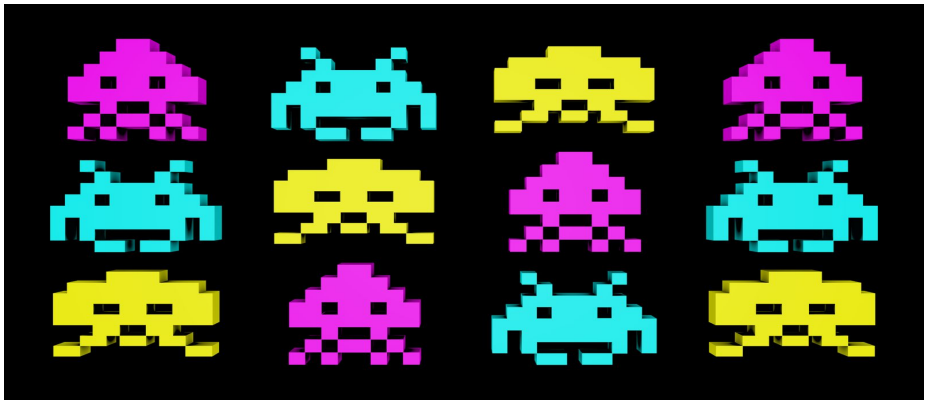
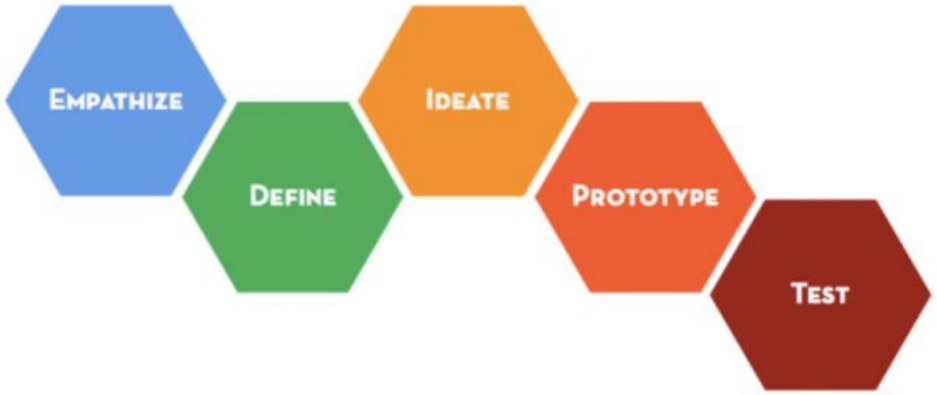
Introduction to Programming
Unit 2 - Game Project

