CpE213 – Digital Systems Design

Homework 1
Ch 1 and Address decoding

NOTE: Just as on tests, I expect you to show all your work on homework problems. A correct answer with no work might not be given full credit.

1. Name 5 important differences between a microcontroller and a microprocessor. What are the 2 *most important* differences?

2. For the following circuit:

   a) What is the address space of RAM1 and ROM1?

   b) List at least 3 locations that we could address REG1.

3. Say you are trying to hook up RAM (each chip with a standard $\overline{CS}$) to a microcontroller with 16 address lines (A0 through A15).

   a) Draw a circuit which uses just 2 74LS138s (and no other parts) to create an address space for 16 4kx8 RAM chips. (Hint: There is a good reason for having multiple chip selects on the 74LS138).

   b) Extending this model, how would you hook up 74LS138s to create separate address spaces for 8 4kx8 and 16 2kx8 RAM chips (you need only label the pins of the 74LS138s, showing what they would be connected to).

   c) For part b), find the address space for each chip.