APENDEX

2128 – THE GAME !

This is the report for 2128 the game project for Programming – 2 (oop) .

SPECIFICATION

We have a maze, and the player (maze runner) should run through the maze to find his way out. He should be careful not to hit a bomb. The player can also destroy any obstacle he face by a weapon, the weapon is filled with limited ammo. While the player is moving inside the maze, he should collect some gifts in his way. The end of the game is by reaching the gate of the maze, or if the player died due to hitting a bomb.

Tasks :

- Randomly auto-generated maze.
- The maze has only one ending gate.
- GUI.
- Wall, maze runner, bombs and gifts are all images being rendered on the GUI.
- Several types of walls, bombs and gifts.
- If the maze runner hit a bomb, he will die.
- If the maze runner collected a gift, the score increases.
- Bonus: Monster in the game.
- Bonus not mentioned :

    1- Leaderboard
    2- Cheating code
    3- Facebook Integration
    4- Animation
    5- Loading bar
    6- Algorism in maze
    7- Health bar
    8- Story
    9- Timer
    10- Sound
    11- Dash

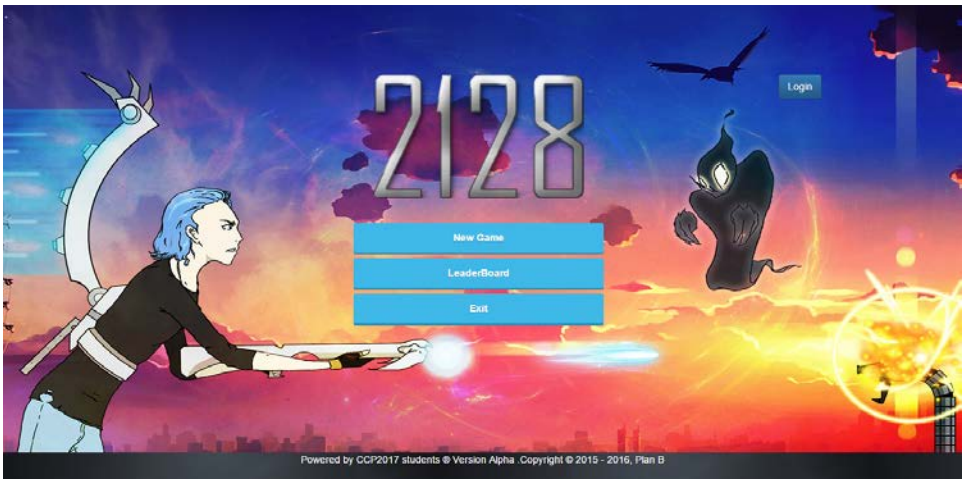
TOOLS

First we want to work with C# but for some issues in the team members we decided to use javascript

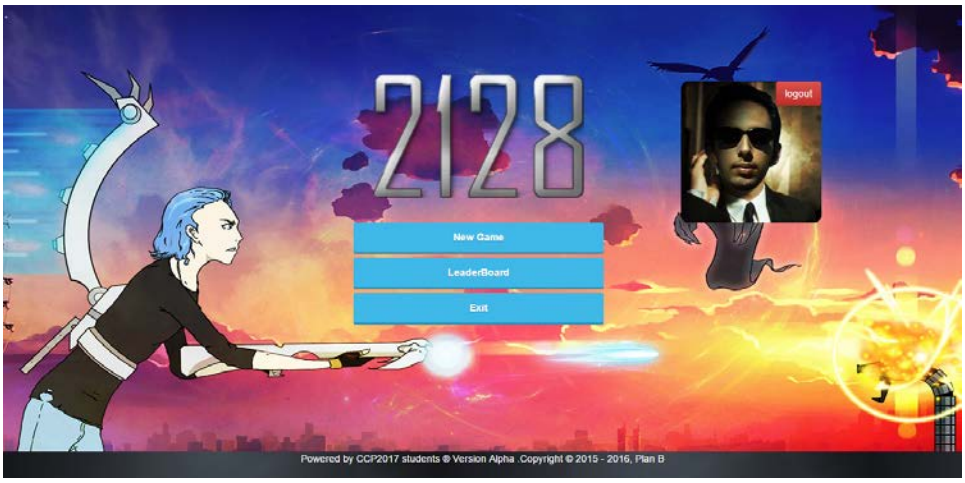
We use pixi.js as a frame work and use jsface lib for OOP

We all learn javascript from scratch and pixi and some of us learn html ,css,php and some sql and some of us learn how to deal with facebook sdk all that we learn it in one week and made that game

SCREENSHOTS

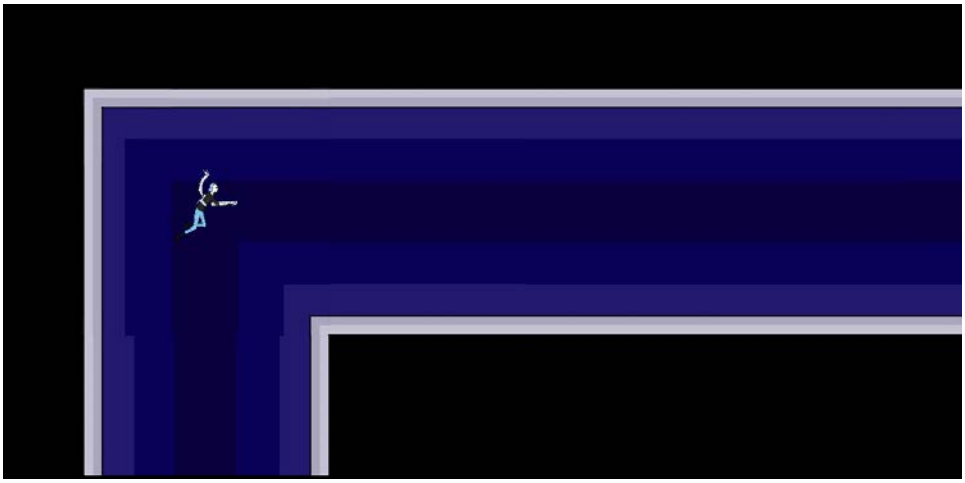


Home screen before login

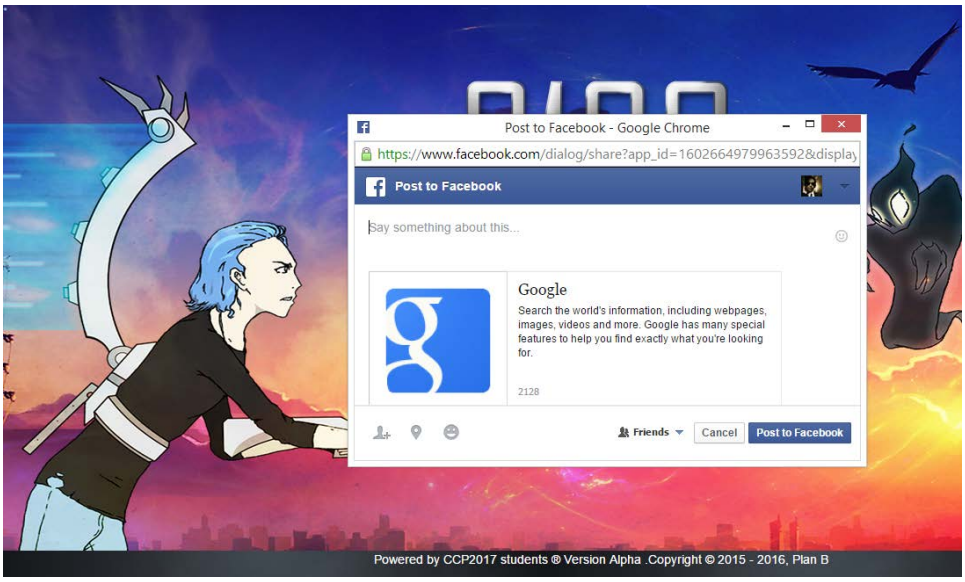


After login

Loading screen



Game



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STORY

Character Listing: Cyrus - Elliot - Jonah - Lloyd - Anna - Sylvester - Elizabeth - Claudia - Aiden.

Backgorund: The year 2128 ...the world is divided into a bunch of sectors. A main sector controls all the other sectors .it contains all the data governing each sector as well as the Earth map were it shows all the sectors in the world....the location of the main sector is unknown for security purposes and it is not found on the system as well ...there's also a bunch of sectors that exist on the map but not in the real world "False sectors". Inside each sector there's a Main Building in charge of forcing the laws of the state onto the sector residents. perhaps the most important law here is the initiation law, which states: each resident of his/her respective sector is to have a chip implanted on top of his brain. this chip will evaluate the individual and when ever he breaks the laws applied the chip sends an electrical pulse through his body. the intensity of the pulse vary according to the sort of crime he/she committed ;in case of exaggerated crimes like murder or attempt of rebellion the pulse can be high enough to kill the carrier of the chip instantly ,the chip also keeps record of all the input data that enters your mind and also knows the exact coordinates of your

current location and it keeps the main system updated with this information as well. However the chip does not take part in any of its operations when the mind is dormant i.e chip does nothing when your sleeping.

Cyrus: Head of algorithm and problem solving committee (APSC) in the Capital Main Building. he's most credited for developing the Grim Reaper Algorithm and the Field Transfer Algorithm (FTA).

---it is worth noting that each sector is completely isolated from the outside world via circular giant walls so that people don't see the outside plain ..but they do how ever get sunlight and see the sky through the dome force-field on top of the circular walls. a complex underground maze connects the main building of the sector to the outside of the walls as well as to the initiation buildings.

FTA: in order for the government officials to access the main building to send out chips or escape to the outside of the walls they must go through the maze as the main building does no have an entrance ...so they use the FTA to solve the maze each time they want to enter or leave the main building (as the maze is bio-mechanical so it reassembles it self after a certain time interval). The FTA is embedded to they're governmental chip found inside they're heads (yes government officials get chips too) and is activated only to the actual bearer of the chip so

only he gets to see the solution of the maze and no one else.

