

Acknowledgement

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We are highly indebted to our instructors for their guidance and constant supervision as well as for providing necessary information regarding the project.

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Project Title:

Wizard Shooting Game.

Overview:

This project is based on only java programming language with the concepts of object oriented programming, the platform and tools we've used is Eclipse IDE, GUI, Paint to showcase everything as decent as possible.

Description:

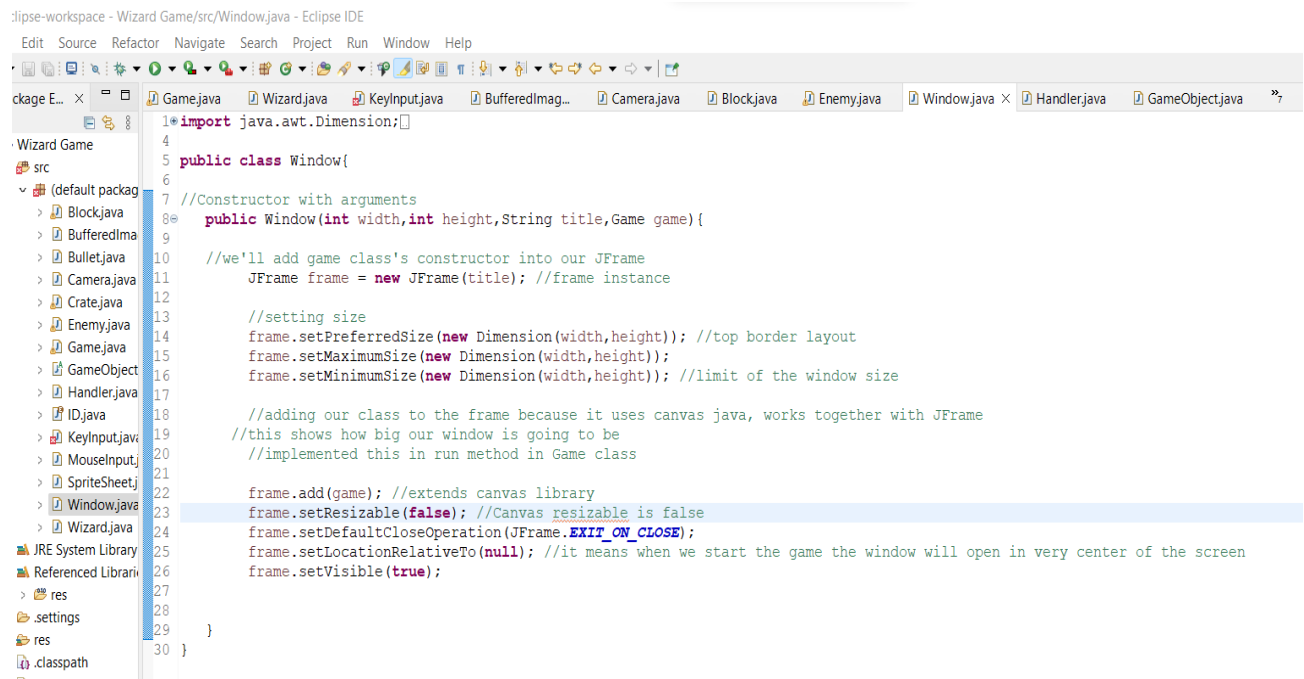
As the main concept of our project revolves around game development. We have make a single player shooting game with a multiple enemies. We've designed the map, complexities, characters to make it more fun. The gamer has to keep track of the enemy, (where they're going and how fast they're moving), focus the crosshairs on the enemy, and make sure gunfire is hitting the target while keeping an eye on their health and ammo.

SOURCE CODE:

Classes:

1. Window Class (Controls GUI):

The window class is going to be just a class that we call right off the bat to create our game window on the GUI.



```
1 import java.awt.Dimension;
2
3
4 public class Window{
5
6     //Constructor with arguments
7     public Window(int width,int height,String title,Game game){
8
9         //we'll add game class's constructor into our JFrame
10        JFrame frame = new JFrame(title); //frame instance
11
12        //setting size
13        frame.setPreferredSize(new Dimension(width,height)); //top border layout
14        frame.setMaximumSize(new Dimension(width,height));
15        frame.setMinimumSize(new Dimension(width,height)); //limit of the window size
16
17        //adding our class to the frame because it uses canvas java, works together with JFrame
18        //this shows how big our window is going to be
19        //implemented this in run method in Game class
20
21        frame.add(game); //extends canvas library
22        frame.setResizable(false); //Canvas resizable is false
23        frame.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
24        frame.setLocationRelativeTo(null); //it means when we start the game the window will open in very center of the screen
25        frame.setVisible(true);
26
27    }
28
29 }
30 }
```

2. Game Class (Main Class):

Game class this is going to be our **main class** this is where everything gets called this is where our game loop is going to be, this is where everything is going to happen so from here from the game class, the game class might it's going to handle all like the updating for X & Y positions for our characters in the game, it's going to handle all the rendering so all of the you know drawing the graphics improves like that, this is game class is going to be handling all that.

```

e-workspace - Wizard Game/src/Game.java - Eclipse IDE
File Edit Source Refactor Navigate Search Project Run Window Help
[Icons]
je E... x [Game.java x]
src
  (default package)
  > Block.java
  > BufferedImage.java
  > Bullet.java
  > Camera.java
  > Crate.java
  > Enemy.java
  > Game.java
  > GameObject.java
  > Handler.java
  > ID.java
  > KeyInput.java
  > MouseInput.java
  > SpriteSheet.java
  > Window.java
  > Wizard.java
JRE System Library
Referenced Libraries
  res
  settings
  res
  .classpath
  .project

11 public class Game extends Canvas implements Runnable{
12
13     private static final long serialVersionUID = 1L; //so it doesn't give as warning
14
15     private boolean isRunning=false;
16     private Thread thread; //runs simultaneously with our actual program so when we start up this thread what it's going to do is call
17     private Handler handler;
18     private Camera camera;
19     private SpriteSheet ss;
20
21     private BufferedImage level = null;
22     private BufferedImage sprite_sheet = null;
23     private BufferedImage floor = null;
24
25     public int ammo = 100;
26     public int hp = 100;
27
28     ///////////////////////////////////////////////////
29
30     //Constructor where we call our window, the main method constructor
31     public Game(){
32         //in this constructor we are going call our window class
33         new Window(1000,563,"Wizard Game", this); //setting dimensions
34         start();
35
36         handler = new Handler();
37         camera = new Camera(0, 0);
38         this.addKeyListener(new KeyInput(handler));
39
40         BufferedImageLoader loader = new BufferedImageLoader();
41         level = loader.loadImage("/wizard_level.png");
42         sprite_sheet = loader.loadImage("/sprite_sheet.png");
43
44         ss = new SpriteSheet(sprite_sheet);
45
46         floor = ss.grabImage(4, 2, 32, 32);
47
48         this.addMouseListener(new MouseInput(handler, camera, this, ss));
49
50         loadLevel(level);

```

```

se-workspace - Wizard Game/src/Game.java - Eclipse IDE
File Edit Source Refactor Navigate Search Project Run Window Help
[Icons]
je E... x [Game.java x]
src
  (default package)
  > Block.java
  > BufferedImage.java
  > Bullet.java
  > Camera.java
  > Crate.java
  > Enemy.java
  > Game.java
  > GameObject.java
  > Handler.java
  > ID.java
  > KeyInput.java
  > MouseInput.java
  > SpriteSheet.java
  > Window.java
  > Wizard.java
JRE System Library
Referenced Libraries
  res
  settings
  res
  .classpath
  .project

50 loadLevel(level);
51 }
52 ///////////////////////////////////////////////////
53
54 //Start our thread
55 private void start(){
56     isRunning = true;
57     thread = new Thread(this); //we use "this" because we are calling run method
58     thread.start();
59 }
60 //stop our thread
61 private void stop(){
62     isRunning = false;
63     //try & catch method in case it fails
64     try {
65         thread.join();
66     }
67     catch (InterruptedException e) {
68         e.printStackTrace();
69     }
70 }
71
72 ///////////////////////////////////////////////////
73
74 //run method for window class, so it'll not show errors
75 //upgrades the game 60 times a second
76 //this is where our game loop is going to be stored
77
78 public void run(){
79     //Actual game loop of our program
80     //making the instance and whenever we make an instance we'll call window constructor
81     this.requestFocus();
82     long lastTime = System.nanoTime();
83     double amountOfTicks = 60.0;
84     double ns = 1000000000L/amountOfTicks;
85     double delta = 0;
86     long timer = System.currentTimeMillis();
87     int frames = 0;
88     while(isRunning){
89         long now = System.nanoTime();
90         delta +=(now - lastTime)/ns;
91         lastTime = now;
92         while(delta>=1){

```

```

89         long now = System.nanoTime();
90         delta +=(now - lastTime)/ns;
91         lastTime = now;
92         while(delta>=1){
93             tick();
94
95             delta--;
96         }
97         render();
98         frames++;
99         if(System.currentTimeMillis() - timer>1000){
100             timer+=1000;
101             frames=0;
102         }
103     }
104
105     stop();
106 }
107 //////////////////////////////////////////////////
108
109 //this method will update everything in the game
110 public void tick() {
111
112     for(int i=0; i<handler.object.size();i++){
113         if(handler.object.get(i).getId() == ID.Player){
114             camera.tick(handler.object.get(i));
115         }
116     }
117     handler.tick();
118 }
119 //to handle graphics and images
120 public void render(){
121
122     BufferStrategy bs = this.getBufferStrategy();
123     if(bs == null){
124         this.createBufferStrategy(3); //pre-loading frames behind the actual window
125         return;
126     }
127
128     //////////////////////////////////////////////////
129
130     //drawings
131     Graphics g = bs.getDrawGraphics();

