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Name [redacted] Roll No :

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Paper IV (Robotics)

MSG (Computer Science) Semester-I" 2022-23

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Robotics Assignment

Assignment 1A

Aim: Write a program to create a robot to perform rectangular motion using gears

Description:

1) NxtRobot() :

    Class that represents a simulated NXT robot brick. Parts (e.g. motors, sensors) may be assembled into the robot to make it doing the desired job.

2) Gear() :

    Creates a gear instance with right motor plugged into port A, left motor plugged into port B.

3) addPart() :

    Assembles the given part into the robot.

4) setSpeed() :

    Sets the speed to the given value (arbitrary units).

5) forward() :

    Starts the forward movement for the given duration (in ms) and stops. Method returns at the end of the given duration.

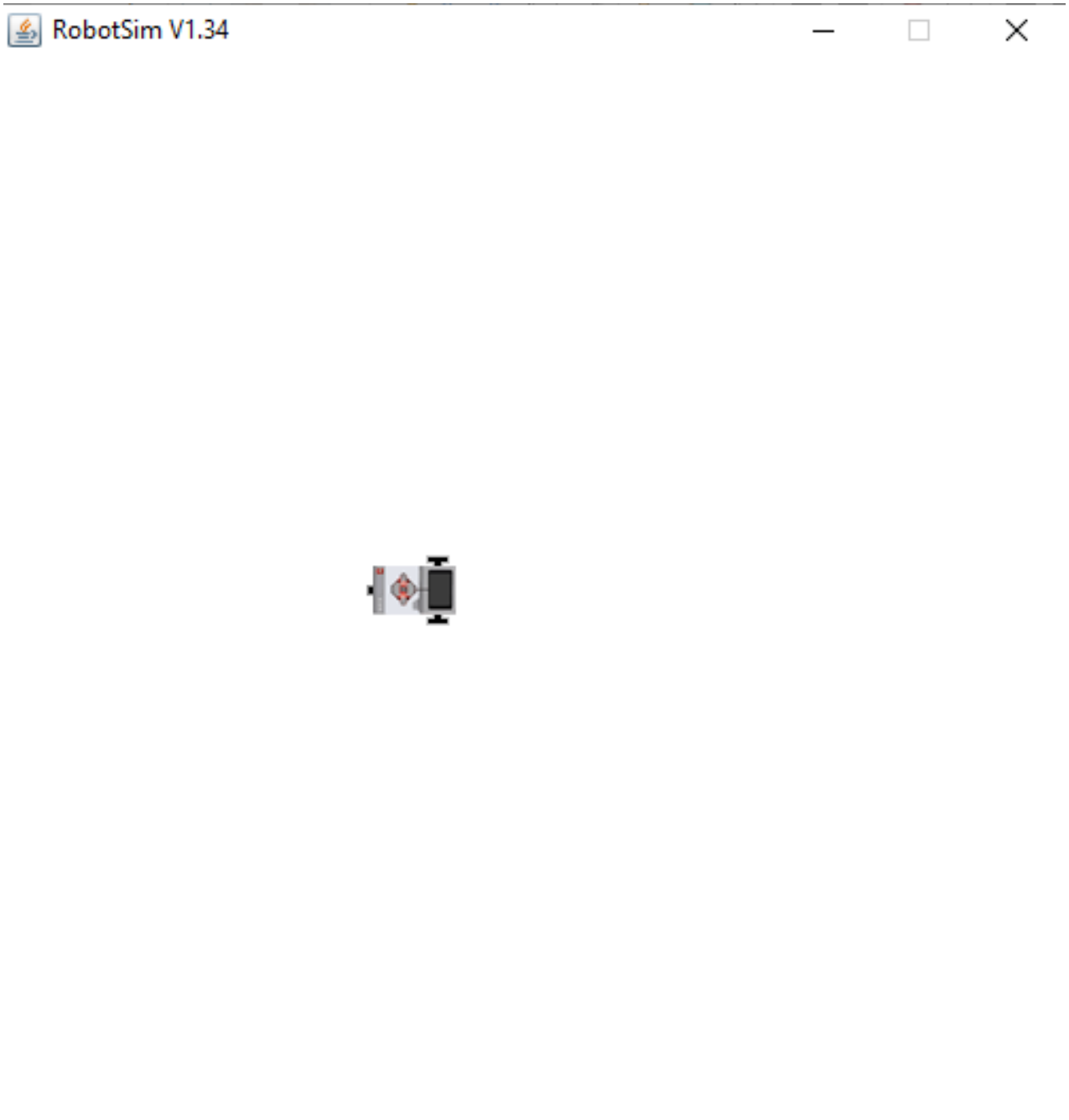
6) left() :

