

1. Introduction

Video game development is the process of creating a video game. Development is undertaken by a game developer, which may range from one person to a large business. Traditional commercial PC and console games is normally funded by a publisher and take several years to develop a 2D JAVA games and less time and can produce cheaply by individuals and small developers. But when we are want to build a 2D game which is made for Internet Users, then we can use JavaScript and Cascading Style Sheet (CSS) to develop and design a game. The web games are in high demand because of its flexibility and portability. It takes less time to execute and loads faster than compared to application software because of cloud.

The first video games were developed in the 1960's, but the required mainframe computers were not available to the general public. Commercial game development began in the 1970's with the advent of the first-generation video game consoles and home computers. Due to low costs and low capability of computers, a lone programmer could develop a full game. However, approaching the 21st century, ever increasing computer processing power and heightened consumer expectations made it difficult for a single developer to produce a mainstream console or PC. Moreover, Internet has actually helped all of the developers to build 2D games which are extravaganza for the games in 21st Century.

The average price of producing a video game slowly rose from US\$ 1-4 million in 2000 and to over \$5 million in 2006, then to over \$20 million by 2010.

2. Motivation

Although most agree that games can be engaging and that games can be interactive there is a little consensus regarding the essential characteristics of instructional games. We can achieve the power of games to engage users and achieve desired instructional goods. Games helps to release pressure from our brain.

The motivation has come through the games which are open world and can be played in arcade mode. The games like SimCity, Roblox, etc., which are open world games having multiple games in a single software containing all the packages that are needed for a perfect gamer.

The instructional games which are interesting to play are having large market for proper growth, we got motivated from that visualization. These games also increase the capability to take instructions faster and efficiently. Many of the games has also gained the attention of training professionals. This represents the shift away from the “Learning by listening” model of instruction to one in which students learn by doing. Multiplayer games also help gamers to work as a team if they are playing together, but against an enemy (not real).

But our motivation came from games like Road Rash, Monster Hunter, need for Speed, CS GO, Mario.

From these kinds of games, we got motivated and built a game on Super Mario which is a Web based game, and can be used as a tool to entertain people. Moreover, if a teenager plays the game, then he/she will be pleased with the game as because the game is satisfying to play.

3. Overview of the Project

The features of the project “Super Mario” is that the objective of the game is to progress through levels by defeating enemies, collecting items and solving puzzles without dying. Power-up use is integral to the series.

In the game, the player character (Mario) jumps on platforms and enemies while avoiding their attacks and moving to the right of the scrolling screen.

Super Mario game levels have single-exit objectives, which must be reached by dodging or killing enemies.

Most items in the Super Mario appear from item blocks when hit, where the character hits a block to receive either coins or power-ups.

The most iconic of these is the Super Mushroom. The Super Mushroom increases the character's size, turning it into a "Super" variant, and allows it to break certain blocks. When hit by an enemy, the character loses a life.

Super Mario level design incorporates many distributed coins as puzzles and rewards. Super Mario game awards the player an extra life once a certain amount of gold coins is collected.



Figure 1: Homepage

The game also features other tokens found in levels in order to progress in the underworld, with the visual motive of a star.

They are typically situated in locations that are not readily found or reached, or awarded for completing stunts.

The series features the option to play Mario as the only character because it is a single player game only.

4. Detailed description of the Project

4.1 HTML page for the homepage:

The Hypertext Markup Language or HTML is the standard markup language for documents designed to be displayed in a web browser. It can be assisted by technologies such as Cascading Style Sheets (CSS) and scripting languages such as JavaScript.

Web browsers receive HTML documents from a web server or from local storage and render the documents into multimedia web pages. HTML describes the structure of a web page semantically and originally included cues for the appearance of the document.

HTML elements are the building blocks of HTML pages. With HTML constructs, images and other objects such as interactive forms may be embedded into the rendered page. HTML provides a means to create structured documents by denoting structural semantics for text such as headings, paragraphs, lists, links, quotes and other items. HTML elements are delineated by tags.

We have used tags to enhance the quality of the webpage. Icons are also used for displaying icons. Icons helps us to identify the webpages.



Figure 2: HTML

4.2 Style sheet for the following HTML page:

Cascading Style Sheets (CSS) is a style sheet language used for describing the presentation of a document written in a markup language such as HTML. CSS is a cornerstone technology of the World Wide Web, alongside HTML and JavaScript.

CSS is designed to enable the separation of presentation and content, including layout, colors, and fonts. This separation can improve content accessibility; provide more flexibility and control in the specification of presentation characteristics; enable multiple web pages to share formatting by specifying the relevant CSS in a separate .css file, which reduces complexity and repetition in the structural content; and enable the .css file to be cached to improve the page load speed between the pages that share the file and its formatting.



Figure 3: CSS

Separation of formatting and content also makes it feasible to present the same markup page in different styles for different rendering methods, such as on-screen, in print, by voice (via speech-based browser or screen reader), and on Braille-based tactile devices. CSS also has rules for alternate formatting if the content is accessed on a mobile device.

