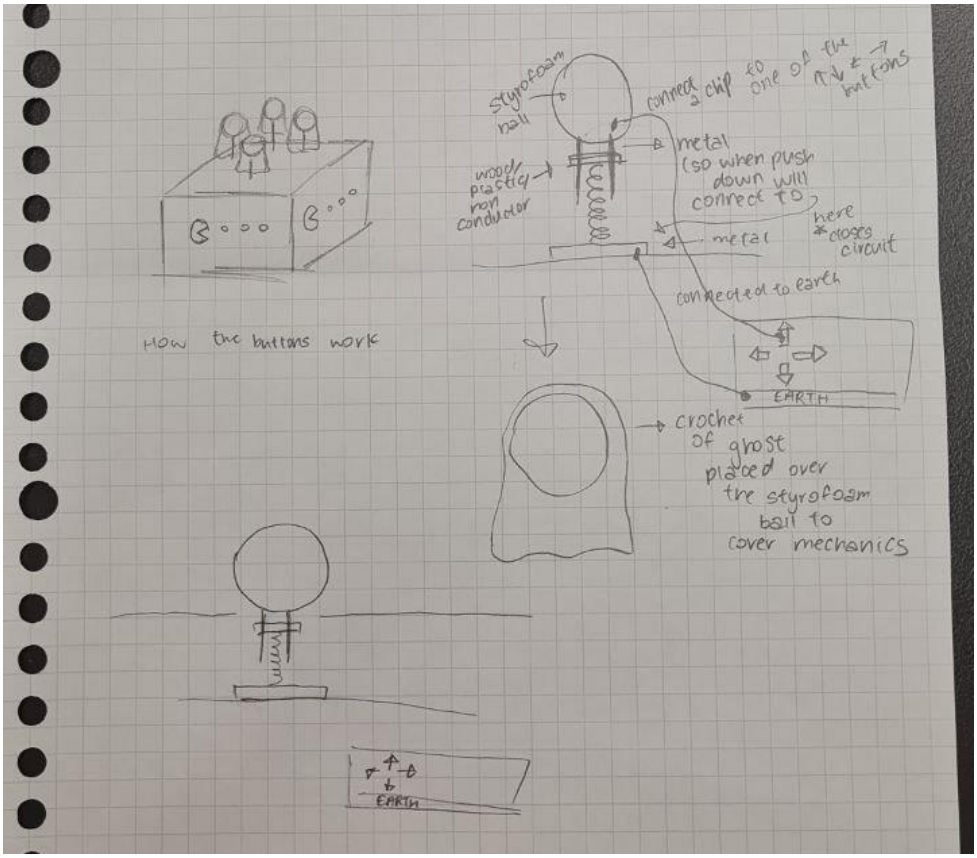
Pac-Man eating pellets.

When it came to designing the controller for Pac-Man, I was in a dilemma. I was deciding between a joystick with a Pac-Man head, or 4 buttons with the 4 different ghost colors. I felt that both were good ideas as they both could really give off the vibe of Pac-Man.

In the end, I chose the 4 ghost buttons. This was because the game only has 4 directions that the player can turn to which is essentially Up, Down, Left and Right. Making a joystick would usually mean that players have a more versatile movement, as one may think that they are able to move in all directions given the nature of a joystick. Thus, making a joystick may be misleading in a certain way since a joystick usually means you can move in all directions, contradicting the Pac-Man gameplay where players can only move in 4 directions.

How it works

Making the controller was not hard, as I already had an idea of how the controller would look and how the mechanics would work.

