Greenfoot Piano Sound

Open the scenario piano-1 and examine the code for the two existing classes, Piano and Key. Make sure you know what code is present and what it does.

Create an object of class Key and place it into the world. Create several of them and place them next to each other.

```java
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()
    {
    }
}
```

We can create the effect of the key being pressed quite easily by switching between the two images when a specific key on the keyboard is pressed.

In this code, we have chosen an arbitrary key on the computer keyboard (the "g" key) to react to.

Implement this version of the act method in your own scenario. Test it— make sure it works.

```java
public void act()
{
    if ( Greenfoot.isKeyDown("g") ) {
        setImage ("white-key-down.png");
    }
    else {
        setImage ("white-key.png");
    }
}
```

- Implement the following in your Class Key.
  private boolean isDown;

```
public void act()
{
    if ( !isDown && Greenfoot.isKeyDown("g") ) {
        setImage ("white-key-down.png");
        isDown = true;
    }
    if ( isDown && !Greenfoot.isKeyDown("g") ) {
        setImage ("white-key.png");
        isDown = false;
    }
}
```

The code informally, can be read as

if (the-piano-key-is-not-currently-down and the-keyboard-key-is-down) {
change the image to show the "down" image; remember that the piano key is down now;

Next add a new method to the Key class, called play. We can add this method in the editor, below the act method.

```
/**
 * Play the note of this key.
 */
public void play()
{
    Greenfoot.playSound("3a.wav");
}
```

Next, create an Object of class Key.

```
public class Key extends Actor
{
    private boolean isDown;
    private String key;
    private String sound;
```

Add code to your Key Class.

```
public class Key extends Actor
{
    private boolean isDown;
    private String key;
    private String sound;
```

Add the following line to the Piano's Constructor.

- addObject (new Key ("g", "3a.wav"), 300, 180);

Remember that the expression new Key ("g", "3a.wav") creates a new key object (with a specified key and sound file), while the statement addObject (some-object, 300, 180);

```
public class Key extends Actor
{
    private boolean isDown;
    private String key;
    private String sound;

    /**
     * Create a new key linked to a given keyboard key, and
     * with a given sound.
     */
    public Key(String keyName, String soundFile)
    {
```

Add the following to your class key:

```
private String sound;
private String upImage;
private String downImage;
```

Complete your method for Key:

```
public Key(String keyName, String soundFile, String img1, String img2)
{
    sound = soundFile;
    key = keyName;
    upImage = img1;
    downImage = img2;
    setImage(upImage);
    isDown = false;
}
```

Make sure your public void act is as follow:

```
{
    if (!isDown && Greenfoot.isKeyDown(key)) {
        play();
        setImage(downImage);
        isDown = true;
    }
    if (isDown && !Greenfoot.isKeyDown(key)) {
        setImage(upImage);
        isDown = false;
    }
}
```

Switch to Piano Class and add the following to the Constructor:

```
public class Piano extends World
{
    private String[] whiteKeys =
        { "A", "S", "D", "F", "G", "H", "J", "K", "L", ";", "'", "\\" };
    private  String[] whiteNotes =
        { "3c", "3d", "3e", "3f", "3g", "3a", "3b", "4c", "4d", "4e", "4f", "4g" };

    private String[] blackKeys =
        { "W", "E", "", "T", "Y", "U", "", "O", "P", "", "]" };
    private String[] blackNotes =
        { "3c#", "3d#", "", "3f#", "3g#", "3a#", "", "4c#", "4d#", "", "4f#" };
```

In the Piano Class, create a new method called MakeKey with the following code:

```
private void makeKeys()
    {
        // make the white keys
        for(int i = 0; i < whiteKeys.length; i++) {
            Key key = new Key(whiteKeys[i], whiteNotes[i]+".wav", "white-key.png", "white-key-down.png");
            addObject(key, i*63 + 54, 140);
        }

        // make the black keys
        for(int i = 0; i < blackKeys.length; i++) {
            if( ! blackKeys[i].equals("") ) {
                Key key = new Key(blackKeys[i], blackNotes[i]+".wav", "black-key.png", "black-key-down.png");
                addObject(key, i*63 + 85, 86);
            }
```

```
    }
```

Complete your code:

```
public Piano()
  {
     super(800, 340, 1);
     makeKeys();
     showText("Click 'Run', then use your keyboard to play", 400, 320);
  }
```