

Chapter 5 Worksheet

Recall the code from our CarWorld.

```
public class CarWorld extends World
{
    public CarWorld()
    {
        super(560, 560, 1);
        addObject(new Car(), Greenfoot.getRandomNumber(getWidth), Greenfoot.getRandomNumber(getHeight()));

        addObject(new Barrel(), Greenfoot.getRandomNumber(getWidth), Greenfoot.getRandomNumber(getHeight()));
        addObject(new Barrel(), Greenfoot.getRandomNumber(getWidth), Greenfoot.getRandomNumber(getHeight()));
        addObject(new Barrel(), Greenfoot.getRandomNumber(getWidth), Greenfoot.getRandomNumber(getHeight()));
        addObject(new Barrel(), Greenfoot.getRandomNumber(getWidth), Greenfoot.getRandomNumber(getHeight()));
        addObject(new Barrel(), Greenfoot.getRandomNumber(getWidth), Greenfoot.getRandomNumber(getHeight()));
        addObject(new Barrel(), Greenfoot.getRandomNumber(getWidth), Greenfoot.getRandomNumber(getHeight()));
        addObject(new Barrel(), Greenfoot.getRandomNumber(getWidth), Greenfoot.getRandomNumber(getHeight()));
        addObject(new Barrel(), Greenfoot.getRandomNumber(getWidth), Greenfoot.getRandomNumber(getHeight()));
    }
}
```

(1) Write the equivalent loop to add 8 barrels to the world:

```
public class CarWorld extends World
{
    public CarWorld()
    {
        super(560, 560, 1);
        addObject(new Car(), Greenfoot.getRandomNumber(getWidth), Greenfoot.getRandomNumber(getHeight()));

    }
}
```

(2) Now create a similar loop as above to put keys into the world of the piano.

```
public class Piano extends World
{
    public Piano()
    {
        super(800, 340, 1);

    }
}
```

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(3) Modify the body of the loop so that all the keys have the same y-position (y = 140).

```
public class Piano extends World
```

```
{
    public Piano()
    {
        super(800, 340, 1);

        int count = 0;
        while(count < 12) {
            addObject(new Key(),
                count = count + 1;
            )
        }
    }
}
```

(4) What expression did we use for the x-coordinate of the keys to get them to be spaced appropriately?

(5) What did we have to change to make sure that none of the keys fell off the edge of the world?

(6) Write the code for setting the image to “white-key-down.png” when the user presses the “f” key and to “white-key.png” when the user is not pressing the “f” key.

```
import greenfoot.*; // (World, Actor, GreenfootImage, and Greenfoot)
```

```
public class Key extends Actor
```

```
{
    /**
     * Create a new key.
     */
    public Key()
    {
    }

    /**
     * Do the action for this key.
     */
    public void act()
    {

    }
}
```

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(7) Write the code to declare the instance variable for a type `String` that represents the key that the user will press on the keyboard.

(8) Fill in the constructor for `Key` so that there is a `String` parameter and the value passed in as the parameter is assigned to the instance variable we just declared in question 7.

```
public Key(                )
{

}

}
```

(9) Write the code that declares an array of `Strings` and assigns to it the strings: `a, s, d, f, g, h, j, k, l, ;, ', \`

(10) Modify the code in the loop to create each key with one of the strings stored in the array.

```
int count = 0;

while(count <                ) {

    addObject(new Key(                ), i*63+54, 140);
    count = count + 1;
}
```

(11) Write the code to declare an instance variable whose type is `Boolean` and whose name is `isDown`.

(12) Modify the code for `act()` so that the `isDown` instance variable is updated appropriately when the user presses the keys.

```
public void act()
{

}

}
```

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(13) Write the code for the play method so that the sound "3a.wav" is played whenever the method is called.

```
public void play() {
```

```
}
```

(14) Finish the code for the Key class.

```
public class Key extends Actor  
{
```

```
    private boolean isDown;  
    private String key;
```

```
/**
```

```
 * Create a new key linked to a given keyboard key, and  
 * with a given sound.
```

```
*/
```

```
public Key(String keyName, )
```

```
{
```

```
    key = keyName;  
    isDown = false;
```

```
}
```

```
/**
```

```
 * Do the action for this key.
```

```
*/
```

```
public void act()
```

```
{
```

```
    if (!isDown && Greenfoot.isKeyDown(key)) {  
        play();  
        setImage(new GreenfootImage("white-key-down.png"));  
        isDown = true;
```

```
    }
```

```
    if (isDown && !Greenfoot.isKeyDown(key)) {  
        setImage(new GreenfootImage("white-key.png"));  
        isDown = false;
```

```
    }
```

```
}
```

```
/**
```

```
 * Play the note of this key.
```

```
*/
```

```
public void play()
```

```
{
```

```
    Greenfoot.playSound( );
```

```
}
```

```
}
```