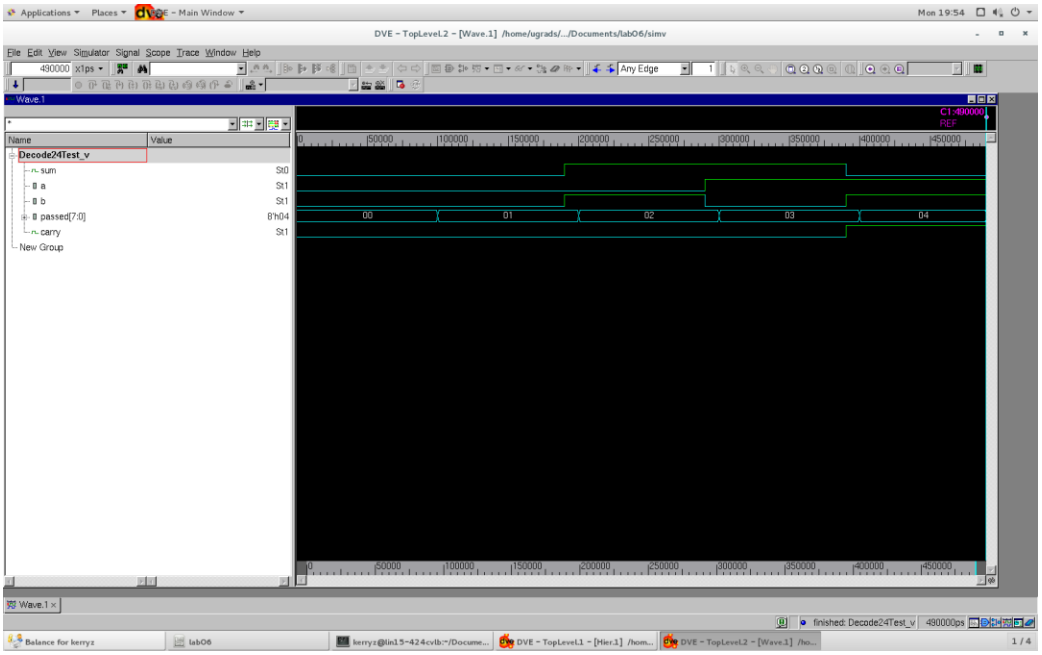
Kerry Zeng

Lab 6

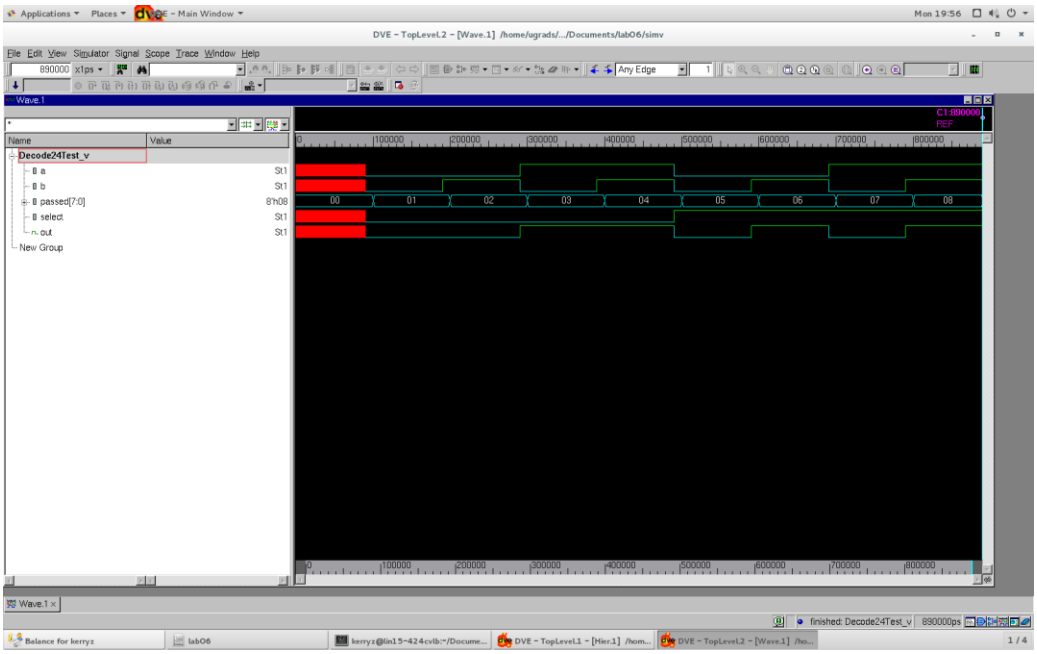
The pictures says it's Decode24Test, but it's actually a different test for the halfadder/mux. I forgot to change the name of the module when I created it.