Starts to rotate left (center of rotation at middle of the wheel axes). Method returns immediately, while the movement continues

Code:

```
import ch.aplu.robotsim.NxtRobot;
import ch.aplu.robotsim.Gear;
public class assignment1A {
   public assignment1A() {
      NxtRobot r = new NxtRobot ();
      Gear g = new Gear();
      r.addPart (g);
      g.setSpeed (100);
      while (true){
         g.forward (800);
         g.left (280);
      }
   }
   public static void main (String [] args){
      new assignment1A ();
   }
}
```

Output:



Assignment 1B

Aim: Write a program to create a robot to perform circular motion using gears

Description:

1) rightArc() :

Starts to move to the right on arc with given radius. Method returns immediately, while the movement continues.

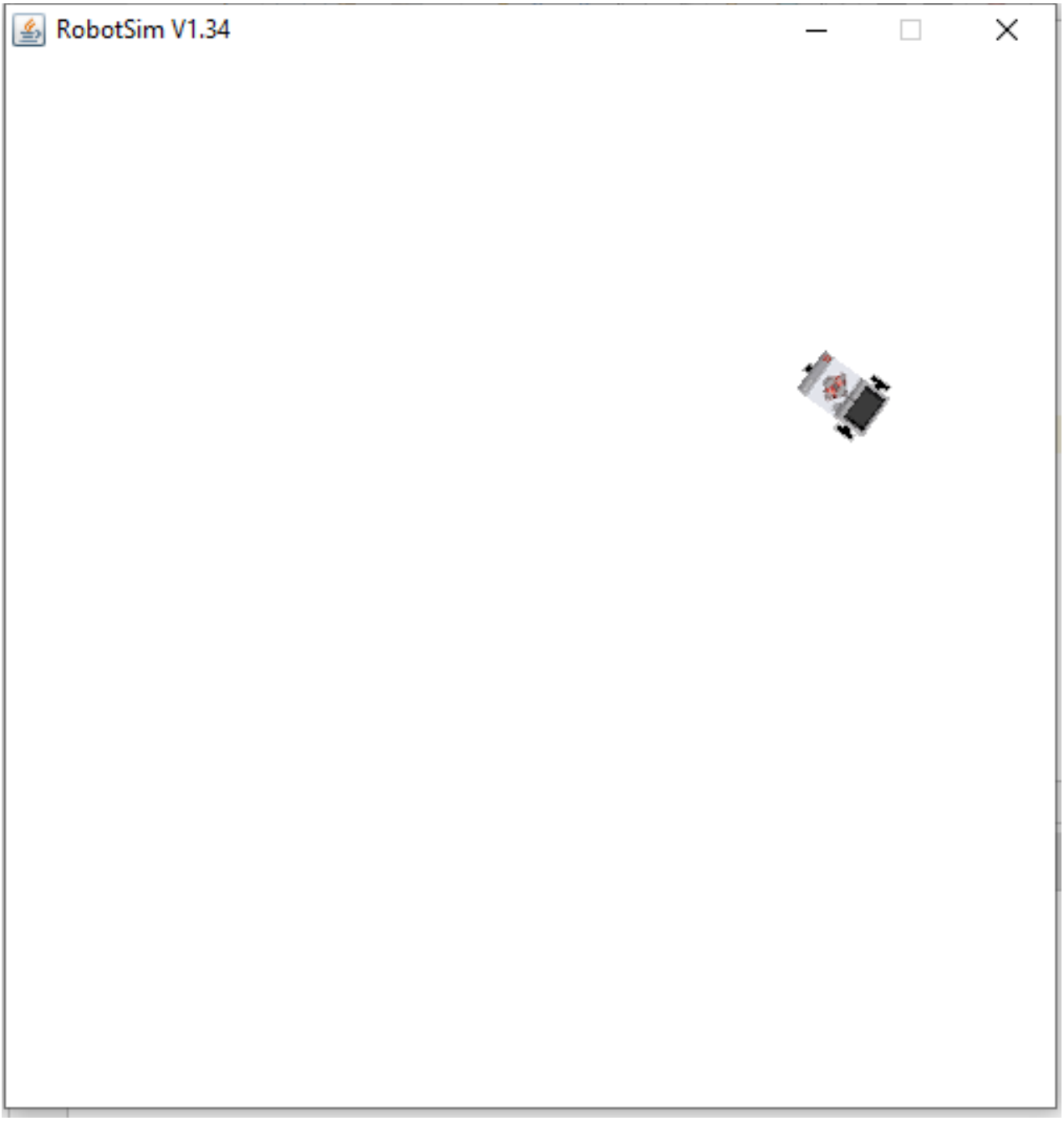
.

Code:

```
import ch.aplu.robotsim.NxtRobot;
import ch.aplu.robotsim.Gear;
public class assignment1B {
   public assignment1B () {
      NxtRobot r = new NxtRobot ();
      Gear g = new Gear ();
      r.addPart (g);
      g.setSpeed (100);
      while (true) {
         g.rightArc (0.5);
      }
   }
   public static void main (String [] args){
```

```
        new assignment1B ();
    }
}
```

Output:



Assignment 2A

Aim: Write a program to create robot to perform a square motion without using gear.

Code:

```
import ch.aplu.robotsim.*;

public class Assignment_2a {
   Assignment_2a () {
         TurtleRobot t = new TurtleRobot ();
         t.setTurtleSpeed (100);
         while (true){
            t.forward(200);
            t.left (90);
         }
      }
   public static void main (String [] args) {
      new Assignment_1a ();
   }
}
```

Output:

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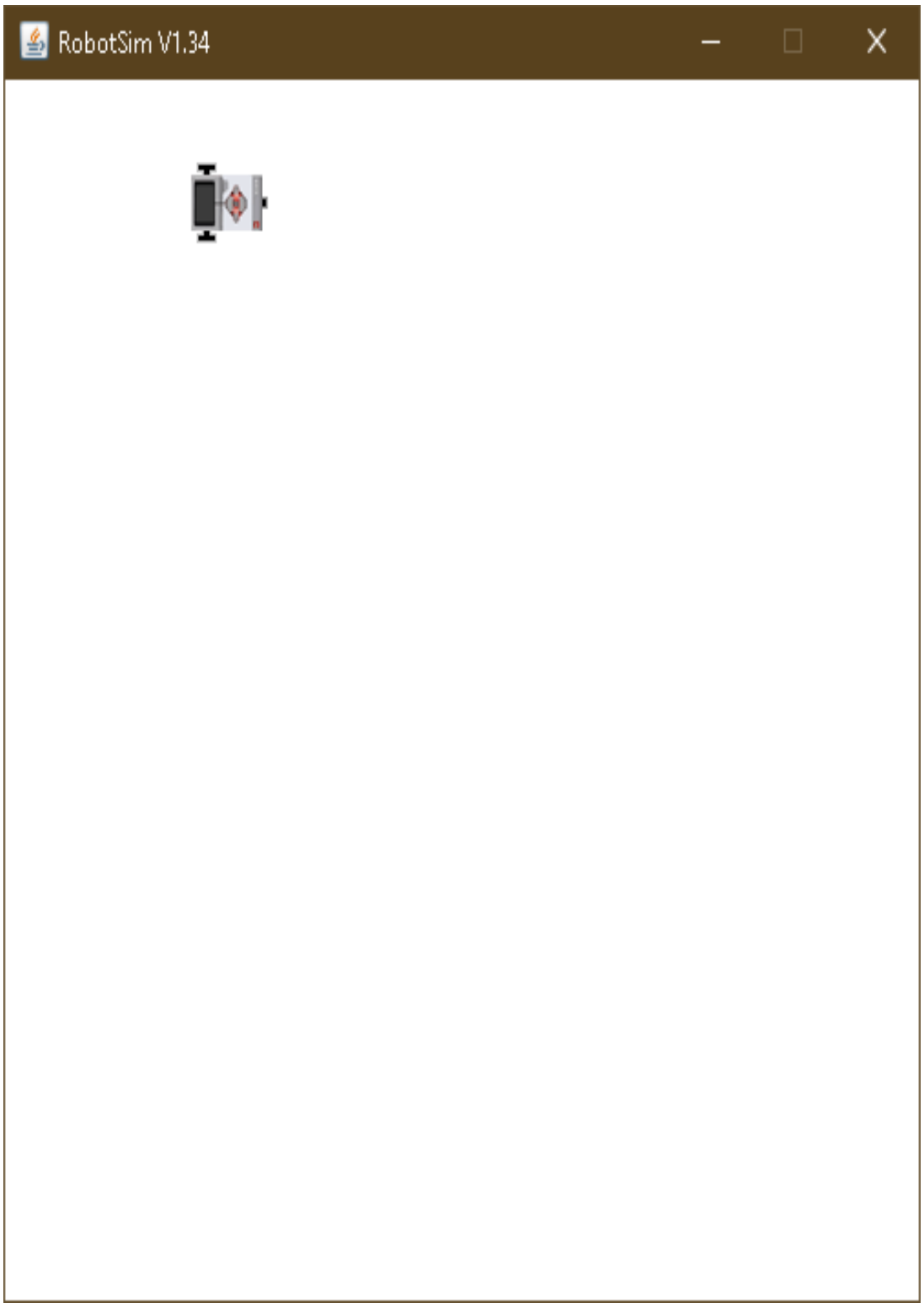

Assignment 2B

Aim: Write a program to create robot to perform a circular motion without using gear.

Code:

```
import ch.aplu.robotsim.*;

public class Assignment_2b {
   Assignment_2b () {
       TurtleRobot t = new TurtleRobot ();
       t.setTurtleSpeed (100);
       while (true) {
          t.forward (2);
          t.left (2);
       }
    }
   public static void main (String [] args)  {
       new Assignment_1b ();
   }
}
```

Output:

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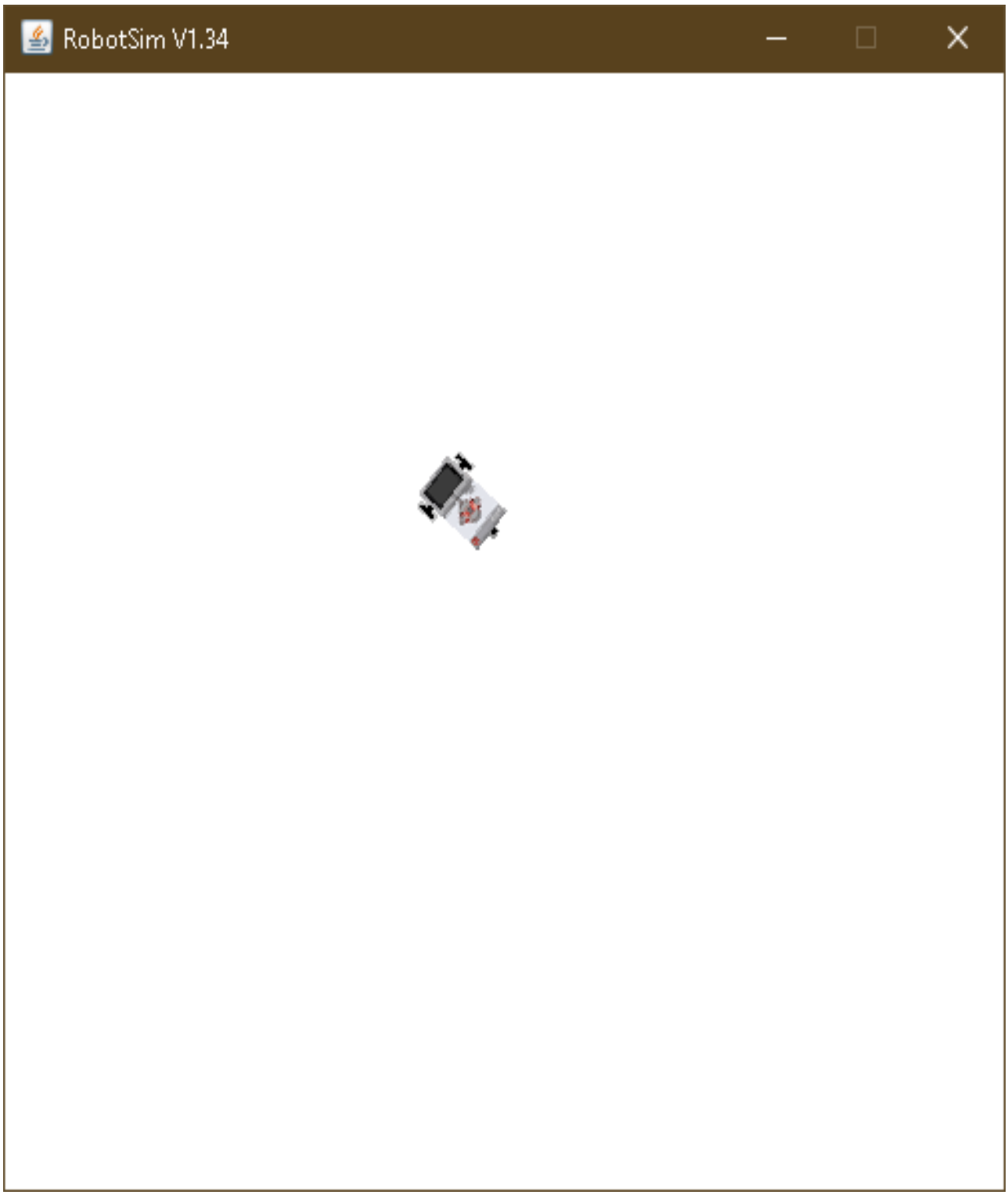

