Unit II: Creating Code

Chapter 7: Posing Objects in Alice3

So far, we have moved the objects around using **move**, **turn** and **roll**. If we want them to walk, kick, or put their hands on their hips and say, "How dare you!" we need to change the position of the **subparts** (elbow, hip, etc.)

An objects subparts can be positioned using **turn** and **roll**. (You cannot **move** a subpart as that would stretch it away from its body.)

Each subpart has its own orientation and sense of direction. The sense of direction for subparts may not be the same as their parent object.

Subparts can be positioned at design time in the scene editor or during execution using code.

In this lesson, you will learn to move and pose the Alice 3D characters and the subparts such as arms and legs. You will do this in both the scene setup mode and using code.

Objectives

- Use tools in design mode to **move**, **turn** and **resize** the 3D actors in the design mode.
- Write code to move, turn and roll the characters.
- Use tools in design mode to turn and roll the subparts such as arms and legs.
- Implement **OneShots** to turn and roll the subparts such as arms and legs.
- Write **code** to turn and roll the subparts.
- Be able to create a pose using several subparts.

The Cat and The Castle Gate Again!

Did you wonder how to make the cat look at the gate, and make the gate swing open?

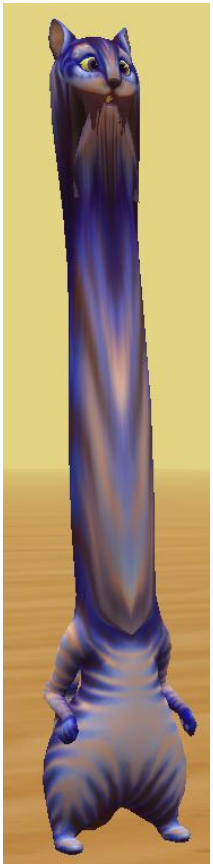
The Cats Head

In code view, select the cat, but then click the **>** symbol after it and select **gethead**.

The head is now selected, not the cat. The head is just one of many subparts that can be selected to create animation. If you look at the procedure list you will see that there are all the same procedures we would see for the cat, but now it is just the cats head.

If you want your animations to look realistic, never **move** the subparts!

Here the cat's head is **moved up 2.0**.



Now that you know why, let's stick to **turn** and **roll** for the subparts.