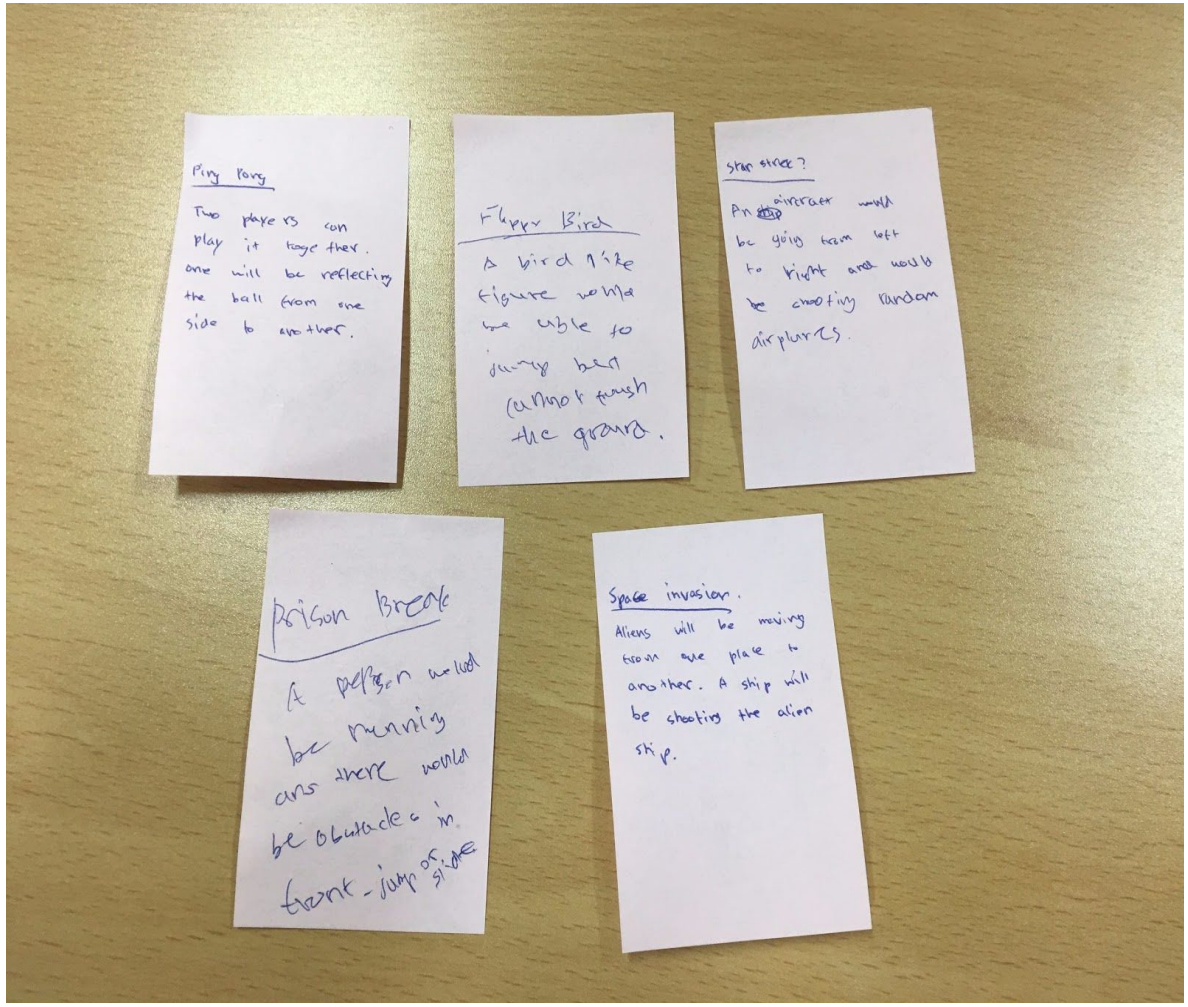




By: Byung Wook Kim

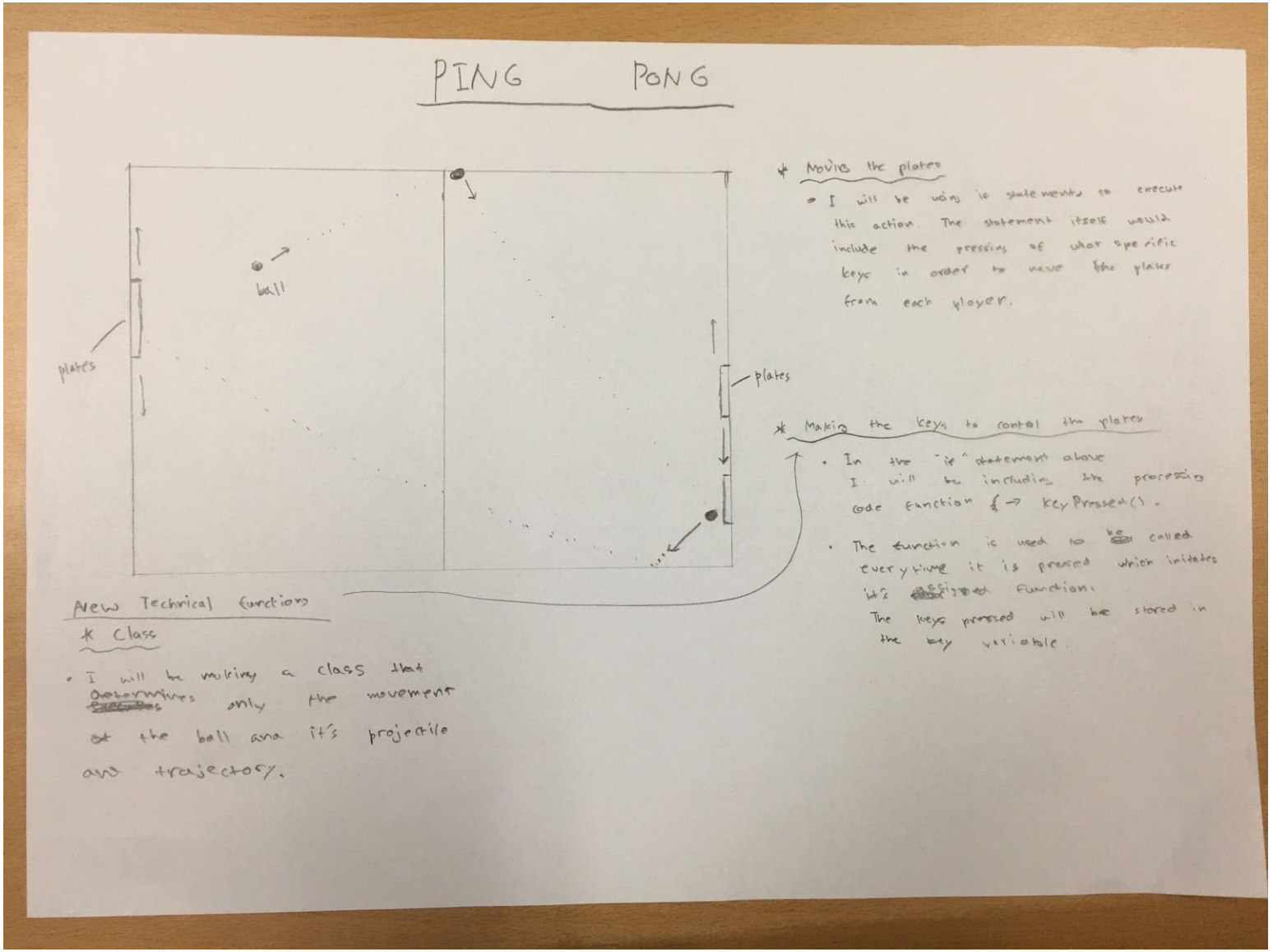
Contents

Prototype 1
Brainstorming

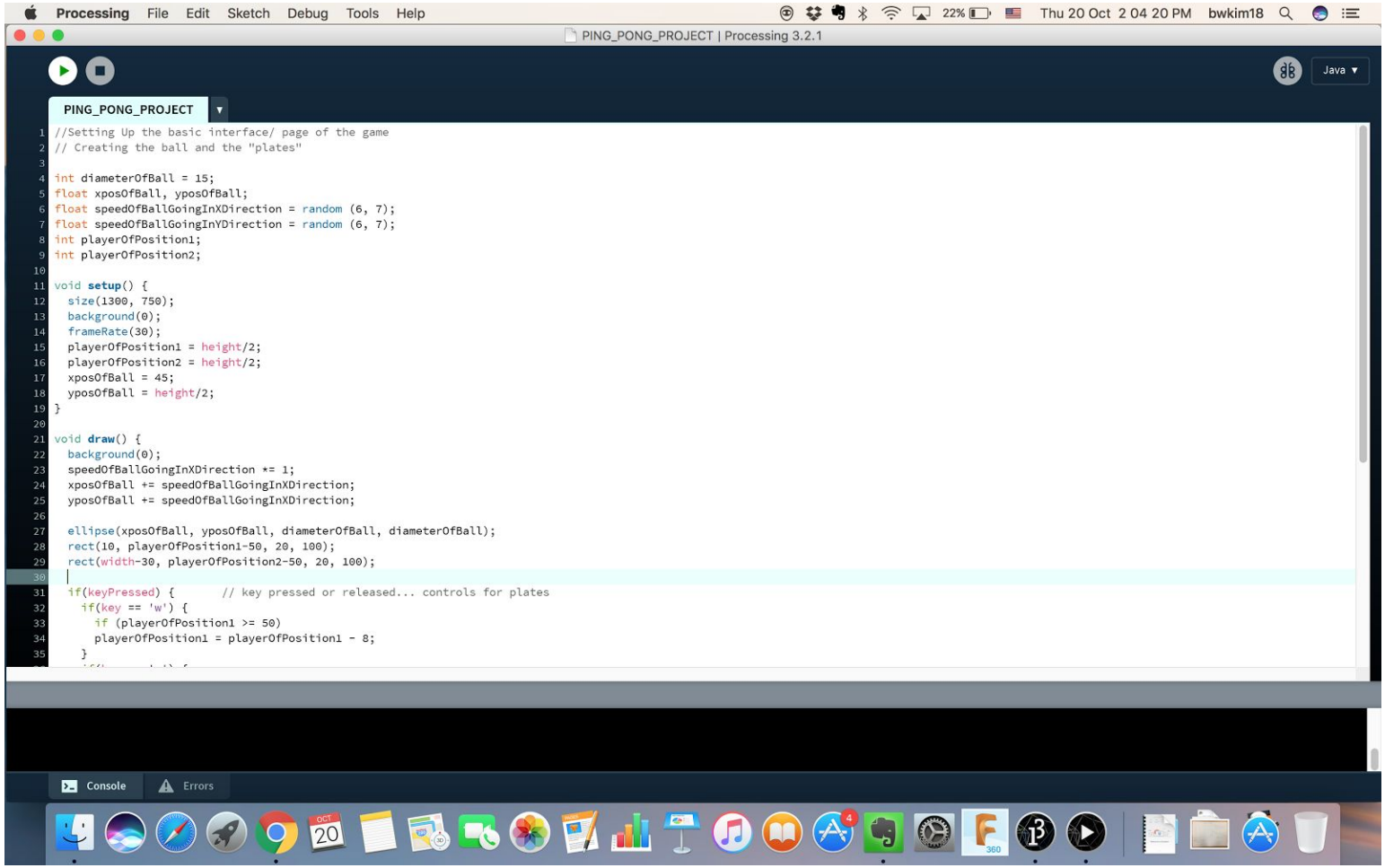


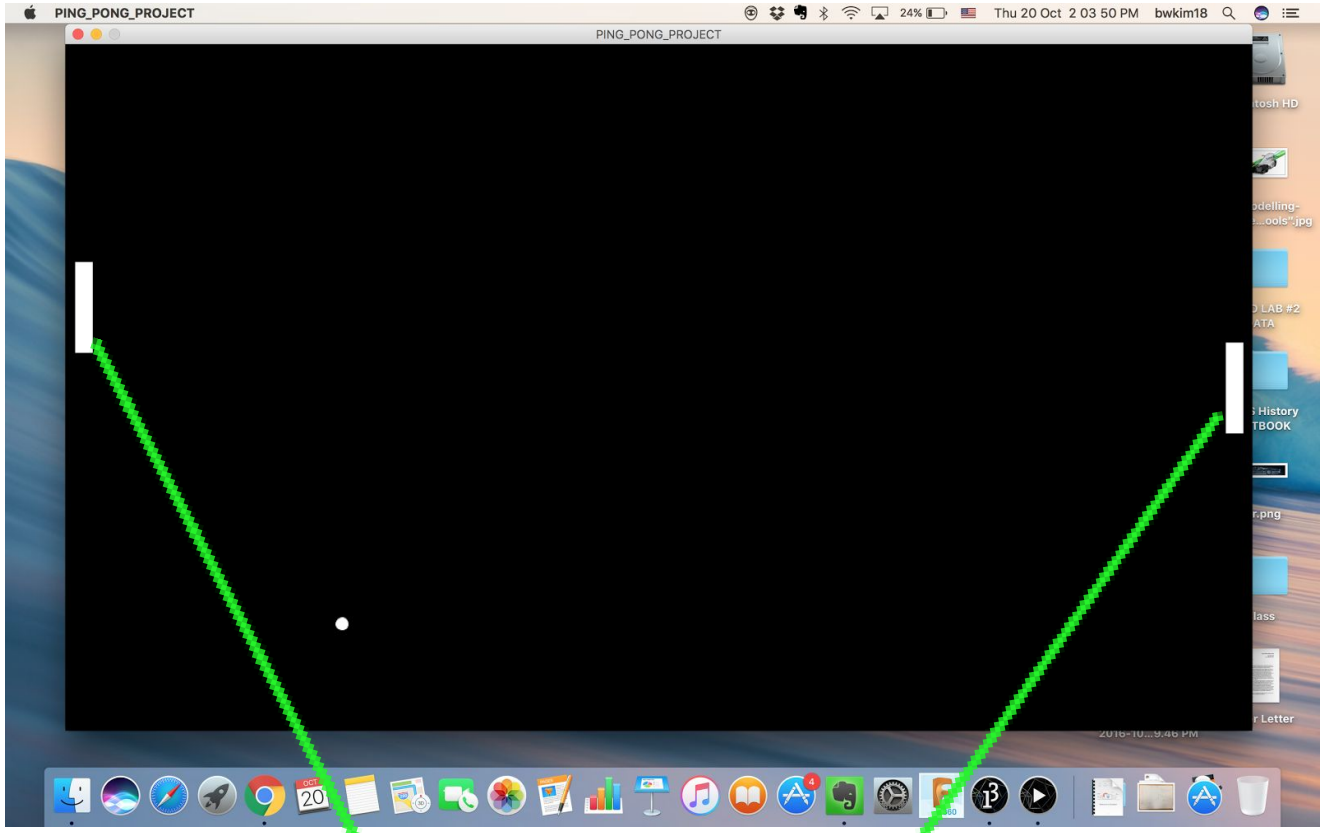
From the 5 choices I picked from above, my final choice is to create a “ping pong” game. This game will require two people and the objective is to not lose the ball’s control while it bounces from the wall across to the right or left side of the screen.

Design


PING PONG
ball
plates
plates
* Moving the plates
• I will be using if statements to execute this action. The statement itself would include the pressing of what specific keys in order to move the plates from each player.
* Making the keys to control the plates
• In the "if" statement above I will be including the processing code function (-> keyPressed() .
• The function is used to be called every time it is pressed which initates it's Function.
