CIE 3 MINI PROJECT
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//CONTROLLER

```
package game;


public class Controller implements java.awt.event.KeyListener, java.awt.event.MouseListener,
java.awt.event.MouseMotionListener{

	Window w;
	Player p;
	java.util.Vector<Enemy> e;
	java.util.Vector<Shot> s;
	javax.swing.JFrame f;
	java.awt.Point mouse_pos;
	int health;
	int shaking;
	int level;
	int xp;
	int levelup;
	int score;
	int cooldown;
	int waittime;
	boolean pause;
	Controller(javax.swing.JFrame f){
		mouse_pos = new java.awt.Point(0, 0);
		w = new Window(this);
		p = new Player(this);
		e = new java.util.Vector<Enemy>();
		s = new java.util.Vector<Shot>();

		health = 450;
		shaking = 0;
		level = 1;
		xp = 0;
		levelup = 0;
		score = 0;
		cooldown = 0;
		waittime = 0;
		this.f = f;
		this.f.getContentPane().add(w, java.awt.BorderLayout.CENTER);
		this.f.pack();
		this.f.addMouseListener(this);
		this.f.addMouseMotionListener(this);
		this.f.addKeyListener(this);
		run();
	}

	void run(){
		while(true){
			if(pause){
```

```
                w.repaint();

                try{
                        Thread.sleep(100);
                }catch(Exception e){}

                continue;
        }

        if(cooldown > 0){
                cooldown--;
        }

        if(Math.random() < ((0.002*level*level)/10)+0.0001*waittime && !p.dead){
                e.add(new Enemy(this));

                waittime = 0;
                if(Math.random() < 0.66){
                        e.get(e.size()-1).x = (Math.random() < 0.5? -50: 550);
                        e.get(e.size()-1).y = (int)(Math.random()*400);
                }else{
                        e.get(e.size()-1).x = (int)(Math.random()*400);
                        e.get(e.size()-1).y = -50;
                }
                e.get(e.size()-1).health = 5*level*level;
        }else{
                op
                waittime++;
        }

        p.run();

        for(int i = 0; i < e.size(); i++){

                e.get(i).run();

                if(e.get(i).dead){

                        if(e.get(i).y > 500){

                                e.remove(i);

                                i--;
                        }
                }
        }

        for(int i = 0; i < s.size(); i++){

                s.get(i).run();

                if(s.get(i).x > 500 || s.get(i).y > 500 || s.get(i).x < 0 || s.get(i).y <
0){

                        s.remove(i);

                        i--;
```

```
}else if(!s.get(i).friendly){

        int xdiff = (p.x+p.cox)-(s.get(i).x);
        int ydiff = (p.y+p.coy)-(s.get(i).y);

        if(Math.abs(xdiff) < 50 && Math.abs(ydiff) < 50){

                s.remove(i);

                i--;

                p.damage = 20;

                health -= 25;

                shaking = 20;

                if(health <= 0){

                        p.dead = true;

                        p.vy = -10;

                        p.vx = 0;
                }
        }

}else{

        for(int j = 0; j < e.size(); j++){

                if(!e.get(j).dead){

                        int xdiff = (e.get(j).x+e.get(j).cox)-
(s.get(i).x);

                        int ydiff = (e.get(j).y+e.get(j).coy)-
(s.get(i).y);

                        if(Math.abs(xdiff) < 50 &&
Math.abs(ydiff) < 50){

                                s.remove(i);

                                i--;

                                e.get(j).damage = 20;

                                e.get(j).health -= 10;

                                if(e.get(j).health <= 0){

                                        e.get(j).dead = true;

                                        e.get(j).vy = -10;

                                        score += 250*level;
```

```