The name cascading comes from the specified priority scheme to determine which style rule applies if more than one rule matches a particular element. This cascading priority scheme is predictable.

The CSS specifications are maintained by the World Wide Web Consortium (W3C). Internet media type (MIME type) text/css is registered for use with CSS by RFC 2318 (March 1998). The W3C operates a free CSS validation service for CSS documents.

4.3 Body of the HTML:

Table 1: Setting the style of the HTML element ‘body’ (inside the ‘body’ tag):

Table 1 has the following elemental description about styling shown in figure 4.

Figure 4: Image of ‘super-mario.jpg’

4.5 CSS file for homepage:

Table 2: Description about the elements in the CSS file

Elements	Description
Source file	"SuperMario256.ttf"
Position	Stagnant within the webpage
Button height and width in percentage	58% & 44%
Transformation of the button	Translation in the negative axis of (-50, -50)
Button height and width in pixels	300px & 100 px
Border style	Border width = 6px, Border style = solid, Color = green
Foreground color	Blue
Background color	Green-yellow
Radius of edges	10px
Shadow of the box	Style = inset, Color = grey
Font Size of the box	3rem
Outline	None
Cursor	Pointer when hovering on the button
Foreground color	Black when hovered
Background color	Yellow when hovered
Transition	When hovered, ease-in with 0.2s delay
Border	Border width = 6px, Border style = solid, Color = green

The icon is also added which is shown in figure 5.



Figure 5: Icon of the home page

4.6 Main HTML file for JavaScript file:

JavaScript containing the Kaboom server.

Another JavaScript file, has been added to this HTML so that when the game starts, this page will be open. That means, the button is registered with the following HTML file. This file starts the JavaScript file.

HTML links are hyperlinks. You can click on a link and jump to another document. When you move the mouse over a link, the mouse arrow will turn into a little hand.

The whole homepage for the game is shown in figure 8.

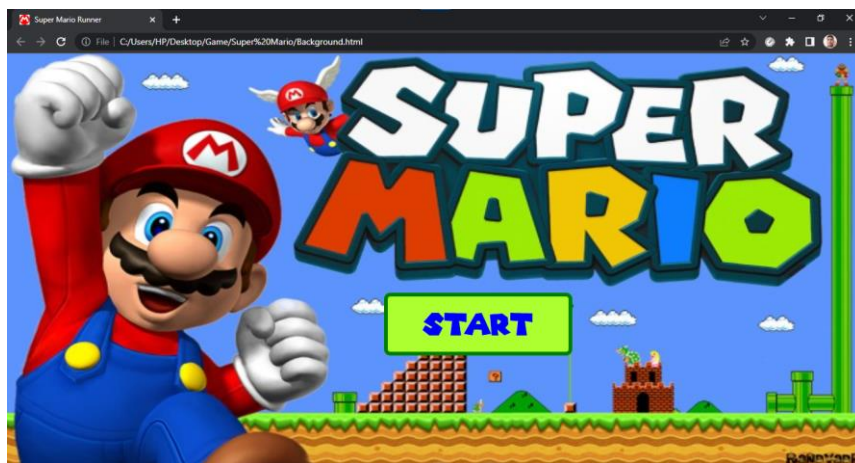


Figure 6: Homepage of the game



Figure 7: Icon of index.html

4.7 Creating a JavaScript file for kaboom.js:

JavaScript often abbreviated JS, is a programming language that is one of the core technologies of the World Wide Web, alongside HTML and CSS. Over 97% of websites use JavaScript on the client side for web page behaviour, often incorporating third-party libraries. All major web browsers have a dedicated JavaScript engine to execute the code on users' devices.

JavaScript is a high-level, often just-in-time compiled language that conforms to the ECMAScript standard. It has dynamic typing, prototype-based object-orientation, and first-class functions. It is multi-paradigm, supporting event-driven, functional, and imperative programming styles. It has application programming interfaces (APIs) for working with text, dates, regular expressions, standard data structures, and the Document Object Model (DOM).

The ECMAScript standard does not include any input/output (I/O), such as networking, storage, or graphics facilities. In practice, the web browser or other runtime system provides JavaScript APIs for I/O.



Figure 8: JavaScript

4.8 Kaboom.js server connect with JavaScript:

The main body of this project is made with Kaboom.js version 0.5.0. Kaboom.js is a JavaScript game programming library that helps you make games fast and fun. “kaboom()” is used to connect Kaboom server with code.

There are a lots of functions and elements in Kaboo.js like add(), get(), pos(), loadBean(), KeyPress() etc.

In this project, We used loadRoot(), loadSprite(), scene(), text(), add(), addLevel(), keypress(), keyDown(), go(), on(), play(), start() and components like pos(), camPos(), layers(), destroy(), solid(), move(), body() etc.

