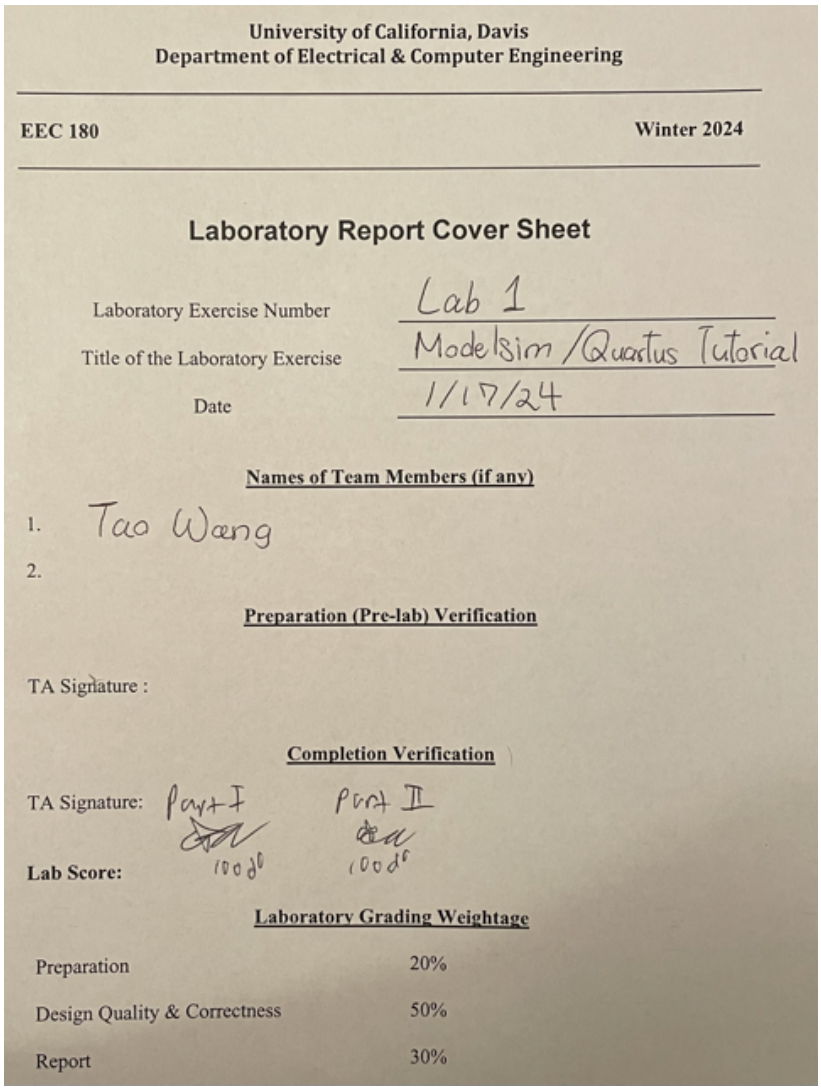
EEC180 Lab 1 Report

Name: Tao Wang

Section: A01

Check-Off Sheet



University of California, Davis
Department of Electrical & Computer Engineering

EEC 180 Winter 2024

Laboratory Report Cover Sheet

Laboratory Exercise Number: Lab 1

Title of the Laboratory Exercise: Modelsim / Quartus Tutorial

Date: 1/17/24

Names of Team Members (if any)

1. Tao Wang
2.

Preparation (Pre-lab) Verification

TA Signature :

Completion Verification

TA Signature: Part I Part II

Lab Score: 100 100

Laboratory Grading Weightage

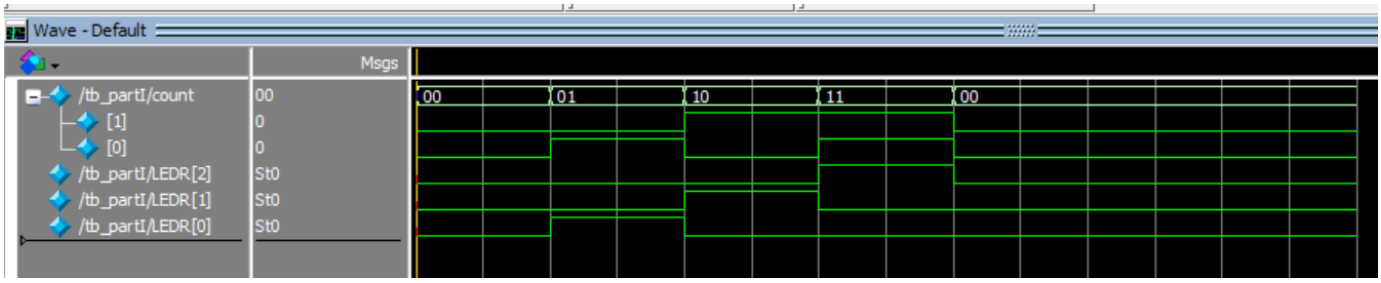
Preparation	20%
Design Quality & Correctness	50%
Report	30%

Part I

I created a basic logic with switches and LEDR based on the following truth table.

SW1	SW0	LEDR[2]	LEDR[1]	LEDR[0]
0	0	0	0	0
0	1	0	0	1
1	0	0	1	0
1	1	1	0	0

SW[1:0] represents the binary input, and LEDR[2:0] represents the decimal output. For example, when SW1 = 1 and SW0 = 1, 3 is the decimal representation of the binary 11, so LEDR[2] lights up because it's the third LEDR.