```

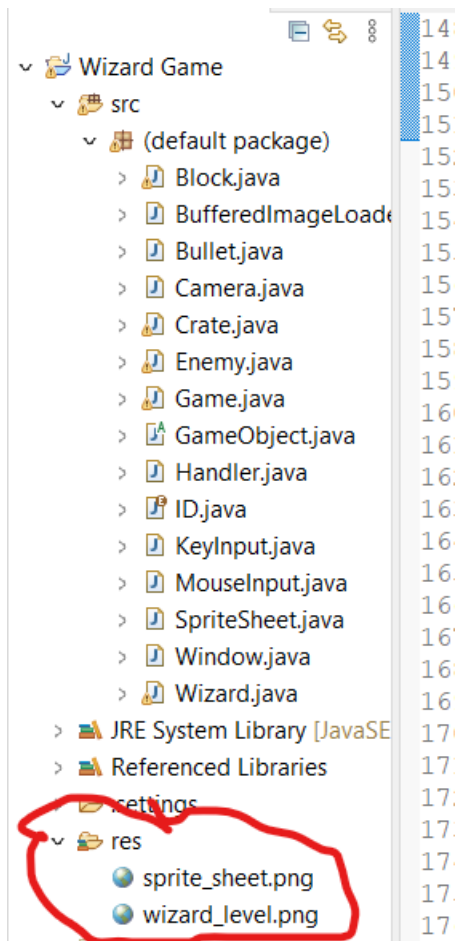
```

131     Graphics g = bs.getDrawGraphics();
132     Graphics2D g2d = (Graphics2D) g;
133     ////////////////////////////////////    GAME DRAWING
134
135     g2d.translate(-camera.getX(), -camera.getY());
136
137     for(int xx = 0; xx < 30*72; xx+=32){
138         for(int yy = 0; yy < 30*72; yy+=32){
139             g.drawImage(floor, xx, yy, null);
140         }
141     }
142
143     handler.render(g);
144
145     g2d.translate(camera.getX(), camera.getY());
146
147     g.setColor(Color.gray);
148     g.fillRect(5, 5, 900, 32);
149     g.setColor(Color.green);
150     g.fillRect(5, 5, hp*9, 32);
151     g.setColor(Color.black);
152     g.drawRect(5, 5, 900, 32);
153
154     g.setColor(Color.white);
155     g.drawString("Ammo: " + ammo, 5, 50);
156
157     ////////////////////////////////////    GAME DRAWING
158     g.dispose();
159     bs.show();
160 }
161
162 //////////////////////////////////////////////////
163 // loading the level
164 private void loadLevel(BufferedImage image){
165     int w = image.getWidth();
166     int h = image.getHeight();
167
168     for(int xx = 0; xx < w; xx++){
169         for(int yy = 0; yy < h;yy++){
170             int pixel = image.getRGB(xx, yy);
171             int red = (pixel >> 16) & 0xff;
172             int green = (pixel >> 8) & 0xff;
173

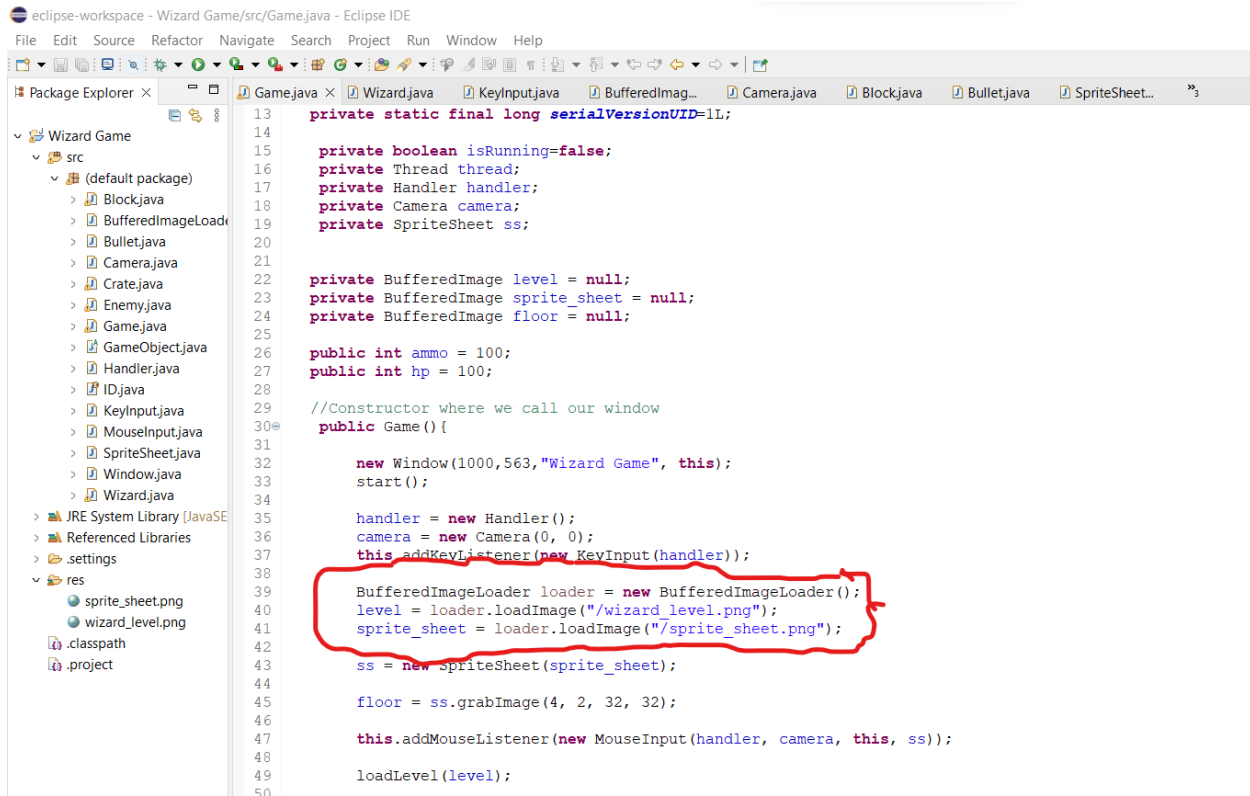
```

```
158 ////////////////////////////////////////////////// GAME DRAWING
159 g.dispose();
160 bs.show();
161 }
162
163 //////////////////////////////////////////////////
164 // loading the level
165 private void loadLevel(BufferedImage image){
166     int w = image.getWidth();
167     int h = image.getHeight();
168
169     for(int xx = 0; xx < w; xx++){
170         for(int yy = 0; yy < h;yy++){
171             int pixel = image.getRGB(xx, yy);
172             int red = (pixel >> 16) & 0xff;
173             int green = (pixel >> 8) & 0xff;
174             int blue = (pixel) & 0xff;
175
176             if(red == 255)
177                 handler.addObject(new Block(xx*32, yy*32, ID.Block, ss));
178
179             if(blue == 255 && green == 0)
180                 handler.addObject(new Wizard(xx*32,yy*32, ID.Player, handler, this, ss));
181
182             if(green == 255 && blue == 0)
183                 handler.addObject(new Enemy(xx*32,yy*32, ID.Enemy, handler, ss));
184
185             if(green == 255 && blue == 255)
186                 handler.addObject(new Crate(xx*32,yy*32, ID.Crate, ss));
187
188         }
189     }
190 }
191
192 //////////////////////////////////////////////////
193
194 //Main Method
195 public static void main(String args[]){
196     new Game(); //set us right to our constructor
197 }
198 }
199
200
```

Res Folder (where paint files are added):



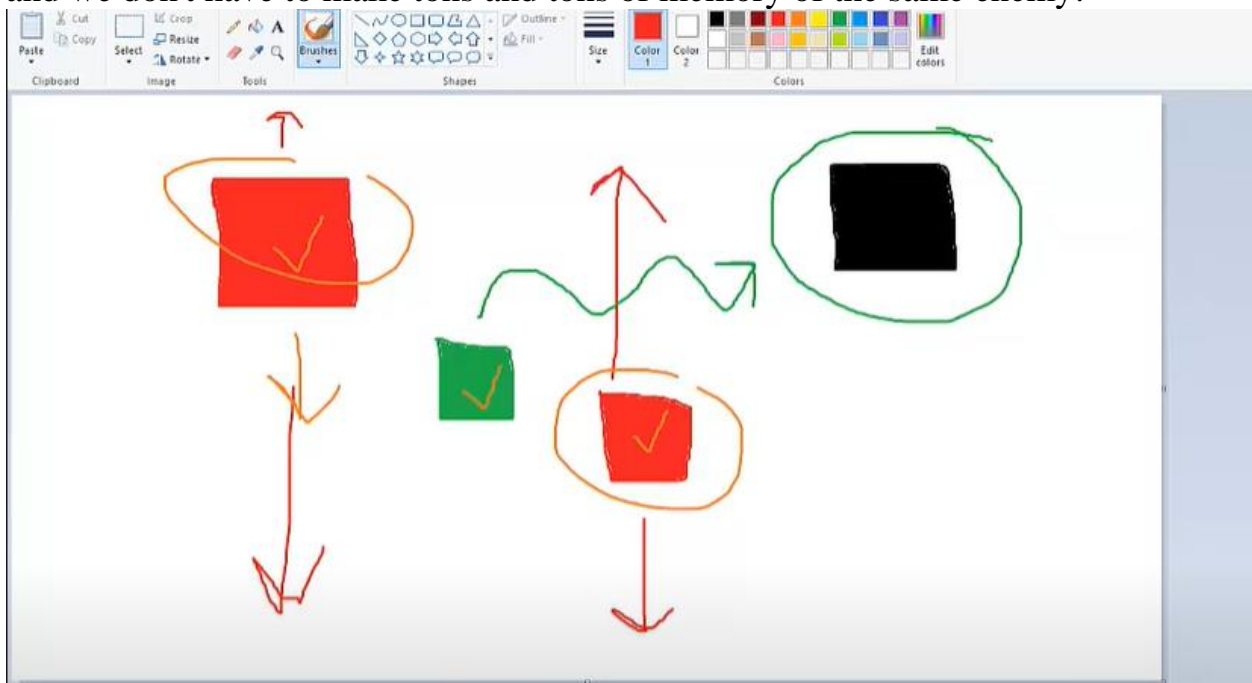
Implemented in main class:



3. Game Object Class (For the objects): Concept:

What we're going to do is look at creating game objects and our handler class to handle all of the game objects enter game, what a game object really is? So, in paint and let's say this is our window right this is our actual game and let's say we want to create, you know a box right and this is going to be like a box that maybe you can move around and do different things right so generally speaking then if we wanted to create this box, we can create a class, a key input everything like that let's say, we wanted to make an enemy now all right so there's our enemy let's say this enemy just moves up and down. We wanted to make another enemy though the same thing just moves up and down all right up and down, we wanted to make another enemy that maybe moves towards our player, so if we actually keep going with this and this is just one level of our game we're now looking at creating four different class files for each one of these guys because we can't even if we have an enemy one an enemy two that does the same thing we can't make two different instances of the same class, we can't say new enemy and then like update our enemy and they're like destroy it because if we destroy this class then it's going to destroy this class like the health goes down, so it gets really confusing and what if we had over 50 enemies in our

game, we need 50 different classes and we wanted to change just one argument in one of these to make this enemy move up and down faster right now, we got to go into 50 different class files and change that it's just so unofficial so what we need to do is create one object that controls everything. One object that controls a block, one object that controls our create, one object that controls our player, one object that controls our enemies different enemies that shoot, that run from you, enemies that explode all controlled with one object and that is our game object and this is what **object-oriented programming** is so essentially now exactly just going to be just one object but instead of having 50 different instances of just our same enemy, we can have one instance of that enemy and then from that we can create multiple ones and then if we want to change something we don't have to go into 50 different classes and we don't have to make tons and tons of memory of the same enemy.