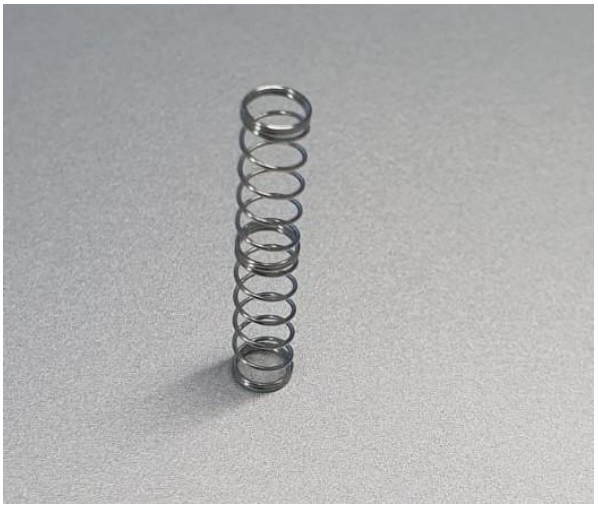


The way the controller works in this picture is that there will be 2 metals stuck into the Styrofoam, which is stuck into a piece of cardboard, as well as a spring (under the carboard) that allows the bouncing effect when pressed. Right below the spring is a piece of aluminium, such that when the button is pushed, the 2 metals in the Styrofoam ball touch the aluminium, causing the circuit to close. One end of a crocodile clip will be connected to one of the 2 metals attached to the ball, and the other end to an Up, Down, Left or Right button. Then take the end of another crocodile clip and attach the earth on the MakeyMakey hardware, to the aluminium under the spring, this is to close the circuit.

I then thought of crocheting to make the ghost cover for the Styrofoam, as I felt that I had more freedom in manipulating the design of the ghost into the way I want it, rather than taking a piece of cloth and covering it, which in my opinion shows no effort.

Making the Controller

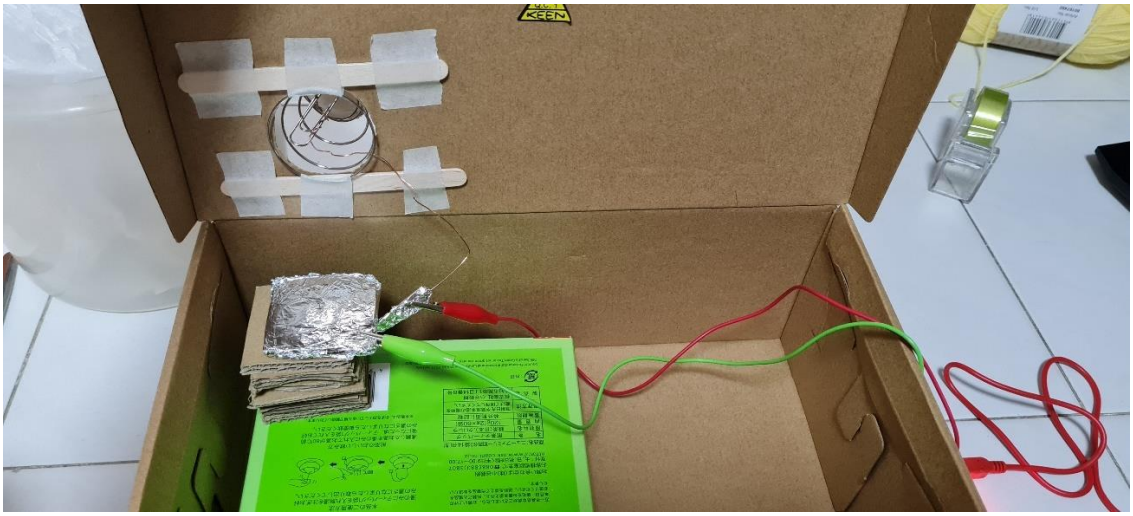
While it was easy to make, finding the materials was hard, the materials I needed were springs, cardboard, a box, some metal wiring, Styrofoam balls and aluminium foil. I managed to get everything, except for the most essential item in my project, which was the spring and a suitable box. I could not find a box that was of perfect size for my controller, as I minimally needed at least 15cm for both the length and width. I also could not determine the height needed for my box as the height must be suitable for the height of the spring, which I also did not have. I was very close to resorting to pen springs. (note that my ball is 5cm in diameter, thus using a pen spring would mean I needed lots of them)



Miraculously, thanks to my mother, I managed to get a box of suitable size, which also had a very interesting exterior.

