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ELEC 3356 Digital Systems: Hardware Programming

University of New Haven

Dr. Martinez

Spring 2023

Final Project Demo Grading Rubric

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| Grading item | =Points |
| VHDL Coding: Use only the coding that was taught in the class.  0 pts if only used class coding  -20 pts if you use coding not taught in class |  |
| Top design file: if you have a top level file that is the connection of your FSM and datapath  5 pts – have a top file that connect FSM and datapath | +5 |
| FSM: If you have a separate file for the FSM  5 pts – have a fsm in a separate file  2 pts – have a fsm written | +5 |
| Datapath: If you have a file for the datapath and a number of components that are linked together.  5 pts – have a datapath file  2 pts – have multiple components | +5 |
| XDC file:  5 pts – have an XDC will all the connection to pins on the board | +5 |
| Adder: you create an adder in VHDL  5 pts if the adder is written and working correct on the board  4 pts if the adder is written and working correct in simulation  2 pts if the adder is written but not working correctly | +4 |
| Multiplier: you create a multiplier in VHDL  5 pts if the multiplier is written and working correct on the board  4 pts if the multiplier is written and working correct in simulation  2 pts if the multiplier is written but not working correctly | +4 |
| Register: you create a register in VHDL  5 pts if the register is written and working correct on the board  4 pts if the register is written and working correct in simulation  2 pts if the register is written but not working correctly | +4 |
| Counter: you create a counter in VHDL  5 pts if the counter is written and working correct on the board  4 pts if the counter is written and working correct in simulation  2 pts if the counter is written but not working correctly | +4 |
| MUX: you create a mux in VHDL  5 pts if the mux is written and working correct on the board  4 pts if the mux is written and working correct in simulation  2 pts if the mux is written but not working correctly | +4 |
| ROM: you create a ROM for a solution in VHDL  5 pts if the solution ROM is written and working correct on the board  4 pts if the solution ROM is written and working correct in simulation  2 pts if the solution ROM is written but not working correctly | +4 |
| ROM: you create a ROM for a starting locations in VHDL  5 pts if the starting locations ROM is written and working correct on the board  4 pts if the starting locations ROM is written and working correct in simulation  2 pts if the starting locations ROM is written but not working correctly | +4 |
| RAM: you create a RAM for a user puzzle in VHDL  5 pts if the RAM is written and working correct on the board  4 pts if the RAM is written and working correct in simulation  2 pts if the RAM is written but not working correctly | +4 |
| Fill in starting location:  5 pts if you have the starting locations read from solution ROM and filled into RAM on the board  4 pts if you have the starting locations read from solution ROM and filled into RAM in simulation |  |
| 2D to 1D addressing: you convert the row and column into a 1D address for the address  5 pts for written code and working correctly on the board  4 pts for written code and working correctly simulation  2 pts for written code and not working correctly | +4 |
| User puzzle: can enter numbers into the user puzzle  5 pts if you can use the switches to select the row, column, and number to enter into the puzzle  2 pts if you can enter a number into the puzzle but not using all the switches | +3 |
| Comparing:  10 pts you have code that can compare two numbers, give the correct result, update the count if not equal and not count a blank spot as incorrect  7 pts you have code that can compare two numbers, give the correct result, and update the count if not equal  5 pts you have code that can compare two numbers, give the correct result, but not have the update count  2 pts you have code to compare but not able to show if you give the correct result  1 point less if working only in simulation | +9 |
| LEDs:  5 pts if you can show the number of wrong boxes on the LEDs  2 pts if you can show the LED outputting some data |  |
| UART:  5 pts if you are able to print out the entire user puzzle to the UART  2 pts you can print out 1 box in the user puzzle  Bonus points: +2 point if you have a , between boxes  +2 point is you have new lines for each row |  |
| 7 Segment LED: Points given base on the following  2 pts can show a number on the 7 segment display  2 pts can show two different numbers being displayed at the same time on the display  2pts can show the row and column on the display  2 pts can show the number in the user puzzle on the display  2 pts can select between the row & column and number in puzzle  (total 10 points possible) | +8 |
| Final Demo: in your final submission how many of the items you can show working on the hardware  2 pts can download VHDL to the FPGA  2 pts can enter in row and column on the board  2 pts can show the row and column on the board  2 pts can enter in the number to place in the puzzle  2 pts can show the number in the puzzle  2 pts can enter in multiple row & columns, and numbers into the puzzle (works more than just one time)  2 pts can press the compare button and get a LED result  2 pts can press the compare button and get result on UART  (total 16 points) | +8 |
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| Total points (121 points + 4 bonus points) |  |