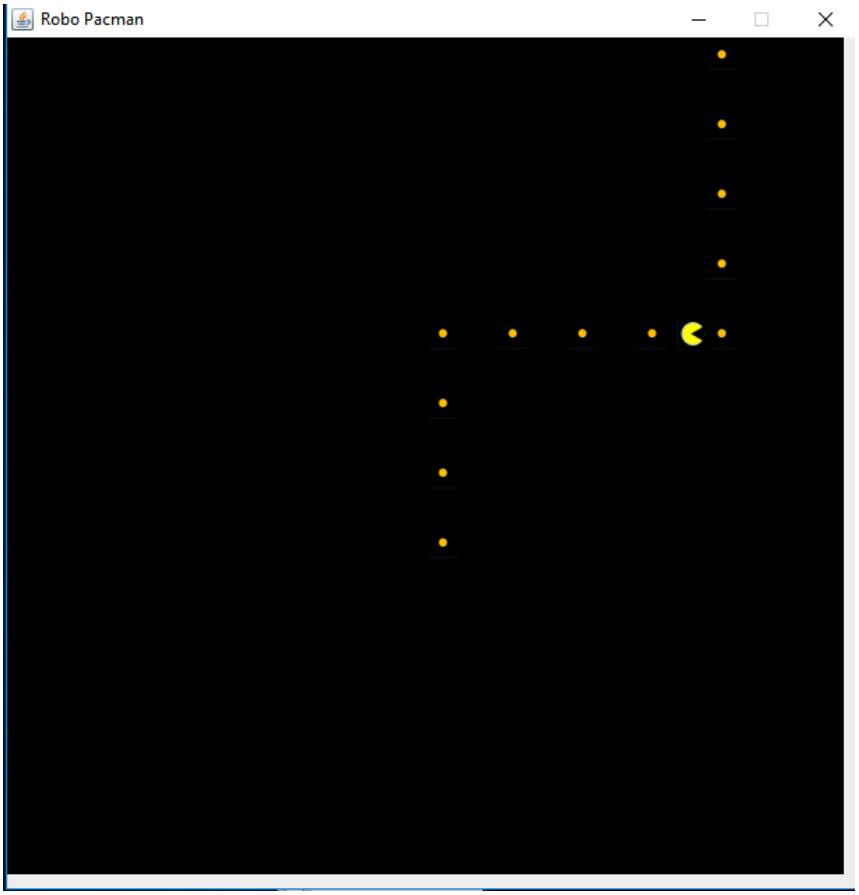
Robo Pacman – DRAFT 1

Challenge: write an autonomous routine to guide Pacman around the field using a tank drive. Eat as many dots as possible within the time allowed.



Learn how a robot is broken down into many subsystems, starting with the drive train.

```
public class Robot extends RobotBase {

    // subsystems
    public static DriveTrain driveTrain;

    public void robotInit() {
        driveTrain = new DriveTrain();
    }

    public static void main(String[] args) {
        Robot robot = new Robot();
        RobotRunner.run(robot, new DriveFromAtoB());
    }

}
```

Learn how to break down a task into reusable commands.

```
public class DriveFromAtoB extends CommandGroupBase{

    public DriveFromAtoB() {
        addSequential(new DriveStraight(300));
        addSequential(new Turn(90));
        addSequential(new DriveStraight(200));
        addSequential(new Turn(0));
        addSequential(new DriveStraight(200));
    }

}
```

Learn how about the command pattern and the basic structure of a WPILib command and how it can be used to implement behavior.

Learn how to control movement using a tank drive.

```
public class DriveStraight extends CommandBase {

    private double targetDistance;
    private double startDistance;
    private boolean success = false;

    public DriveStraight(double distance) {
        // save the target distance for later
        this.targetDistance = distance;
        Robot.log("DriveStraight:targetDistance:"+targetDistance);
    }

        // Called just before this Command runs the first time
    protected void initialize() {
        // save the starting point for later
        startDistance = Robot.driveTrain.getDistance();
    }

    // Called repeatedly when this Command is scheduled to run
    protected void execute() {
        // calc distance traveled since this command started
        double currentDistance = Robot.driveTrain.getDistance() - startDistance;
        Robot.log("DriveStraight:currentDistance:"+currentDistance);

        // if we have gone far enough then stop
        if (currentDistance >= targetDistance) {
            Robot.driveTrain.tankDrive(0, 0);
            success = true;
        } else {
            Robot.driveTrain.tankDrive(1, 1);
        }
    }

    // Make this return true when this Command no longer needs to run execute()
    protected boolean isFinished() {
        return success;
    }

}
```

Learn how sensors can be used to improve the capabilities of a robot.

```
public class Turn extends CommandBase {

    private boolean success = false;
    private int targetAngle;

    public Turn(int angle) {
        // save the target angle for later
        this.targetAngle = angle;
        Robot.log("Turn:targetAngle:"+targetAngle);
    }

    // Called repeatedly when this Command is scheduled to run
    protected void execute() {
        int currentAngle = Robot.driveTrain.getAngle();
        Robot.log("Turn:currentAngle:"+currentAngle);

        // if we have turned far enough then stop
        if (currentAngle == targetAngle) {
            Robot.driveTrain.tankDrive(0, 0);
            success = true;
        } else {
            // compare the current to the target angle to see which way to turn
            if (currentAngle < targetAngle) {
                Robot.driveTrain.tankDrive(1, -1);
            } else {
                Robot.driveTrain.tankDrive(-1, 1);
            }
        }
    }

    protected boolean isFinished() {
        return success;
    }

}
```