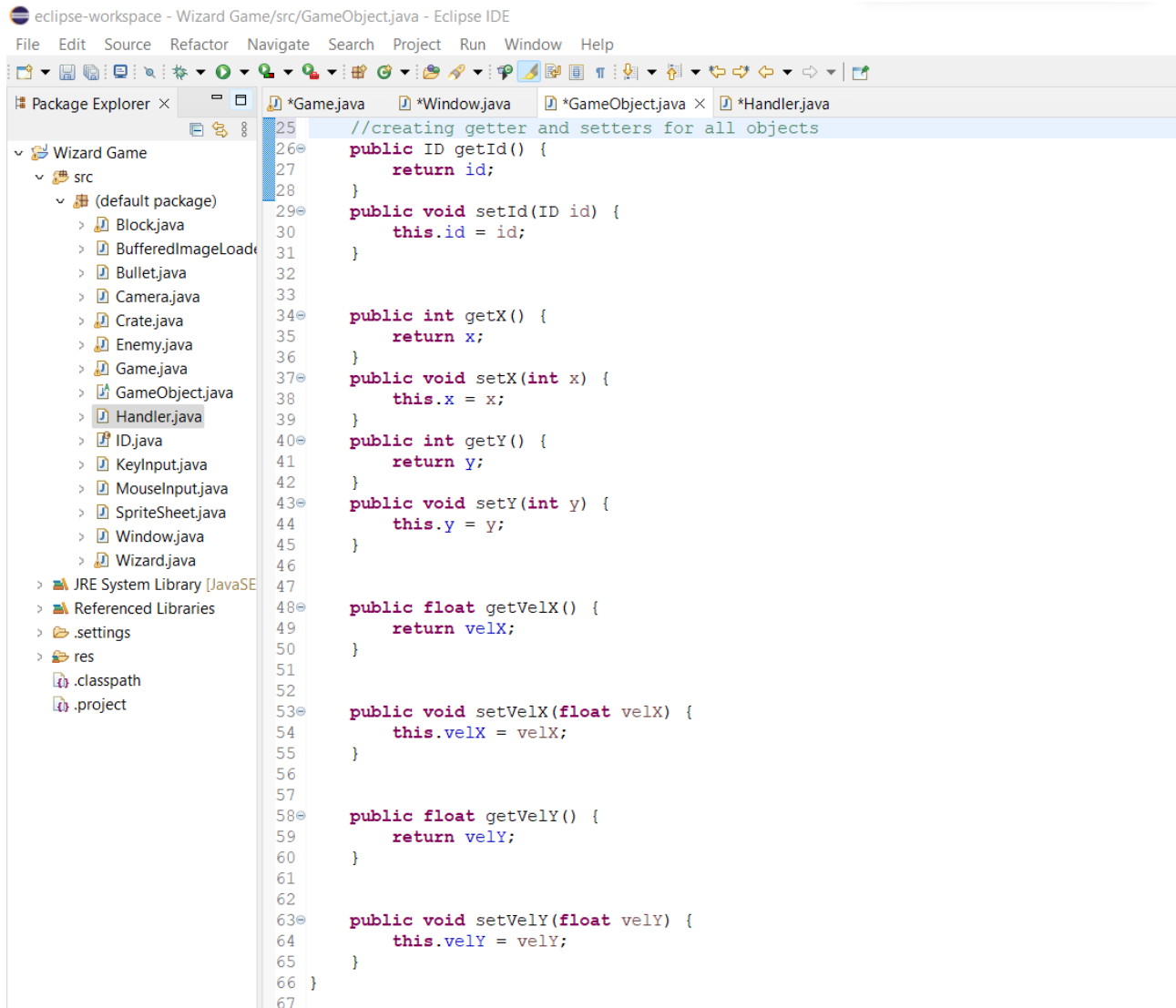
eclipse-workspace - Wizard Game/src/GameObject.java - Eclipse IDE

File Edit Source Refactor Navigate Search Project Run Window Help

Package Explorer Wizard Game

- src
 - (default package)
 - Block.java
 - BufferedImageLoad.java
 - Bullet.java
 - Camera.java
 - Crate.java
 - Enemy.java
 - Game.java
 - GameObject.java
 - Handler.java
 - ID.java
 - KeyInput.java
 - MouseInput.java
 - SpriteSheet.java
 - Window.java
 - Wizard.java
 - JRE System Library [JavaSE 8.0_60]
 - Referenced Libraries
 - .settings
 - res
 - .classpath
 - .project

```
1 import java.awt.Graphics;
2
3 //Abstract class
4 public abstract class GameObject{
5
6     protected int x, y;
7     protected float velX = 0, velY = 0; //set velocity, speed of our objects going
8     protected ID id;
9     protected SpriteSheet ss;
10
11     //Constructor
12     public GameObject(int x, int y, ID id, SpriteSheet ss){
13         this.x = x;
14         this.y = y;
15         this.id = id;
16         this.ss = ss;
17     }
18
19     public abstract void tick(); //every object needs upgrade
20     public abstract void render(Graphics g); //every objects needs to draw something/appear to be something
21     public abstract Rectangle getBounds(); //for collision detection, every object will be rectangle
22
23
24
25 //creating getter and setters for all objects
26 public ID getId() {
27     return id;
28 }
29 public void setId(ID id) {
30     this.id = id;
31 }
32
33
34 public int getX() {
35     return x;
36 }
37 public void setX(int x) {
38     this.x = x;
39 }
40 public int getY() {
41     return y;
42 }
43 public void setY(int y) {
44     this.y = y;
45 }
```



The screenshot shows the Eclipse IDE interface. The Package Explorer on the left displays the project structure for 'Wizard Game', including a 'src' package with various Java files like Block.java, Bullet.java, Camera.java, etc., and 'Handler.java' selected. The main editor shows the code for 'GameObject.java', which includes methods for getting and setting ID, X, Y, and velocity coordinates. The code is as follows:

```
25 //creating getter and setters for all objects
26 public ID getId() {
27     return id;
28 }
29 public void setId(ID id) {
30     this.id = id;
31 }
32
33
34 public int getX() {
35     return x;
36 }
37 public void setX(int x) {
38     this.x = x;
39 }
40 public int getY() {
41     return y;
42 }
43 public void setY(int y) {
44     this.y = y;
45 }
46
47
48 public float getVelX() {
49     return velX;
50 }
51
52
53 public void setVelX(float velX) {
54     this.velX = velX;
55 }
56
57
58 public float getVelY() {
59     return velY;
60 }
61
62
63 public void setVelY(float velY) {
64     this.velY = velY;
65 }
66 }
67
```

4. Handler Class (To handle all objects):

We make handler class because this is going to handle all of our objects and here we going to create a new linked list game object, we call it object and equal to a new linked list game object, now linked list is essentially an array of objects, so it gets a bunch of other different information that we need we can also use the linked list functions to get a certain ID of one object over another.

eclipse-workspace - Wizard Game/src/Handler.java - Eclipse IDE

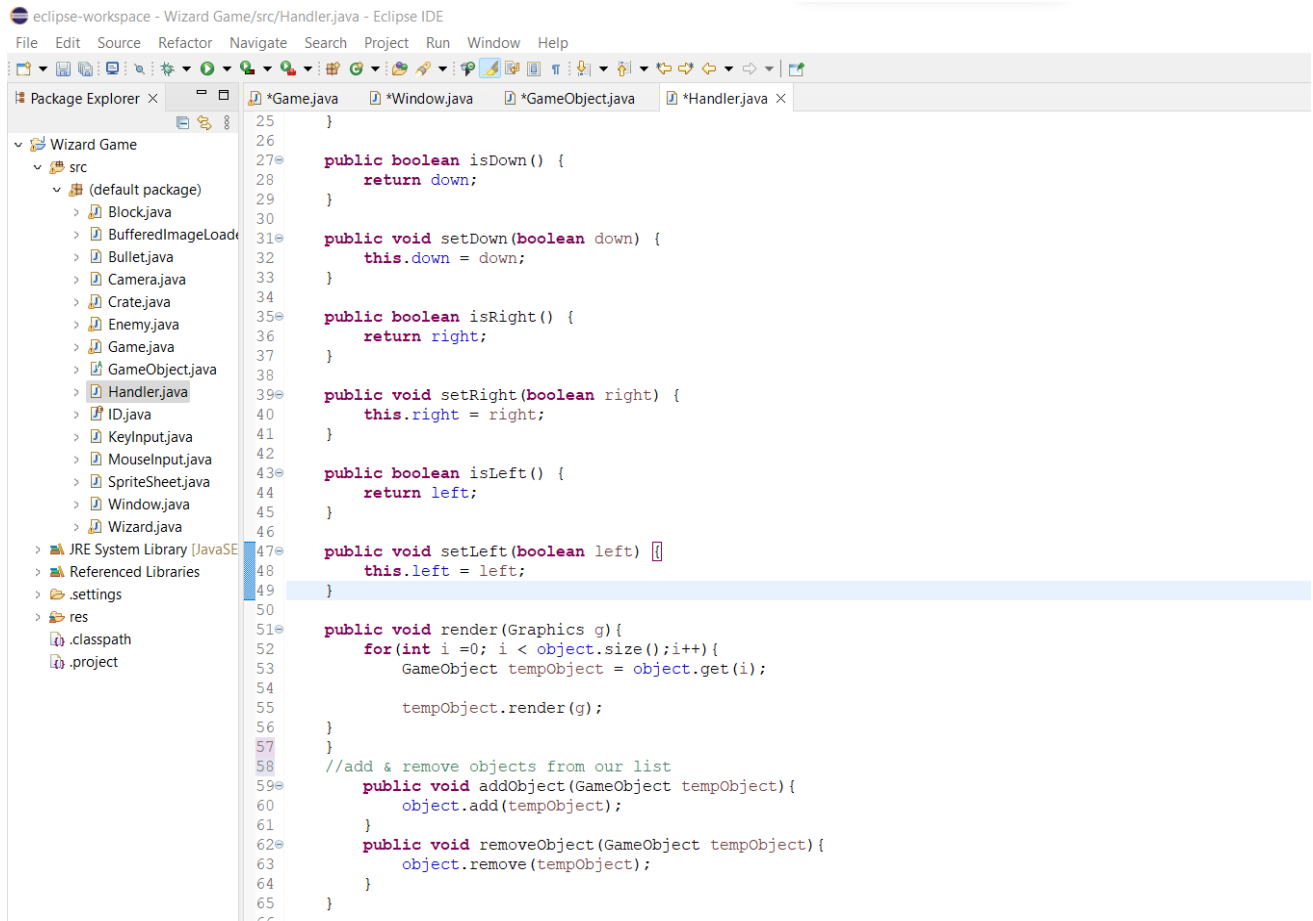
File Edit Source Refactor Navigate Search Project Run Window Help