The keys pressed will be stored in the key variable.
New Technical functions
* Class
• I will be making a class that determines only the movement of the ball and it's projectile and trajectory.

Product


Processing File Edit Sketch Debug Tools Help
Thu 20 Oct 2 04 20 PM bwkim18
PING_PONG_PROJECT | Processing 3.2.1
Java
PING_PONG_PROJECT
//Setting Up the basic interface/ page of the game
// Creating the ball and the "plates"
int diameterOfBall = 15;
float xposOfBall, yposOfBall;
float speedOfBallGoingInXDirection = random (6, 7);
float speedOfBallGoingInYDirection = random (6, 7);
int playerOfPosition1;
int playerOfPosition2;
void setup() {
size(1300, 750);
background(0);
frameRate(30);
playerOfPosition1 = height/2;
playerOfPosition2 = height/2;
xposOfBall = 45;
yposOfBall = height/2;
}
void draw() {
background(0);
speedOfBallGoingInXDirection *= 1;
xposOfBall += speedOfBallGoingInXDirection;
yposOfBall += speedOfBallGoingInXDirection;
ellipse(xposOfBall, yposOfBall, diameterOfBall, diameterOfBall);
rect(10, playerOfPosition1-50, 20, 100);
rect(width-30, playerOfPosition2-50, 20, 100);
if(keyPressed) { // key pressed or released... controls for plates
if(key == 'w') {
if (playerOfPosition1 >= 50)
playerOfPosition1 = playerOfPosition1 - 8;
}
Console
Errors



Another unique technical feature that is conspicuous in my game is the addition of a collision detection code. I have engendered this code so that the “ball” seen in the picture can bounce off the walls or the - so called - “plates” I have designed.

One of the interesting technical features I added to my program is the feature of being able to move the plates by pressing certain keys. I have utilized the input functions of “keyPressed” to execute the actions of moving the plates when keys are pressed.