Grim Reaper Algorithm: it got developed in case something went wrong in the main building of a certain sector....when the Grim Reaper Algorithm is activated it destroys the main building.

Builder Robots(NOT IN GAME): are immediately called after the Grim Reaper Algorithm has been activated ..they enter the sector through the dome force-field to rebuild the main building and transport new authority. It is worth noting that only the Builder Robots can access the dome force-field. Jonah: Lloyd (protagonist) 's brother. he's almost 18 yrs old so his initiation is due soon ..however he is more of a rebellious type and doesn't like

doing what others force him to do ..to him initiation is equal to death ..so he decide's he's gonna escape. he goes to his cousin (a computer geek) and shares his intentions with him ...he's cousin agrees to help ,however Elliot(cousin) tells him there is no way to solve the maze algorithm (FTA) but if he were to enter the maze with a reference point on an (x,y,z) coordinate then he can calculate the displacement on the 3 axes between his current location and his previous one ,thus knowing where he is and whether he is out of the sector or not.... so he will supply him with an electronic device onto which is a program to calculate the necessary data and a source program for exploding the armor it self so he can blow his way out of the maze ;he will also supply him with the necessary weaponry to fight the bio-mechanical Mobs in the maze. his cousin then manages to hack into the system and quickly out of it with out being noticed by jamming the system's buffer ..retrieving an armor design and a weapon design. he's able to print these designs via a bio-mechanical printer. On a late night later on Jonah and Elliot(Cousin) will go to an area near to the initiation building and in order for Jonah to enter the maze Elliot will download a source program to one of the Chip Carriers' armor which will explode the armor once the input signal from the source supplied by Elliot is equal to Null ,it is worth noting that Elliot was able to understand the operating program of the current usable armor from the armor design he was able to hack. Elliot: The cousin of Jonah and Lloyd. he was one of the few who were able to hack into the sector's main system with out being noticed. he also supplied Jonah with the necessary data to help him find a way out of the maze and consequently a way out of the sector. However,Jonah didn't make it and was killed by the "Masks of the Black Rose" Mobs. Elliot lives with Anna(his sister) and his Grand pa ,however his Grand pa is clinically dead in a wheel chair so his chip is dormant and the government cant monitor Elliot's moves ...Elliot just keeps his Grand pa

around as a form of diversion from the government since he cant live alone as a minor.

Anna: Elliot's sister ,and Lloyd and Jonah's cousin. she doesn't show up a lot but does help Lloyd and Elliot prepare for Lloyd's entrance to the underground maze.

Lloyd: The main protagonist of the story (Brother of Jonah and Cousin of Elliot and Anna). He lived with both his parents and his brother until his brother (Jonah) decided to move out and go live with their cousin (Elliot). No news was herd of Jonah after he entered the maze not even to his family or cousins and since he had no chip on ;the authorities weren't able to know that he died inside the maze ..and still assumed that he was alive ..so they went after his parents and accused them of trying to hide him so he can escape the initiation ,and consequently arrested his parents and executed them ..however Lloyd escaped and went to Elliot's for a temporary hide out ..since the government had records of Lloyd they went searching after him since he's part of Jonah's family. so he decided to enter the maze since he's gonna get caught eventually if he stays inside the sector. but unlike his brother he did not enter the maze to escape ;he seeks revenge. He enters the maze to find his way to the main building's center room ,so he can activate the Grim Reaper Algorithm and destroy the main building. As he says about the chip "If everybody hates it then why does it exist?". He was determined to put an end to this whole initiation and chip thing. Elliot will also be his aid in getting him inside the maze. He(Elliot) is a lot more informed now on how the maze and the sector's system work. he also altered the armor and weapon designs he had from last time as well as hacked a bunch of other different designs from the system. so he was able to supply Lloyd with an armor and weapon unlike any other in the sector ;they were entirely reformed by Elliot. Elliot was also able to keep track of the hole in the maze caused by the first explosion by sending a signal from the system's satellite and receiving data that there was a hole in the ground in that area although the signal was weak and sometimes interrupted because the maze itself blocks the signal from any outside source ,and since the maze takes a lot of time to reconstruct it self when damaged but is quick to reassemble itself when damage occurs ,and by his doing so ..he gained two important pieces of information::

1- The time interval that the maze usually takes to reassemble.

2- The location of the hole ,that he can use as an entrance to get Lloyd into the maze.

and through this data he had ..he got Lloyd into the maze and made it easier for him to solve it; Eventually Lloyd was able to solve the maze and find his way to the main building's center room. However to his surprise ,only one person was waiting there for him.

Sylvester: Head of the sector where Lloyd and Jonah live ..is supplied with a "Virtual Supreme Chip" (unlike normal Government Chips and Citizen Chips) .As noted from the name it is a virtual chip so its contents are downloaded directly to the brain with out the use of hardware. Only Sector Head's get these virtual chips as well as Cyrus but Cyrus has his own version of it (Virtual Supreme Chip X.0). Any bearer of the virtual chip can access the minds of the sector maze Mobs as well as create Mobs out of thin air. he will know of Lloyd's presence inside the maze when Lloyd is near to the main building and notice his bizarre looking armor ,so he will take no action to stop him because his intrigued to find out the capabilities of this armor as he is obsessed with swordsman-ship and wants to take Lloyd on a one on one duel. so he empties the main building's center room and sits there waiting for Lloyd to make an entrance ,when Lloyd enters the room he's astonished that there's no one there when suddenly Sylvester comes out and starts speaking to Lloyd ;they argue about the fact that Sylvester did not kill Lloyd although he could ,and then Lloyd brings up the Grim Reaper Algorithm and the fact that he wants to destroy the main building. Sylvester is not astonished that Lloyd knows of this ,in fact he explains how to activate the Grim Reaper Algorithm (in order to activate it he has to cut out Sylvester's brain and scan it for the password that Sylvester himself doesn't know ,as it is embedded in an unconscious part of his mind. Once this is done the Grim Reaper Algorithm will activate) ..did i mention he's insane?! ,and then they have a one on one battle that Sylvester seems to extensively enjoy ,however Sylvester loses and is killed by Lloyd. Then Lloyd cuts out Sylvester's brain and activates the Grim Reaper Algorithm destroying the main building and ending the chip era.

Elizabeth(NOT IN GAME): One of the Rebels (Rebels: A group of people who were able to activate the Grim Reaper Algorithm to destroy the main buildings in the their respective sectors and

survived the attack of the Builder Robots). She was able to rescue Lloyd from the Builder Robots who came to rebuild the main building after Lloyd destroyed it ,however she couldn't rescue Elliot and Anna who both were killed. She Entered Their sector with the Builder Robots through the dome force-field. Elizabeth does not use an armor instead she uses a blend of extremely sharp daggers and sharp barely visible ropes to move around enemies and attack them.

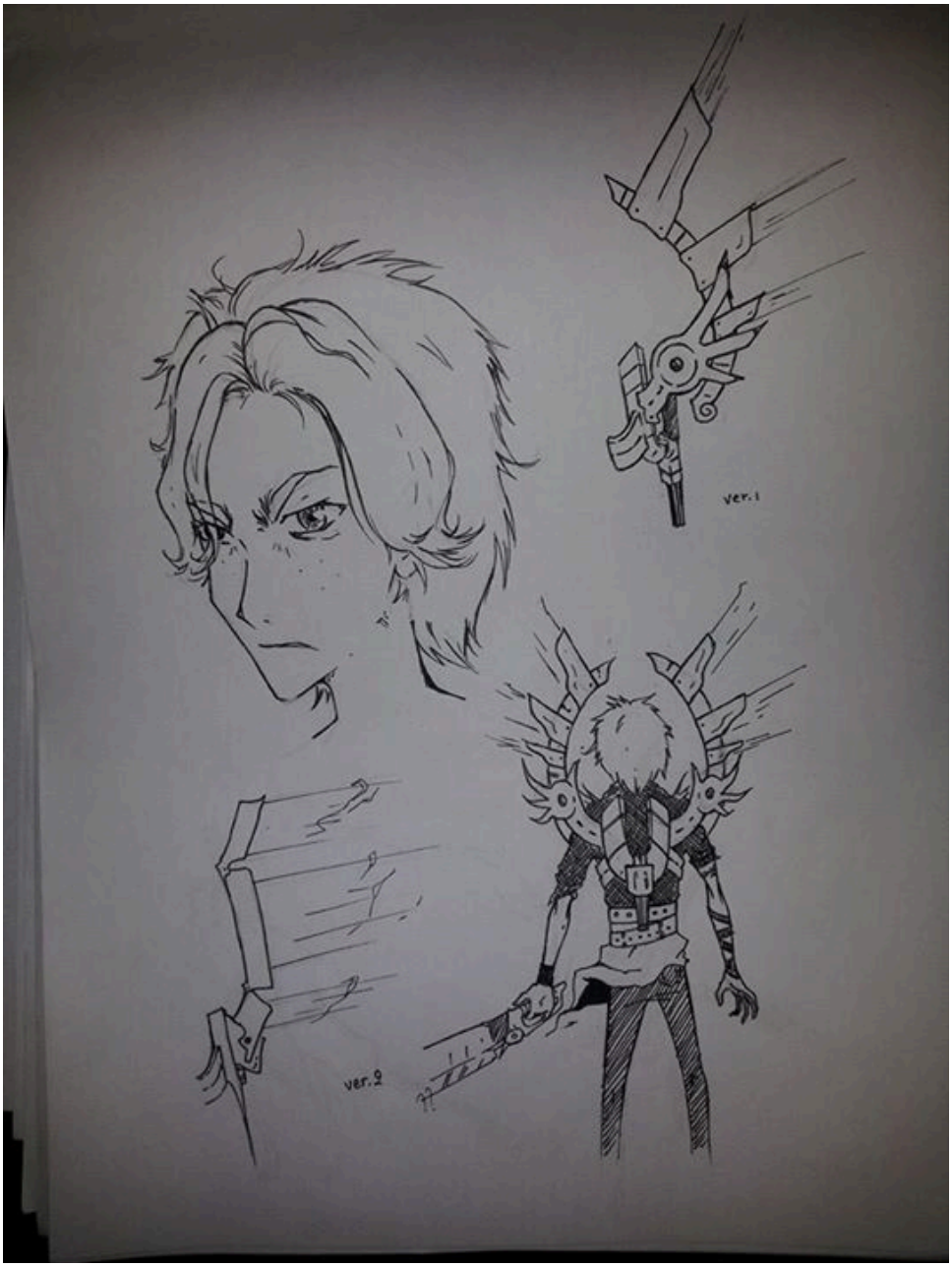
Claudia(NOT IN GAME): Another rebel...however, Claudia is extremely smart and self aware that when she was initiated her mind started overwriting the chip and now she can control its powers. Her powers include: Telekinesis and the ability to control Bio-Mechanical items inside

