**CS 3173 Assignment 9 14 points**

**chapter 12**

**Due 11/16**

**Email your homework to me at** [**harringp@nsuok.edu**](mailto:harringp@nsuok.edu)

**Part 1: Problem Solving: Type your answers (8 points):**

1. What is a bus? **– A set of parallel wires that connect a microprocessor to external devices**
2. List and describe the three types of connections a microprocessor needs? **– Data lines to send and receive data from memory, address lines to specify where in memory data is coming from or going to, and control lines to specify timing and direction of these data transfers.**
3. What is a memory map? **– A depiction of how each section of memory is used as defined by the designer of the system**
4. What determines the full memory address space of a processor? **The width of the address bus**
5. Given a full memory address with enable and device address bits, which bits are used to enable the memory device and which ones access a memory location? **– Most significant bits are used to enable the device, while least significant bits are used to access the memory location**
6. What is the main memory of the computer? **– Random Access Memory**
7. What is stored in ROM? **­– Data intended to be read-only that needs to persist when power is turned off, such as the BIOS or an embedded operating system**
8. What are the advantages and disadvantages of DRAM? **– It is better for higher densities and cheaper compared to SRAM, but it requires refresh circuitry, is slower than SRAM, and loses data if power is lost.**

**Part 2: Java Programming (6 points):**

Write a Java program to recreate the microchip select hardware of the NAND gate described below:

