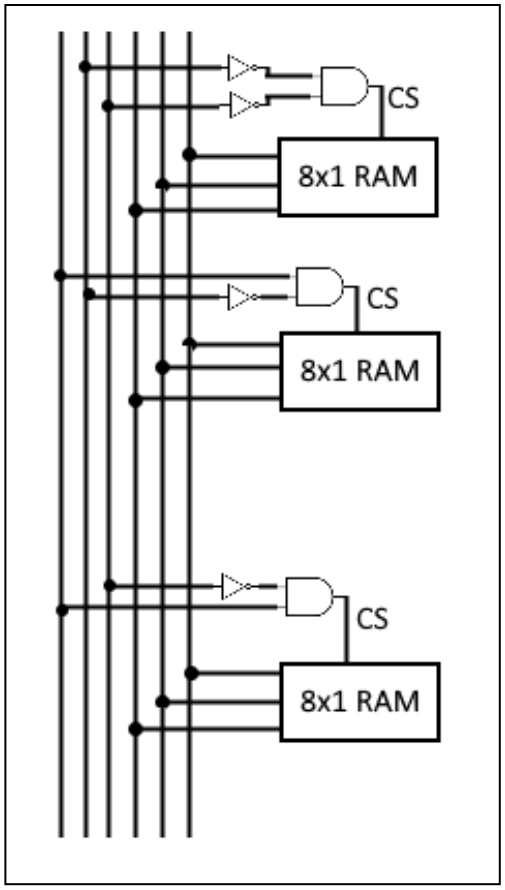
CS220 Spring 2017
Homework #4 Due in one week (4/12 or 4/13)

Name:

Address decoding: You drew diagrams to show how address decoding worked, now take a look at the following diagram and answer the following questions. **Include a brief explanation of how you arrived at your answer.** You must provide this explanation to receive credit for your answer.

There are three 8-bit by 1-bit RAM chips connected to an address bus (a set of wires which contain the address in binary). Each chip has 3 address lines going directly into the chip, and a 4th chip select line which turns the chip on and off. At most 1 of these chips should be on at any time.



1. For the top RAM chip, where is the chip placed in the address space? Put differently, what is the address range of the bits stored in this chip. Please give your answer in binary.

2. What is the address range for the middle chip?

3. What is the address range for the lower chip?

Hamming Codes

You did the worksheets, and hopefully you have had enough practice to be quite good at these sorts of problems. (If you are in doubt, I will be happy to answer any questions you might have). Please make it clear how you arrived at your answers.

Provide the Hamming encoded value for the following binary numbers. Add only the minimum number of parity bits that you need for each problem.

4. 10110

5. 100

6. 11001110

For the following questions, decode these Hamming-encoded values and tell me the original data bits. Make any corrections that you need if there is a bit in error. You do not need to show the list of binary numbers used to determine parity bit values (E.g 1-15 in binary)

7. 0110 111

8. 1111 0011 0001

9. 1010 1000 0100 0011 1