Table 3: About the Used Functions

loadRoot()	Load the root of sprites into asset manager, with name and resource URL and optional config.
loadSprite()	Load a sprite into asset manager, with name and resource URL and optional config.
scene()	Construct a level based on symbols.
text()	Render as text.
add()	Assemble a game object from a list of components, and add it to the game perform defined
addLevel()	Construct a level based on symbols.
keypress()	Register an event that runs when user presses certain key.
keyDown()	Register an event that runs every frame when a key is held down.
start()	Register an event when starts.
go()	Go to a scene, passing all rest args to scene callback.
on()	Register an event on all game objs with certain tag.
play()	Play a piece of audio.

Table 4: About the Used Components

pos()	Position
camPos()	Get / set camera position.
layers()	Which layer this object belongs to.
destroy()	Remove the game obj.
solid()	Make other objects cannot move pass. Requires "area" comp.
move()	Move towards a direction infinitely, and destroys when it leaves game view. Requires "pos" comp.
body()	Physical body that responds to gravity. Requires "area" and "pos" comp. This also makes the object "solid".

It is a 2D game for that only forward and backward movement is possible. We assigned 'd' and '→' for right or forward movement and 'a' and '←' for left or backward movement. 'Spacebar' is assigned for jump.

All the used images upload on imgur.com and then each images assigned with respective character using loadRoot() and loadSprite().

[Imgur.com](https://imgur.com) is a cloud-based website with makes image online to use it many places from one source.

All the used audio effects are Non copyrighted audio effect downloaded vgmsite.com and soundfxcenter.com.

4.9 Assets from Imgur.com:

We have loaded a root of sprites into asset manager, with name and resource URL and optional config from <https://i.imgur.com/> and loaded a sprite into asset manager, with name and resource URL and optional config using loadSprite().

As we have developed a 5-level game so the assets of this game are added according to levels.

4.9.1 LEVEL 1:



Figure 9: Title of the level 1



Figure 10: evil-shroom



Figure 11: Brick



Figure 12: Block



Figure 13: Mushroom



Figure 14: Surprise



Figure 15: Unboxed

4.9.2 LEVEL 2:



Figure 16: Title of the level 2



Figure 17: Blue block



Figure 18: Blue brick



Figure 19: Blue steel



Figure 20: Blue evil shroom



Figure 21: Blue surprise

4.9.3 LEVEL 3:



Figure 22: Title of level 3



Figure 23: Yellow evil shroom



Figure 24: Green brick



Figure 25: Green block

4.9.4 LEVEL 4:



Figure 26: Title of the level 4



Figure 27: Yellow evil shroom stan

4.9.5 LEVEL 5:



Figure 28: Title of the level 5



Figure 29: Turtle



Figure 30: Shrooms

The usage of items like coins and all supported items are shown below.



Figure 31: Mario



Figure 32: Coin



Figure 33: Pipe top left



Figure 34: Pipe top right



Figure 35: Pipe bottom left



Figure 36: Pipe bottom right

4.10 Controls:

The movement of character through the game and how it is controlled are shown below in a form of table in Table 5.

Table 5: Movement with key associated

Movement	Key Associated
Go left	left arrow ← or A
Go right	right arrow → or D
Jump	space
Teleport using pipes	down arrow ↓ or S
Restart	R
Quit	Q

4.11 How to kill an enemy:

To kill an enemy like shrooms, we have to first target that enemy and then jump over that particular enemy to kill. A minor mistake can kill your Mario in the game.



Figure 37: Killing an enemy

4.12 Collect coins:

You can collect coins by simply passing through the way where the coins are situated.



Figure 38: Collecting the coins

4.13 Score and Level label:

The score and level label are added so as to give information for the gamer that what is the score and how much level a gamer has passed.



Figure 39: Level and Score Label

We can increase our score in two ways:

- By collecting coins
- By killing enemies

4.14 Teleport to another world:

After passing all obstacles, Mario wants to teleport to another level. So he does the following method to teleport.

To teleport to another, the Mario just jumps to stand on the pipe and presses the following key shown in table 5.

Two figures namely Figure 41 is shown below to depict the following method to teleport to another world.

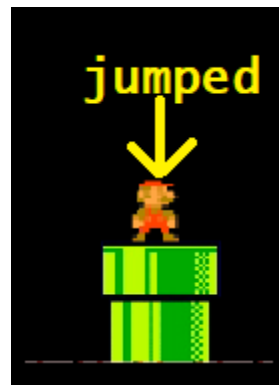
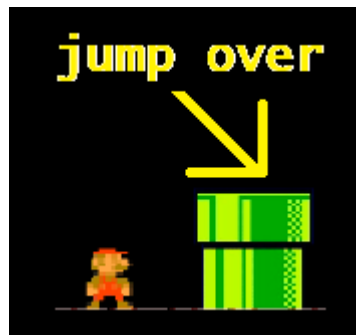


Figure 40: Jumping over the pipe and getting ready to get teleported

4.15 Switching surprises to get coins:

To get coin surprises then you have to follow this method in Figure 42.

