Physics 314, Fall 2016
Lab 5: Introduction to the microcontroller

1. Using the microcontroller to control output

Connect an LED and a 470 Ω resistor in series between V_{dd} and pin 4 so that the LED will be forward-biased when pin 4 goes low (to 0V).

Connect the Board of Education to the PC via the USB port and power it up.

Open the BASIC Stamp editor. Type the following program into the BASIC Stamp editor:

```
output 4
reblink:
        out4 = 0
        pause 1000
        out4 = 1
        pause 1000
goto reblink
```

Select Run from the Menu. (If you get a message asking you to specify the version, choose BS2.) This downloads the program to the EEPROM memory of the Stamp and runs it. Does it work?

Explain what each line in the program does (you may want to talk to me about this).

2. Managing input and output

Now modify the hardware and software to blink the LED only when a button is pushed.

Hook up the pushbutton so that pin 0 is connected through a 10k resistor to V_{dd} when the button is NOT pushed, but to ground (through the pushbutton) when the button is pushed. (Before turning it on, check your circuit with me.)

Modify your program to the following:

```
output 4
input 0
out4=1
recheck:
        if in0=0 then reblink
goto recheck
reblink:
        out4 = 0
        pause 1000
        out4 = 1
        pause 1000
goto recheck
```

and try it. What do you observe? In particular, if you release the button while the light is off, what happens?

3. Introduction to Bit Crunching—see handout.