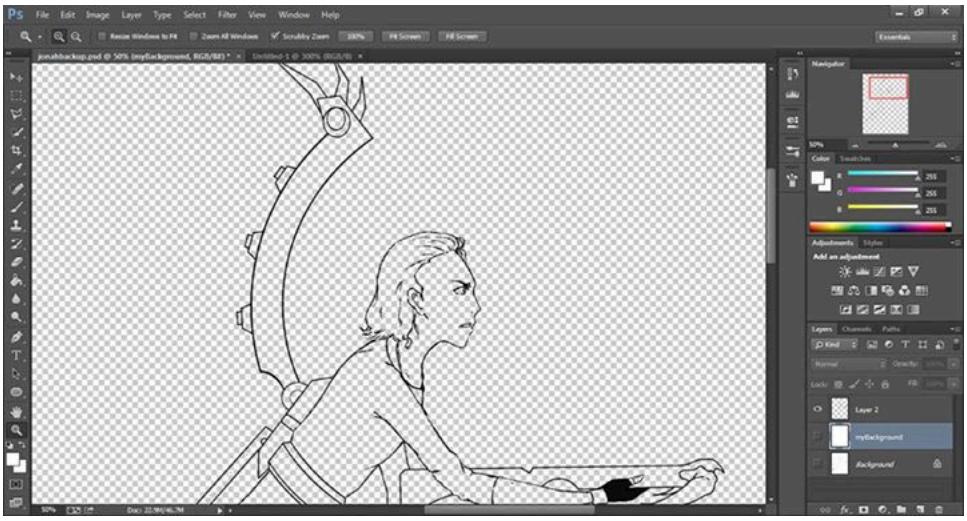
sectors.

Aiden(NOT IN GAME): Also another rebel who is able to cause nuclear explosions out of thin air and control them.

