

Lab 7: Using I/O and Interrupts

1. **Interrupt Handling:** Explain the role of the `GPIO.add_event_detect()` function in the interrupt-handling script. How does it help the Raspberry Pi handle GPIO inputs more efficiently compared to polling?

The function listens for an event, which is a value passed into the function when it is instantiated. In this case, the function listens for a signal coming from the specified pin. The pin is connection to the motion detector, which sends a signal when it detects something. This helps the pi handle inputs more efficiently because, according to the OPi.GPIO Documentation, it is a threaded callback function so it runs at the same time as the rest of the program and unlike polling it is not going to miss the change in state of an input while the CPU is busy working on other things.

2. **Callback Functions:** Describe how the `motion_detected()` function in the GPIO script is triggered. What conditions must be met for this function to run?

In the `add_event_detect` function, the trigger value is set to `GPIO.RISING`, which means that its true when the state of the electrical signal of the pin being measured is changing from LOW to HIGH. This is the condition that must be met for the callback function to run.

3. **I2C Communication:** In the I2C sensor script, why do we use the `smbus.SMBus(1)` function? What does the number 1 signify in this context?

This function is to create an SMBus object so that we can access our device that is using the I2C protocol. The reason we use 1 is because that is the port number on our pi of the I2C device.

4. **Data Register Access:** Explain how the temperature data is read from the BMP280 sensor. What is the significance of reading multiple bytes (e.g., `temp_msb`, `temp_lsb`, and `temp_xlsb`)?

Temperature is read from the sensor, which collects it's readings as bits. Thus, we need to read multiple bytes of data and do binary operations on them in order to combine the data and convert them into a temperature in celsius.