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Assignment 3

Aim: Write a program to do a square using while or for loop, change direction based on condition and control motor movement

Description:

1) Motor() :

Creates a motor instance that is plugged into given port.

2) Tools.delay() :

Suspends execution of the current thread for the given amount of time.

Code:

```
import ch.aplu.robotsim.*;
import java.util.*;
public class assignment2 {
   assignment2 () {
      Scanner sc = new Scanner (System.in);
      NxtRobot r = new NxtRobot ();
      Motor m1 = new Motor (MotorPort.A);
      Motor m2 = new Motor (MotorPort.B);
      r.addPart (m1);
      r.addPart (m2);
      System.out.println ("Enter 1 for left and 2 for right :");
      int direction = sc.nextInt ();
```

```
        switch (direction) {
            case 1:
                for (int i=0; i<4; i++){
                    m1.forward ();
                    Tools.delay (1090);
                    m2.forward ();

                    Tools.delay (1090);
                    m1.stop ();
                    m2.stop ();
                }
            break;
            case 2:
                for (int i=0; i<4; i++){
                    m2.forward ();
                    Tools.delay (1090);
                    m1.forward ();
                    Tools.delay (1090);
                    m1.stop ();
                    m2.stop ();
                }
            break;
        }
    }
    public static void main (String args[]){
        new assignment2 ();
    }
}
```

Output:


Output - RoboticsAssignment (run)
run:
Enter 1 for left and 2 for right:
1
Activate Windows
Go to Settings to activate Windows.
RoboticsAssignment (run)
running...
59:1
INS