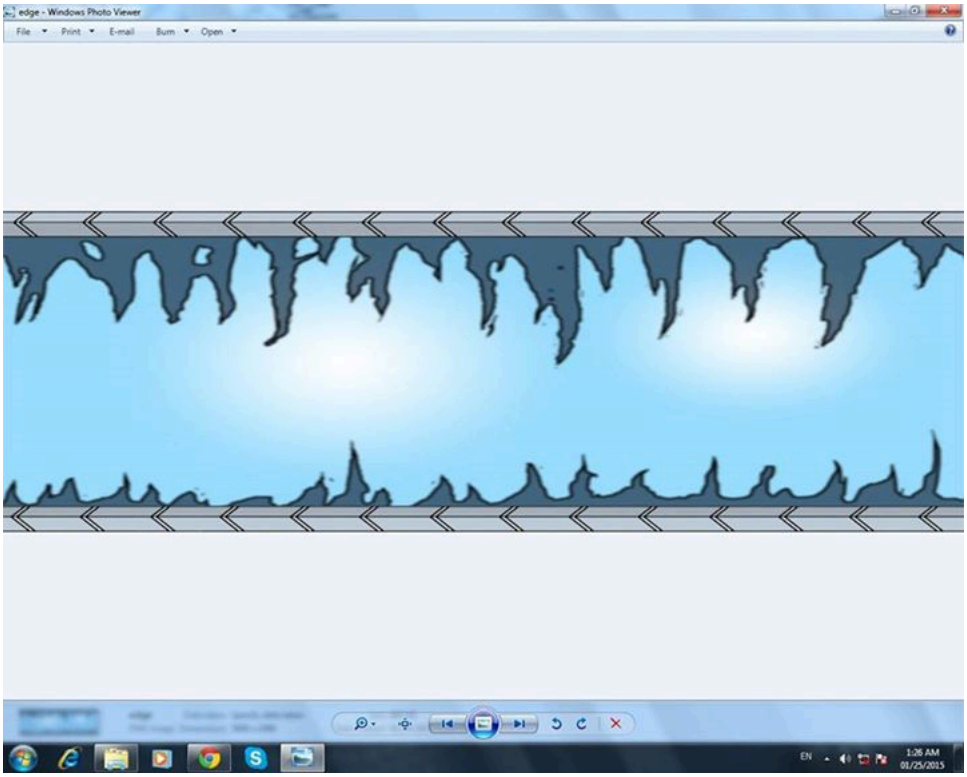
ART

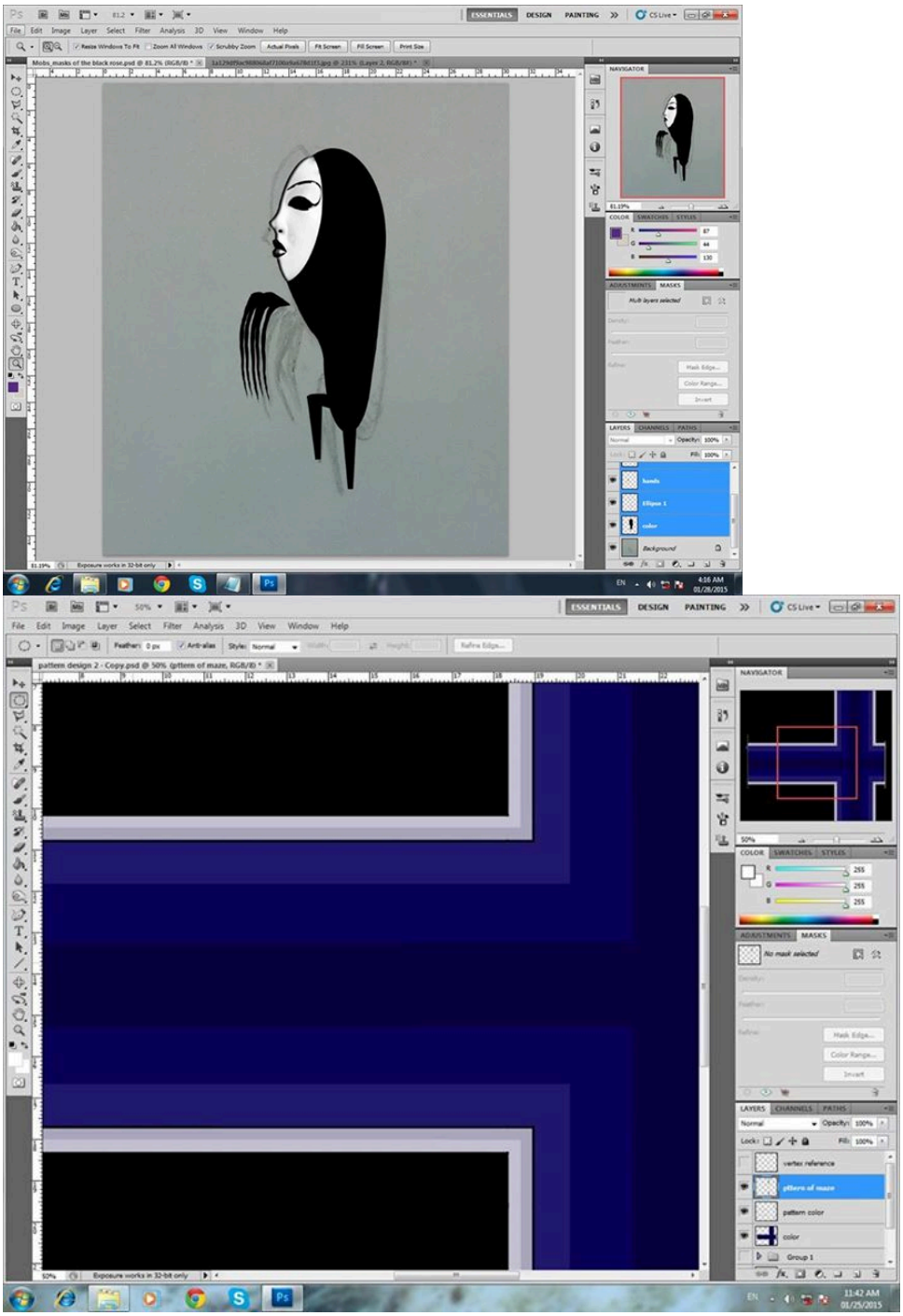
Concept Art

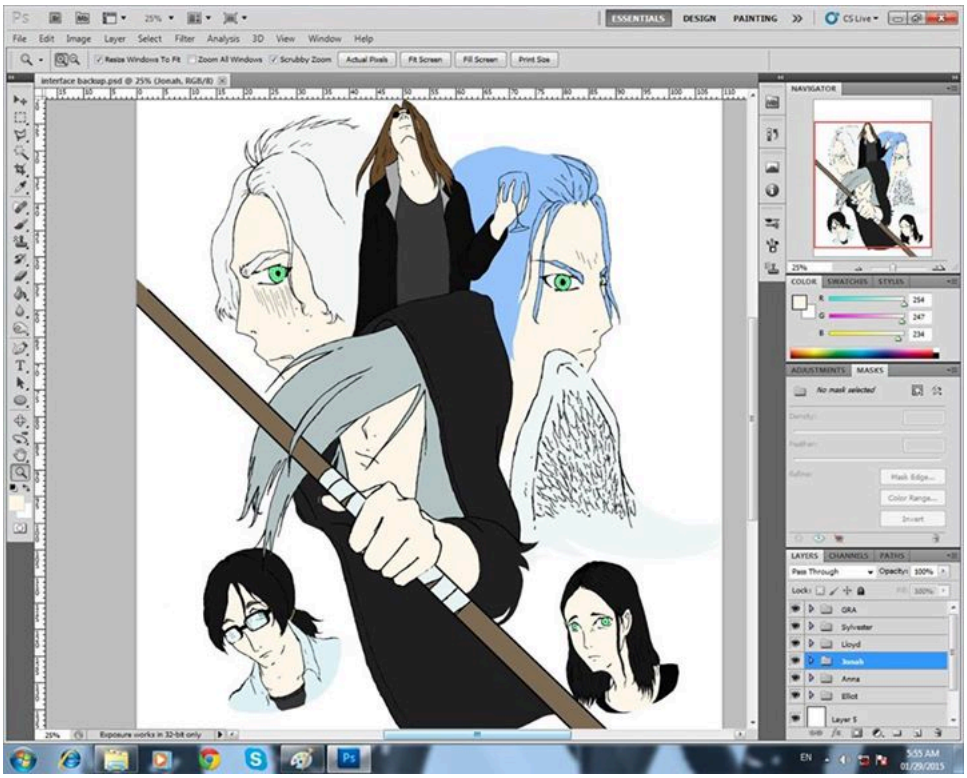




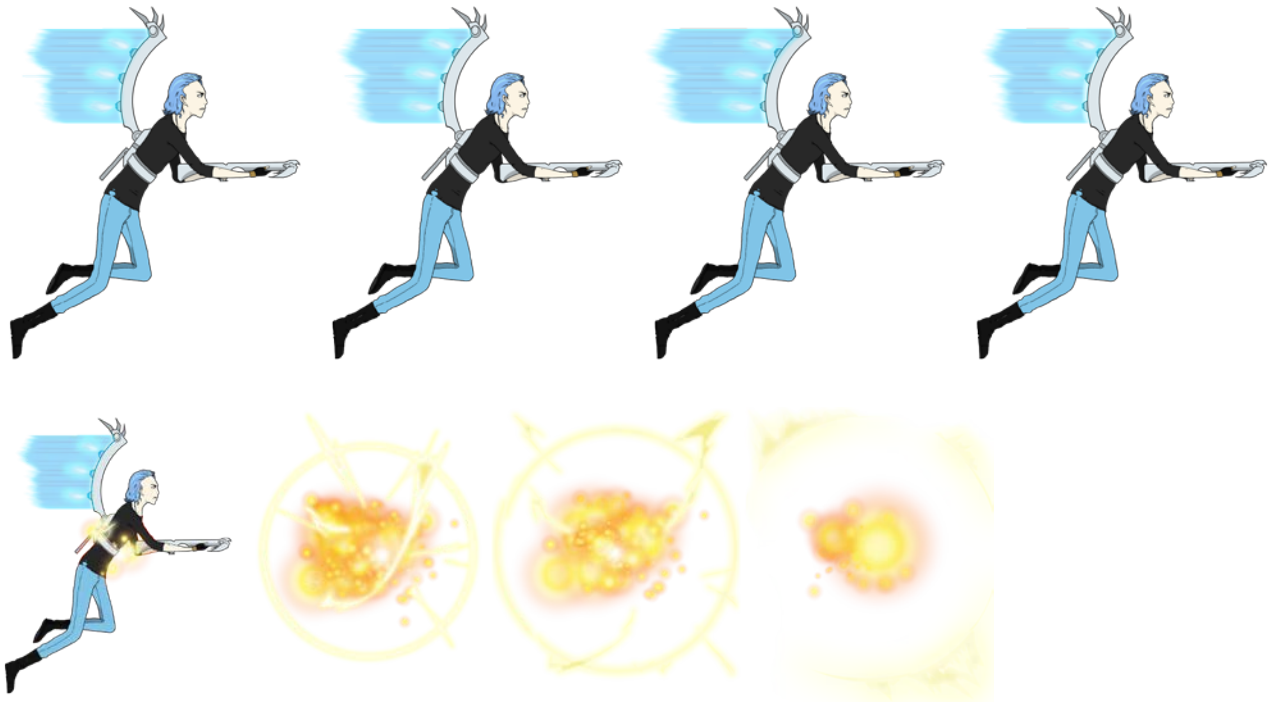
Old design for maze tubes



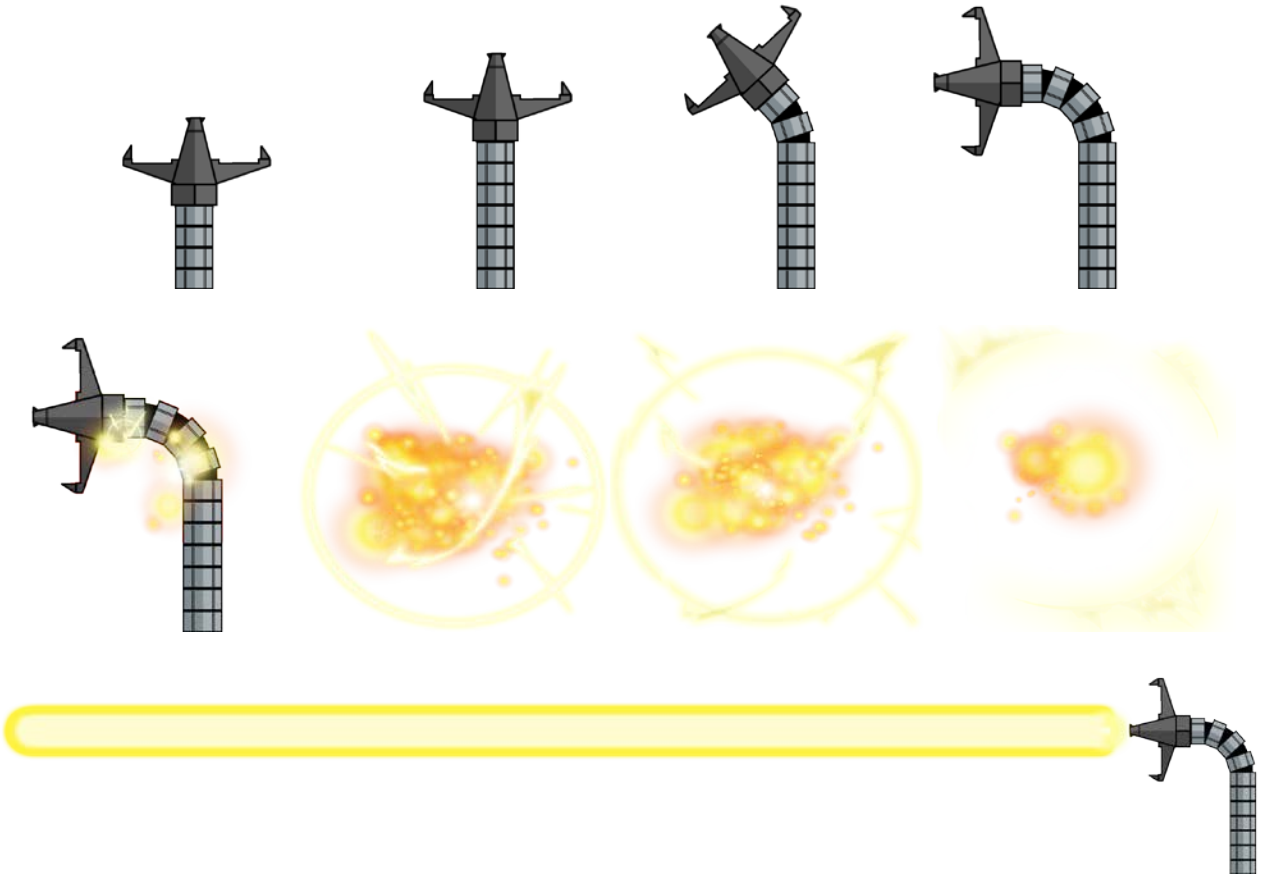




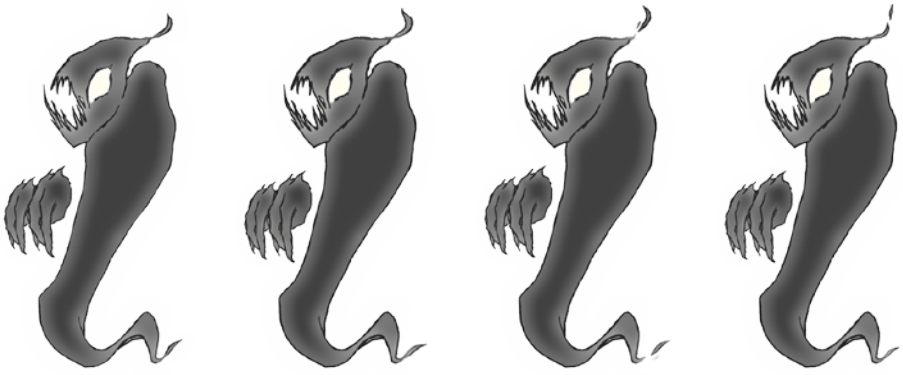
*Sprite sheets :



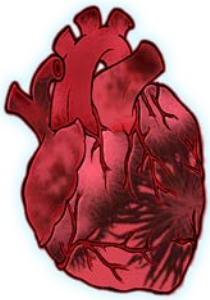
Maze Worm (monster)



Elemental (monster)



