**Modifying movement in Minecraft: SuperJump and Parachute**

**Minecraft controls:**

* ‘w’ – forward
* ‘s’ – backward
* ‘a’ – left
* ‘d’ – right
* Space – jump
* Shift – sneak

**This activity is adapted from chapter 5 of *Minecraft Modding with Forge* by Aditya Gupta and Arun Gupta.**

**Super Jump: This mod allows Minecraft players to modify their jump height. This could be useful for jumping over a high obstacle or out of a deep cave.**

1. If you’re new to Minecraft, try starting the game by clicking the green arrow button in Eclipse (under “Project”). Select or create a creative mode world. Try jumping a few times – you should be able to jump a height of about two blocks, but we can change that. Be sure to quit Minecraft before continuing.
2. Open the file “SuperJump.java”. This is where you’ll write Java code that allows you to jump higher. SuperJump won’t do anything yet. Type the code below under the line “// Put code here”. Make sure to save afterward.

**if** (event.entity **instanceof** EntityPlayer) {

event.entity.motionY \*= 2;

}

1. The code you just wrote is known as an “event handler”. In order for it to work, the SuperJump event handler must be registered. Open the file “Main.java” and type the code below under the line “// Register event handlers here”:

MinecraftForge.*EVENT\_BUS*.register(**new** SuperJump());

1. Run Minecraft in creative mode and try jumping – you should jump higher than before! The line that controls your jump height is below:  
   Try increasing the value on the right to a number greater than 2. This will increase your jump height even more.

event.entity.motionY \*= 2;

1. The modification we just made causes you, the player, to jump higher. This is because of the line below:  
   There are many types of “entities” in Minecraft. For example, there are pigs (EntityPig), cows, and horses. Try to modify SuperJump to make pigs jump higher. Run Minecraft in creative mode to test the change you made. To see a pig jump, hold a carrot while near a pig and jump onto a block (pigs follow you if you’re holding a carrot). Depending on the jump height you used in SuperJump, the pig may injure itself or die when it lands on the ground. As a player, you weren’t injured when landing from a high jump because you were playing in creative mode. In survival mode, you would be damaged from these higher-than-normal jumps. The next section will show how to avoid fall injuries using a parachute.

**if** (event.entity **instanceof** EntityPlayer)

**Parachute: This mod allows Minecraft players to jump high in survival mode without getting injured.**

1. If you modified SuperJump to make an animal, such as a pig, jump higher, undo this change. SuperJump should contain the following line:

**if** (event.entity **instanceof** EntityPlayer)

1. Try running Minecraft and select or create a survival mode world. If you try jumping, you should see that you injure yourself when you land.
2. The parachute we’ll create handles two tasks separately:
   1. Slowing down a player’s falling speed
   2. Preventing fall damage

Open the file “Parachute.java”. To slow a player down as he/she falls, type the code below under the line “// Put code to slow fall motion here”:

EntityPlayer player = event.player;

**if** (player.isAirBorne && player.isSneaking()) {

event.player.motionY = -0.05;

}

Line 2 above checks whether a player is currently airborne and ALSO sneaking. A player is “sneaking” when they’re holding down the shift key. If a player is in the air and holding down shift, the next line slows the player’s vertical motion. A negative value is used since we want motion to be downward (as opposed to upward in SuperJump).

1. To prevent fall damage, type the code below under the line “// Put code to prevent fall damage here”:  
   This code will run whenever something living falls. If it’s a player that’s falling and they are sneaking (holding down the shift key), then their fall damage will be canceled. The following line is the key piece which prevents fall damage:

event.setCanceled(**true**);

**if** (event.entity **instanceof** EntityPlayer) {

EntityPlayer player = (EntityPlayer) event.entity;

**if** (player.isSneaking()) {

event.setCanceled(**true**);

}

}

1. Before trying out the new parachute, type the following code in the file “Main.java” under the line you entered when working on SuperJump:

FMLCommonHandler.*instance*().bus().register(**new** Parachute());

MinecraftForge.*EVENT\_BUS*.register(**new** Parachute());

1. Try running Minecraft in survival mode. Try jumping, then holding down the shift key as you fall. When you land, you should be unharmed ☺

The SuperJump and Parachute mods let you jump high without injury. Jumping high might be useful sometimes, but could also interfere with normal gameplay. There are lots of ways the mods we built could be extended or customized. For example, you could modify SuperJump to only increase jump height if a player is standing on a sponge block.

There are many other ways to modify a player’s or a creature’s movement. You could make a player swim faster, for example, or make creatures climb walls – the possibilities are endless!