                                                                        xp++;
                                                                        if(xp > level*6){
                                                                                xp -= level*6;
                                                                                level++;
                                                                                levelup = 150;
                                                                                score +=
10000*level;
                                                                        }
                                                                }
                                                                        break;
                                                        }
                                                }
                                        }
                                }
                        }

                        w.repaint();

                        try{
                                Thread.sleep(20);
                        }catch(Exception e){}
                }
        }

        public void keyReleased(java.awt.event.KeyEvent e){

                if(!p.dead){

                        if(e.getKeyCode() == 65 || e.getKeyCode() == 68){

                                p.vx = 0;
                        }
                }
        }

        public void keyPressed(java.awt.event.KeyEvent e){

                if(!p.dead){

                        if(e.getKeyCode() == 65){

                                p.vx = -4;

                        }else if(e.getKeyCode() == 68){

                                p.vx = 4;

                        }else if(e.getKeyCode() == 32){

                                if(p.y == 400-p.h){
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```
                                        p.y -= 10;

                                        p.vy = -10;
                                }

                        }else if(e.getKeyCode() == 80){

                                if(pause){
                                        pause = false;
                                }else{
                                        pause = true;
                                }
                        }
                }
        }

        public void mouseReleased(java.awt.event.MouseEvent e){

                if(p.y > 2000){

                        if(e.getButton() == e.BUTTON1){

                                if(mouse_pos.x > 150 && mouse_pos.x < 350 && mouse_pos.y >
300 && mouse_pos.y < 350){

                                        System.exit(0);
                                }
                        }
                }
        }

        public void mousePressed(java.awt.event.MouseEvent e){

                if(!p.dead && !pause){

                        if(e.getButton() == e.BUTTON1){

                                int xdiff = mouse_pos.x-(p.x+p.cox);
                                int ydiff = mouse_pos.y-(p.y+p.coy);

                                double length = Math.sqrt(xdiff*xdiff+ydiff*ydiff);

                                s.add(new Shot(p.x+p.cox, p.y+p.coy, (int)(xdiff*(5/length)),
(int)(ydiff*(5/length)), true));

                        }else if(e.getButton() == e.BUTTON3){

                                if(cooldown == 0){

                                        for(int i = 0; i < 360; i += 360/40){
                                                s.add(new Shot(p.x+p.cox, p.y+p.coy,
(int)(Math.cos(i)*10), (int)(Math.sin(i)*10), true));
                                        }

                                        cooldown = 450-level*15;
                                }
```

```
                        }