In order to abridge my code and to augment the readability of it, I implemented a structure called “class”. According to the Processing reference page, a class is a series of data and methods that can be represented by an object. I created several classes, one especially that deals with the points of where the ball would travel.

Testing

Questionnaire

Form description

Do you like the game I have programmed so far?

- [ ] Yes
- [ ] No

What score would you give this program?

	1	2	3	4	5	
Bad	○	○	○	○	○	Good

Would you play this game?

- ○ Yes
- ○ No

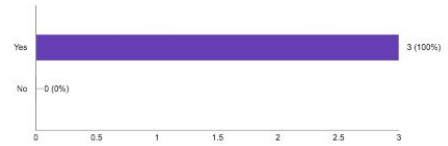
What is the biggest problem that you see so far?

Short answer text

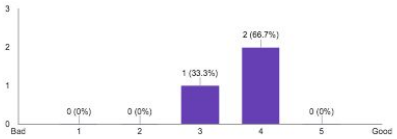
What should be added?

- [ ] Sounds
- [ ] Colors
- [ ] Detailed Graphics
- [ ] Better shapes (of ping pong ball or the plates)
- [ ] Screen of game bigger or smaller
- [ ] Score Board
- [ ] Other...

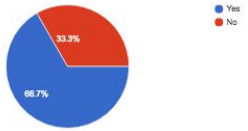
Do you like the game I have programmed so far?
(3 responses)



What score would you give this program? (3 responses)



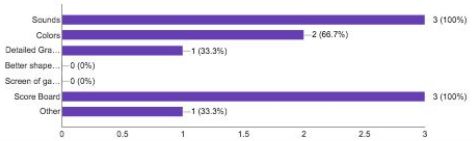
Would you play this game? (3 responses)



What is the biggest problem that you see so far?
(3 responses)

The ball doesn't work
There's no bounce on the ball, so it disappears. Also, i think you should maybe make the speed of the blocks faster.
the ball disappears at the bottom

What should be added? (3 responses)



Problems

According to results from survey

1. One of the problems that I have figured out from the testing is that the ball doesn't bounce off the wall nor the plate.

2. Another problem that can be extracted from the testing is that two plates cannot be moved simultaneously when keys - that control each plates - are also pressed at the same time.