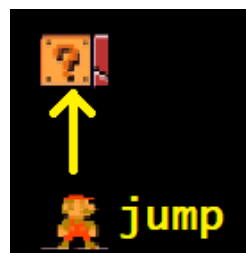


Figure 41: Jump to get coin

4.16 Levels with information:

The Mario game contains 5 levels which are of different worlds. Mario overcomes all the levels and wins the faith of that wall. In this section, we will be discussing about who are the associate assets of the levels and what is their function.

The usage of common items that are needed for every level are Mario, Coin, Pipe top left, Pipe top right, Pipe bottom left, Pipe bottom right.

4.16.1 Under World (LEVEL 1):

This level is inspired from a 3D platforming game for the Nintendo Switch. It is the first world in the Super Mario Runner. The game has Mario getting trapped in a mysterious underground world called the Underworld, and need to escape by collecting coins through the Underworld Trials.

Assets added-

- Title of the level 1
- Evil-shroom
- Brick
- Block
- Mushroom
- Surprise
- Unboxed

Objective of the game is to kill the brown shrooms and teleport to ICE WORLD.

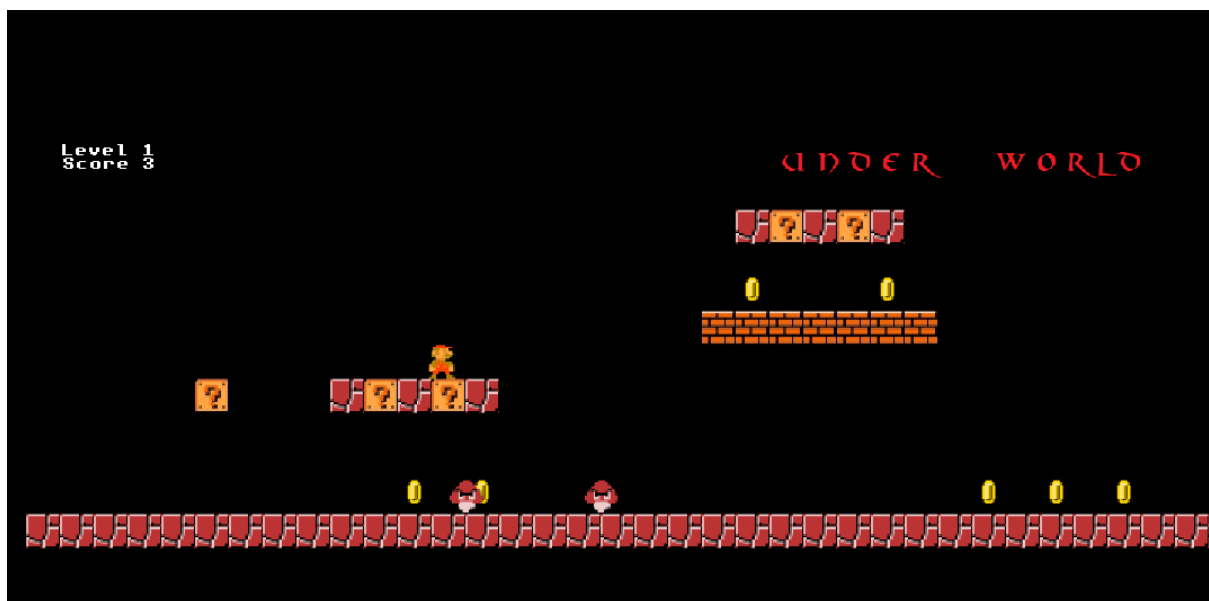


Figure 42: Screen shot of the Level 1

This world contains an object mushroom to get Mario big for few seconds. This can be done by seeing the following way-

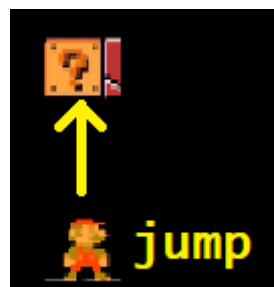


Figure 43: Mario jumping to activate the power up

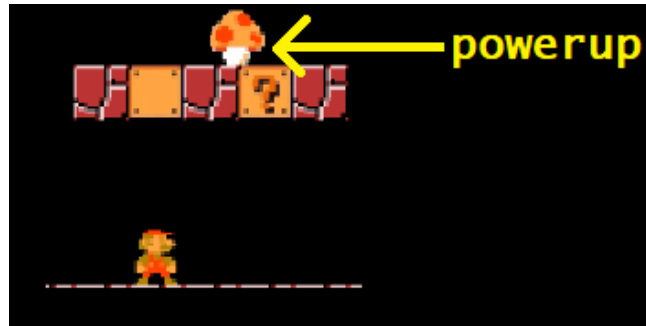


Figure 44: Mario activated the power up



Figure 45: Mario got bigger after eating the power up mushroom

4.16.2 Ice world (LEVEL 2):

Ice Land (alternatively Iced Land, Winter Wonderland, the Ice World, or Ice Country) is the 2nd world in Super Mario Bros. As the world's name implies, it is a frozen wasteland covered with slippery floors and frozen lakes. This icy kingdom by stealing the royal magic wand and turning the king of Ice Land into a seal (a Monty Mole in the game's remakes). The map in Super Mario Advance Super Mario Bros. Figure 46 shows that Ice Land is north of Dark Land and east of Pipe Land.

