

## Posing Subparts

The goal of this lesson is to learn to pose the 3D characters by positioning subparts such as arms, legs using both design tools and code. When we talk about subparts, we include arms and legs, but also things like the lid to a treasure chest or the door to a car.

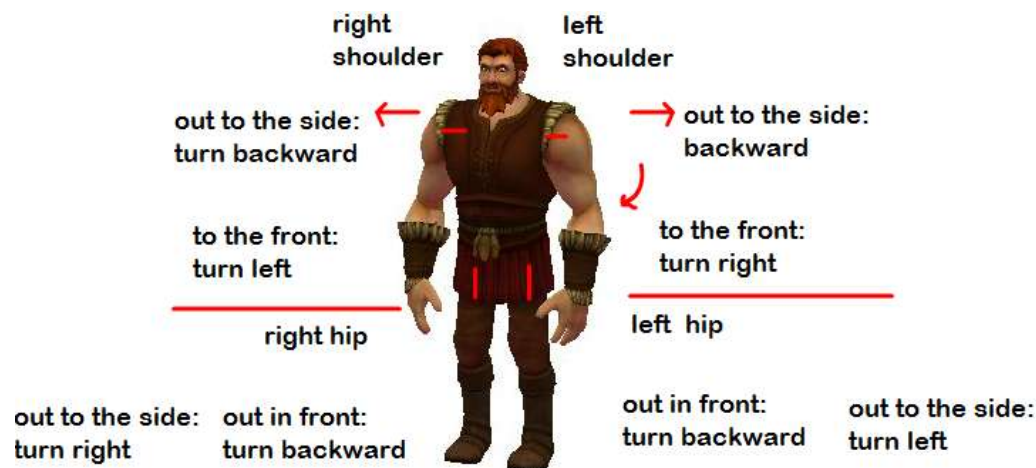
So far, we have moved the objects around using move, turn and roll. If we want them to walk, kick, or put their hands on their hips and say "How dare you!" we need to change the position of the subparts.

An objects subparts can be positioned using turn and roll. (*You do not want to move a subpart as that would distort it.*) Each subpart has its own orientation and sense of direction. The sense of direction for subparts may not be the same as its parent object.

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

## Subparts for Bipeds

A bipeds arms are mirror images of each other. Most of the commands for positioning the arms by turning the shoulder joint will be the opposite for the left and right side of the body. Legs however both descend down from the body. Movement forward and backward are the same, but movement to the left and right will be the opposite.



## A few arm movements

Start with Thor facing the camera and arms down to the side. His left arm is on your right, and his right arm is on your left. Turning his right shoulder to the left 0.25 puts it in front of him. Turning his right shoulder backward 0.25 puts it in out to the side. (*Turning his right shoulder forward 0.25 puts it inside his body, something humans can't do.*) Turning his left shoulder to the **right** 0.25 puts it in front of him. (*The opposite of the right shoulder.*) Turning his right shoulder backward 0.25 puts it in out to the side, the same on both sides.



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## A few leg movements

Start with Thor facing the camera and arms down to the side. His left leg is on your right, and his right leg is on your left.

Turning his right hip backward puts it in front of him. Turning his right hip right puts it out to the side.

Turning his left hip backward puts it in front of him. Turning his left hip left puts it out to the side.

It is important to work in Alice to try each of the movements to get a feel for it.

It is possible to pose the 3D objects in a way that is impossible for a human.

## Other Objects

Other objects have subparts that can be positioned.

You can open a car's front left door (the driver's side) by turning it to the right. You can open a car's front right door (the passenger's side) by turning it to the left.

It is also possible to turn and roll the doors in other directions, but they do not mimic the movements of a real car door.

Many of the prop class models have subparts that can be positioned. You can open the cover of a book, open the door of the refrigerator, and the lid of the treasure chest, among others. Both doors on the castle gate can be opened by turning.

It is important to spend some time posing the 3D characters because in the next lesson you will learn to animate the characters. Try to create various poses such as pulling the hands on the hips, kicking, put both hands in front as if holding something, and any other poses you think of.



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