Homework 3. Due Friday April 11 @ start of class.
Problem 4 is to be written up formally as per problem instructions.

Problem 1. In an air standard Brayton cycle the air enters the compressor at 0.1 MPa, 15 °C. The pressure leaving the compressor is 0.5 MPa and the maximum temperature in the cycle is 900 °C.

Determine:
(a) The pressure and temperature at each point in the cycle.
(b) The compressor work, the turbine work and the cycle efficiency. (Answer: $\eta_{th} = 36.9\%$)

Problem 2. Consider a gas turbine with air entering under the same conditions as in Problem 1 and leaving at a pressure of 0.5 MPa. The maximum temperature is 900 °C. Assume a compressor efficiency of 80%, a turbine efficiency of 85% and a pressure drop between the compressor and turbine of 15 kPa.

Determine:
(a) The pressure and temperature at each point in the cycle
(b) The compressor work, the turbine work and the cycle efficiency (Answer: $\eta_{th} = 22.5\%$)

Problem 3. If an ideal regenerator is incorporated into the cycle of Problem 1. Determine the thermal efficiency of the cycle. (Answer: $\eta_{th} = 61.1\%$)