Asset added-

- Title of the level 2
- Blue block
- Blue brick
- Blue steel
- Blue evil shroom
- Blue surprise

Objective of the game is to kill the blue evil shroom and teleport to SWAMPWORLD-1



Figure 46: Screen shot of Level 2

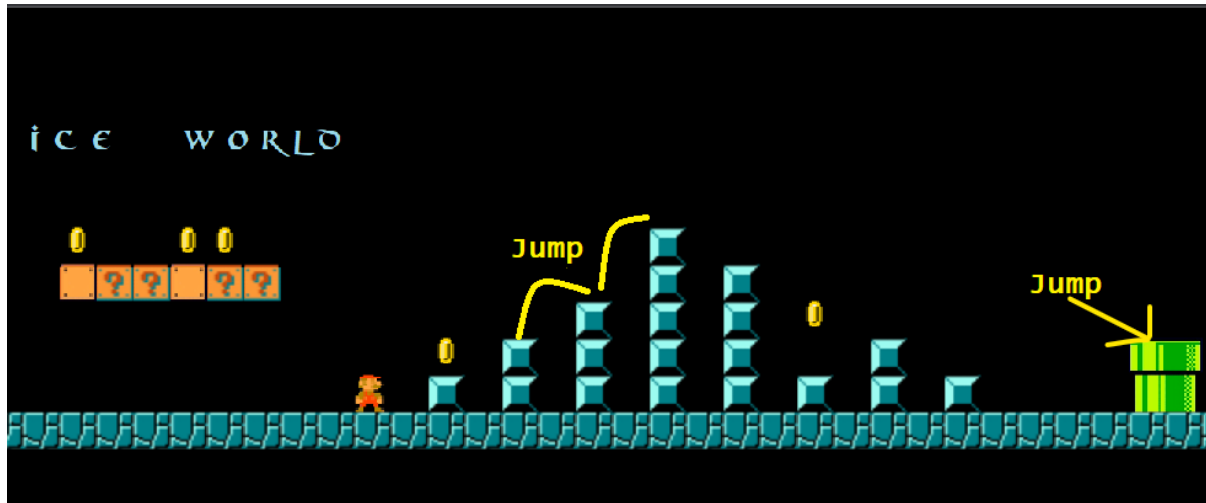


Figure 47: Screenshot of Level 2 having obstacles

4.16.3 Swamp world-1 (LEVEL 3):

Swamp world is the third world that Mario enters and it consists of swamps and algae. It is not found in any of the sister games of Mario and is totally our creation. We have divided the swamp world into two parts and hence this world escape becomes the largest level to escape.

Assets added-

- Title of level 3
- Yellow evil shroom
- Green brick
- Green block

Objective of the game is to kill the green evil shroom and teleport to SWAMPWORLD-2.

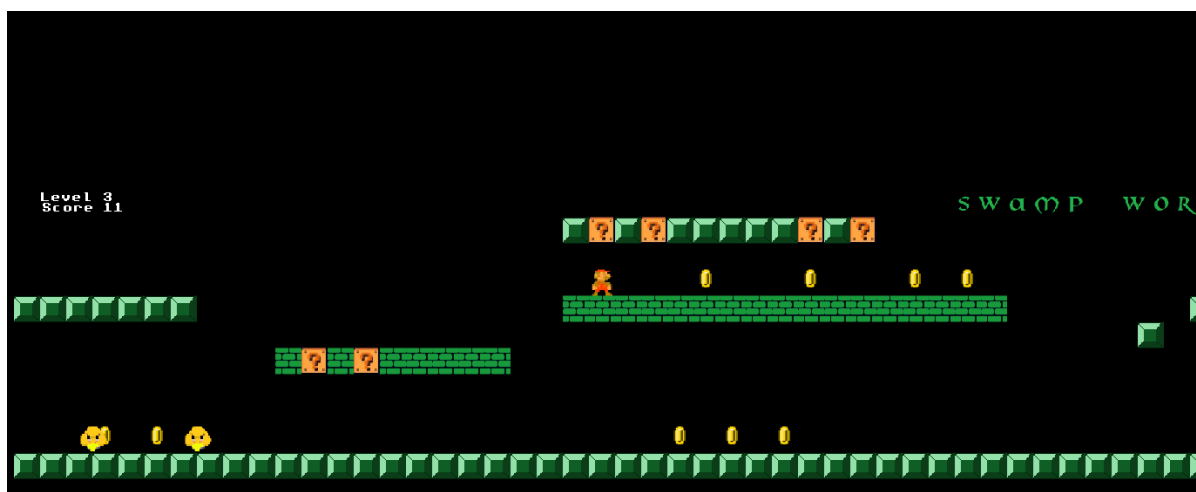


Figure 48: Screen shot of Level 3

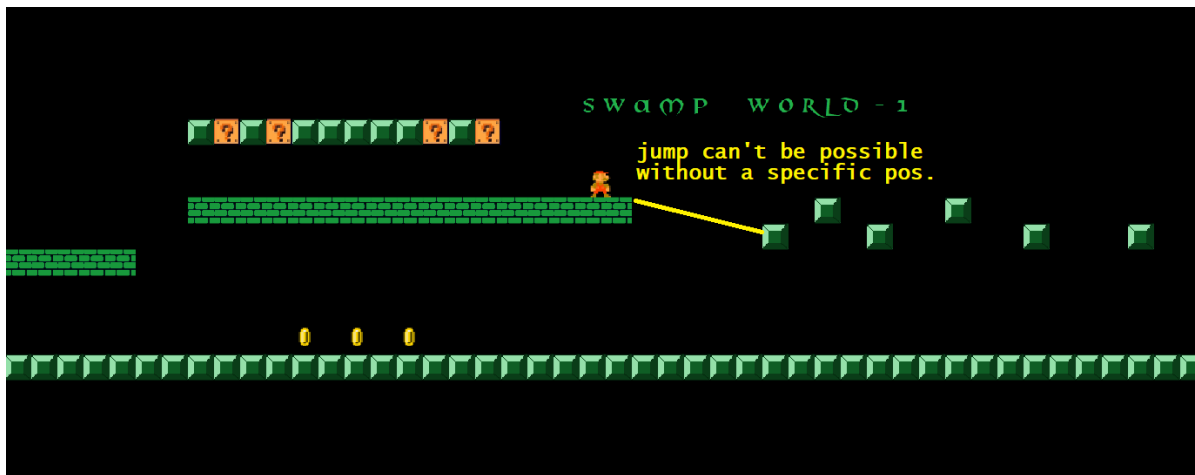


Figure 49: Screen shot of Level 3 with jumping position

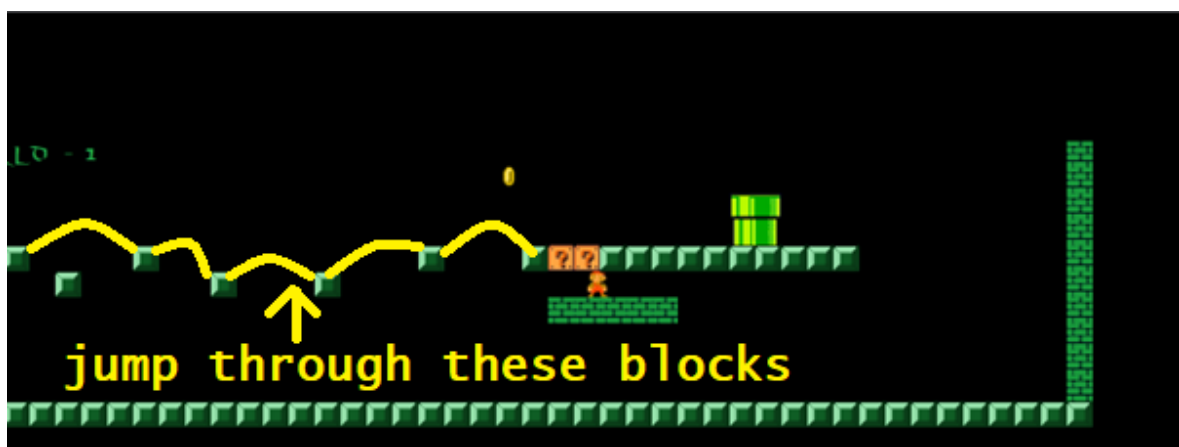


Figure 50: Screen shot of Level 3 with finish point

4.16.3 Swamp world-2 (LEVEL 4):

Assets added previous components are also added-

- Title of level 4
- Yellow evil shroom
- Green brick
- Green block
- Yellow evil shroom stan

Objective of the game is to kill the green evil shroom and teleport to SWAMPWORLD-2.