Package Explorer ×

- Wizard Game
 - src
 - (default package)
 - Block.java
 - BufferedImageLoad.java
 - Bullet.java
 - Camera.java
 - Crate.java
 - Enemy.java
 - Game.java
 - GameObject.java
 - Handler.java
 - ID.java
 - KeyInput.java
 - MouseInput.java
 - SpriteSheet.java
 - Window.java
 - Wizard.java
 - JRE System Library [JavaSE]
 - Referenced Libraries
 - .settings
 - res
 - .classpath
 - .project

*Game.java *Window.java *GameObject.java *Handler.java ×

```
1 import java.awt.Graphics;
2
3 //handle all of our objects
4 public class Handler{
5
6
7     LinkedList<GameObject> object = new LinkedList<GameObject>();
8
9     private boolean up = false, down = false, right = false, left = false;
10
11     public void tick() { //update all our game objects
12         for(int i=0; i < object.size();i++){ //this loop will run in our all game objects
13             GameObject tempObject = object.get(i); //temporary game object
14             tempObject.tick();
15         }
16     }
17
18     public boolean isUp() {
19         return up;
20     }
21
22     public void setUp(boolean up) {
23         this.up = up;
24     }
25
26     public boolean isDown() {
27         return down;
28     }
29
30     public void setDown(boolean down) {
31         this.down = down;
32     }
33
34     public boolean isRight() {
35         return right;
36     }
37
38     public void setRight(boolean right) {
39         this.right = right;
40     }
41
42     public boolean isLeft() {
43         return left;
44     }
```



5. ID Class (Objects proper ID)

We just going to create a new enum and going to call it ID and all capitals there and essentially, what an enum is our enumeration is the concept of okay you can basically put an ID on something but you can just call it whatever you'd like so like instead of like maybe say having an integer of like, if, int ID equals one then it's a player, if ID two equals or if the ID equals two then, it's a box something like that instead, we can just in this ID enumeration here put let's say player and if we do that then now we have this player ID that we can call "going to go ahead" and put everything in this ID. Now we're going to have in our game so what do we have, we have by ID, we have our block that we're going to have in the game, we have what's there crate so we can pick up ammo, we have our bullet that we're going to have eventually and let's say we have our enemy We think that's their anything so we're going to have five separate objects in this game they're all going to be game objects every one you see so we have four player block, create bullet man, our enemy all going to be game objects and now they have their proper IDs.

```

Game/src/ID.java - Eclipse IDE
File Edit Source Refactor Navigate Search Project Run Window Help
1 public enum ID { // enum class to represent a group of constants means unchangeable variable like final variables
2     Player(),
3     Block(),
4     Bullet(),
5     Enemy(),
6     Crate(),
7 }
8
9

```

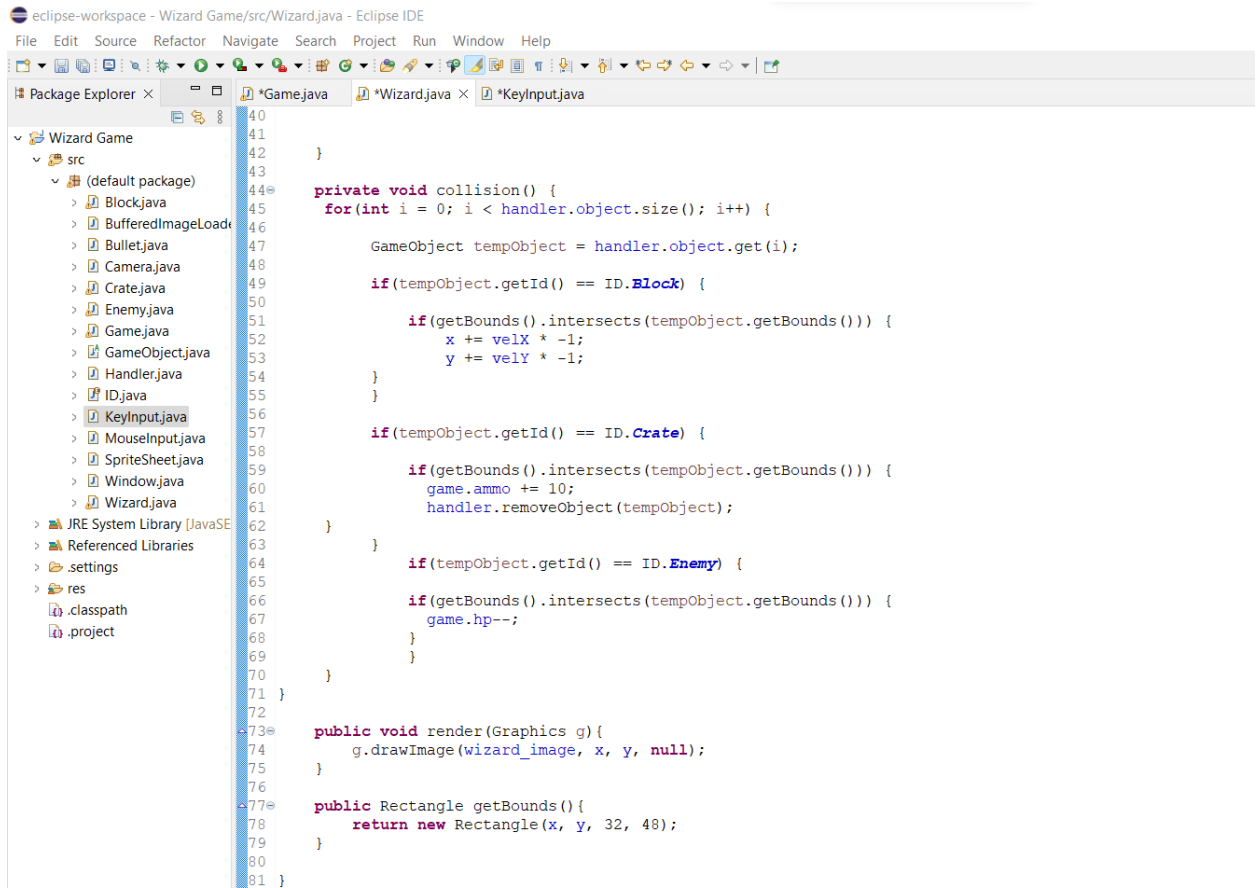
6. Wizard Class (Main Character Functions):

Here we have described our main characters features and how it'll deal with the enemies, collect crate and the movements of the character.

```

eclipse-workspace - Wizard Game/src/Wizard.java - Eclipse IDE
File Edit Source Refactor Navigate Search Project Run Window Help
Package Explorer ×
v Wizard Game
  v src
    (default package)
    > Block.java
    > BufferedImageLoad.java
    > Bullet.java
    > Camera.java
    > Crate.java
    > Enemy.java
    > Game.java
    > GameObject.java
    > Handler.java
    > ID.java
    > KeyInput.java
    > MouseInput.java
    > SpriteSheet.java
    > Window.java
    > Wizard.java
  > JRE System Library [JavaSE]
  > Referenced Libraries
  > .settings
  > res
    .classpath
    .project
1 import java.awt.Color;
2 //Our main Character
3 public class Wizard extends GameObject{
4     Handler handler;
5     Game game;
6     private BufferedImage wizard_image ;
7     public Wizard(int x,int y,ID id, Handler handler, Game game, SpriteSheet ss){
8         super(x, y, id, ss);
9         this.handler = handler;
10        this.game = game;
11        wizard_image = ss.grabImage(1, 1, 32, 48);
12    }
13    public void tick(){
14        x += velX;
15        y += velY;
16        collision();
17        // movement
18        if(handler.isUp())velY = -5;
19        else if(!handler.isDown())velY=0;
20        if(handler.isDown())velY=5;
21        else if(!handler.isUp())velY=0;
22        if(handler.isRight())velX=5;
23        else if(!handler.isLeft())velX=0;
24        if(handler.isLeft())velX=-5;
25        else if(!handler.isRight())velX=0;
26    }
27    private void collision() {
28        for(int i = 0; i < handler.object.size(); i++) {

```

The screenshot shows the Eclipse IDE interface. The Package Explorer on the left displays the project structure: Wizard Game (src) -> (default package) -> Wizard.java. The main editor shows the code for Wizard.java. The code includes a collision method that iterates through handler.object, checking for intersections with Block, Crate, and Enemy objects. It updates position (x, y) and health (hp) based on these collisions. The render method draws the wizard image, and getBounds returns a rectangle for the wizard's hitbox.

```
40  
41  
42 }  
43  
44 private void collision() {  
45     for(int i = 0; i < handler.object.size(); i++) {  
46  
47         GameObject tempObject = handler.object.get(i);  
48  
49         if(tempObject.getId() == ID.Block) {  
50  
51             if(getBounds().intersects(tempObject.getBounds())) {  
52                 x += velX * -1;  
53                 y += velY * -1;  
54             }  
55         }  
56  
57         if(tempObject.getId() == ID.Crate) {  
58  
59             if(getBounds().intersects(tempObject.getBounds())) {  
60                 game.ammo += 10;  
61                 handler.removeObject(tempObject);  
62             }  
63         }  
64  
65         if(tempObject.getId() == ID.Enemy) {  
66  
67             if(getBounds().intersects(tempObject.getBounds())) {  
68                 game.hp--;  
69             }  
70         }  
71     }  
72  
73 public void render(Graphics g){  
74     g.drawImage(wizard_image, x, y, null);  
75 }  
76  
77 public Rectangle getBounds(){  
78     return new Rectangle(x, y, 32, 48);  
79 }  
80  
81 }
```