Gifts



DESIGN PATTERNS

That what we search for but we didn’t use it all

-Singleton

-State

-Memento

-MVC

-Object Pooling

-Observer

-Command

-Factory

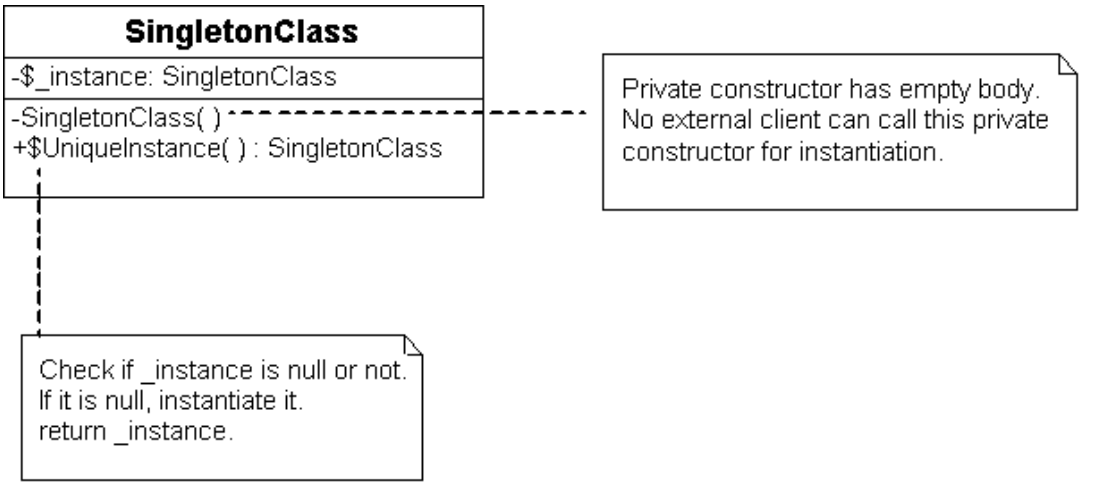
Singleton

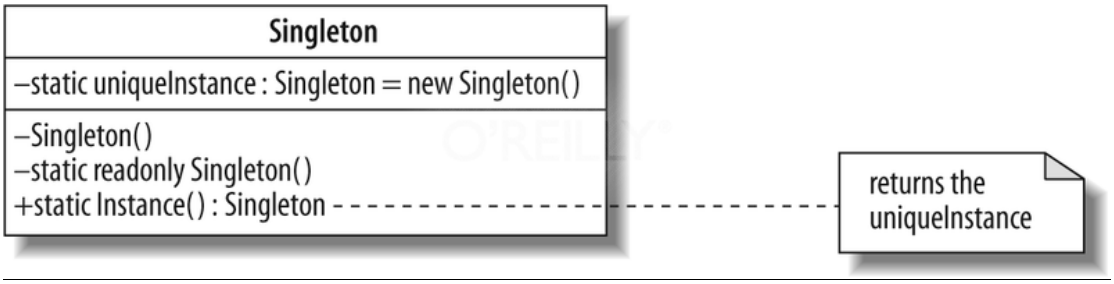
The singleton pattern involves only one class which is responsible to instantiate itself, to make sure it creates not more than one instance; in the same time it provides a global point of access to that instance. In this case the same instance can be used from everywhere, being impossible to invoke directly the constructor each time.

It ensures that only one instance of a class is created and provides a global point of access to the object.

The implementation involves a static member in the "Singleton" class, a private constructor and a static public method that returns a reference to the static member.

The Singleton Pattern defines a getInstance operation which exposes the unique instance which is accessed by the clients. getInstance() is is responsible for creating its class unique instance in case it is not created yet and to return that instance.

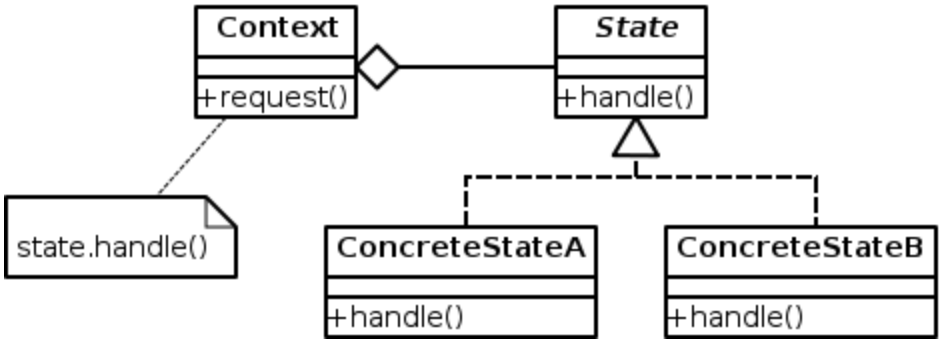




State

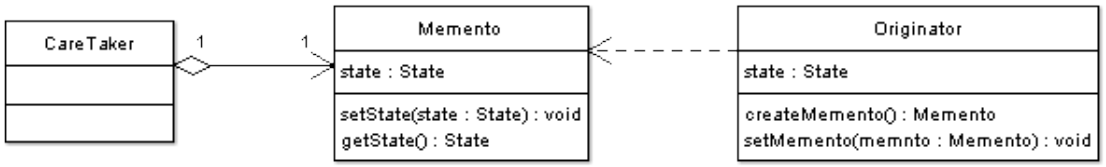
This pattern is used to encapsulate varying behavior for the same routine based on an object's state object.

This can be a cleaner way for an object to change its behavior at runtime without resorting to large monolithic conditional statements.


Context
+request()
State
+handle()
state.handle()
ConcreteStateA
+handle()
ConcreteStateB
+handle()

Memento

It is sometimes necessary to capture the internal state of an object at some point and have the ability to restore the object to that state later in time. Such a case is useful in case of error or failure. The intent of this pattern is to capture the internal state of an object without violating encapsulation and thus providing a mean for restoring the object into initial state when needed.



Object Pooling

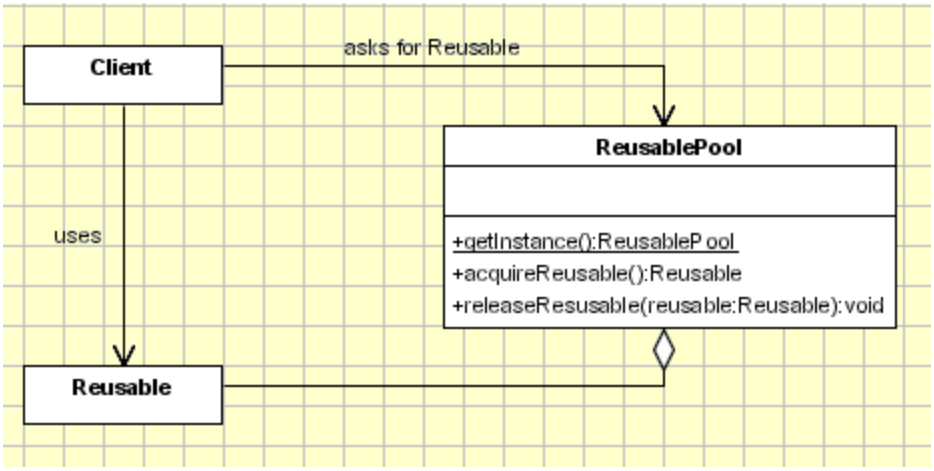
Performance can be sometimes the key issue during the software development and the object creation(class instantiation) is a costly step. While the Prototype pattern helps in improving the performance by cloning the objects, the Object Pool pattern offer a mechanism to reuse objects that are expensive to create.

Implementation involves the following objects:

Reusable – Wraps the limited resource, will be shared by several clients for a limited amount of time.

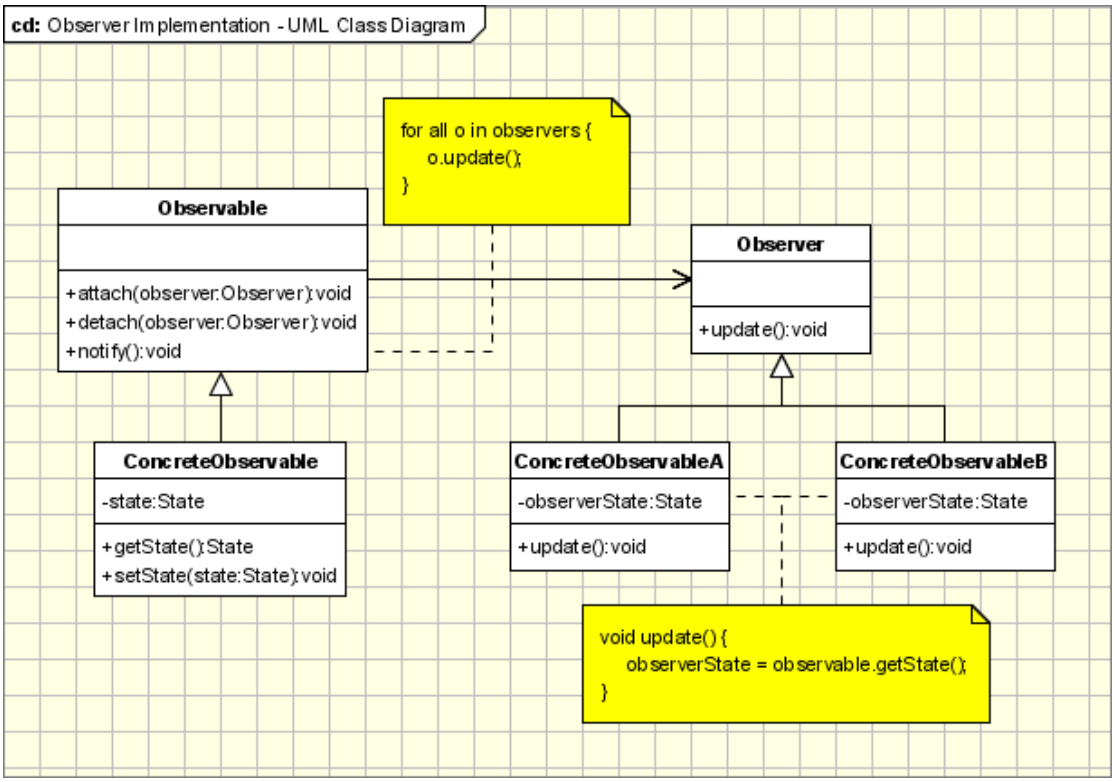
Client – uses an instance of type Reusable.

ReusablePool – manage the reusable objects for use by Clients, creating and managing a pool of objects.