Figure 51: Screen shot of Level 4

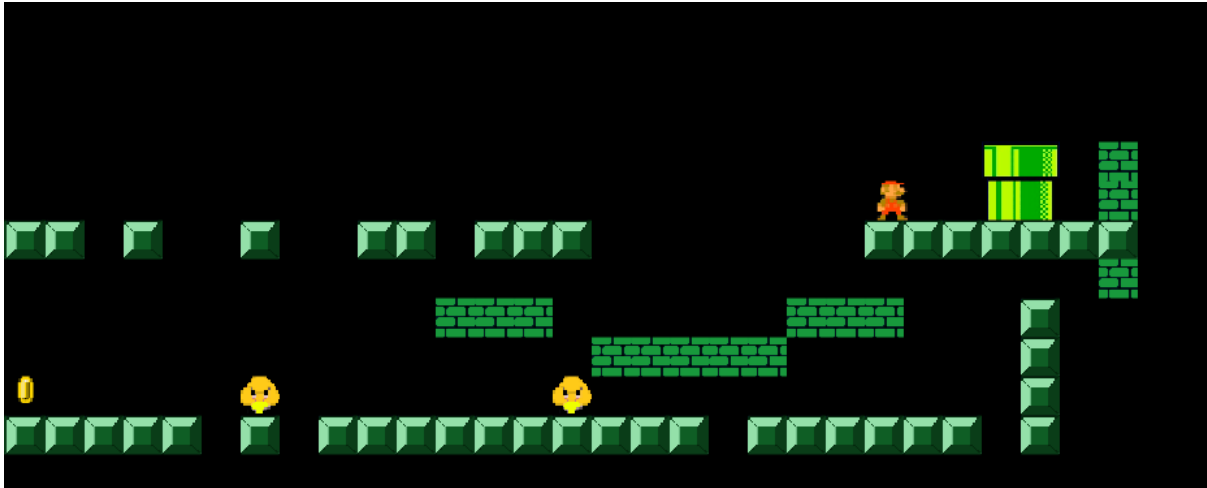


Figure 52: Screenshot of Level 4 with finish point

4.16.3 Final world (LEVEL 5):

Final is the fourth Special World. It is unlocked after every Green Power Star and Stamp from the previous eleven worlds are collected, as well as getting the Gold Flag by reaching the top of the Goal Pole for every level.

Asset added (also added on previous levels)-

- Title of the level 5
- Turtle
- Shrooms

Objective of the game is to kill turtles and shrooms and. This is the final level of the game.

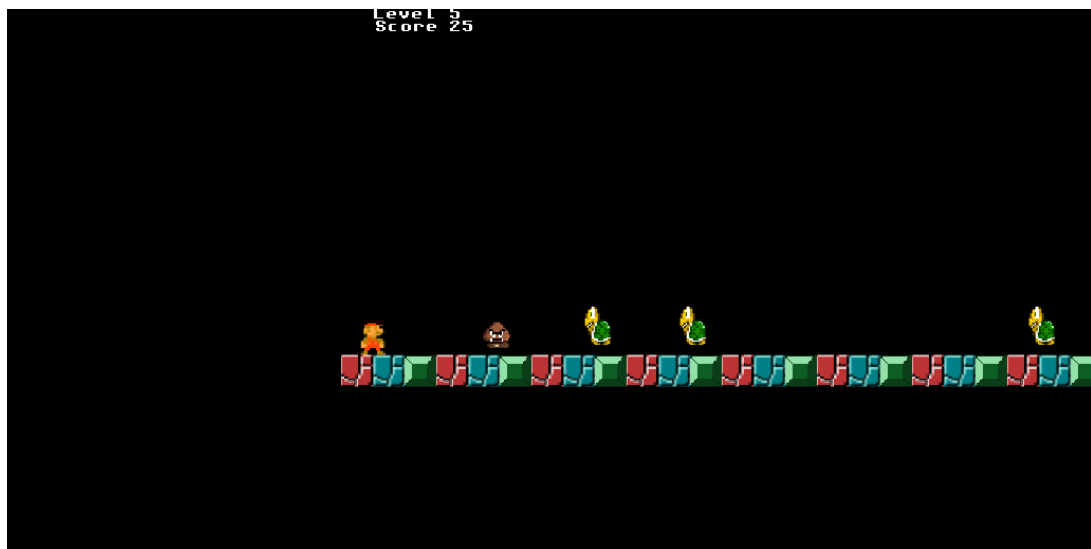


Figure 53: Screenshot of Level 5 with enemies

4.17 Death of Mario in the game:

In every game, the main player dies in the hands of enemies or suicidies himself unintentionally. So, in this game, mario dies by various ways.

Some of the ways are described as follows:

4.17.1 Suicide into the void:

The Void is an inter-dimensional hole in the game. Its purpose is to increasingly grow in size and consume and destroy "all worlds" in accordance with a prophecy. The Void was created by the creation

of the Chaos Heart, formed by Count Bleck through the forced marriage of Bowser to Princess Peach. According to Merlon, the center of The Void is where Castle Bleck is situated.

The Void appears as an ominous, pulsing black hole that hovers in the skies above. Its size varies depending on the dimension one is in, as each dimension is a different distance from The Void. Frequent waves of tremors show that The Void is becoming large enough to be destructive. When the Void finally becomes large and close enough to destroy a dimension, the tremors become earth-shattering, space begins to warp, and flashes of light consume all matter, leaving behind a stark, white realm of nothingness. An example of this occurs when the purple Pure Heart is sucked through The Void with Sammer's Kingdom and is turned to stone in the World of Nothing that remains; ultimately, Queen Jaydes of The Underwhere, with her "power over life and death", is able to restore the pure heart.