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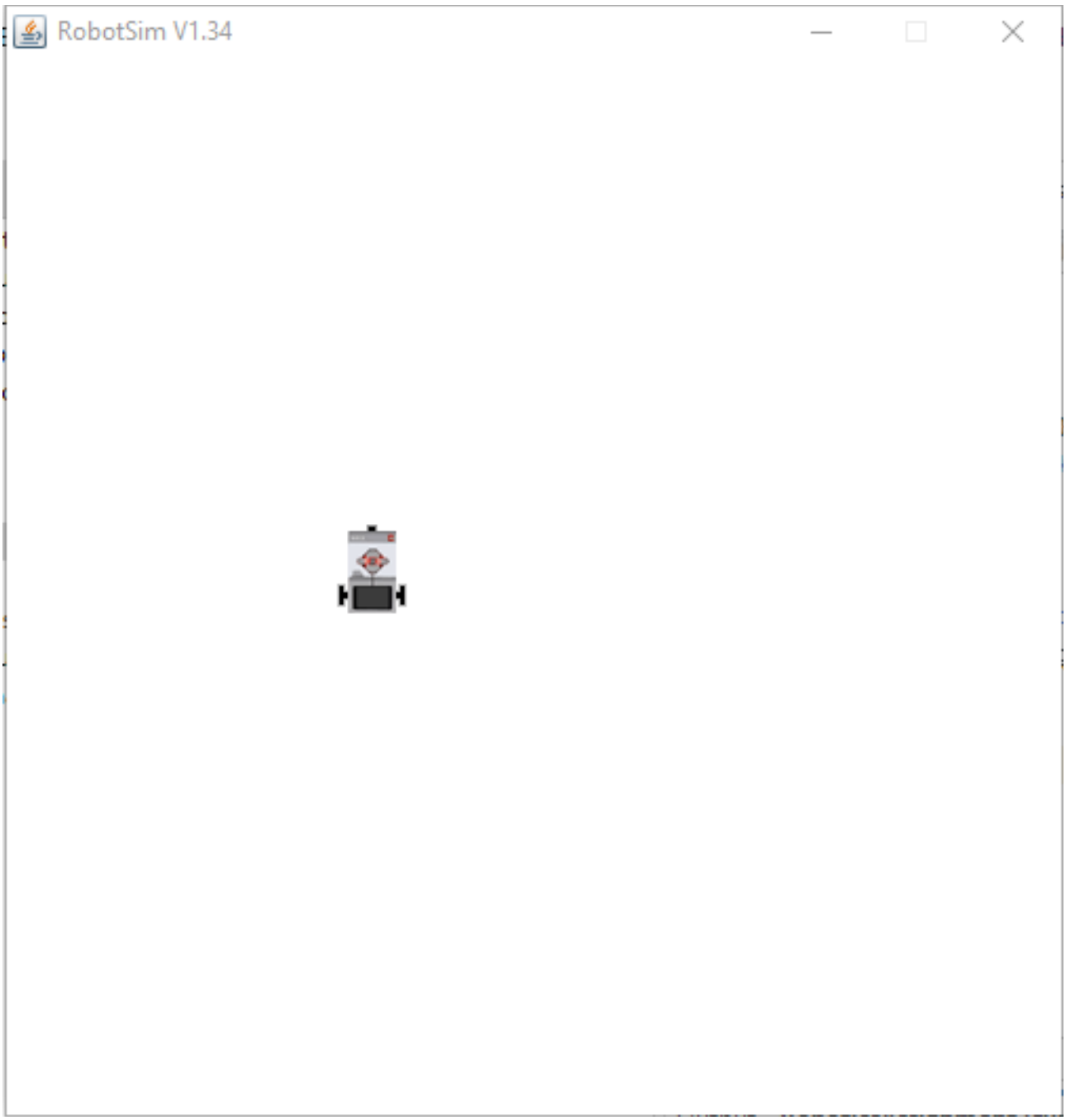