Observer

We can not talk about Object Oriented Programming without considering the state of the objects. After all object oriented programming is about objects and their interaction. The cases when certain objects need to be informed about the changes occured in other objects are frequent. To have a good design means to decouple as much as possible and to reduce the dependencies. The Observer Design Pattern can be used whenever a subject has to be observed by one or more observers.



Command

"An object that contains a symbol, name or key that represents a list of commands, actions or keystrokes". This is the definition of a macro, one that should be familiar to any computer user. From this idea the Command design pattern was given birth.

The Macro represents, at some extent, a command that is built from the reunion of a set of other commands, in a given order. Just as a macro, the Command design

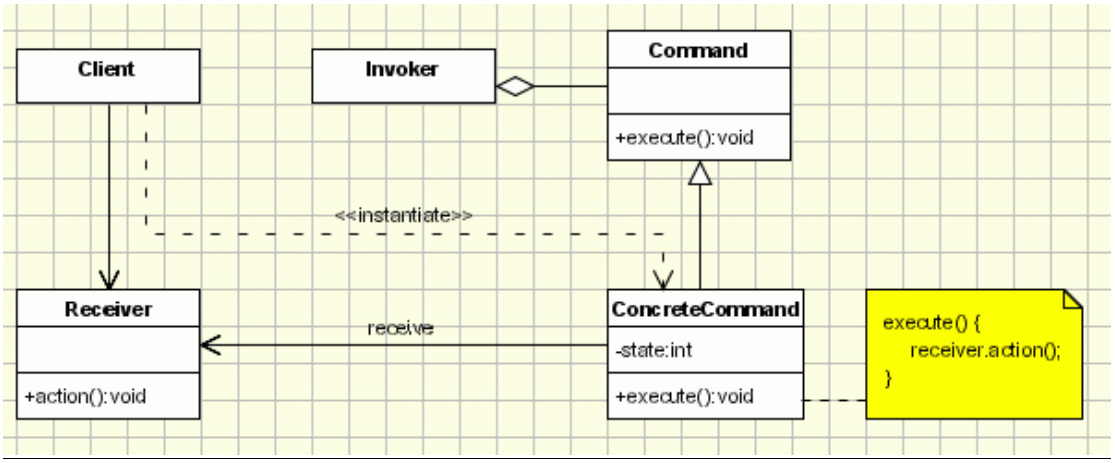
pattern encapsulates commands (method calls) in objects allowing us to issue requests without knowing the requested operation or the requesting object. Command design pattern provides the options to queue commands, undo/redo actions and other manipulations.

–Important Features:

– encapsulate a request in an object

– allows the parameterization of clients with different requests

– allows saving the requests in a queue



Factory

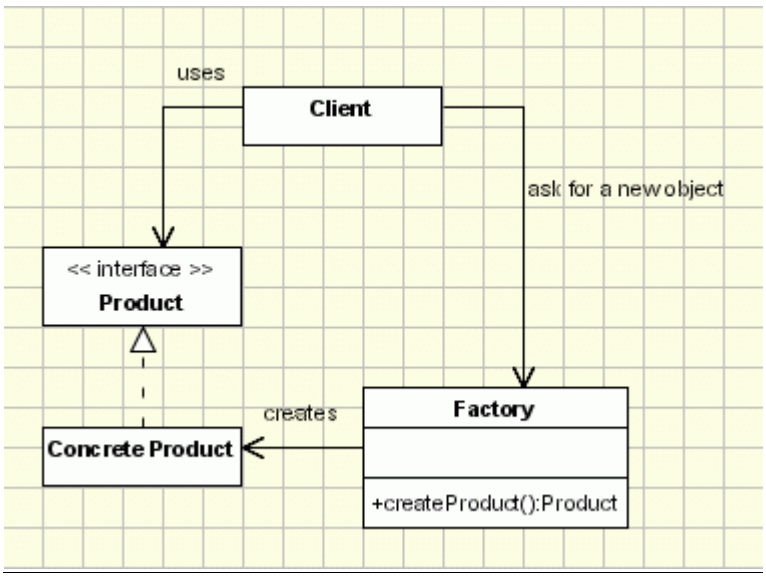
The Factory Design Pattern is probably the most used design pattern in modern programming languages like Java and C#. It comes in different variants and implementations. If you are searching for it, most likely, you'll find references about the GoF patterns: Factory Method and Abstract Factory.

In this article we'll describe a flavor of factory pattern commonly used nowdays. You can also check the original Factory Method pattern which is very similar.

Important Features:

creates objects without exposing the instantiation logic to the client.

refers to the newly created object through a common interface



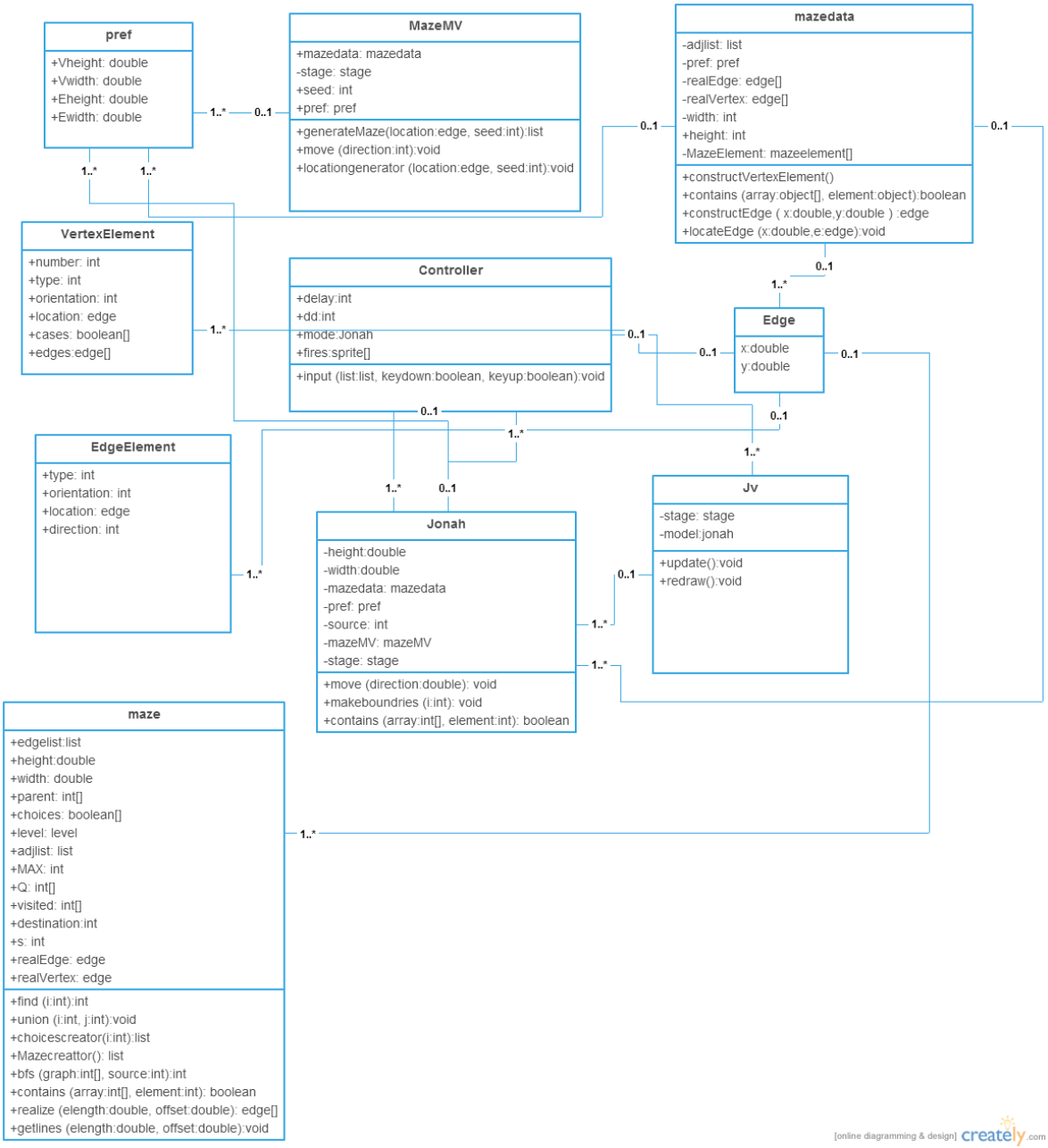
Implementation:

-The client needs a product, but instead of creating it directly using the new operator, it asks the factory object for a new product, providing the information about the type of object it needs.