3. A lot of people answered my survey saying that I should add color, sounds, a score board and others.

Prototype 2

Brainstorming

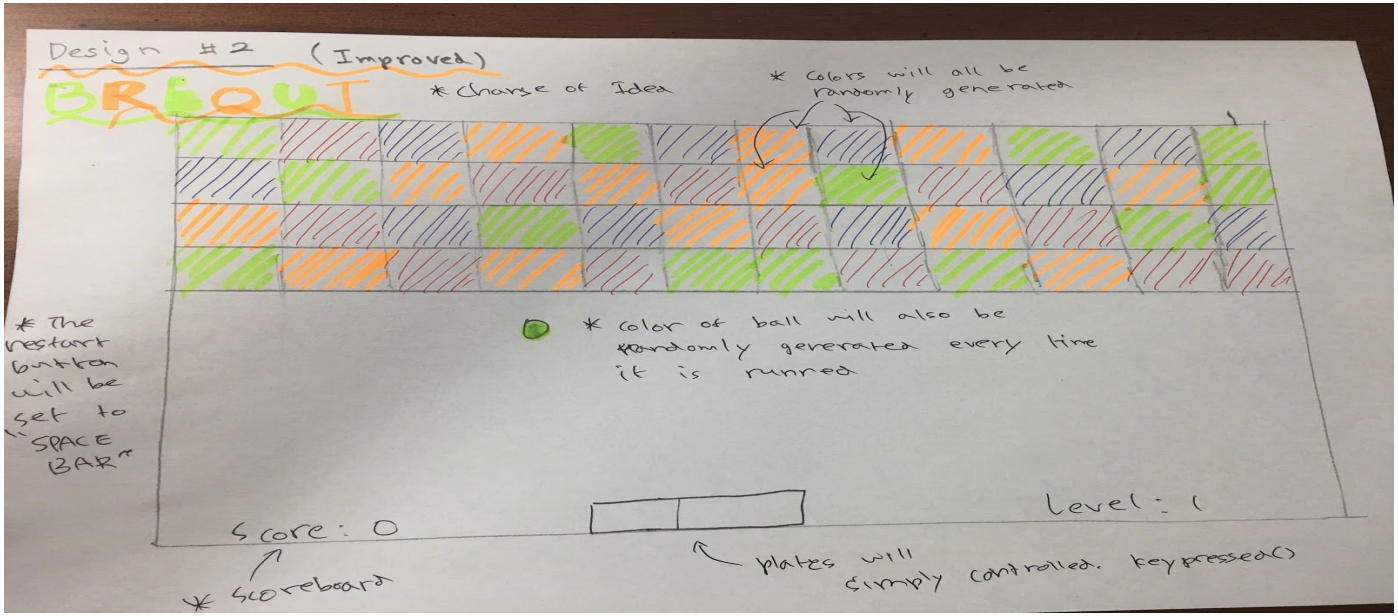
10 improvements

1. Some improvements that I would make would be to **add colors**. Not only did the survey tell me that I had to include colors in my game but I also realized it myself. I realized that the color of simple black and white made my game look very unattractive and boring.
2. **Changing the game to a one player game**. The reason why I wanted to change my game to a single player game was because there was a huge problem that I wasn't able to solve. Despite the many researches I have done to solve this issue, I still wasn't able to fix my game to have two actions be executed by two separate at the same time. For example, the moving keys of one player for my "Pong" idea was 'w' and 's' while the other player's was 'arrow key UP' and 'arrow key DOWN'. If both players pressed it at the same time, only one player's brick would move and not both. Facing this problem and not being able to solve it made me come to a decision to just change my game to a single player game.
3. I thought that **adding a scoreboard** would really help not only my game look good but to also make my players feel more motivated. Furthermore, by adding a scoreboard I thought that it would have augmented the competitiveness of the game, prompting more people to play - to break the record.
4. By **adding some sounds (especially sound effects)** would make my game more entertaining as certain sounds would be able to also affect the auditory senses of the player.
5. So after my first idea failed - the idea of "Pong" - I decided to change my game and to create a different way for players to earn scores. Changing the main factor that would allow my players to earn points from beating the opposite side to breaking bricks, I **created brick walls.**
6. Changing the game to "Breakout". Well as I wasn't able to create my original idea I basically changed my idea to creating the game "Breakout". A game where a player is required to break walls using the collision of balls. I thought that changing my idea to this game was most reasonable as I already made a collision detector code.
7. Make a **restart Button**. It was difficult for me (personally) to always quit the Processing "processor" and to always rerun the code. Therefore, I decided to create a restart button.

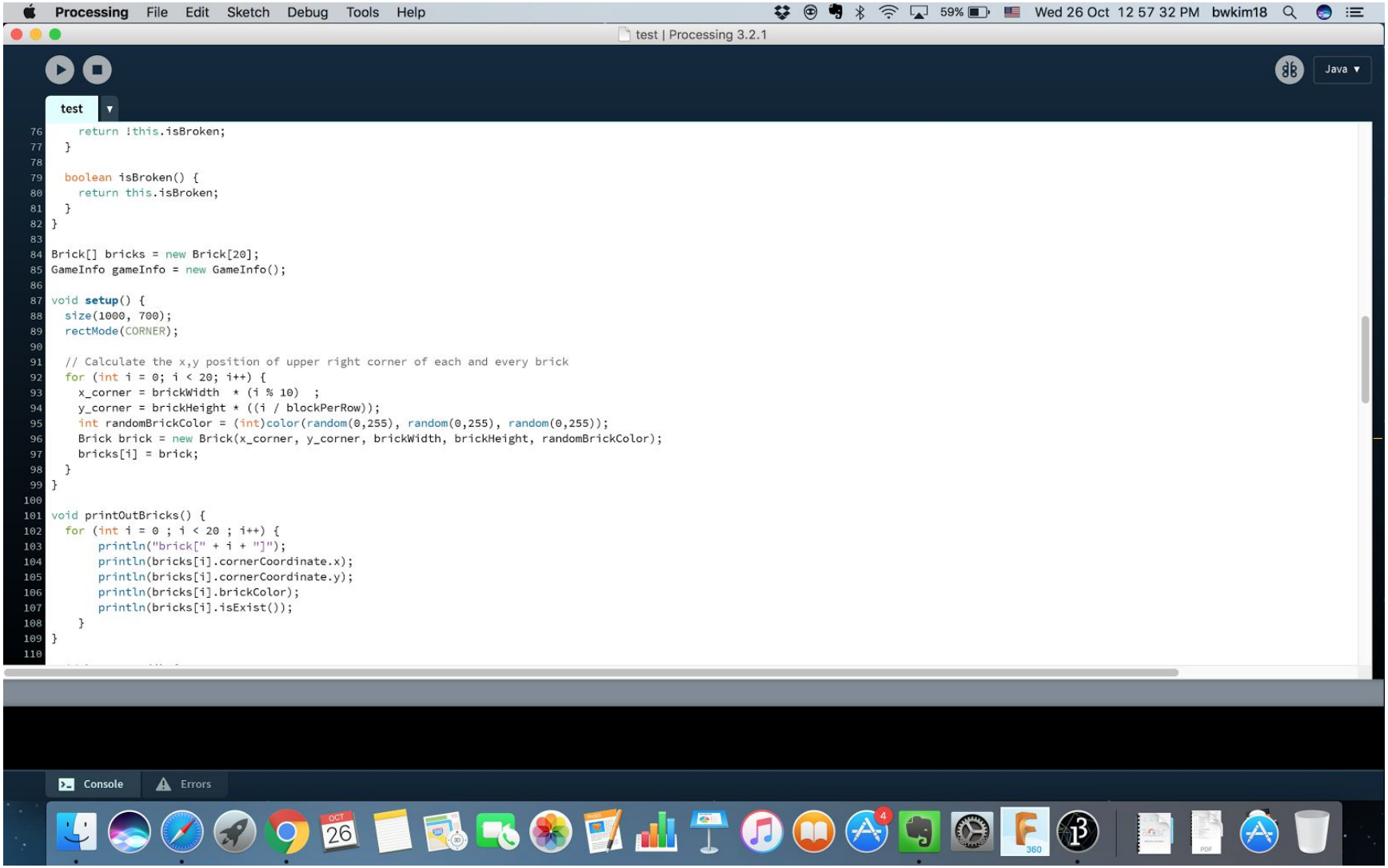
8. I thought by **adding levels,** it would have created the game to be more entertaining and again more motivating. Allowing people to play my game for longer times with different levels of difficulty.
9. Change **Background Color**. Having the background be plain black really made my eyes feel “bored” so I decided that changing the background color would make the quality of my game better.
10. Add options to **change the ball** into different shapes. Not too sure about this improvement, but my survey showed that one person wanted the shape of the the “ball” to change.