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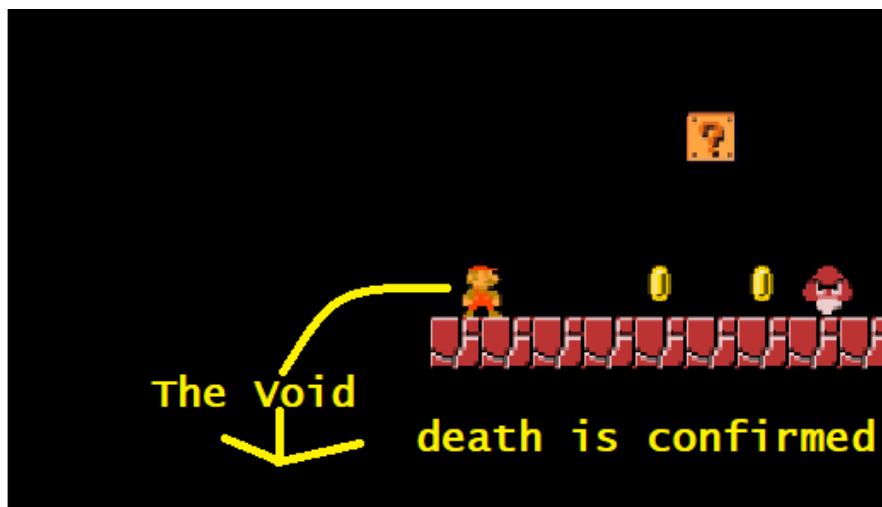


Figure 54: Death through suicide in the void

4.17.2 Shrooms and turtles:

Shrooms were first introduced in 1985's Super Mario Bros., the game responsible for defining how Super Mario would play for decades. The mushroom enemies were not a part of the original game design but were a last-minute addition put into the levels to adjust the game's difficulty — testers were complaining that the game was too hard without a basic enemy. More than three decades later, Shrooms proudly hold their position as every villain's footsoldier, that allow players to practice their jumps with not much danger involved. After Super Mario Bros., Shrooms also received several upgrades, assuming more dangerous forms that can give Mario some trouble. There are flying Shrooms, known as ParaShrooms, and even Shrooms with spike hats that prevent Mario from stomping them. After 2011's Super Mario 3D Land, Shrooms also learned how to climb each other's backs, forming amazing Goomba Stacks. Shrooms were another classic Super Mario enemy to face Link in Link's Awakening.

Turtles, are fictional footsoldiers of the turtle-like Koopa race from the Mario media franchise. They are commonly referred to generically as Koopas, a race that includes Bowser, King of the Koopas, the Koopalings, Lakitu, and others.

Predecessors to Turtles, Shellcreepers, appeared in the 1983 game Mario Bros., with Turtles debuting in the first Super Mario game, Super Mario Bros. (1985). Turtles have appeared in some form in most of the Super Mario games and many of the spin-off games. When defeated, they may flee from or retreat inside their shells, which can usually be used as weapons. They are often shown to be peaceful, some teaming up with Mario. A skeleton of a Turtle is a Dry Bones.

4.18 Scene after Mario death:

The following figure represents the whole scenario after the Mario's death. The following components used in the following scene are shown using Table 5.

Table 5: Components used in Game Over Scene

Name	Description
Score	Shows the total score of the player
Game over	A string defined in the scene
Restart(r)	Pressing key r, restarts the whole game.
Quit(q)	Pressing the key q, quits the whole game and returns to the homepage
Created by	Shows tht team member of the project



Figure 55: Scene of the Game Over

5. Conclusion and Scope of the further study

As mentioned earlier in the overview of the project was to enhance the understanding of the web development of the game through the idea of the server. We have shed some light on the mismatch between the enthusiastic proponents of formal specification technique and reluctant gamers; show the potential of the coding specifications and the formal specification technique in general; get feedback from the game that we have developed; and find ways to bridge the gap. Assumptions, beliefs and ideas that endorsed this effort that we can present.

In this project, we have created a game that everyone can play. We have done vigorous tests on the game from different stages of the development and studied carefully that what errors are shown for that. We have checked and rectified those errors.

The belief in which the project is standing is to help people especially for the children and people for the dyslexia problems. Through that project we create more smile, more conscious towards life and last but not the least, controlling the brain and understanding multiple instructions quickly.

This game is a subpart of the bigger game community of the Mario universe and through this small step we can build more games out of which will be an extension of those games. In the coming future, with the help of artificial intelligence, Mario games can be built with greater flexibility.

6. References

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- [3] <https://www.redringtones.com/>
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- [5] <https://vgmsite.com/soundtracks/super-mario-bros/>
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- [8] <https://cdn.iconscout.com/icon/premium/png-256-thumb/>