

Chapter 4 Worksheet

(1) Here is the code for the CarWorld class – circle the constructor definition.

```
public class CarWorld extends World
{

    public CarWorld()
    {
        super(560, 560, 1);
    }
}
```

Correct Answer:

```
public class CarWorld extends World
{

    public CarWorld()
    {
        super(560, 560, 1);
    }
}
```

(2) Write the code showing how to insert a Car into the world at location (100, 100).

```
public class CarWorld extends World
{

    public CarWorld()
    {
        super(560, 560, 1);

    }
}
```

(3) Write the code showing how to insert a Car into the world at a random location.

```
public class CarWorld extends World
{

    public CarWorld()
    {
        super(560, 560, 1);
        addObject(new Car(), 100, 100);

    }
}
```

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(4) We are going to modify the checkBarrels method so that after we hit a certain number of barrels, we stop the scenario. This is our thinking/brainstorming part.

```
private void checkBarrels() {
    if(canSee(Barrel.class)) {
        turn(45);
        // What else do we need to do?
    }
}
```

Some notes about what we want to do.

```
private void checkBarrels() {
    if(canSee(Barrel.class)) {
        turn(45);
        // note that we hit another barrel
        //if(we've hit too many) {
            //Stop scenario
        //}
    }
}
```

Next step: Here is some executable pseudo-code for this problem.

```
private void checkBarrels() {
    if(canSee(Barrel.class)) {
        turn(45);
        // note that we hit another barrel
        if(false) { //we've hit too many
            //Stop scenario
        }
    }
}
```

(5) Fill in the code for stopping the scenario:

```
private void checkBarrels() {
    if(canSee(Barrel.class)) {
        turn(45);
        // note that we hit another barrel
        if(false) { //we've hit too many

        }
    }
}
```

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(6) Fill in the code to declare the instance variable we need and add the constructor to initialize it.

```
public class Car extends Vehicle
{

    public void act()
    {
        move();
        checkEdges();
        checkBarrels();
        checkKeys();
    }

    private void checkEdges() {
        if(atWorldEdge()) {
            turn(15);
        }
    }

    private void checkKeys() {
        if(Greenfoot.isKeyDown("left")) {
            turn(-30);
        }
        if(Greenfoot.isKeyDown("right")) {
            turn(30);
        }
    }

    private void checkBarrels() {
        if(canSee(Barrel.class)) {
            turn(45);
            // note that we hit another barrel
            if(false) { //we've hit too many
                Greenfoot.stop();
            }
        }
    }
}
```

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(7) Fill in the proper condition in the if so that we will stop if we hit more than 20 barrels.

```
public class Car extends Vehicle
{
    private int numHits;

    public Car() {
        numHits = 0;
    }

    public void act()
    {
        move();
        checkEdges();
        checkBarrels();
        checkKeys();

    }

    private void checkEdges() {
        if(atWorldEdge()) {
            turn(15);
        }
    }

    private void checkKeys() {
        if(Greenfoot.isKeyDown("left")) {
            turn(-30);
        }
        if(Greenfoot.isKeyDown("right")) {
            turn(30);
        }
    }

    private void checkBarrels() {
        if(canSee(Barrel.class)) {
            turn(45);
            // note that we hit another barrel

            if(
                Greenfoot.stop();
            ) { //fill in here
            }
        }
    }
}
```

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(8) Fill in the code so that we add one to the number of barrels hit every time we hit one.

```
public class Car extends Vehicle
{
    private int numHits;

    public Car() {
        numHits = 0;
    }

    public void act()
    {
        move();
        checkEdges();
        checkBarrels();
        checkKeys();

    }

    private void checkEdges() {
        if(atWorldEdge()) {
            turn(15);
        }
    }

    private void checkKeys() {
        if(Greenfoot.isKeyDown("left")) {
            turn(-30);
        }
        if(Greenfoot.isKeyDown("right")) {
            turn(30);
        }
    }

    private void checkBarrels() {
        if(canSee(Barrel.class)) {
            turn(45);
            // fill in code after this line

            if(numHits > 20) {
                Greenfoot.stop();
            }
        }
    }
}
```

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(9) Now let's add code to alternate the image every time a barrel is hit. (Editing done to this code to fit on page.)

```
public class Car extends Vehicle
```

```
{  
    private int numHits;
```

```
  
    public Car() {  
        numHits = 0;
```

```
    }
```

```
    public void act() {  
        move();  
        checkEdges();  
        checkBarrels();  
        checkKeys();
```

```
    }
```

```
    private void checkEdges() {  
        if(atWorldEdge()) { turn(15); }  
    }
```

```
    private void checkKeys() {  
        if(Greenfoot.isKeyDown("left")) { turn(-30); }  
        if(Greenfoot.isKeyDown("right")) { turn(30); }  
    }
```

```
    private void checkBarrels() {  
        if(canSee(Barrel.class)) {  
            turn(45);  
            numHits = numHits + 1;
```

```
  
            if(numHits > 20) { Greenfoot.stop(); }  
        }
```

```
    }  
}}
```

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Answer:

```
public class Car extends Vehicle
{
    private int numHits;
    private String image1;
    private String image2;

    public Car() {
        numHits = 0;
        image1 = "car.png";
        image2 = "flower.png";
        setImage(image1);
    }

    public void act() {
        move();
        checkEdges();
        checkBarrels();
        checkKeys();
    }

    private void checkEdges() {
        if(atWorldEdge()) {
            turn(15);
        }
    }

    private void checkKeys() {
        if(Greenfoot.isKeyDown("left")) {
            turn(-30);
        }
        if(Greenfoot.isKeyDown("right")) {
            turn(30);
        }
    }

    private void checkBarrels() {
        if(canSee(Barrel.class)) {
            turn(45);
            numHits = numHits + 1;

            if(numHits % 2 == 1) {
                setImage(image2);
            }
            else {
                setImage(image1);
            }
            if(numHits > 20) {
                Greenfoot.stop();
            }
        }
    }
}
```