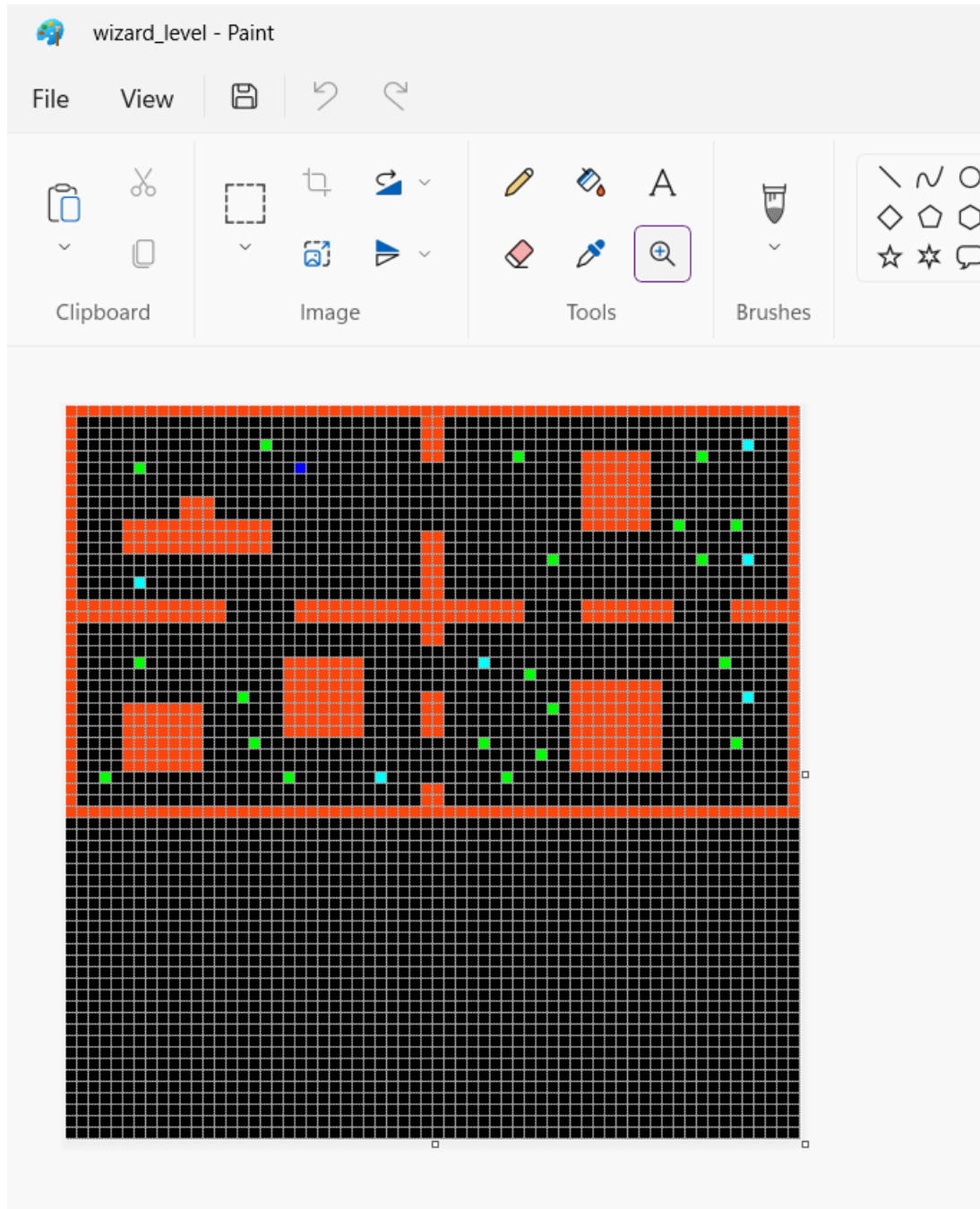
7. KeyInput Class (Initializing the keys for movements):

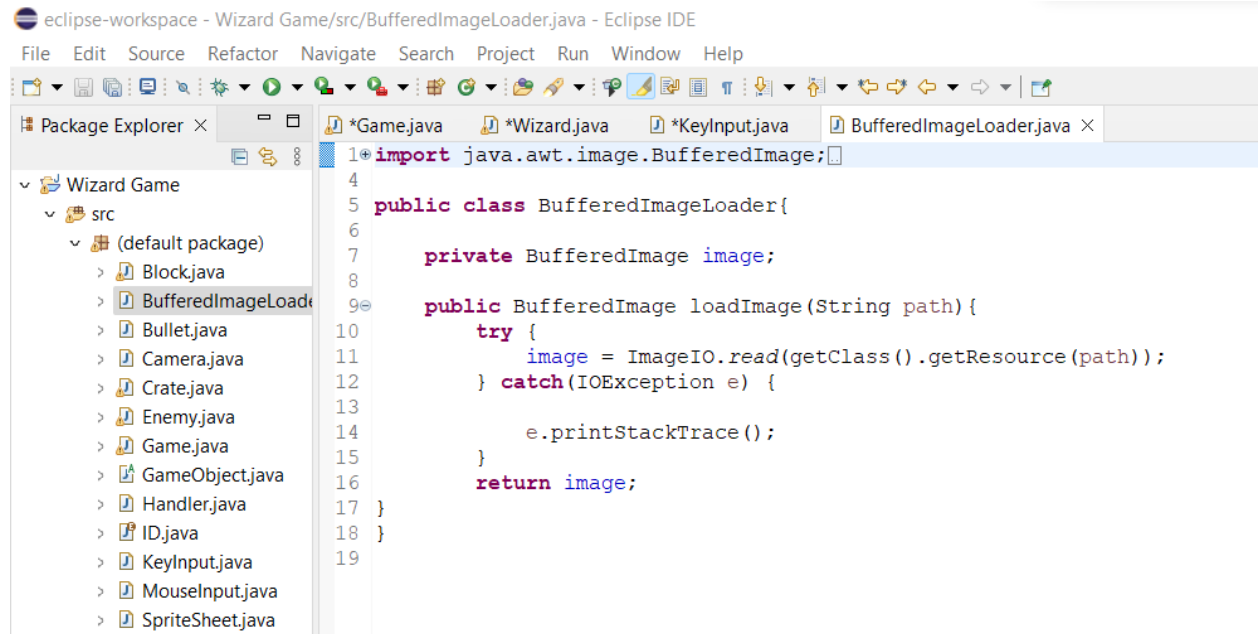
The wizards X position like goes to the right 3 pixels, if it's being held but what we want to have happen is that it goes to the right three pixels but if you immediately like go to the left then you're going to have no lag whatsoever. All right now it shouldn't make a lot of sense to you right now, especially if you've never done any sort of key input with Java but essentially, originally here or you know if you press the key then it goes to the right this amount of pixels, you have lag between the keys and it really just plays for it's just an awful play experience if you're hitting the left key and it's not going left right away you really want to have that nice stable control.


```
Wizard Game/src/KeyInput.java - Eclipse IDE
Refactor  Navigate  Search  Project  Run  Window  Help
[Icons]
1 //initializes the keys for movements
2
3 *import java.awt.event.KeyAdapter;
4
5
6
7
8 public class KeyInput extends KeyAdapter{
9
10     Handler handler;
11
12     public KeyInput(Handler handler) {
13         this.handler = handler;
14     }
15 //initialized & handled in Handler class
16 public void keyPressed(KeyEvent e){
17     int key = e.getKeyCode();
18
19     for(int i=0;i<handler.object.size();i++){
20         GameObject tempObject=handler.object.get(i);
21
22         //setting up the keys for the movement of player when pressed
23         if(tempObject.getId() == ID.Player){
24             if(key == KeyEvent.VK_W) handler.setUp(true);
25             if(key == KeyEvent.VK_S) handler.setDown(true);
26             if(key == KeyEvent.VK_A) handler.setLeft(true);
27             if(key == KeyEvent.VK_D) handler.setRight(true);
28         }
29     }
30 }
31 //method when keys are released
32 public void keyReleased(KeyEvent e){
33     int key = e.getKeyCode();
34     for(int i=0;i<handler.object.size();i++){
35         GameObject tempObject=handler.object.get(i);
36
37         if(tempObject.getId() == ID.Player){
38             if(key == KeyEvent.VK_W) handler.setUp(false);
39             if(key == KeyEvent.VK_S) handler.setDown(false);
40             if(key == KeyEvent.VK_A) handler.setLeft(false);
41             if(key == KeyEvent.VK_D) handler.setRight(false);
42         }
43     }
44 }
45 }
```

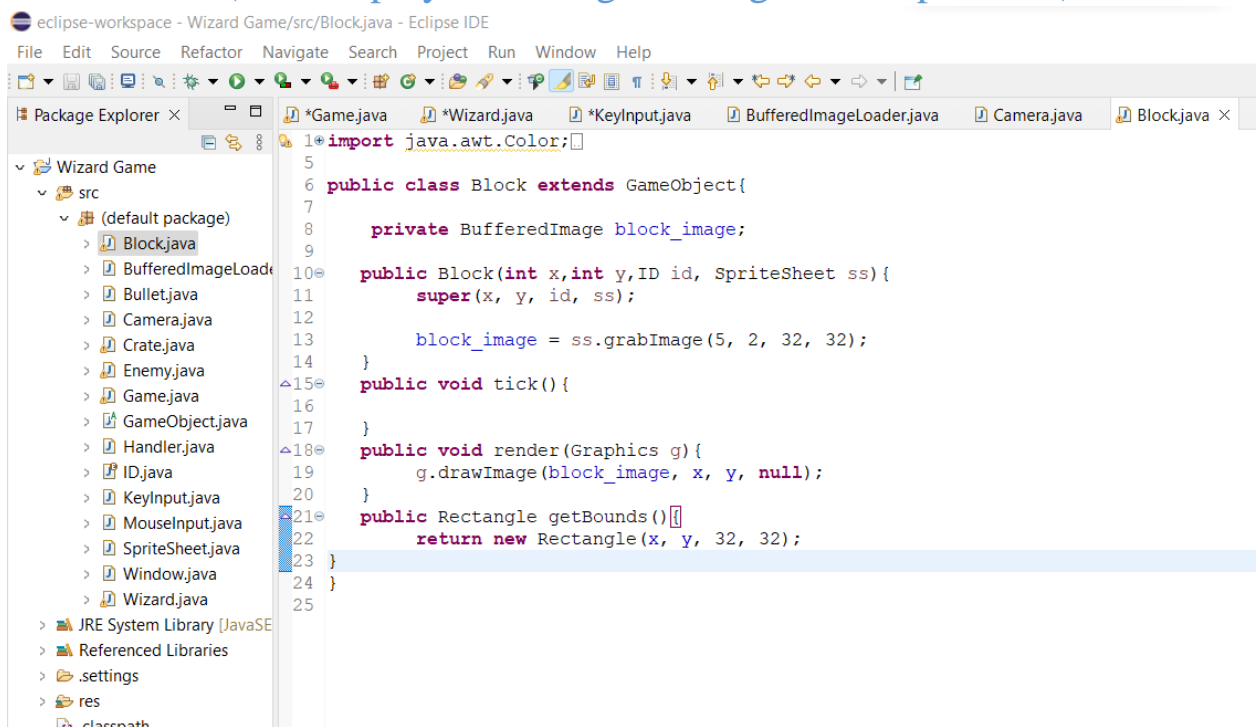
8. BufferedImageLoader Class (for implementation of map design):

Now we have draw the raw map using the paint and gonna implement that in the code. We are actually gonna make a folder under the name “res” and copy paste our paint files there and copy the URL of that file in the main class “Game class”.



