CSE/EEE 120

Lab 1 Answer Sheet

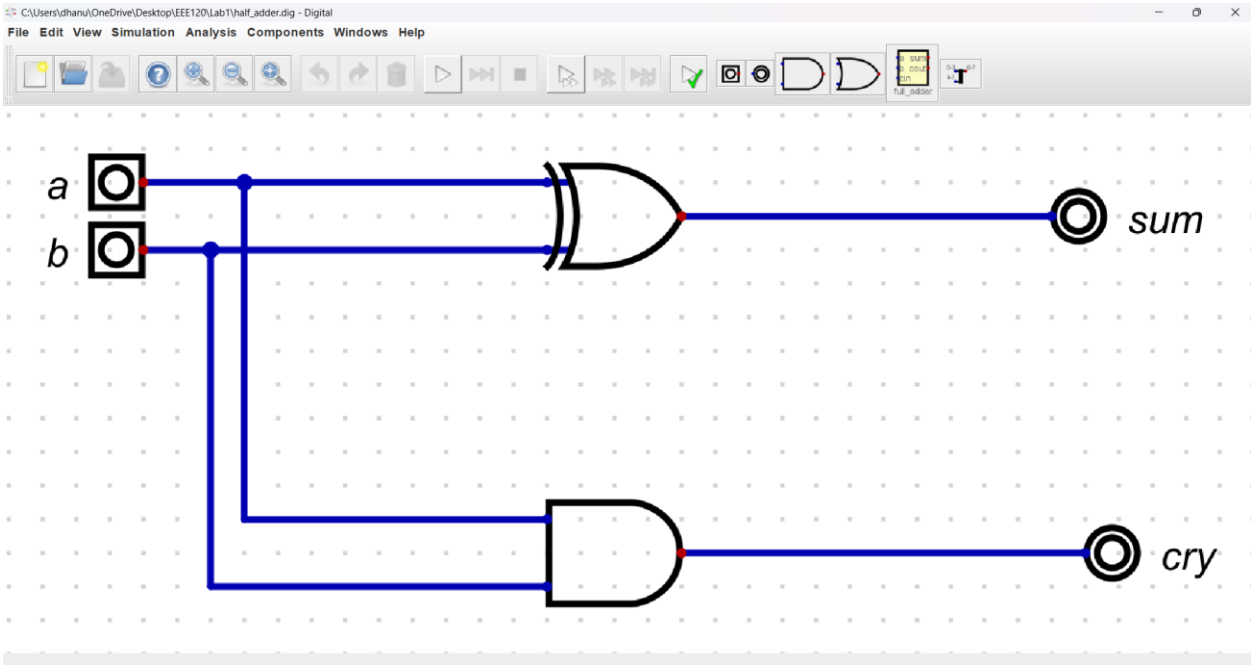
Half Adder, Full Adder, 4-bit Incrementer and Adder

Name: Adwait Sharad More Instructor/Time: Steve Millman/ 4:30 p.m. to 5:45 p.m.

Date: 09/19/2024

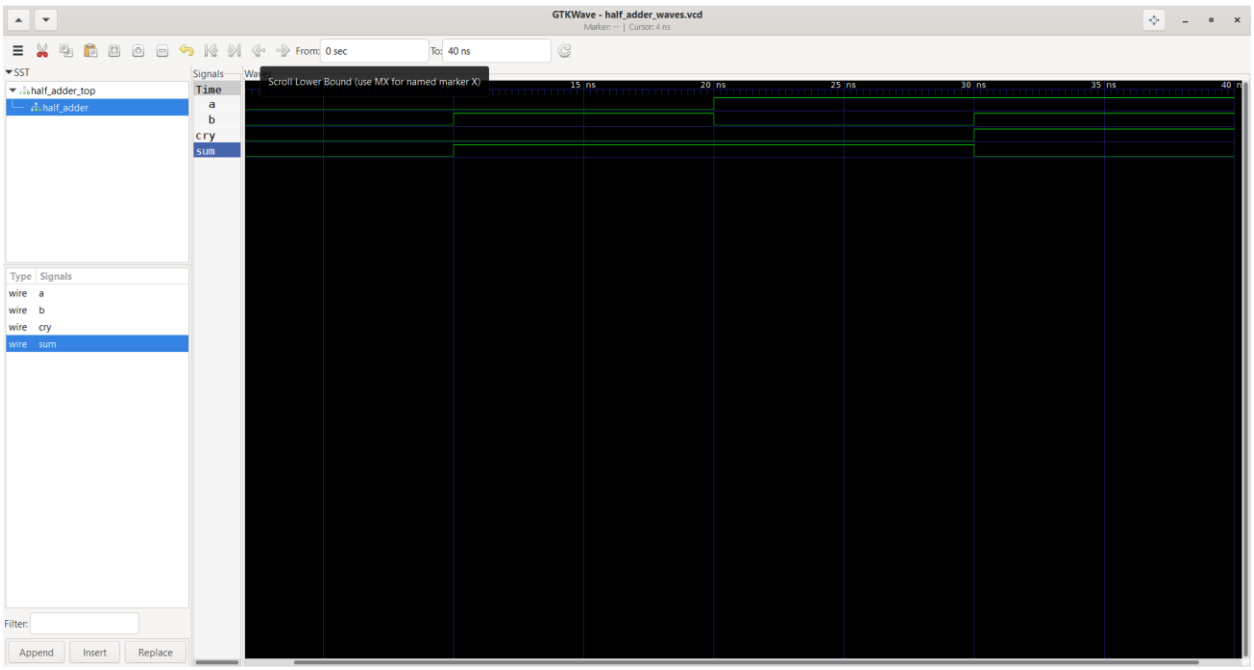
Task 1-1: Build and Test the 1-Bit Half-Adder

Include a picture of your circuit in Digital here:



Please comment on the single biggest issue you were facing when designing the circuit. I didn't face any issues.

Include a picture of your waveform (timing diagram) here:



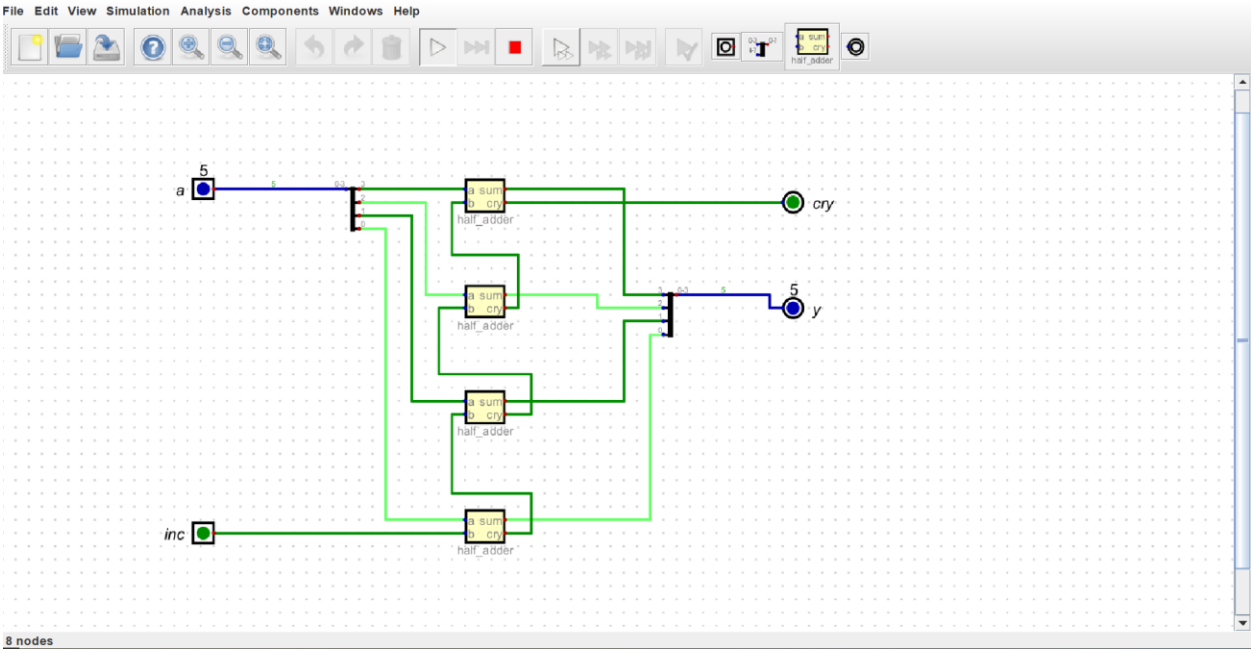
Did the circuit behave as expected? If no, what was wrong? It behaved as expected

Please comment on the single biggest issue you were facing when simulating the circuit.

I didn’t face any issues.

Task 1-2: Build and Test a 4-Bit Increment Circuit

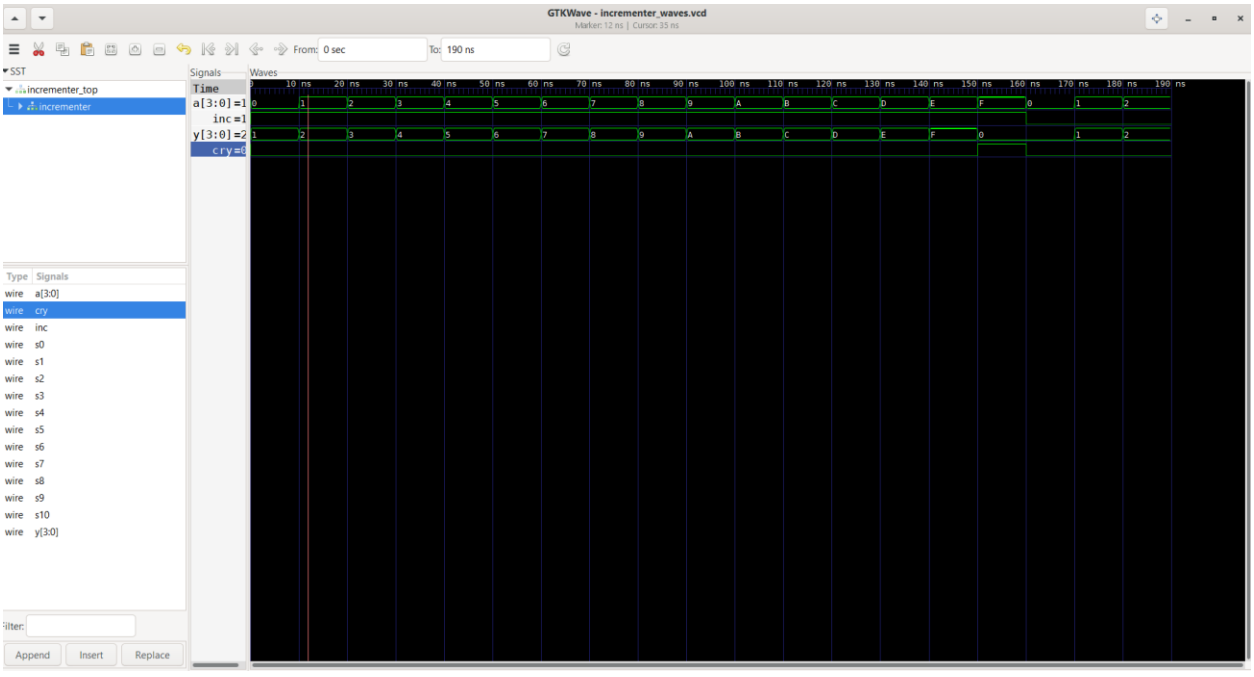
Include a picture of your circuit in Digital here:



Please comment on the single biggest issue you were facing when designing the circuit.

I faced some issues in wire management.

Include a picture of your waveform (timing diagram) here:

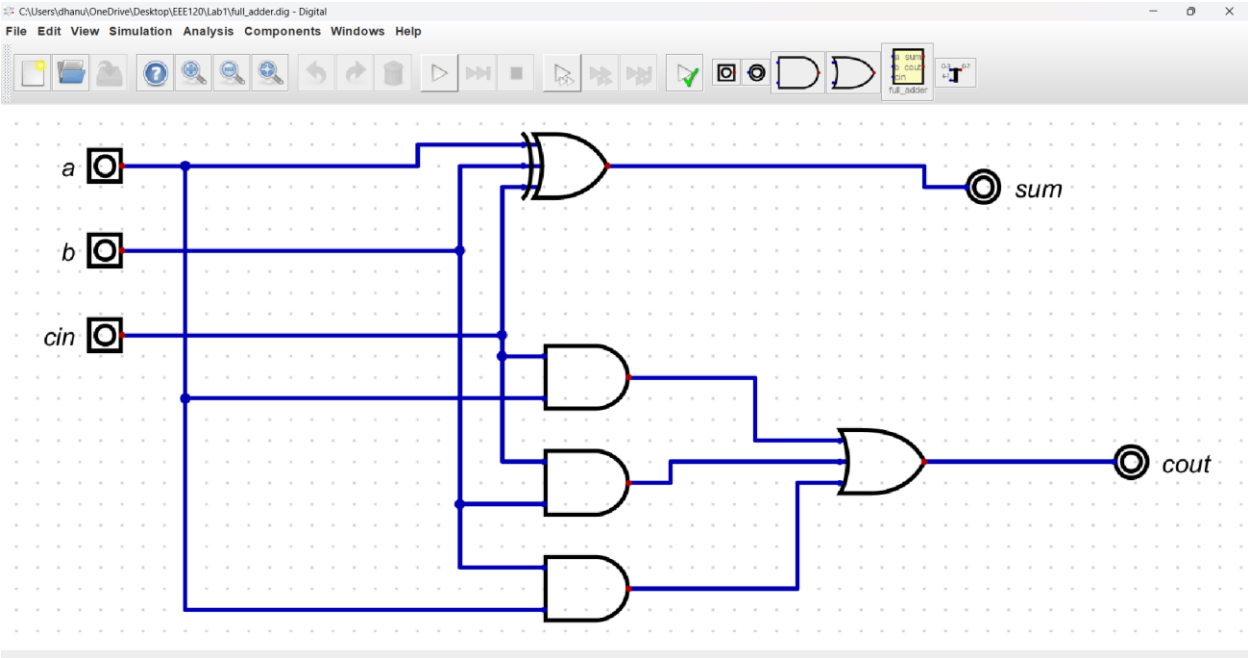


Did the circuit behave as expected? If no, what was wrong? It behaved as expected.

Please comment on the single biggest issue you were facing when simulating the circuit. I didn't face any issues simulating.

Task 1-3: Build and Test a 1-bit Full Adder

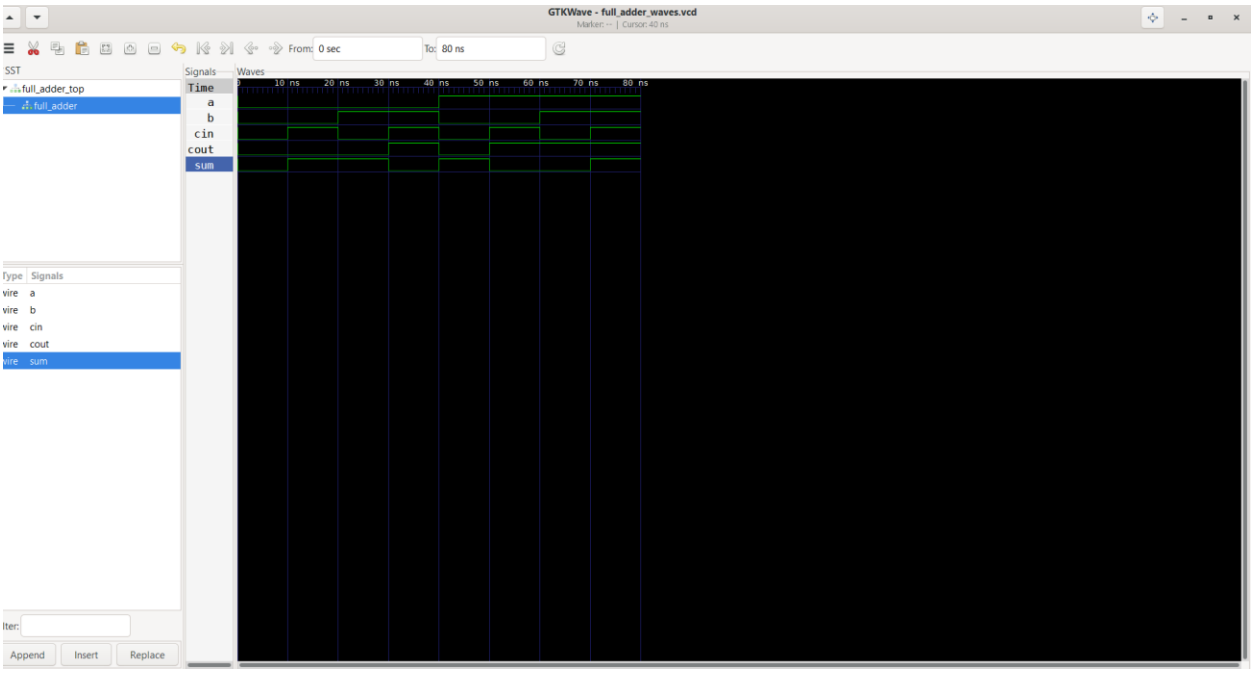
Include a picture of your circuit in Digital here:



Please comment on the single biggest issue you were facing when designing the circuit.

I faced a bit issue in wire management.

Include a picture of your waveform (timing diagram) here:

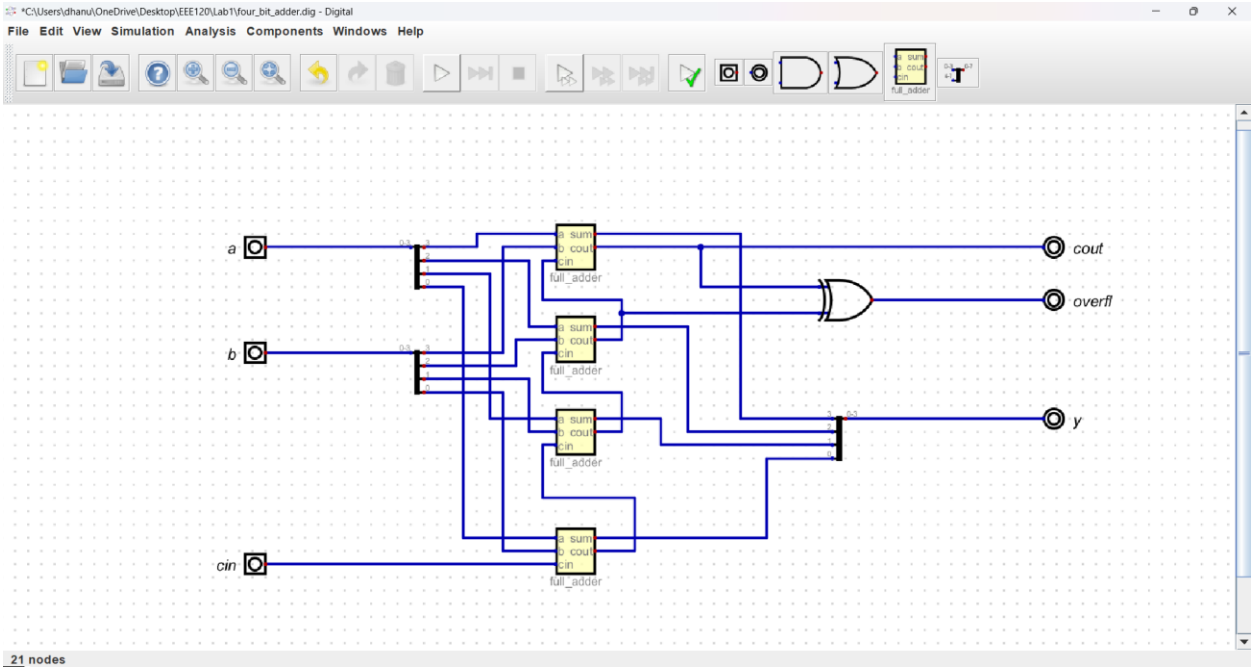


Did the circuit behave as expected? If no, what was wrong? It behaved as expected.

Please comment on the single biggest issue you were facing when simulating the circuit. I didn't face any issue in simulation.

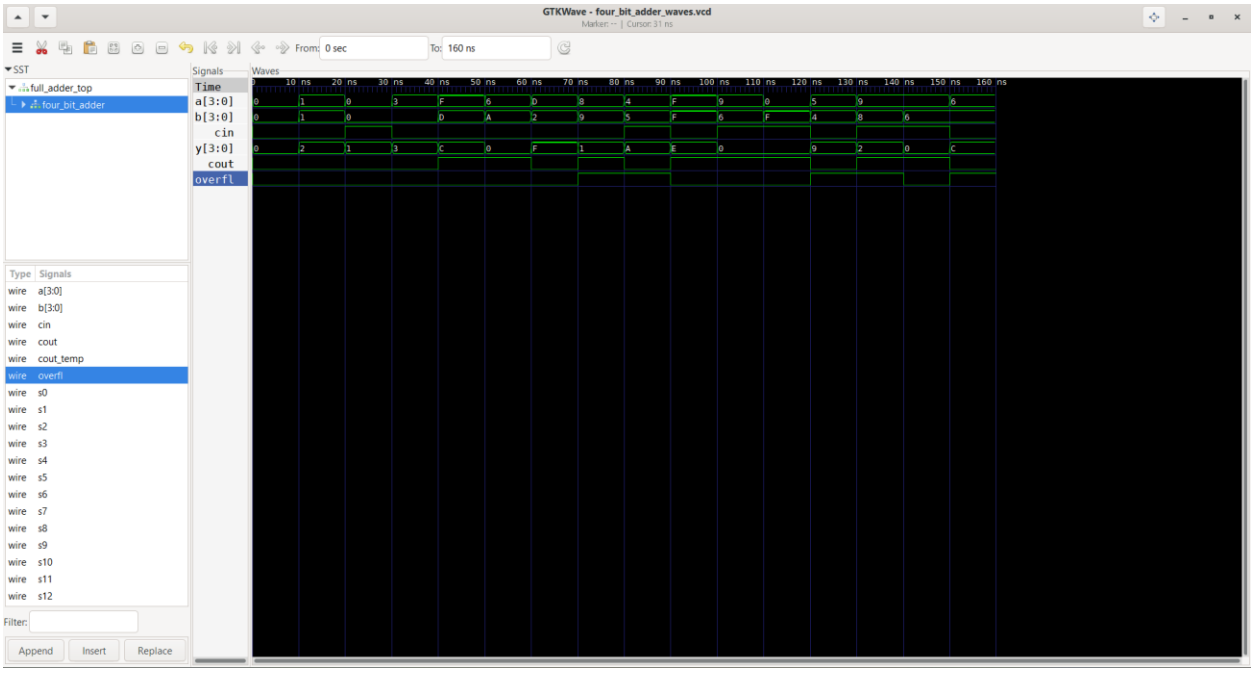
Task 1-4: Build and Test a 4-Bit Full Adder

Include a picture of your circuit in Digital here:



Please comment on the single biggest issue you were facing when designing the circuit. I faced few issues in wire management.

Include a picture of your waveform (timing diagram) here:



Which tests did you perform and why? Use the following table to describe your test sequence. You need to make sure to perform a sufficient number of tests to check the circuit for eventual faults. Each row of

the first column corresponds to a row of stimulus from your four_bit_adder_stim.txt file. Note that you only need to use as many tests as needed. Extra space is provided for enthusiastic students.

Test stimulus	**Test motivation**	**Pass/Fail**
0_0_0_0_0	Check for stuck-at-1 faults (this makes sure none of the wires were accidentally connected to power)	Pass
0_2_0_1_1	Check for addition of 2 positive numbers	Pass
0_1_1_0_0	Check if carry-in input works	Pass
0_3_0_3_0	Check for addition if one of the inputs is 0	Pass
1_C_0_F_D	Check for addition of negative numbers and if the carry-out works	Pass
0_F_0_D_2	Check for addition of positive and negative numbers	Pass
1_0_0_6_A	Check if the carry-out works	Pass
3_1_0_8_9	Check if both overflow and carry-out work together	Pass
2_A_1_4_5	Check if overflow in signed addition works with carry-in	Pass
1_E_0_F_F	Check for addition of maximum numbers	Pass
1_0_1_9_6	Check to see if carry-out works if it is due to the carry-in	Pass
1_0_1_0_F	Check to see adding 0 to the maximum number works even with the carry-in	Pass
2_9_0_5_4	Check to see if overflow works as expected for signed addition	Pass
3_2_1_9_8	Check to see if both overflow and carry-out works with the carry-in	Pass
1_0_1_9_6	Check to see the carry-out for the addition of positive and negative numbers even with the carry-in	Pass
	Check to see overflow on addition of two negative numbers	Pass

Please comment on the single biggest issue you were facing when simulating the circuit. There are no issues I faced while simulating the circuit.

Task 1-5: Create a video and submit your report.

Record a short video showing your schematics in Digital and your waveforms in GTKWave. Be sure to show yourself in the video and show your screen. Explain how your circuit works – you need to convince the grader you did the lab and understand it! **Copy and paste the link to your video below. Make sure the link is working and pointing to the correct video. Remember to include the password if required. Do NOT upload your video to Canvas. It is recommended that you use Zoom to record to the cloud, pasting the link and password below.** If your circuit is not working as expected, explain in the video how it is not working and why you think it is not working.

Video Link:

https://drive.google.com/file/d/1TlJIashjCqWi59G8R37kZ6UgLcVDw44-/view?usp=sharing

At the beginning of your recording, say your name and the lab name. Be brief in your recording. Submit the completed template to Canvas.

Make sure all your files are in the Lab1 directory. Create a zip file of the Lab1 directory. Remember to turn in the zip file and your completed template on Canvas!

Do not include the video in the zip file! This makes the file very large and you run the risk of the zip file not uploading or taking so long to upload that your submission will be late. Remember that the submission is dated at the time the upload completes, not when it starts!

LAB 1: LAB REPORT GRADE SHEET

Name _____

NOTE: You submit the zip file in order to show your work.
If the zip file is not submitted you will receive a 0 for this lab!

Instructor Assessment

Grading Criteria	Max Points	Points Lost
Description of Assigned Tasks, Work Performed & Outcomes Met		
Task 1-1: Build and Test a 1-Bit Half-Adder	10	
Task 1-2: Build and Test a 4-Bit Increment Circuit	10	
Task 1-3: Build and Test a 1-Bit Full Adder	10	
Task 1-4: Build and Test a 4-Bit Full Adder	10	
Task 1-5: Create a video and submit your report.	10	
Lab Score (50 points total)	**Points Lost**	
	Late Lab	
	Lab Score	