                }
        }

        public void mouseMoved(java.awt.event.MouseEvent e){

                mouse_pos.setLocation(e.getX(), e.getY());
        }

        public void mouseDragged(java.awt.event.MouseEvent e){

                mouse_pos.setLocation(e.getX(), e.getY());
        }
}


//ENEMY
package game;


public class Enemy extends Player{

        int health;

        public Enemy(Controller parent){

                super(parent);

                gp1 = new java.awt.GradientPaint(x, y, new java.awt.Color(255, 50, 0), x, y+h, new
java.awt.Color(150, 50, 0), true);

                x = 0;
                y = 0;
                health = 1;
        }

        public int target(int i){
                if(i == 0){

                        return parent.p.x+parent.p.cox;
                }else{

                        return parent.p.y+parent.p.coy;
                }
        }

        public void run(){

                if(dead){

                        vy += 0.2;
                        y += vy;

                }else{

                        if(parent.p.dead){
```

```
                    return;
                }

                int xdiff = (parent.p.x+parent.p.cox)-(x+cox);
                int ydiff = (parent.p.y+parent.p.coy)-(y+coy);

                if(xdiff > 0){

                    x += 2;

                }else if(xdiff < 0){

                    x -= 2;
                }

                if(ydiff > 0){

                    y += 2;

                }else if(ydiff < 0){

                    y -= 2;
                }

                if(Math.abs(xdiff) < 50 && Math.abs(ydiff) < 50){

                    parent.health--;

                    parent.shaking = 10;

                    parent.p.damage = 10;

                    if(parent.health <= 0){

                        parent.p.dead = true;

                        parent.p.vy = -10;

                        parent.p.vx = 0;
                    }
                }

                if(Math.random() < ((0.002*parent.level*parent.level)/10)+0.005
&& !parent.p.dead){

                    xdiff = (parent.p.x+parent.p.cox)-(x+cox);
                    ydiff = (parent.p.y+parent.p.coy)-(y+coy);

                    double length = Math.sqrt(xdiff*xdiff+ydiff*ydiff);

                    parent.s.add(new Shot(x+cox, y+coy, (int)(xdiff*(5/length)),
(int)(ydiff*(5/length)), false));
                }
            }
        }
}
```

```
//PLAYER
package game;

public class Player{

	public int x, y, w, h, cox, coy;
	public double vx, vy;
	java.awt.GradientPaint gp1;
	java.awt.geom.Ellipse2D e1, e2, e3;
	java.awt.geom.Rectangle2D r1;
	java.awt.BasicStroke bs1;``
	java.awt.geom.Line2D l1, l2, l3, l4, l5, l6;
	Controller parent;
	int damage;
	boolean dead;

	public Player(Controller parent){

		x = 200;
		y = 100;
		w = 75;
		h = 75;
		cox = 30;
		coy = 45;
		damage = 0;

		this.parent = parent;

		gp1 = new java.awt.GradientPaint(x, y, new java.awt.Color(255, 200, 0), x, y+h, new
java.awt.Color(255, 75, 0), true);
		e1 = new java.awt.geom.Ellipse2D.Double(0, 0, w, h);
		e2 = new java.awt.geom.Ellipse2D.Double(0, 0, 20, 30);
		e3 = new java.awt.geom.Ellipse2D.Double(0, 0, 8, 8);
		r1 = new java.awt.geom.Rectangle2D.Double(-25, -10, 75, 25);
		bs1 = new java.awt.BasicStroke(2);
		l1 = new java.awt.geom.Line2D.Double(0, 0, 40, 20);
		l2 = new java.awt.geom.Line2D.Double(0, 20, 40, 0);
		l3 = new java.awt.geom.Line2D.Double(0, 20, 20, 0);
		l4 = new java.awt.geom.Line2D.Double(0, 0, 20, 20);
		l5 = new java.awt.geom.Line2D.Double(20, 20, 40, 0);
		l6 = new java.awt.geom.Line2D.Double(20, 0, 40, 20);
	}

	public int target(int i){

		if(i == 0){

			return parent.mouse_pos.x;

		}else{

			return parent.mouse_pos.y;
		}
	}