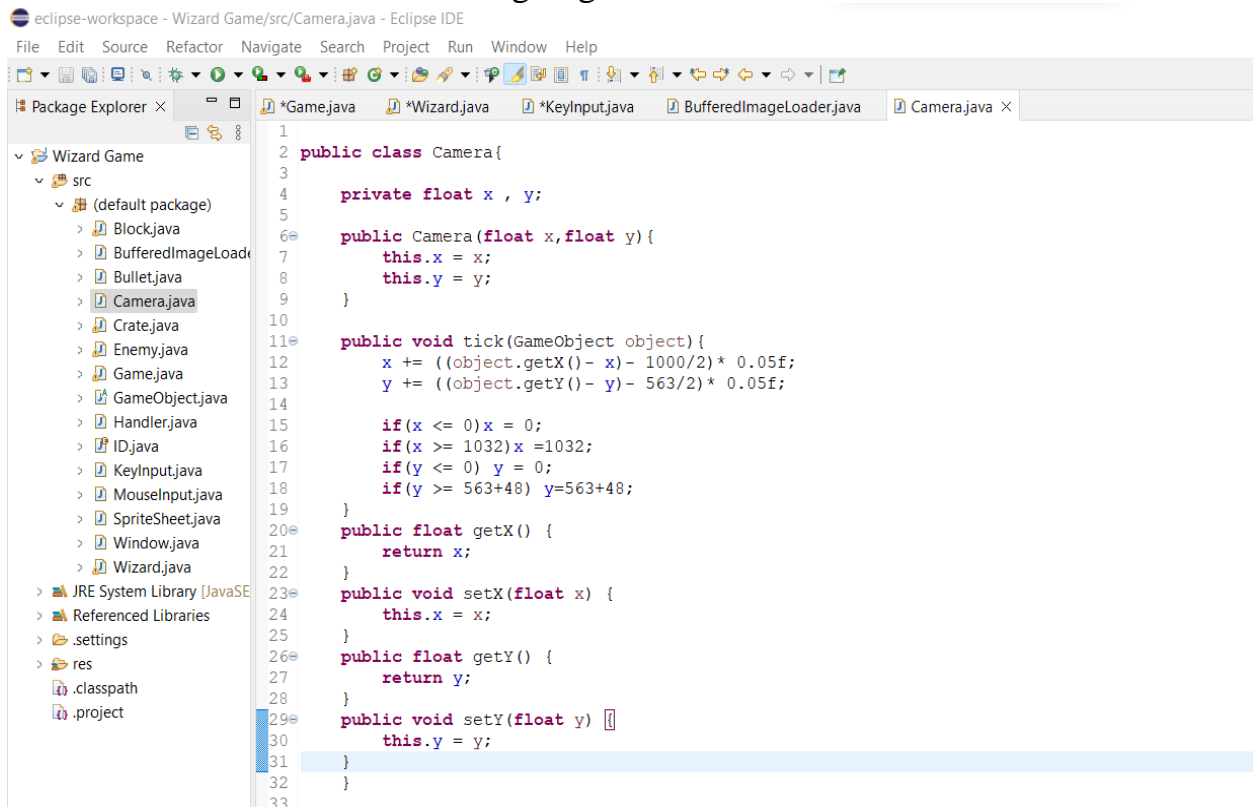


9. Block Class (For the player to not get through the map blocks):



10. Camera Class (To move the view angle with the player):

Now we have this level here that we've created, there's more to explore here but we physically can't in the game why because we need a camera that's going to follow our character so that's what we're going to make.



The screenshot shows the Eclipse IDE interface. The Package Explorer on the left displays the project structure for 'Wizard Game', including a 'src' package with various Java files like Block.java, Camera.java, and Wizard.java. The main editor window shows the code for 'Camera.java'. The code defines a 'Camera' class with private fields 'x' and 'y', a constructor, and methods for updating position, getting, and setting coordinates.

```
1 public class Camera{
2
3
4     private float x , y;
5
6     public Camera(float x,float y){
7         this.x = x;
8         this.y = y;
9     }
10
11     public void tick(GameObject object){
12         x += ((object.getX()- x)- 1000/2)* 0.05f;
13         y += ((object.getY()- y)- 563/2)* 0.05f;
14
15         if(x <= 0)x = 0;
16         if(x >= 1032)x =1032;
17         if(y <= 0) y = 0;
18         if(y >= 563+48) y=563+48;
19     }
20     public float getX() {
21         return x;
22     }
23     public void setX(float x) {
24         this.x = x;
25     }
26     public float getY() {
27         return y;
28     }
29     public void setY(float y) {
30         this.y = y;
31     }
32 }
33
```

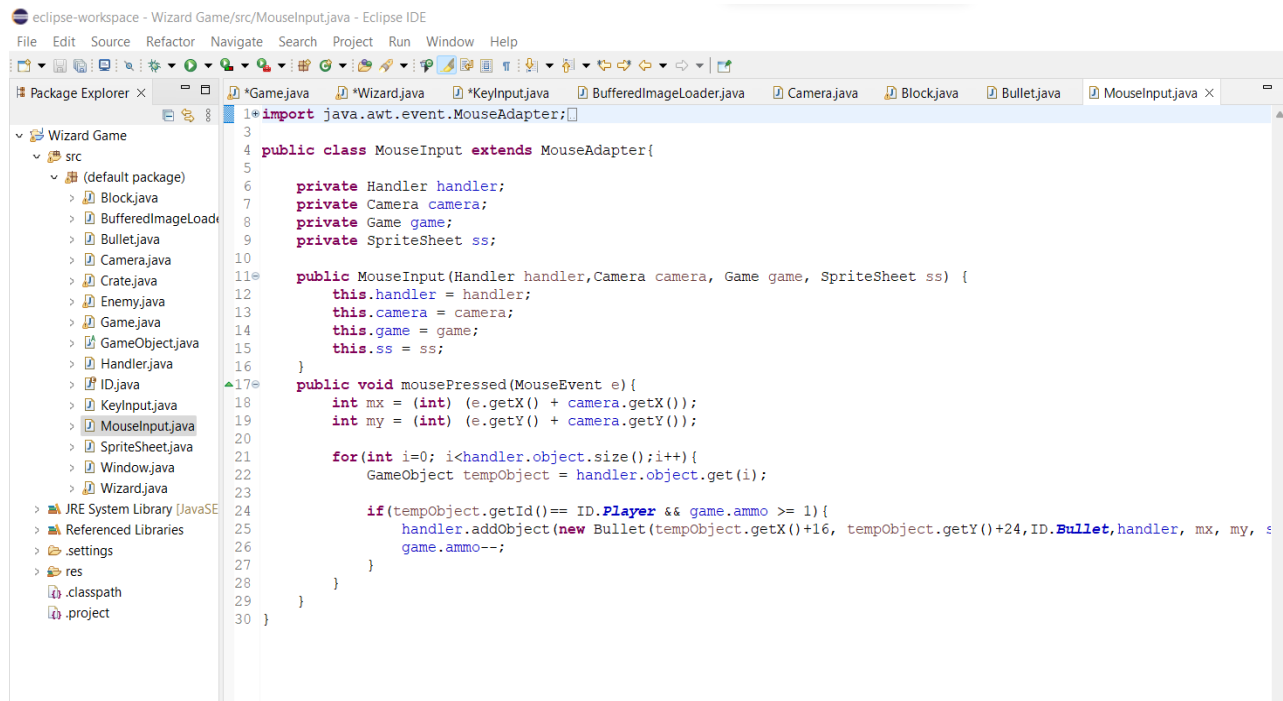
11. Bullet Class (To shoot the enemies):

In this what we're going to do is create a shooting system for our game so basically, we can run around our world here and we can use the mouse anywhere we'd like to click point and shoot a bullet.

```
1 import java.awt.Color;
2
3
4
5 public class Bullet extends GameObject {
6
7     private Handler handler;
8
9     public Bullet(int x, int y, ID id, Handler handler, int mx, int my, SpriteSheet ss) {
10         super(x, y, id, ss);
11         this.handler = handler;
12
13         velX = (mx - x) / 10;
14         velY = (my - y) / 10;
15     }
16
17     public void tick() {
18         x += velX;
19         y += velY;
20
21         for(int i=0; i<handler.object.size();i++){
22             GameObject tempObject = handler.object.get(i);
23
24             if(tempObject.getId() == ID.Block) {
25                 if(getBounds().intersects(tempObject.getBounds())) {
26                     handler.removeObject(this);
27                 }
28             }
29         }
30     }
31
32
33     public void render(Graphics g) {
34         g.setColor(Color.green);
35         g.fillOval(x, y, 8, 8);
36     }
37
38
39     public Rectangle getBounds() {
40         return new Rectangle(x, y, 8, 8);
41     }
42
43 }
```

12. MouseInput Class (For the control to shoot):

So, just like your key input we need a mouse input and we need to extend our mouse adapter, ctrl shift o to import, it so it's not the wrong all right and in our mouse adapter we want to save it.