Part II

In partII of the lab, I computed the output boolean equation for each segment of the HEX0 and HEX1 display by using the truth table below.

I then assigned these equations to the associated segments with the `assign` statement, which continuously checks the input and updates the output.

HEX0

SW3	SW2	SW1	SW0	HEX0[7]	HEX0[6]	HEX0[5]	HEX0[4]	HEX0[3]	HEX0[2]	HEX0[1]	HEX0[0]
0	0	0	0	1	1	0	0	0	0	0	0
0	0	0	1	1	1	1	1	1	0	0	1
0	0	1	0	1	0	1	0	0	1	0	0
0	0	1	1	1	0	1	1	0	0	0	0
0	1	0	0	1	0	0	1	1	0	0	1
0	1	0	1	1	0	0	1	0	0	1	0
0	1	1	0	1	0	0	0	0	0	1	0
0	1	1	1	1	1	1	1	1	0	0	0
1	0	0	0	1	0	0	0	0	0	0	0
1	0	0	1	1	0	0	1	1	0	0	0
1	0	1	0	1	1	0	0	0	0	0	0
1	0	1	1	1	1	1	1	1	0	0	1
1	1	0	0	1	0	1	0	0	1	0	0
1	1	0	1	1	0	1	1	0	0	0	0
1	1	1	0	1	0	0	1	1	0	0	1
1	1	1	1	1	0	0	1	0	0	1	0

Output Equations

HEX0[7] = 1

HEX0[6] = (!SW[3] & !SW[2] & !SW[1]) | (SW[3] & !SW[2] & SW[1]) | (!SW[3] & SW[2] & SW[1] & SW[0])

HEX0[5] = (!SW[3] & !SW[2] & SW[0]) | (!SW[3] & !SW[2] & SW[1]) | (!SW[3] & SW[1] & SW[0]) | (!SW[2] & SW[1] & SW[0]) | (SW[3] & SW[2] & !SW[1])

HEX0[4] = (SW[0]) | (!SW[3] & SW[2] & !SW[1]) | (SW[3] & SW[2] & SW[1])

HEX0[3] = (!SW[2] & !SW[1] & SW[0]) | (SW[3] & !SW[2] & SW[0]) | (!SW[3] & SW[2] & !SW[1] & !SW[0]) | (!SW[3] & SW[2] & SW[1] & SW[0]) | (SW[3] & SW[2] & SW[1] & !SW[0])

HEX0[2] = (!SW[3] & !SW[2] & SW[1] & !SW[0]) | (SW[3] & SW[2] & !SW[1] & !SW[0])

HEX0[1] = (!SW[3] & SW[2] & !SW[1] & SW[0]) | (!SW[3] & SW[2] & SW[1] & !SW[0]) | (SW[3] & SW[2] & SW[1] & SW[0])

HEX0[0] = (!SW[3] & !SW[2] & !SW[1] & SW[0]) | (!SW[3] & SW[2] & !SW[1] & !SW[0]) | (SW[3] & !SW[2] & SW[1] & SW[0]) | (SW[3] & SW[2] & SW[1] & !SW[0])

HEX1

SW3	SW2	SW1	SW0	HEX1[7]	HEX1[6]	HEX1[5]	HEX1[4]	HEX1[3]	HEX1[2]	HEX1[1]	HEX1[0]
0	0	0	0	1	1	0	0	0	0	0	0
0	0	0	1	1	1	0	0	0	0	0	0
0	0	1	0	1	1	0	0	0	0	0	0
0	0	1	1	1	1	0	0	0	0	0	0
0	1	0	0	1	1	0	0	0	0	0	0
0	1	0	1	1	1	0	0	0	0	0	0
0	1	1	0	1	1	0	0	0	0	0	0
0	1	1	1	1	1	0	0	0	0	0	0
1	0	0	0	1	1	0	0	0	0	0	0
1	0	0	1	1	1	0	0	0	0	0	0
1	0	1	0	1	1	1	1	1	0	0	1
1	0	1	1	1	1	1	1	1	0	0	1
1	1	0	0	1	1	1	1	1	0	0	1
1	1	0	1	1	1	1	1	1	0	0	1
1	1	1	0	1	1	1	1	1	0	0	1
1	1	1	1	1	1	1	1	1	0	0	1

Output Equations

HEX1[7] = 1

HEX1[6] = 1

HEX1[5] = (SW[3] & SW[1]) | (SW[3] & SW[2])

HEX1[4] = HEX1[5]

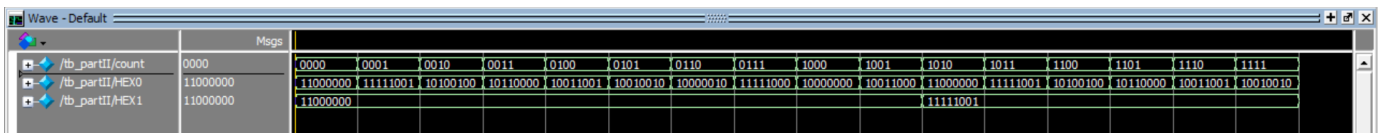
HEX1[3] = HEX1[5]

HEX1[2] = 0

HEX1[1] = 0

HEX1[0] = HEX1[5]

Simulation



Helpful Link

Visit this GitHub Page for more information about the lab.