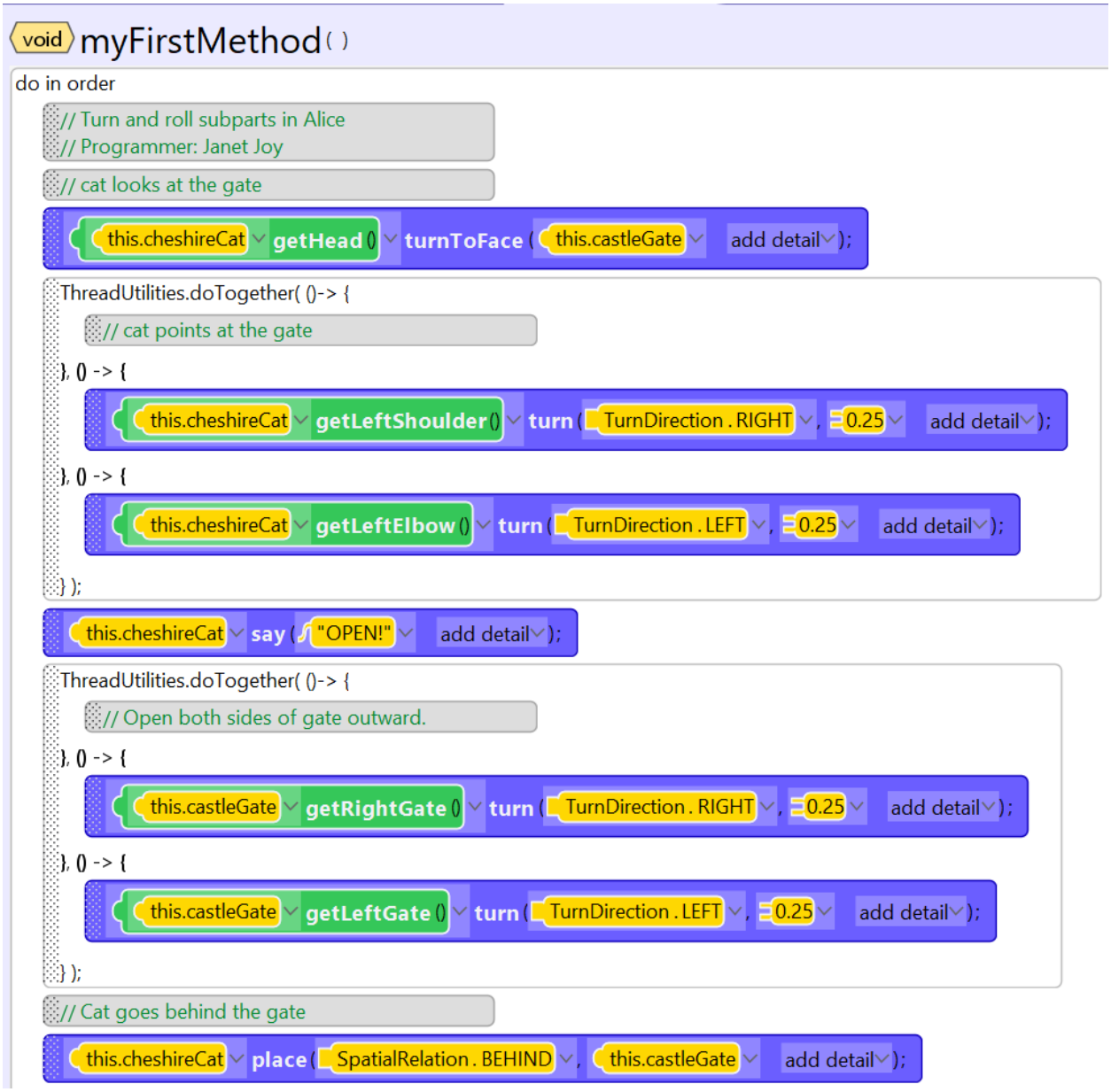
Turn To Face

this.cheshireCat.getHead().turnToFace(this.castleGate);

When we say to face the gate, the cat faces the **pivot point** in the middle at the bottom of the gate. The body doesn't turn, just the head.

Gate Opens

Study the code below, read the comments and see if you can guess what happens.



Please note that the two gates are mirror images of each other. The left side turns to the left and the right side turns to the right. Both sides open outward.

AI: Hands on Hips

I prompted ChatGPT “I would like to create a pose in Alice3 for a biped to have both hands on hips.” Because Alice is a drag and drop program, AI can’t create a program, it just shows you the code.

This is the response:

Start with your biped standing in a neutral position. It helps to work on one arm first and then mirror the movements on the other. For the **right arm**, try these movements:

Body Part	Action	Approximate Amount
Right upper arm	**Roll Right**	0.10–0.15 revolution
Right upper arm	**Turn Backward**	0.08–0.12 revolution
Right forearm	**Turn Backward / Bend**	about 0.20 revolution
Right hand	**Turn/Roll**	Adjust until palm is near hip

For the **left arm**, make the movements symmetrical:

Body Part	Action	Approximate Amount
Left upper arm	**Roll Left**	0.10–0.15 revolution
Left upper arm	**Turn Backward**	0.08–0.12 revolution
Left forearm	**Turn Backward / Bend**	about 0.20 revolution
Left hand	**Turn/Roll**	Adjust until palm is near hip

Note: In Alice, you can select joints, not body parts. Instead of the **right upper arm**, you need to select the **right shoulder** for the first step. In the code below, the hand is not included.

Alice: Hands on Hips

With a few corrections, this is the pose and the code that produced it.

```
public void myFirstMethod() {
    // Loki with hand on hips
    // Programmer : Janet Joy
    doTogether( () -> {
        this.loki.getRightShoulder().roll( RollDirection.RIGHT, 0.15 );
    }, () -> {
        this.loki.getRightShoulder().turn( TurnDirection.BACKWARD, 0.1 );
    }, () -> {
        this.loki.getRightElbow().turn( TurnDirection.FORWARD, 0.3 );
    }, () -> {
        this.loki.getLeftShoulder().roll( RollDirection.LEFT, 0.15 );
    }, () -> {
        this.loki.getLeftShoulder().turn( TurnDirection.BACKWARD, 0.1 );
    }, () -> {
        this.loki.getLeftElbow().turn( TurnDirection.FORWARD, 0.3 );
    } );
 }
```

Evaluation

Although the response from AI was not perfect, it was a big help in identifying the basic movements, but did need some tweaking to make it look natural. Getting one arm working first, then mirroring it is a good suggestion, but ultimately, putting all the statements in a **do together** block made it look more natural. Feel free to ask AI for help in creating poses, but expect to spend some time making adjustment through trial and error. AI is changing fast, so this may need less tweaking in the future. Notice that the turn commands are the same for left and right, but the roll commands are the opposite: The right shoulder rolls to the right, the left shoulder rolls to the left.

Hands

When Walt Disney and his animators developed Mickey Mouse, they gave him **three fingers and a thumb on each hand**, rather than the five digits of a realistic human hand. This simplified design made Mickey's hands easier and faster to draw repeatedly for animation and helped keep his small hands clear and recognizable on screen. The choice became part of Mickey's distinctive cartoon appearance, and influenced the design of many later animated characters. In Alice there are 4 fingers, but you can't select the ring finger. Save time in the code below by bending one finger, then right click on the statement, save to clipboard, then drag the clipboard to do the other fingers.

Making a Fist

To make a fist, turn all the fingers forward and the thumb backward. You can't select the ring finger. With the Alice character, turning the pinky also turned the ring finger. With Thor, you can't make a fist. You could try making the finger invisible.

```
public void myFirstMethod() {
    // Make a fist
    // Programmer : Janet Joy
    doTogether( () -> {
        this.thor.getRightIndexFinger().turn( TurnDirection.FORWARD, 0.25 );
    }, () -> {
        this.thor.getRightMiddleFinger().turn( TurnDirection.FORWARD, 0.25 );
    }, () -> {
        this.thor.getRightIndexFinger().turn( TurnDirection.FORWARD, 0.25 );
    }, () -> {
        this.thor.getRightPinkyFinger().turn( TurnDirection.FORWARD, 0.25 );
    }, () -> {
        this.thor.getRightThumb().turn( TurnDirection.BACKWARD, 0.25 );
    } );
}
```

Experiment!

Try to make all the hand poses for the Rock, Paper, Scissor game.