School of Computing
Computer Science Program

CDA 3101

Introduction to Computer Logic

Assignment 8

Rubric

Student Name			
Assignment Name	**Assignment 08: Working with RAM**		
Checklist	**Maximum Available Points**	**Received Points**	**Information**
Logic diagram of designed circuit using HM6116A SRAM	60		All Inputs, outputs, and control lines clearly identified. Proper connection of the tri-state buffer.
Printout shows captured data	20		Demonstrate a captured pattern of 10101100 from address 3. Part D.
Other Documents	20		Memory Map for given functions. Part E.
Multisim files			See Notes for Scoring
Final Grade	**Total =**		

Notes for Scoring:

Note 1: Assignments will not be accepted late.

Note 2: Any assigned quizzes that are associated with this assignment will be taken on Canvas unless otherwise noted.

Note 3: No "print screens" will be accepted from Multisim. Print all documents using the print function within the software.

Note 4: All submitted documents from MultiSim must contain the student's name and UNF n-number printed via the software (insert text). No name and number; no points!!!!

Note 5: You must also submit the Multisim circuit that was used to create the required documents for this assignment. A final grade of "0" will be assigned if the submitted circuit fails to work completely or is not submitted.

Note 6: All waveforms must be derived from the submitted logic diagram associated with the waveform.

Assignment 8: Static RAM Memory

The purpose of this assignment is to familiarize the student with static RAM memory.

Equipment / parts needed:

HM6116A (1024 x 8) SRAM
74LS244 Octal Tri-State Buffer
Other Assorted 74LSxx TTL gates
Multisim Software

Pre-lab:

A) Design and construct a circuit that will demonstrate the operation of a static RAM. Eight input-output (I/O) lines will be connected to eight logic indicators (LEDs) in your circuit. Use eight input logic switches for data input to the unit. The switches will connect to the I/O pins through a tri-state buffer (74LS244). The four low order address lines will connect to four other logic switches. Set the remaining address lines to ground. Note that the tri-state buffer will act to isolate the logic switches from the memory outputs during a read operation. It will set the buffer to the high impedance state when reading the memory. See your class notes for wiring instructions.

Using the Multisim Software:

A) Implement the design using the simulation software. *The SRAM can be found in the MCU library group.*

B) Use this simulation to experiment with memory operations. You should be able to write data to the SRAM at different memory addresses and then read that data at the same addresses. In other words, you should be able to write 8-bit patterns to multiple address locations between 0000 – 1111, and then read back these patterns.

C) Print a logic diagram of your designed circuit. All inputs, outputs and control

lines should be clearly marked. Only the logic diagram is required to be printed. No wiring diagram for this assignment. **Submit this document for grading.**

D) Print a captured output pattern of 10101100 from address 3. The printout should show the SRAM in the READ mode with the proper address selected. Submit this document for final grading. **Submit this document for grading.**

E) Create a memory map that used to implement the following functions. Use this data to populate your memory and prove to yourself that all functions are working correctly. **Submit this document for grading.**

$$F_{1(ABCD)} = \Sigma\, m\,(1,3,5,7,9,11,13)$$
$$F_{2(ABCD)} = \Sigma\, m\,(0,2,4,6,8,10,12)$$
$$F_{3(ABCD)} = \Sigma\, m\,(1,3,5,7,9,13)$$
$$F_{4(ABCD)} = \Sigma\, m\,(2,4,6,8,10,12)$$

Grading:

Submit the printed logic diagram of your Multisim design for grading. Also submit documents created in parts D and E (see above). No waveforms are required in this assignment. Don't forget to submit the Multisim circuit file as well.