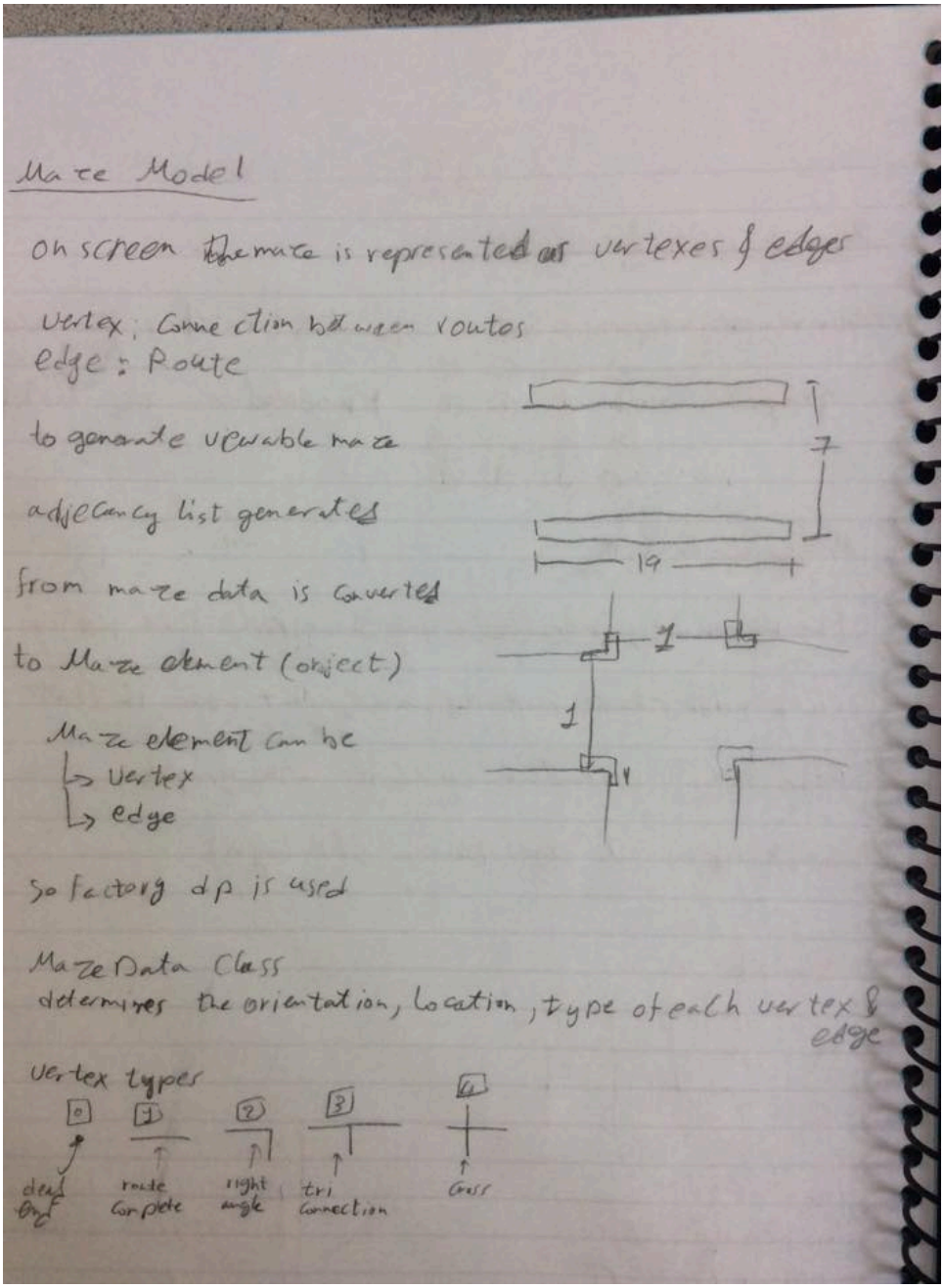
-The factory instantiates a new concrete product and then returns to the client the newly created product(casted to abstract product class).

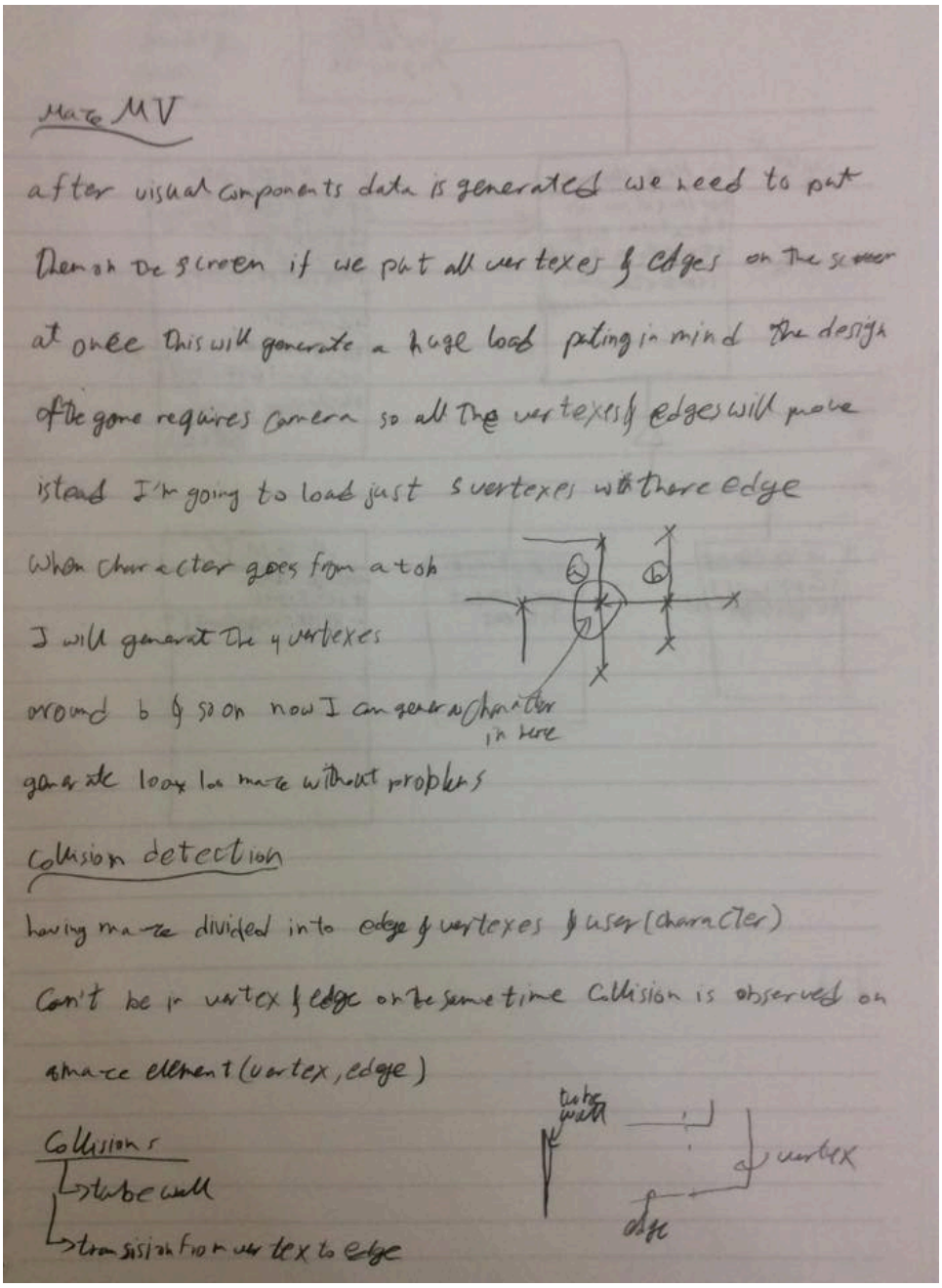
–The client uses the products as abstract products without being aware about their concrete implementation.

DESIGN



IMPLEMENTATION





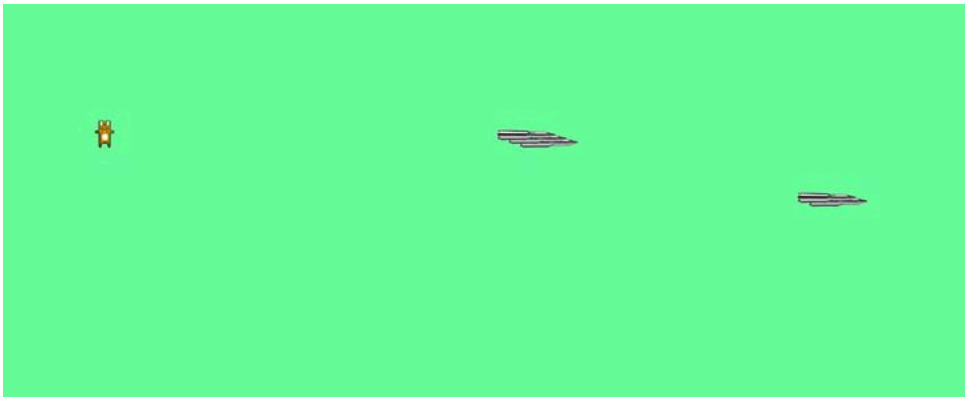
TESTING

There was a problem in bullets that is the bullets are near each other we solve this problem by adding delay between each bullets

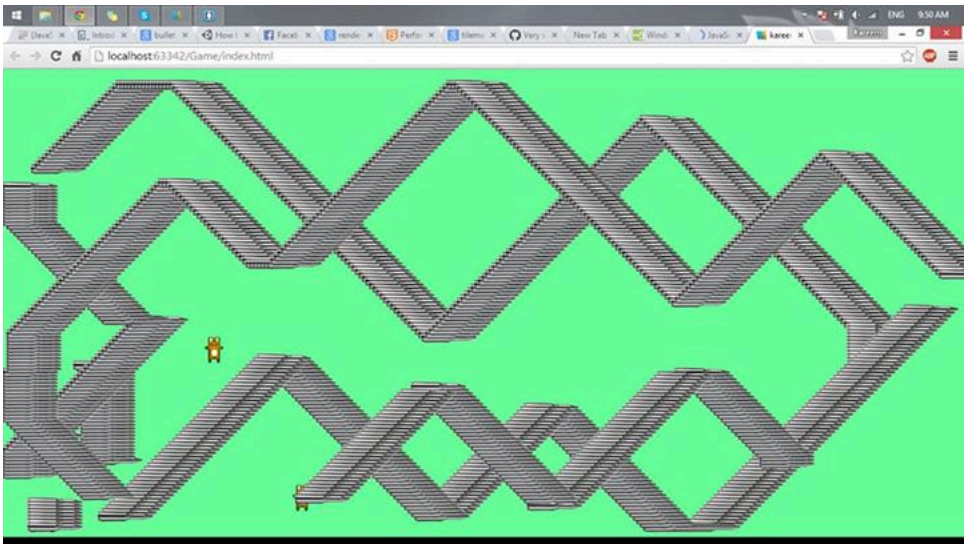
```
if(list[32]) {

        if (Math.floor(delay/18) == dd)
```

```
{
    document.getElementById('audiotag1').play();
    var newFire = new  PIXI.Sprite(PIXI.Texture.fromImage("2.png"));
    stage.addChild(newFire);
    newFire.anchor.x = 0;
    newFire.anchor.y = 1;
    newFire.position.x = bunny.position.x+60;
    newFire.position.y = bunny.position.y;
    fires.push(newFire);
    dd++; }
delay++;}
```