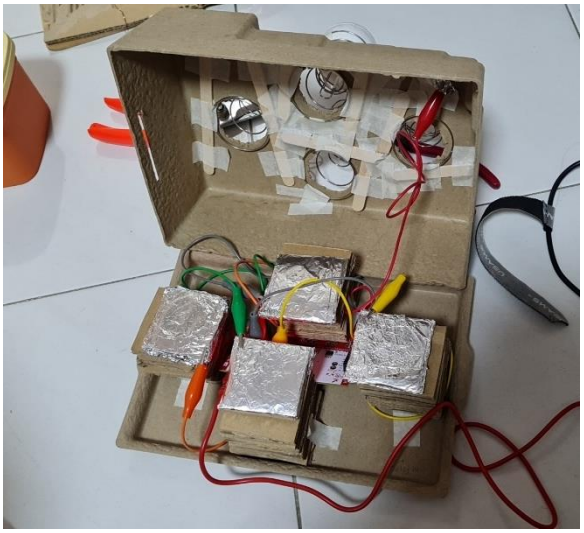
And also, after walking through the entire Jurong Point Shopping Mall, I managed to find a spring, which was actually just an air plant holder, which also miraculously fits my Styrofoam ball perfectly.

After getting all the items, I had to do some replanning of the mechanics, since the measurements were different now (bigger spring). Previously, the 2 metals stuck into the Styrofoam ball, would not work in this scenario, so I used paper clips, and I stuck one of them in the middle of the Styrofoam ball. Then, instead of having the spring touch the aluminium, I made it such that the spring sticks to the bottom of the cover of the box using ice cream sticks and tapes. I then used a copper wire and tied it onto the paper clip, the copper wire is connected to the earth on the MakeyMakey. The aluminium is connected to one of the buttons on the MakeyMakey. You may also notice that the aluminium is propped up by some cardboard. That is because there was no way for the clip to reach the bottom of the box, and it was also not possible for the players to press the button so deeply into the box.



After confirming the mechanics of the button, I repeated it 4 times on the actual box that I was going to use.

The images above show how the springs were attached to the box, and using copper wires go attach the paper clips to the earth wire (red). The image below shows all the connections made.

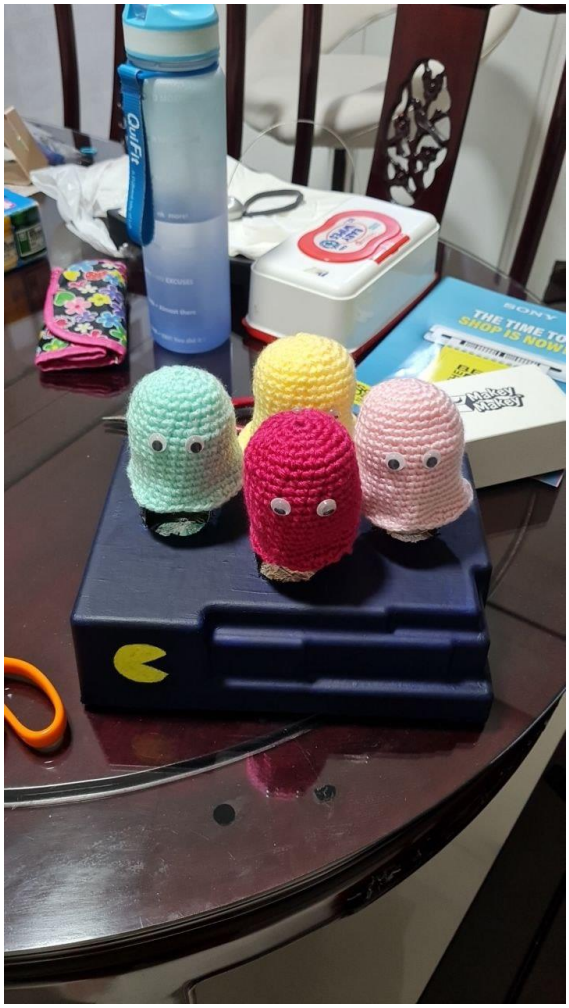


Now, that that's aside, I started crocheting the ghost covers for the Styrofoam balls.

And after I was done with all of them, I placed googly eyes on them!

Finally, I painted the box, and painted the box and placed the ghosts on the Styrofoam balls.

And that was how the Pac-Man Controller was created!