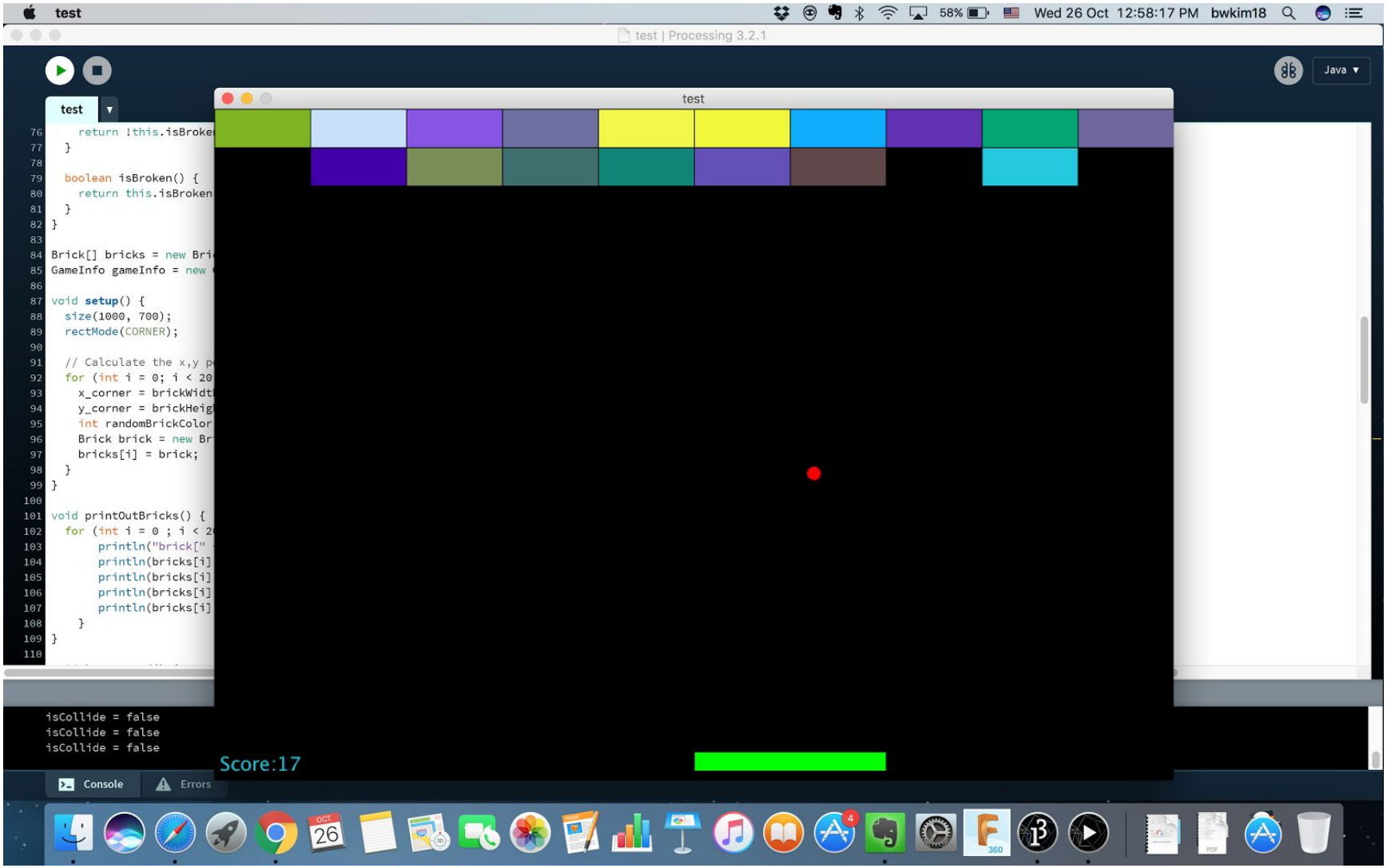
<u>Design #2 - Refer to Brainstorming PHASE ABOVE</u>

1. Adding Colors
2. Changing game to one player game
3. Add a scoreboard
4. Add bricks
5. Change the game to “Breakout"
6. Make a restart Button



Product


Processing File Edit Sketch Debug Tools Help
Wed 26 Oct 12 57 32 PM bwkim18
test | Processing 3.2.1
Java
test
return !this.isBroken;
}
boolean isBroken() {
return this.isBroken;
}
}
Brick[] bricks = new Brick[20];
GameInfo gameInfo = new GameInfo();
void setup() {
size(1000, 700);
rectMode(CORNER);
// Calculate the x,y position of upper right corner of each and every brick
for (int i = 0; i < 20; i++) {
x_corner = brickWidth * (i % 10) ;
y_corner = brickHeight * ((i / blockPerRow));
int randomBrickColor = (int)color(random(0,255), random(0,255), random(0,255));
Brick brick = new Brick(x_corner, y_corner, brickWidth, brickHeight, randomBrickColor);
bricks[i] = brick;
}
}
void printOutBricks() {
for (int i = 0 ; i < 20 ; i++) {
println("brick[" + i + "]");
println(bricks[i].cornerCoordinate.x);
println(bricks[i].cornerCoordinate.y);
println(bricks[i].brickColor);
println(bricks[i].isExist());
}
}
Console
Errors


test
Wed 26 Oct 12:58:17 PM bwkim18
test | Processing 3.2.1
Java
test
return !this.isBroke
}
boolean isBroken() {
return this.isBroken
}
}
Brick[] bricks = new Bri
GameInfo gameInfo = new
void setup() {
size(1000, 700);
rectMode(CORNER);
// Calculate the x,y p
for (int i = 0; i < 20
x_corner = brickWidt
y_corner = brickHeig
int randomBrickColor
Brick brick = new Br
bricks[i] = brick;
}
}
void printOutBricks() {
for (int i = 0 ; i < 2
println("brick["
println(bricks[i]
println(bricks[i]
println(bricks[i]
println(bricks[i]
}
}
isCollide = false
isCollide = false
isCollide = false
Score:17
Console
Errors

FIXED EVALUATION

1. Names some parts of your project you were happy with and explain why.
2. What did you learn from your last project that helped you with this project
3. What extra did you learn about coding during this project (ways of programming, finding errors, new technical abilities etc.)
4. In what way do you think the Design Thinking process is effective or ineffective and how would you change the way you used it?
5. What did you have problems with in this project which you could have done better and how would you do better next time?

Despite the many problems I encountered during the course of this project, there were certainly some parts in my project that I was very personally happy with such as the new technical features that I have included in my project or the final project itself. I was very happy with the fact that I was able to add certain technical features that I took time to figure out by myself. One of the technical features that I added to my project that especially made me feel both proud and happy was the use of “functions” and “classes”. Taking me almost the majority of the project time given to figure out and to understand how to make use of these two features in this specific project, I was very happy when I added it to my code and when my code processed in the way I wished it to. Not only did the utilization of these features make me feel really proud but it also shortened my code a lot. Originally, my code was around 280 lines long but now it's only around 200 lines long.

Prior to this project, I also used classes and functions in my graphics project but I recognized it as a new technical feature in this project as I used it differently. Although the names of the technical features may have been the same, the use of the functions in my project was different. Furthermore, I also had to do further research of how to use the features effectively in order to create a “game” called “Breakout”. So the graphics project helped me realized that features such as classes and functions existed and in the game project I was able to use the implications I received from the prior project.

Another factor that I learned from the course of this project was ways to solve my own problems - especially with coding. A lot of the problems I encountered was the way I didn't know how to code some parts in my game in order for the application to produce the certain images or the actions that I wanted. Personally, I had the most trouble with making the balls bounce from the plates. In order to solve this problem I researched codes related to the "Collision Theory" and I tried to make my last choice Mr. Livesay. I believe that these extra experience would help me in future projects.

I think the design thinking process really helped me get a overall view of how I should plan to arrive at my goal. The **brainstorming phase** served really well in helping me engender ideas and to think thoroughly upon the benefits and drawbacks of the ideas that I created. In addition the brainstorming phase helped me bring out the ideas that I most wanted to do or the ideas that were already at the top of my head. Due to the limited time that we were given during the brainstorming phase, I didn't have a choice but to write down the ideas that always roamed around my head or ideas that I always wanted to do. Hence, I think the brainstorming phase was very helpful. The **designing phase and the prototype phase** both really helped me plan and figure out improvements respectively. Drawing and outlining the ideas and features that would be included in my product really helped me create a certain "prior pathway" that would lead me towards the creation of my product. By making a prototype, I was able to successfully understand both the benefits and - especially - the limitations to my code. In fact, due to the prototype phase I was able to recreate my project and to rather just change the content of my entire project. Furthermore the **testing phase** also really helped me understand what my audience wanted me to improve, really helping me think more thoroughly and to find all sorts of ways to meet the certain improvements suggested by my audience. Overall, I thought that the design process is very effective and that I do not want to change the way I used it in this project for future projects.

The main issue that I faced throughout the entire project was the lack of an array operator. As the assignment was to create a game with an array operator as its main function, I had to change my idea and it was a really big problem. Starting from figuring out a series of other ideas that I would change from my original idea that would include an array operator to writing a whole code that would produce my new idea, I was very frustrated and I did lose a lot of sleep. In order to solve this problem or to prevent this from happening again in my future projects, I will put more emphasis on the instructions and to focus more on the assignment then my own desires in creating something that I wanted to make.