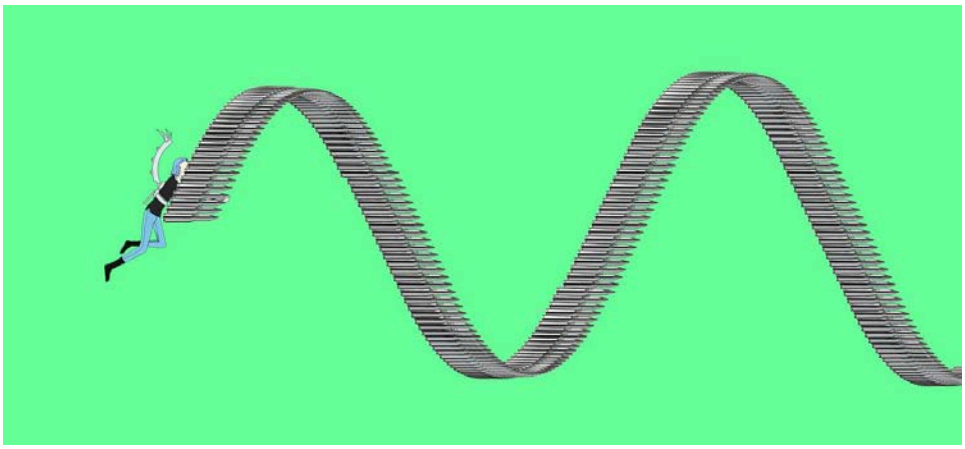
photo of the problem

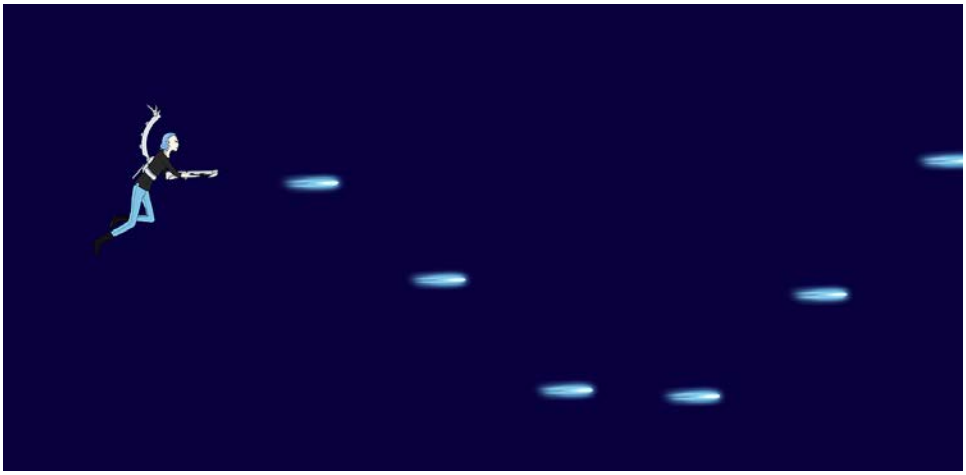


There was second problem in movement of the character that it stop suddenly the motion isn't efficient so we improve it by adding acceleration in the begging of motion and deceleration at the end of motion



There it is a photo from the problem we stop the motion of bullets to show the problem of the movement the move was sharp not like sin wave so we improve the motion





This photo show the solution of sin movement and Far apart bullets

The maze has a lot of modification to make it better and better and add a lot of algorism to it

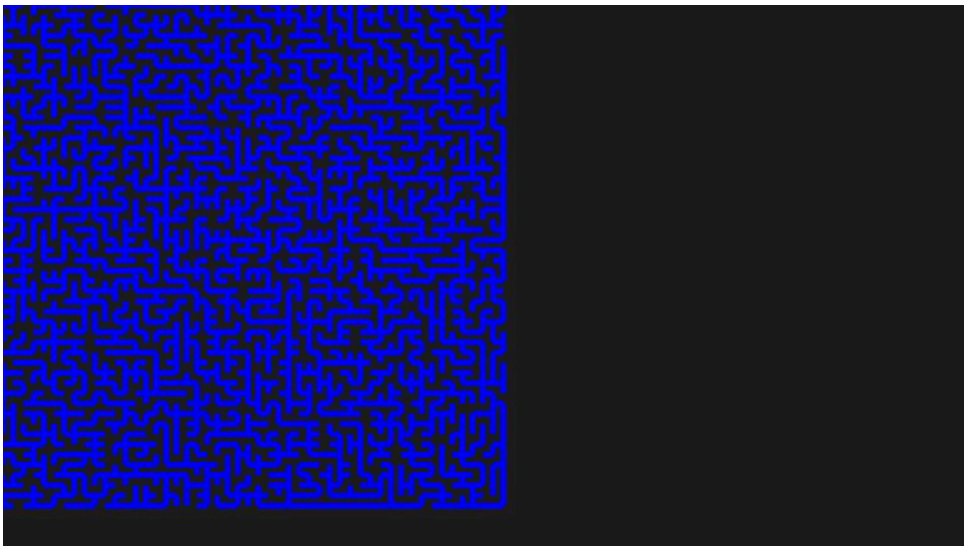
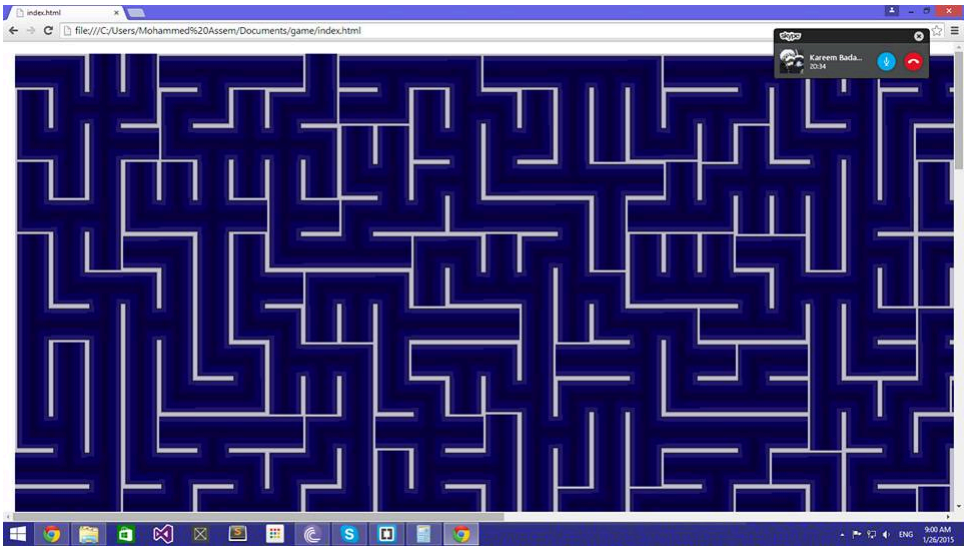
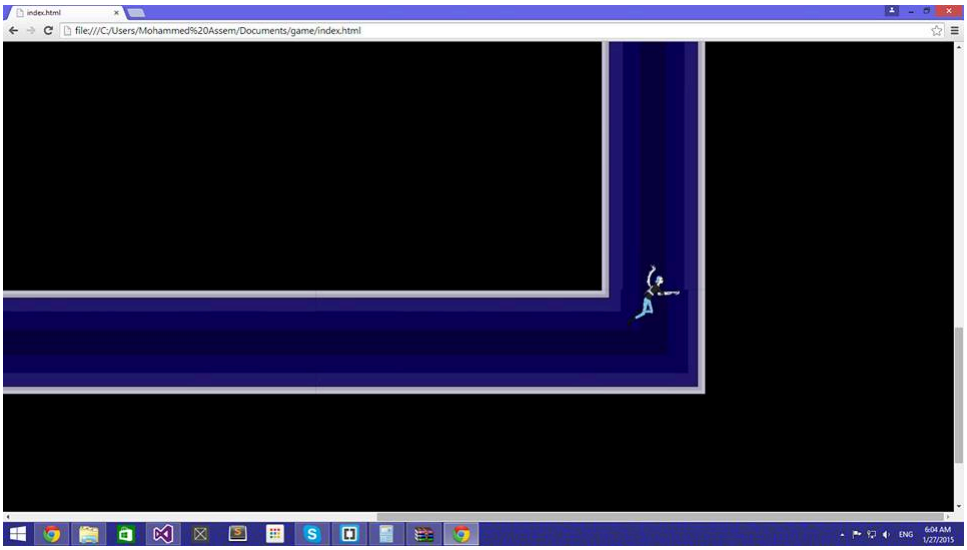


Photo of the old maze



After some modification.

We have another problem that we create maze 30*30 and draw the sprites on it but we face a problem that pixi.js can't hold more than 10*10 so we handled this problem by follow a new algorism for maze animation by Creating a Tile Map Engine that not load all the sprits in the beginning of the game but load it sequential by move character now we can create 100*100 maze without lagging



Problems we didn’t solve because of limitation of time

Problem to move sprites using pixi framework we learn to write json file to animate the sprites but it didn’t work we know another solution by cut the sprites and put them in array and change photo with respect of time (tic)

TEAM

Kareem Badawy	**2392**
Shady Hesham Tawfik Morsi	**2394**
Mona Mohamed Hendawi	**2200**
Mohab Mohamed Usama	**2387**
Mohamed Farag	**2769**
Emad Eldeen Mohamed	**2093**
Mohamed Assem	**2118**
Sherif Adham El Sadek	**2464**

CONCLUSION

At the end right we didn't fish the game as we wish but we made a super effort in the game Art and algorism and performance we do more than the required and we want to make a professional game that we want in future in all stores

This version is Alpha we will release Beta version soon then the stable version so keep touch with us on our site .

SITE

We have a host on internet for the game and put it in the site

http://ccp2017.eb2a.com/game/

NICE TO MEET YOU

Thanks ^_^

When you've added all the citations you need for your report, on the References tab, click Bibliography to insert a formatted bibliography in your choice of styles.

And you're done. Nice work!