Project 4: ADC w/ Interrupt
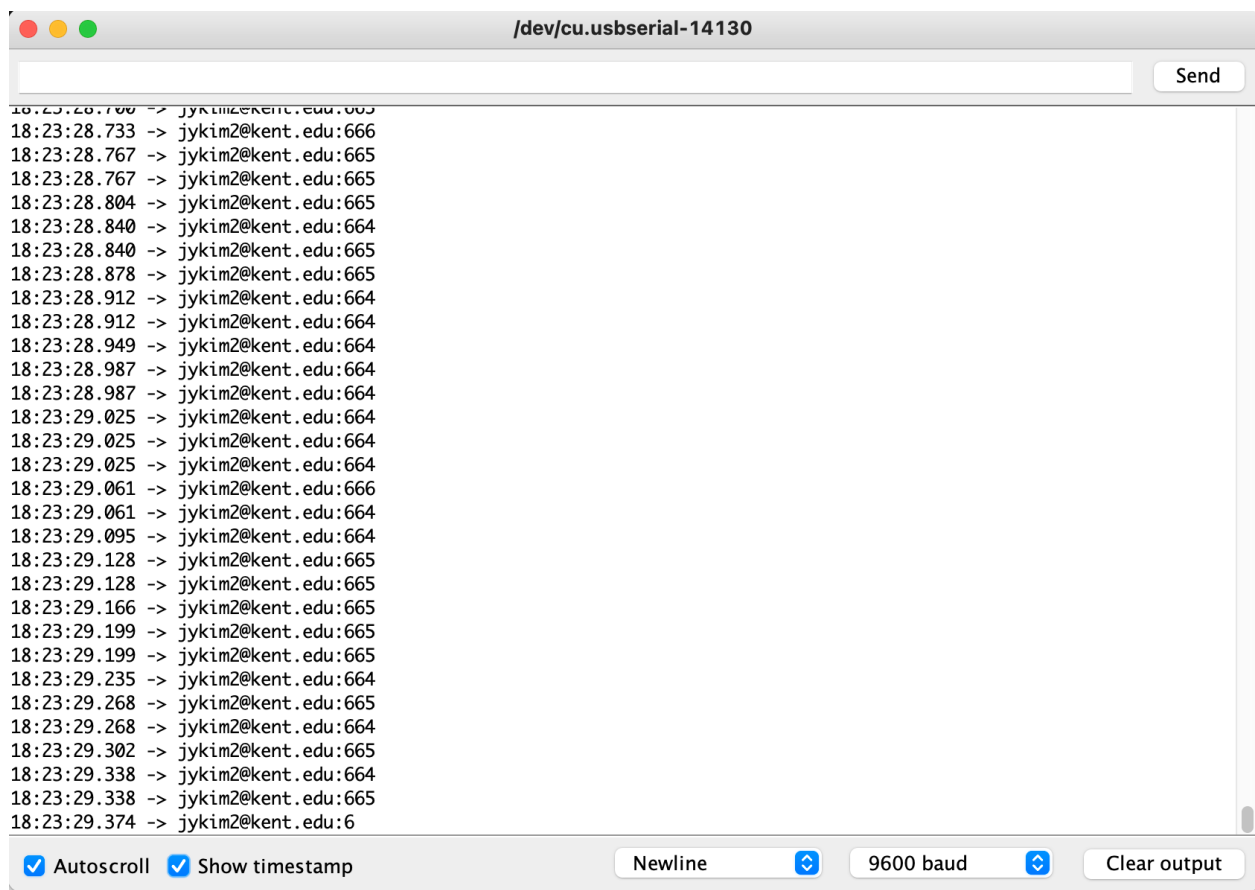
Write a program with appropriate comments. Input switch should be working with the external interrupt. HW Connection: Using External Interrupt 0 for input switch (normal state is high and pushed state is low) and no need to add an external LED.

1. Initial state: Internal LED OFF (15)

Using an ADC Interrupt (10-bit ADC), write a program for blinking LED every one second when your ADC value (A0 pin) is over 500. You can test this function with 3.3V pin and 0V pin. In order to check the ADC value of A0 Pin, serial communication function can be used. Setting Registers of ADC, LED blink and Serial data to your email address. Refer to the figure below.


```
                                    /dev/cu.usbserial-14130

                                                                              Send

18:23:28.700 -> jykim2@kent.edu:665
18:23:28.733 -> jykim2@kent.edu:666
18:23:28.767 -> jykim2@kent.edu:665
18:23:28.767 -> jykim2@kent.edu:665
18:23:28.804 -> jykim2@kent.edu:665
18:23:28.840 -> jykim2@kent.edu:664
18:23:28.840 -> jykim2@kent.edu:665
18:23:28.878 -> jykim2@kent.edu:665
18:23:28.912 -> jykim2@kent.edu:664
18:23:28.912 -> jykim2@kent.edu:664
18:23:28.949 -> jykim2@kent.edu:664
18:23:28.987 -> jykim2@kent.edu:664
18:23:28.987 -> jykim2@kent.edu:664
18:23:29.025 -> jykim2@kent.edu:664
18:23:29.025 -> jykim2@kent.edu:664
18:23:29.025 -> jykim2@kent.edu:664
18:23:29.061 -> jykim2@kent.edu:666
18:23:29.061 -> jykim2@kent.edu:664
18:23:29.095 -> jykim2@kent.edu:664
18:23:29.128 -> jykim2@kent.edu:665
18:23:29.128 -> jykim2@kent.edu:665
18:23:29.166 -> jykim2@kent.edu:665
18:23:29.199 -> jykim2@kent.edu:665
18:23:29.199 -> jykim2@kent.edu:665
18:23:29.235 -> jykim2@kent.edu:664
18:23:29.268 -> jykim2@kent.edu:665
18:23:29.268 -> jykim2@kent.edu:664
18:23:29.302 -> jykim2@kent.edu:665
18:23:29.338 -> jykim2@kent.edu:664
18:23:29.338 -> jykim2@kent.edu:665
18:23:29.374 -> jykim2@kent.edu:6

☑ Autoscroll  ☑ Show timestamp          Newline ⬍    9600 baud ⬍    Clear output
```

2. initial state: internal LED OFF (10)

a. When the pushed button is pushed. → ADC value of temperature sensor. When your ADC value (temperature) is over 50, blinking LED every one second.
b. When the pushed button is pushed. → ADC value of A1 pin. When your ADC value (temperature) is over 50, blinking LED every one second.

c. When the pushed button is pushed. → ADC value of GND without external connection. No need to control LED.

d. When the pushed button is pushed. → ADC value of A7 without external connection. No need to control LED.

… (Repeat a – d)

3. Monitoring PWM w/ ADC (10)

Fast PWM output at the OC0A pin (port D pin 6) with maximal period and select the duty cycle based on your student ID (last two digits). For example, if your student id is 3455 1234, your duty cycle should be 34%. Connect your A0 pin to port D pin 6 and extract the ADC values for at least 5 seconds. The results need to be plotted in excel and submit and excel file with the plot result and number recordings.

% You should not use any Arduino function, except [Serial.begin(9600) and Serial.println("jykim2@kent.edu")].

% Any code from Arduino library except [Serial.begin(9600) and Serial.println("jykim2@kent.edu")], is found, it will be directly zero point.

% We will not accept any H/W issues on due date and one day before. If you have H/W issues, please contact the GA as soon as possible.

% Use a ATMega328 Datasheet for checking the registers' information