13. Enemy Class (To create multiple enemies and their functions):

Just like Wizard class here we are going to implements all the functions designs and features of our enemies.

eclipse-workspace - Wizard Game/src/Enemy.java - Eclipse IDE

File Edit Source Refactor Navigate Search Project Run Window Help

Package Explorer Wizard Game src (default package) Block.java BufferedImageLoad... Bullet.java Camera.java Block.java Bullet.java MouseInput.java

```
1 import java.awt.Color;
2
3 public class Enemy extends GameObject{
4
5     private Handler handler;
6     Random r = new Random(); // for the movements controls of the enemies
7     int choose = 0;
8     int hp = 100; //health points
9
10    private BufferedImage enemy_image;
11
12    public Enemy(int x,int y,ID id,Handler handler, SpriteSheet ss){
13        super(x,y,id, ss);
14        this.handler=handler;
15
16        enemy_image = ss.grabImage(4, 1, 32, 32);
17    }
18
19    public void tick(){
20        x +=velX;
21        y +=velY;
22
23        choose = r.nextInt(10);
24
25        for (int i = 0; i<handler.object.size(); i++) {
26            GameObject tempObject = handler.object.get(i);
27
28            if(tempObject.getId() == ID.Block) {
29                if(getBoundsBig().intersects(tempObject.getBounds())) {
30                    x +=(velX*5) * -1;
31                    y +=(velY*5) * -1;
32                    velX *= -1;
33                    velY *= -1;
34                }else if (choose == 0) {
35                    velX =(r.nextInt(4 - -4) + -4);
36                    velY =(r.nextInt(4 - -4) + -4);
37                }
38            }
39
40            if(tempObject.getId() == ID.Bullet){
41                if(getBounds().intersects(tempObject.getBounds())){
42                    hp -=50;
43                    handler.removeObject(tempObject);
44                }
45            }
46        }
47    }
48 }
```

```
eclipse-workspace - Wizard Game/src/Enemy.java - Eclipse IDE
File Edit Source Refactor Navigate Search Project Run Window Help

Wizard Game
├── src
│   ├── (default package)
│   │   ├── Block.java
│   │   ├── BufferedImageLoad...
│   │   ├── Bullet.java
│   │   ├── Camera.java
│   │   ├── Crate.java
│   │   ├── Enemy.java
│   │   ├── Game.java
│   │   ├── GameObject.java
│   │   ├── Handler.java
│   │   ├── ID.java
│   │   ├── KeyInput.java
│   │   ├── MouseInput.java
│   │   ├── SpriteSheet.java
│   │   ├── Window.java
│   │   └── Wizard.java
│   ├── JRE System Library [JavaSE
│   ├── Referenced Libraries
│   ├── .settings
│   └── res
│       ├── .classpath
│       └── .project

24      x +=velX;
25      y +=velY;
26
27      choose = r.nextInt(10);
28
29      for (int i = 0; i<handler.object.size(); i++) {
30          GameObject tempObject = handler.object.get(i);
31
32          if(tempObject.getId() == ID.Block) {
33              if(getBoundsBig().intersects(tempObject.getBounds())) {
34                  x +=(velX*5) * -1;
35                  y +=(velY*5) * -1;
36                  velX *= -1;
37                  velY *= -1;
38              }else if (choose == 0) {
39                  velX =(r.nextInt(4 - -4) + -4);
40                  velY =(r.nextInt(4 - -4) + -4);
41              }
42          }
43      }
44      if(tempObject.getId() == ID.Bullet){
45          if(getBounds().intersects(tempObject.getBounds())){
46              hp -=50;
47              handler.removeObject(tempObject);
48          }
49      }
50      if(hp<0)handler.removeObject(this);
51  }
52
53  public void render(Graphics g) {
54      g.drawImage(enemy_image,x, y, null);
55  }
56
57  public Rectangle getBounds(){
58      return new Rectangle(x, y, 32, 32);
59  }
60  public Rectangle getBoundsBig(){
61      return new Rectangle(x-16, y-16, 64, 64);
62  }
63  }
64  }
65  }
```

14. Crate (for the ammo refill):

Going to add design (box) to the map and implement that, so if the player ran out of ammo it can collect and refill.

The screenshot shows the Eclipse IDE interface. The Package Explorer on the left displays the project structure: Wizard Game > src > (default package). The main editor shows the code for `Crate.java`. The code includes an import for `java.awt.Color`, a class declaration `public class Crate extends GameObject`, a private field `private BufferedImage crate_image;`, and several methods: `public Crate(int x, int y, ID id, SpriteSheet ss)`, `public void tick()`, `public void render(Graphics g)`, and `public Rectangle getBounds()`.

```

1 import java.awt.Color;
2
3 public class Crate extends GameObject {
4
5     private BufferedImage crate_image;
6
7     public Crate(int x, int y, ID id, SpriteSheet ss) {
8         super(x, y, id, ss);
9
10        crate_image = ss.grabImage(6, 2, 32, 32);
11    }
12
13    public void tick() {
14    }
15
16    public void render(Graphics g) {
17        g.drawImage(crate_image, x, y, null);
18    }
19
20    public Rectangle getBounds() {
21        return new Rectangle(x, y, 32, 32);
22    }
23 }

```

15. SpriteSheet Class (Design of overall game):

The screenshot shows the Eclipse IDE interface. The Package Explorer on the left displays the project structure: Wizard Game > src > (default package). The main editor shows the code for `SpriteSheet.java`. The code includes an import for `java.awt.image.BufferedImage`, a class declaration `public class SpriteSheet`, a private field `private BufferedImage image;`, and two methods: `public SpriteSheet(BufferedImage image)` and `public BufferedImage grabImage(int col, int row, int width, int height)`.

```

1 import java.awt.image.BufferedImage;
2
3 public class SpriteSheet {
4
5     private BufferedImage image;
6
7     public SpriteSheet(BufferedImage image) {
8         this.image = image;
9     }
10
11    public BufferedImage grabImage(int col, int row, int width, int height) {
12        return image.getSubimage((col*32)-32, (row*32)-32, width, height);
13    }
14 }

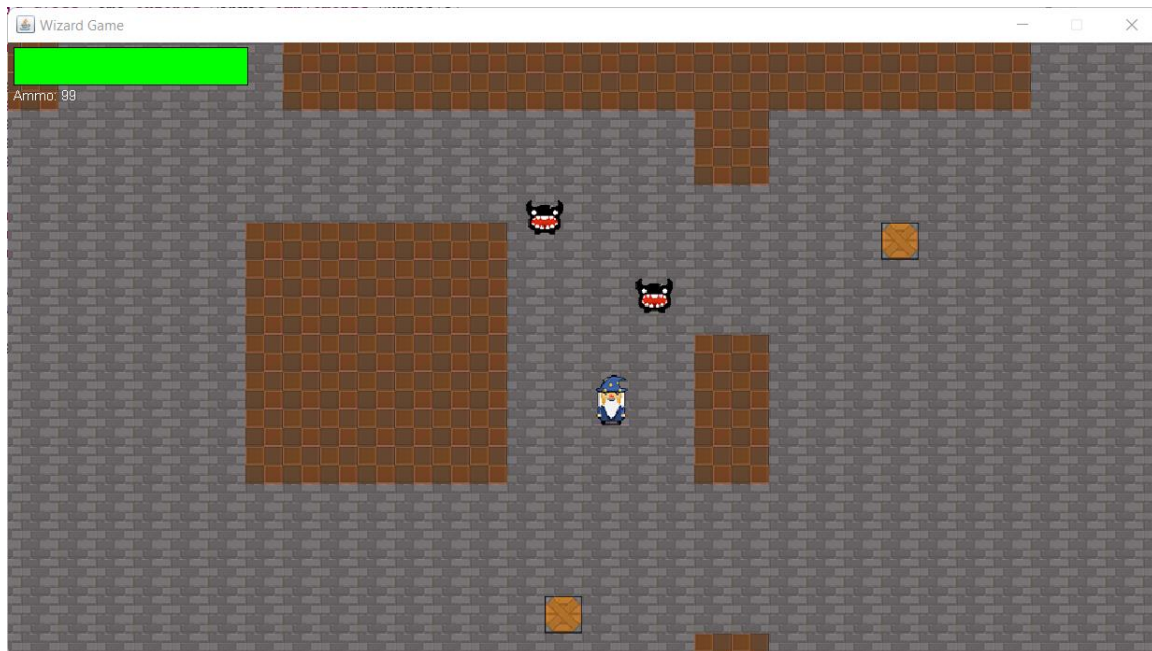
```

OUTPUT:

- **Raw Output:**



- **Overall:**



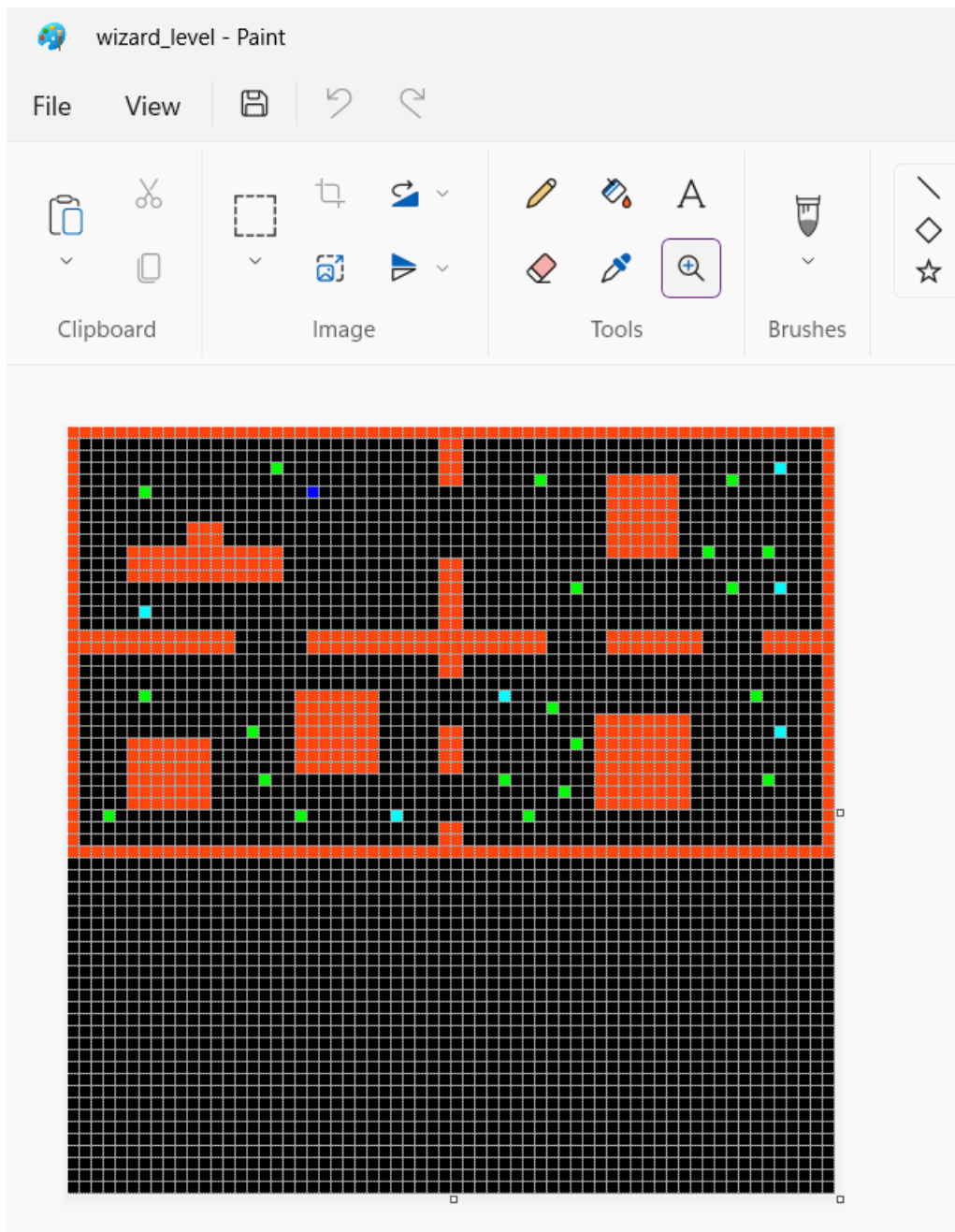
- **Health & Ammo:**

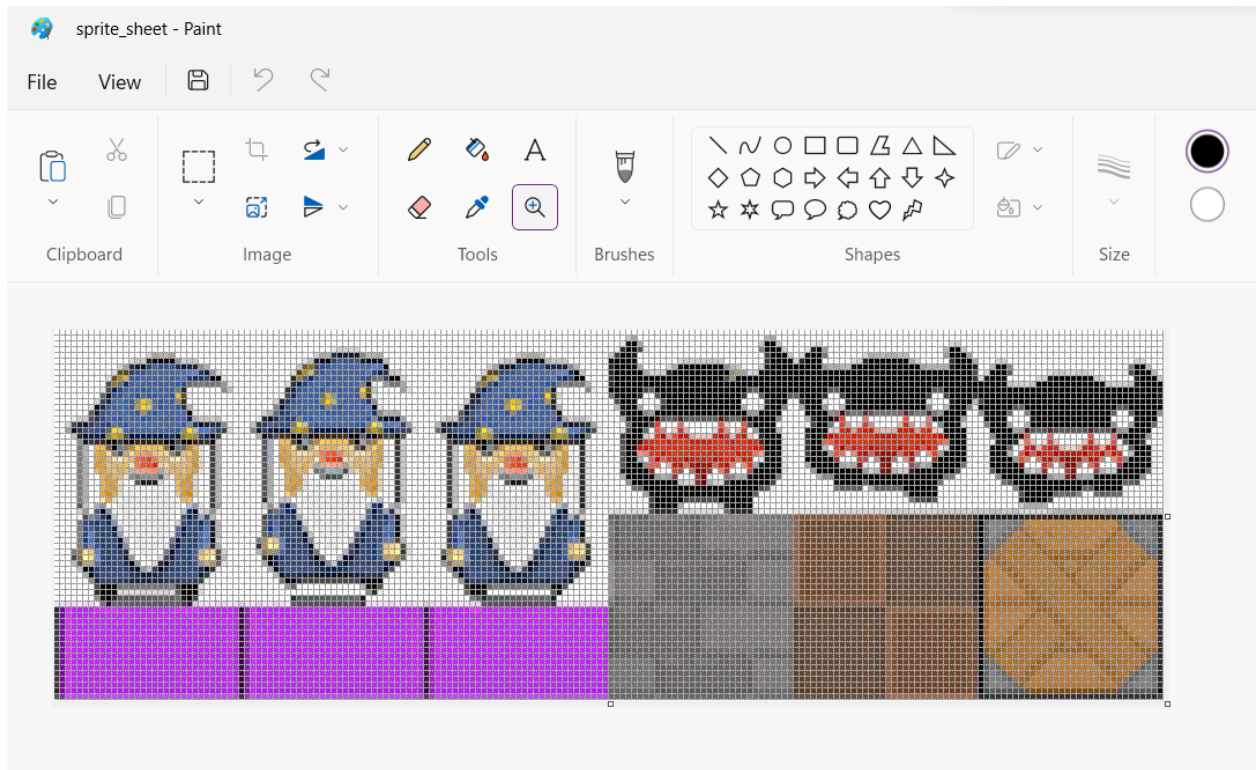


- **Shooting Part:**



DESIGN:





SCOPE:

This report outlines the said project's details, which have great potential and benefits in the long term as it can be played by any age group people also it was a great & new experience for us as well. Although shooting games are violent, they can be very efficient in teaching hand-eye coordination, motor, and spatial skills.

CONCLUSION:

Thinking of the game as a part of a bigger educational process is really in the core mind-set that this project wants to promote. Games can do many things very well, but they certainly cannot do everything at once. Especially not without solid supporting structures around them. Throughout the project and the case studies we built this was true.

CORRECTIONS THAT WERE ASKED TO DO IN AFTER VIVA:

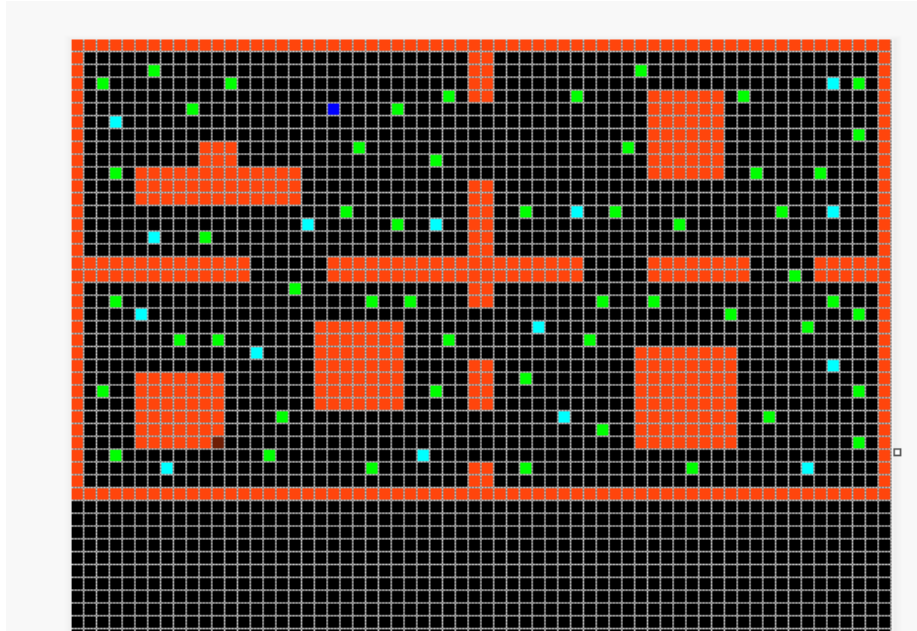
- **Game exit after player health has been over:**

```
    }  
    }  
  
    //intersect library is introduced which determines the intersection between player and crate  
    if(tempObject.getId() == ID.Crate) {  
  
        if(getBounds().intersects(tempObject.getBounds())) {  
            game.ammo += 20;  
            handler.removeObject(tempObject);  
        }  
    }  
  
    //intersect library is introduced which determines the intersection between player and enemy  
    if(tempObject.getId() == ID.Enemy) {  
        if(getBounds().intersects(tempObject.getBounds())) {  
            game.hp--;  
        }  
        else if(game.hp==0) { //condition that when health is empty the game will exit  
            System.exit(0);  
        }  
    }  
}  
  
//render method is created which converts the image into 2D and 3D  
public void render(Graphics g){  
    g.drawImage(wizard_image, x, y, null);  
}  
  
//this constructor helps create a rectangle  
public Rectangle getBounds(){  
    return new Rectangle(x, y, 32, 48);  
}
```

Writable Smart Insert 76:16:232

In wizard class we have implemented the condition that the game will stop as soon as the health point (hp) get to 0.

- **Added more enemies as per directions:**



The green dots represent enemies.

- **A single shoot will kill the enemy:**

```

1 //class made to create multiple enemies and their functions
2
3 import java.awt.Color;
4
5
6
7
8
9
10 public class Enemy extends GameObject{
11
12     private Handler handler;
13     Random r = new Random(); // for the movements controls of the enemies
14     int choose = 0;
15     int hp = 10; //health points
16
17     private BufferedImage enemy_image;
18
19
20

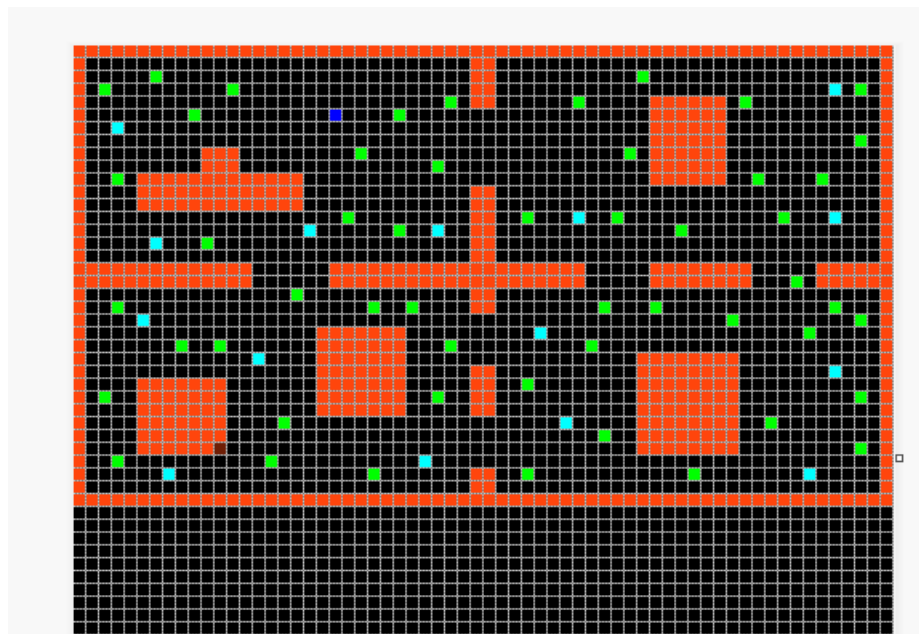
```

Decreased the enemy health so it would be killed by 1 bullet.

- **Increase the health level bar:**



- **Increase the ammo crate:**



Cyan is the ammo crate.

- **More detailed comments added to code.**