Homework #6: Interfacing the Atmega128

1. (30 pts) Interface a momentary push button switch and a DC motor (rated at 12 V, 1 A) to the Atmega128, and write a program, so that the motor is turned on when the button is pressed and is turned off when the button is released.

   - Use one pin for interfacing the switch and one pin for interfacing the motor. (It would be good practice for you to try to add a switch separate from those on the STK500).
   - Include a schematic diagram showing the components and how they are connected. Please be specific in your choice of any resistors or other components used in your interface, and label them on the schematic.
   - Include comments in your code to clearly explain what is going on.

Hints:

   - This is a good opportunity to use the optional internal pull-up resistor for the pin connected to the switch. (See pp. 63-69 in the Atmega128 data sheet: http://www.atmel.com/dyn/resources/prod_documents/doc2467.pdf) Referring to Figure 29 from the data sheet, you can enable the pull-up resistor on one of the I/O pins when it is set as an input, and it means that the pin will be at 5 V until some external device pulls the pin low. When the pin is pulled low, the pull-up resistor limits the current drawn out of the pin to a reasonably small amount.
   - In case we don’t get to it in lecture before you start working on this problem, a motor is a relatively large inductive load. Switching off inductive loads can present a problem without a diode as shown in Figure 3.30.
   - You should be able to use much of the code you generated for HW #5 or the example code from lecture for your program.