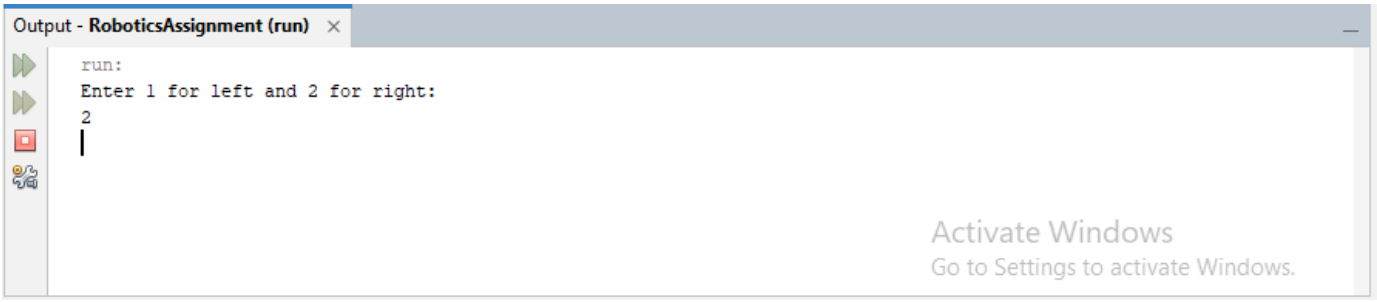

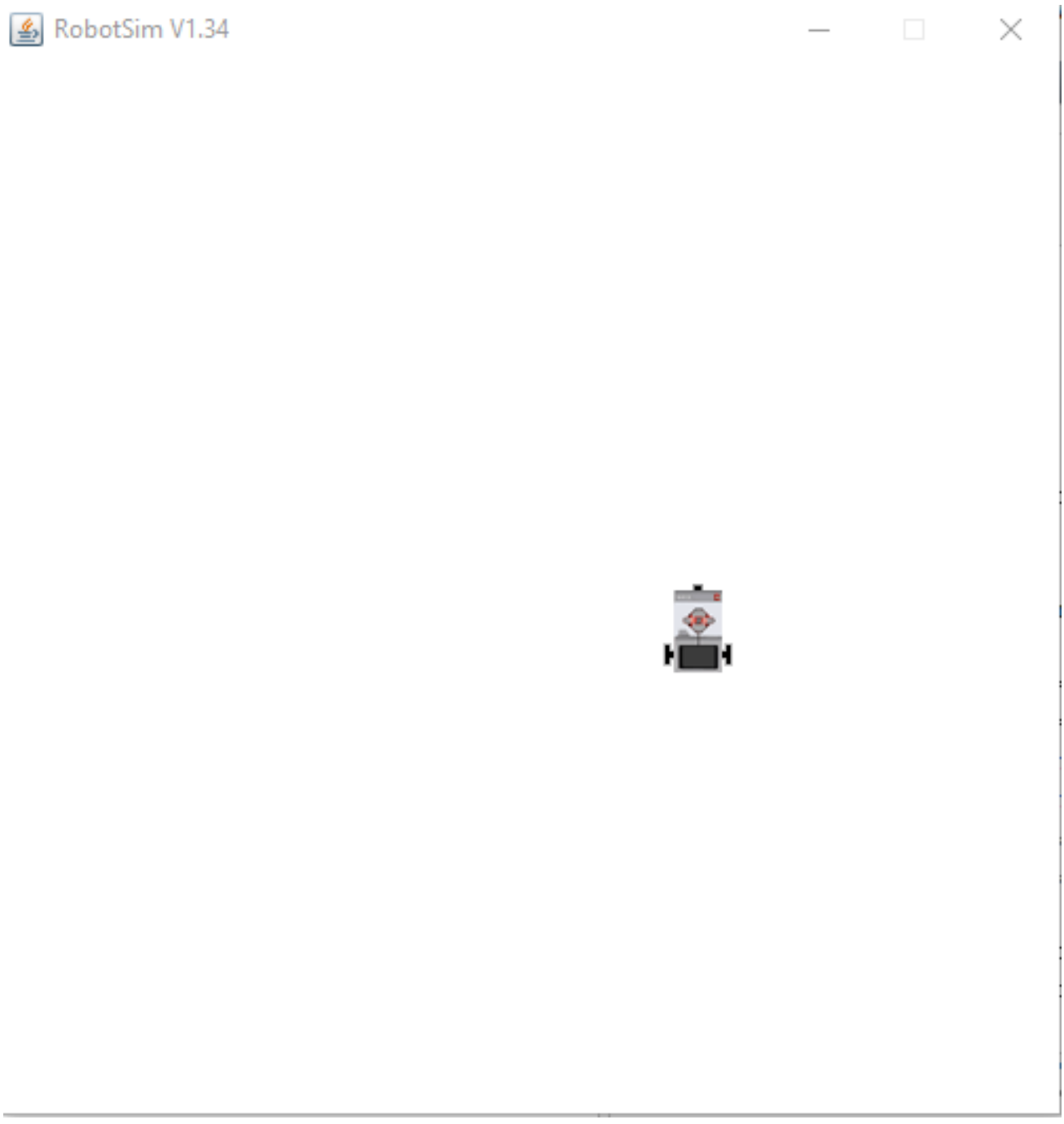
RobotSim V1.34


Output - RoboticsAssignment (run)
run:
Enter 1 for left and 2 for right:
2
BUILD SUCCESSFUL (total time: 1 minute 24 seconds)
Activate Windows
Go to Settings to activate Windows.