	public void paint(java.awt.Graphics2D g){
```

```
int tx = x, ty = y, tcox = cox, tcoy = coy;

g.translate(tx, ty);

        g.setPaint(gp1);

        g.fill(e1);

        g.setStroke(bs1);

        g.setPaint(java.awt.Color.RED);

        g.draw(e1);

        g.translate(17, 10);

                if(dead){

                        g.draw(l3);
                        g.draw(l4);
                        g.draw(l5);
                        g.draw(l6);

                }else if(damage > 0){

                        damage--;

                        g.draw(l1);
                        g.draw(l2);

                }else{

                        g.setPaint(java.awt.Color.WHITE);

                        g.fill(e2);

                        g.setPaint(java.awt.Color.BLACK);

                        g.draw(e2);

                        g.translate(6, 10);

                                g.fill(e3);

                        g.translate(-6, -10);

                        g.translate(22, 0);

                                g.setPaint(java.awt.Color.WHITE);

                                g.fill(e2);

                                g.setPaint(java.awt.Color.BLACK);

                                g.draw(e2);
```

```
                                        g.translate(6, 10);

                                                g.fill(e3);

                                        g.translate(-6, -10);

                                g.translate(-22, 0);
                        }

                g.translate(-17, -10);

                g.translate(tcox, tcoy);

                        double xdiff = target(0)-(tx+tcox);
                        double ydiff = target(1)-(ty+tcoy);

                        if(ydiff != 0){

                                g.rotate(Math.atan(ydiff/xdiff));

                                if(xdiff < 0){

                                        g.rotate(Math.PI);
                                }
                        }

                        g.setPaint(java.awt.Color.GRAY);

                        g.fill(r1);

                        g.setPaint(java.awt.Color.BLACK);

                        g.draw(r1);

                        if(ydiff != 0){
                                g.rotate(-Math.atan(ydiff/xdiff));
                                if(xdiff < 0){
                                        g.rotate(-Math.PI);
                                }
                        }

                g.translate(-tcox, -tcoy);

        g.translate(-tx, -ty);
}

public void run(){

        if(dead){

                vy += 0.2;

        }else{

                if(y+h < 400){

                        vy += 0.2;
```

```
                }else if(y+h > 400){

                        vy = 0;

                        y = 400-h;
                }
        }

        x += Math.ceil(vx);
        y += Math.ceil(vy);

        if(x > 500-h){

                x = 500-h;

        }else if(x < 0){
                x = 0;
        }
    }
}


//SHOT
package game;

public class Shot{

    public int x, y;
    double vx, vy;
    boolean friendly;
    java.awt.geom.Ellipse2D e;

    public Shot(int x, int y, int vx, int vy, boolean friendly){

        this.x = x;
        this.y = y;
        this.vx = vx;
        this.vy = vy;
        this.friendly = friendly;

        e = new java.awt.geom.Ellipse2D.Double(-8, -8, 16, 16);
    }

    public void paint(java.awt.Graphics2D g){

        g.translate(x, y);

                if(friendly){

                        g.setPaint(java.awt.Color.YELLOW);

                }else{

                        g.setPaint(java.awt.Color.ORANGE);
                }
```

```
                g.fill(e);

            g.translate(-x, -y);
        }

        public void run(){

            x += vx;