Study on Game Controllers

Pandora's Box

The first controller I will be talking about is called the Pandora's Box. It is a two-player arcade gaming board that contains popular old vintage games such as Street Fighter, Teenage Mutant Ninja Turtles and much more.

There are many different variations of Pandora's box, but I will only be speaking on this specific controller.

Taken from the website bootleggames fandom, it is stated that the Pandora's Box is a series of bootleg JAMMA XXX-in-1 arcade boards initially manufactured by 3A-Game Electronic Technology. The board was first released in 2012, headquartered in Guangzhou, China This controller became popular because of the vast number of old games loaded in the controller. Based on personal experience, the controller that I own has over 300 games loaded.

Over the years, Pandora's boxes 2, 3, 4, 4S, 4S+, 5 and 6 were produced, loading more games than the versions before. The most recent Pandora's Box 6 was released in 2018, which included over 1300 games.

The board has a non-standard JAMMA pinout, even though it was stated that the board has a JAMMA pinout. Newer boards use 48PIN instead of the traditional JAMMA.

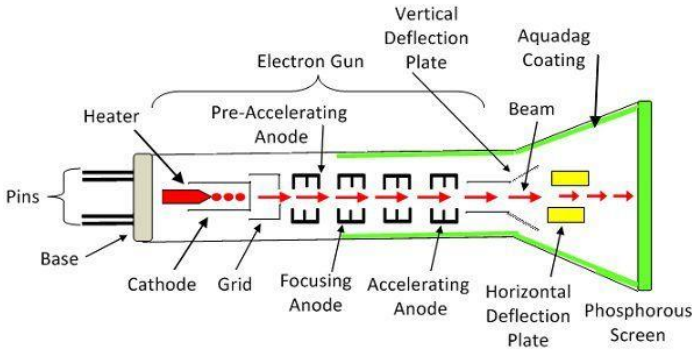
The idea of this controller is for players to play 2 player games together. The controllers are flexible, since each player is provided with 6 buttons and a joystick each, which have multiple functionalities in different games.

ATARI 2600

The next controller I will be talking about is the Atari 2600. This controller is rather infamous because of their version of Pac-Man that was released. The controller was widely criticized for its inaccurate portrayal of the arcade version, with its unusual design and music. Some of the notably poor designs were the poor color choices and flickering ghosts. However, it was still a commercial success as it sold over 7 million copies.

The Atari 2600 is a home video game console developed and produced by Atari, Inc. The company was founded by Nolan Bushnell and Ted Dabney in 1972. The Atari 2600 made microprocessor-based hardware and games stored on swappable ROM cartridges more popular. The first Atari 2600 VCS had 2 types of controllers, a joystick and a pair of rotary paddle controllers.

The graphics of the Atari 2600 were designed to be compatible with the cathode-ray tube television sets produced in the late 70s, which lacked the auxiliary video inputs that receive audio and video from another device. Thus, requiring a radio frequency signal compatible with the regional television standards in order to connect to a television.



The Atari 2600 can also be a 2-player controller. However, the bundle only comes with one joystick, thus one would have to buy another joystick separately in order to play 2-player.

Super Nintendo Entertainment System

Commonly known as Super Nintendo or SNES, is a video game console first released by Nintendo back in 1990 in Japan and South Korea. In Japan, this controller was famously known as Super Famicom. SNES was a selling hit, the 16-bit home video game console's sales were overlapping the NES's 61.9-million-unit sales.

The SNES controller design was created by Lance Barr, it consisted of the A, B, X and Y buttons in a diamond arrangement, with 2 shoulder buttons. The controller also uses ROM cartridges to play.

The design of SNES incorporated the graphics and sound co-processors that perform tiling and stimulated 3D effects. The graphics have a palette of 32,768 colors and 8-channel ADPCM audio, which was a significant advantage over its competitors such as Genesis.

SNES had 1757 games that were officially released, some including Super Mario World, Final Fantasy VI, and the Legend of Zelda: A Link to the Past, which were considered to be some of the most legendary video games.

Credits And References

Software Used

Adobe XD – illustrate improvements

Photoshop – remove background for pictures

Miro – user journey

Canva – user persona

MindMup – user flow

ClipChamp – edit videos

Links

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