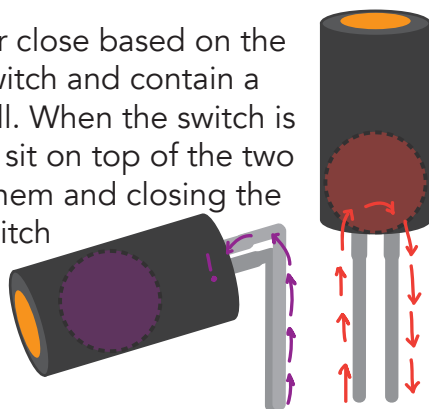# Accelerometer LED:

An accelerometer such as the one on our beans can give a reading of up to 2^{10} (1024) different values -- measuring a range from -512 (2Gs) to 512 (2Gs) across a single axis. To translate this range of values to something that will work on the LED, the default "AccelerationLed" sketch for the bean divides the result of the acceleration's measurement across an axis by 4 (to get a value 0-256) which is more compatible with the <R, G, B> tuple of values used to set the LED.

```
17    AccelerationReading accel = Bean.getAcceleration();
18
19    // Update LED color
20    uint16_t r = (abs(accel.xAxis)) / 4;
21    uint16_t g = (abs(accel.yAxis)) / 4;
22    uint16_t b = (abs(accel.zAxis)) / 4;
23    Bean.setLed((uint8_t)r,(uint8_t)g,(uint8_t)b);
24
25    Bean.sleep(50);
```

As we transition from the bean's accelerometer to using our tilt switches we have to consider how we will change the code to function similarly to the default sketch, but using an input that can only be one of two states.

Tilt Switch

Tilt switches open or close based on the orientation of the switch and contain a small conductive ball. When the switch is upright, the ball will sit on top of the two contacts, bridging them and closing the circuit. When the switch is inverted, the ball moves and breaks the connection.

For this lab, we will consider any bean accelerometer readings that are less than or equal to 32 to be high (1), and anything exceeding 32 to be low (0). This will help us make a smoother transition to implementing the same functionality when we begin using tilt switches as our input.

x-axis   **red**
y-axis   **green**
z-axis   **blue**

when we have a high input we will want the value of that axis' LED to be 255, in all other cases it should be low

Tilt switches work well with wearables because they can disappear into a garment and respond to the movements of the body without the wearer even thinking about it. Raising your hand or touching your toes can suddenly become a way to activate a circuit.
Hartman, Kate (2014-08-12). Make: Wearable Electronics: Design, prototype, and wear your own interactive garments

The bean has 2 different types of pins:

Digital: digital (or 'discrete') pins can be in one of two states -- either high (1) or low (0). Its the same idea as a boolean

Analog: "is a measurable electrical signal with a defined range. The analog input changes continuously in a definable manner in relation to the measured property."
http://accesio.com/?p=../cat/analog_input.html

For Homework:

Design a circuit with the tilt switches provided to you that will change the color of your Bean's LED based on the orientation of the breadboard. Think about what orientation should the accelerometers have on the breadboard and how you will read in their digital input to the Bean.