            y += vy;
        }
}


//WINDOW
package game;


public class Window extends javax.swing.JPanel{

        Controller parent;
        java.awt.GradientPaint gp1, gp2;
        java.awt.geom.Rectangle2D r1, r2, r3, r4;
        java.awt.BasicStroke bs1;
        java.awt.geom.Line2D s1, s2;
        java.awt.Font f1, f2;
        java.awt.geom.RoundRectangle2D rr1, rr2;

        public Window(Controller c){

            parent = c;

            setPreferredSize(new java.awt.Dimension(500, 500));

            gp1 = new java.awt.GradientPaint(0, 0, new java.awt.Color(50, 200, 255), 0, 400,
java.awt.Color.BLACK);

            gp2 = new java.awt.GradientPaint(0, 100, new java.awt.Color(150, 255, 150), 0, 500,
new java.awt.Color(50, 200, 50));

            r1 = new java.awt.geom.Rectangle2D.Double(0, 0, 500, 400);

            r2 = new java.awt.geom.Rectangle2D.Double(0, 400, 500, 100);

            r3 = new java.awt.geom.Rectangle2D.Double(0, 0, 450, 50);

            r4 = new java.awt.geom.Rectangle2D.Double(0, 0, 450, 5);

            bs1 = new java.awt.BasicStroke(1);

            s1 = new java.awt.geom.Line2D.Double(-16, 0, 16, 0);
            s2 = new java.awt.geom.Line2D.Double(0, -16, 0, 16);

            f1 = new java.awt.Font("Arial", 0, 40);
            f2 = new java.awt.Font("Arial", 0, 20);

            rr1 = new java.awt.geom.RoundRectangle2D.Double(100, 100, 300, 300, 10, 10);
            rr2 = new java.awt.geom.RoundRectangle2D.Double(150, 300, 200, 50, 10, 10);
```

```
	}

	public void paint(java.awt.Graphics g){
		update(g);
	}
	public void update(java.awt.Graphics g2){

		java.awt.Graphics2D g = (java.awt.Graphics2D) g2;

		g.setRenderingHint(java.awt.RenderingHints.KEY_ANTIALIASING,
java.awt.RenderingHints.VALUE_ANTIALIAS_ON);

		if(parent.shaking > 0){

			parent.shaking--;

			g.translate(Math.random()*5, Math.random()*5);
		}

		g.setPaint(gp1);

		g.fill(r1);

		g.setPaint(gp2);

		g.fill(r2);

		for(int i = 0; i < parent.e.size(); i++){

			parent.e.get(i).paint(g);
		}

		parent.p.paint(g);

		for(int i = 0; i < parent.s.size(); i++){

			parent.s.get(i).paint(g);
		}

		if(!parent.p.dead){

			g.translate(25, 25);

				r3.setRect(0, 0, parent.health, 25);

				if(parent.health > 225){

					g.setPaint(java.awt.Color.RED);

				}else if(parent.health > 100){

					g.setPaint(java.awt.Color.RED);

				}else{

					g.setPaint(java.awt.Color.RED);
				}
```

```
                                        g.fill(r3);

                                        g.setPaint(java.awt.Color.RED);

                                        g.draw(r3);

                                        if(parent.cooldown > 0){

                                                g.translate(0, 25);

                                                        g.setPaint(java.awt.Color.RED);

                                                        r4.setRect(0, 0, parent.cooldown, 5);

                                                        g.fill(r4);

                                                        g.setPaint(java.awt.Color.RED);

                                                        g.draw(r4);

                                                g.translate(0, -25);
                                        }

                                        g.translate(225, 33);

                                                g.setFont(f2);

                                                java.awt.FontMetrics fm = g.getFontMetrics();

                                                g.drawString("Score: "+parent.score+"   Level:
"+parent.level, -fm.stringWidth("Score: "+parent.score+" : Level: "+parent.level)/2, -fm.getHeight()/2);

                                        g.translate(-225, -37);

                        g.translate(-25, -25);
                }

                if(parent.levelup > 0){

                        double rot = (Math.random()-0.5)/3;

                        if(parent.levelup < 50){

                                g.translate(250, 250-(-parent.levelup+50)*5);
                        }else{

                                g.translate(250, 250);
                        }

                        g.setFont(f1);

                        java.awt.FontMetrics fm = g.getFontMetrics();

                        g.rotate(rot);
```

```
                                g.drawString("LEVEL UP", -fm.stringWidth("LEVEL UP")/2, -
fm.getHeight());

                        g.rotate(-rot);

                        if(parent.levelup < 50){
                                g.translate(-250, -(250-(-parent.levelup+50)*5));
                        }else{
                                g.translate(-250, -250);
                        }

                        parent.levelup--;
                }

                if(parent.p.y > 2000){

                        parent.p.vy = 0;

                        parent.p.y = 2001;

                        g.setPaint(java.awt.Color.RED);

                        g.fill(rr1);

                        g.setPaint(java.awt.Color.RED);

                        g.draw(rr1);

                        g.setFont(f1);

                        java.awt.FontMetrics fm = g.getFontMetrics();

                        g.drawString("GAME OVER!", 250-fm.stringWidth("GAME OVER!")/2, 175-
fm.getHeight()/2);

                        g.drawString(""+parent.score, 250-fm.stringWidth(""+parent.score)/2, 275-
fm.getHeight()/2);

                        g.setFont(f2);

                        fm = g.getFontMetrics();

                        g.drawString("Final Score:", 250-fm.stringWidth("final Score:")/2, 220-
fm.getHeight()/2);

                        g.drawString("Quit", 250-fm.stringWidth("Quit")/2, 345-fm.getHeight()/2);

                        g.draw(rr2);
                }

                if(parent.pause){

                        g.setPaint(java.awt.Color.WHITE);

                        g.fill(rr2);

                        g.setPaint(java.awt.Color.BLACK);
```

```
                        g.draw(rr2);

                        g.setFont(f2);

                        java.awt.FontMetrics fm = g.getFontMetrics();

                        g.drawString("Pause", 250-fm.stringWidth("Pause")/2, 345-
fm.getHeight()/2);
                }

                g.translate(parent.mouse_pos.x, parent.mouse_pos.y);

                g.setStroke(bs1);

                g.setPaint(java.awt.Color.RED);

                g.draw(s1);
                g.draw(s2);
        }
}


//MAIN
package game;


public class Main{
   public static void main(String[] args){

                javax.swing.JFrame f = new javax.swing.JFrame("Java spil");

                f.setVisible(true);

                f.setDefaultCloseOperation(f.EXIT_ON_CLOSE);

                f.setResizable(false);

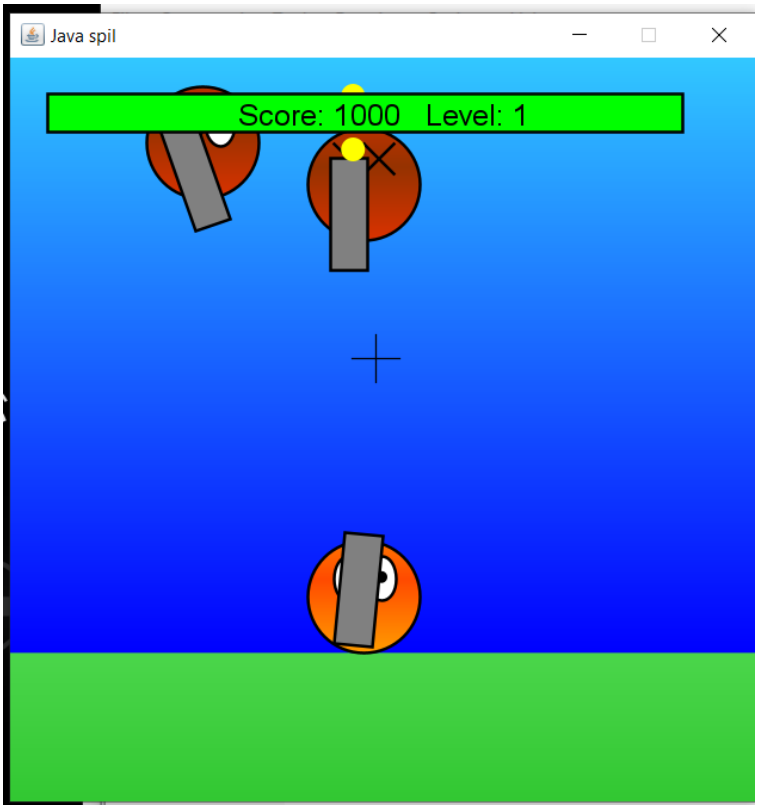
                int[] pixels = new int[16 * 16];
                java.awt.Image image = java.awt.Toolkit.getDefaultToolkit().createImage(new
java.awt.image.MemoryImageSource(16, 16, pixels, 0, 16));
                java.awt.Cursor transparentCursor =
java.awt.Toolkit.getDefaultToolkit().createCustomCursor(image, new java.awt.Point(0, 0),
"invisiblecursor");
                f.setCursor(transparentCursor);

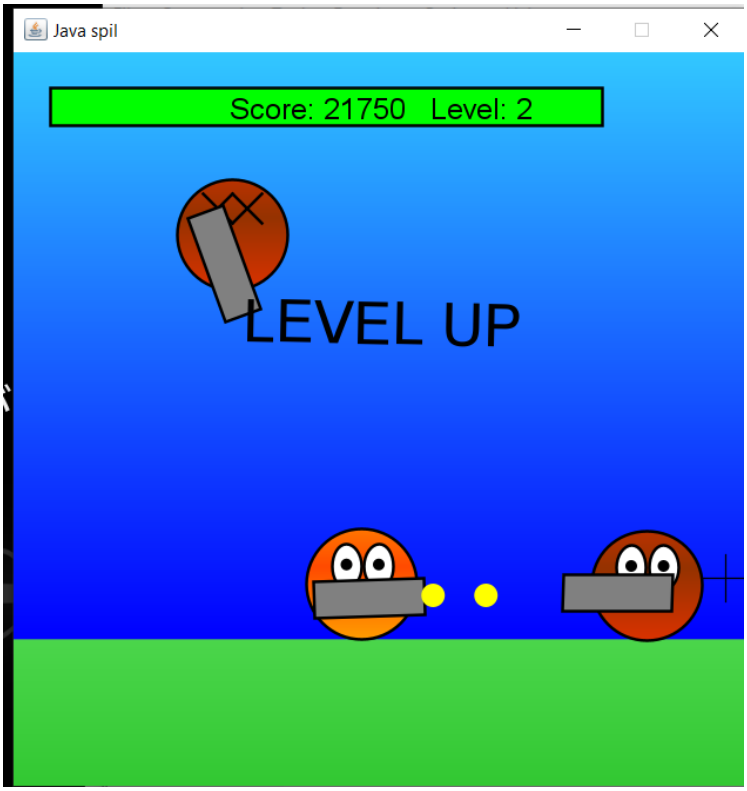

                f.getContentPane().setLayout(new java.awt.BorderLayout());

                f.setAlwaysOnTop(true);

                new Controller(f);
   }
}
```

OUTPUT :


Java spil
Score: 1000 Level: 1


Java spil
Score: 21750 Level: 2
LEVEL UP


Java spil
Score: 22750 Level: 2