Half Adder Waveform



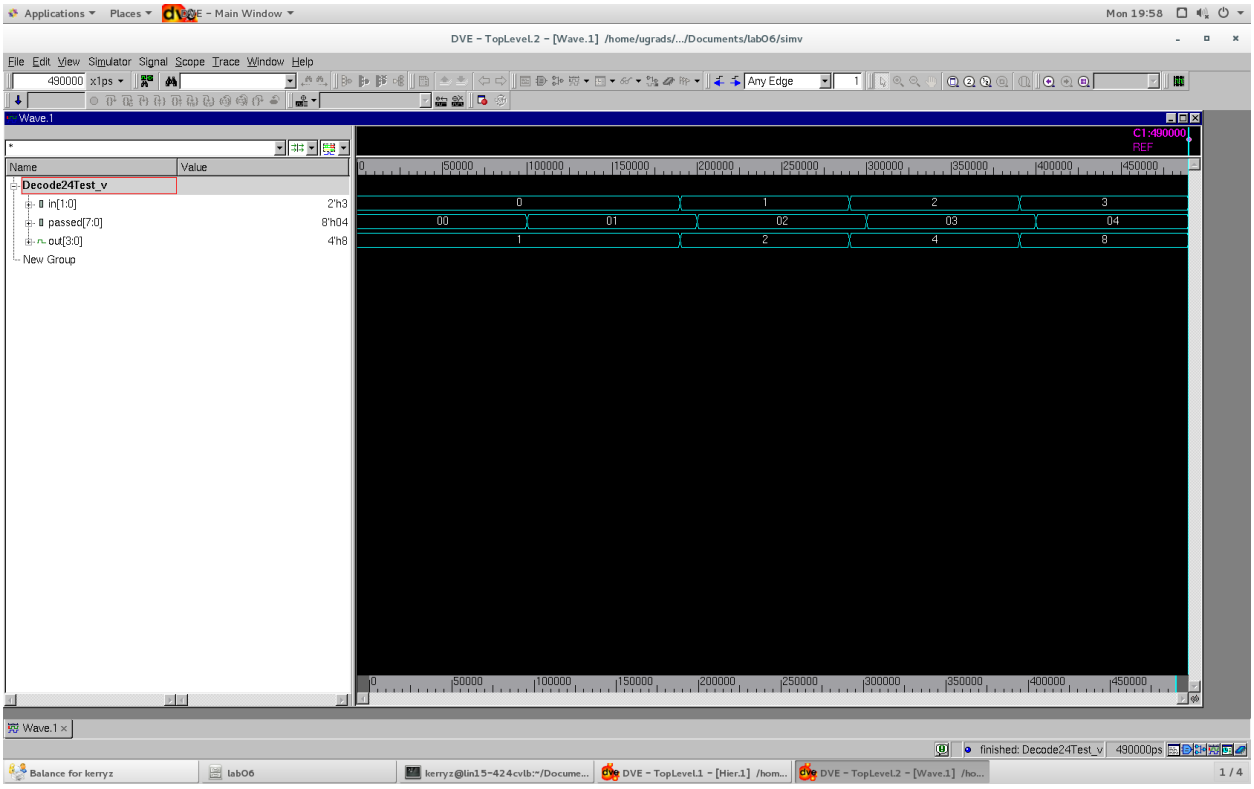
This is the half adder waveform. The "a" and "b" waveform go from 0 to 1 and basically test every combination in the truth table. For example in the beginning at (a,b)=(0,0) the sum is 0 and carry is 0. For (a,b)=(0,1) the sum is 1 and carry is 0 and etc. At the end both (a,b)=(1,1) and thus the sum is 0 and the carry is 1.

Mux Waveform



The waveform shows the input (select,a,b) alternating in the same way that the truth table is set up. The output is correct because it copies the waveform of “a” when select is 0 and copies the waveform of “b” when select is 1, which is what a mux does. A mux’s select determines which one the inputs it uses and then the output is just whatever the input is. So for example (0,0,1)=0 the select is 0, so it selects a, which is 0.

Decoder



The input is a 2 bits and the decoder basically takes that and converts it into 4 bits with one hot encoding. One hot encoding is when you only have one “1” in the entire number. The input goes from 00 to 01 to 10 and then 11, which is represented by 0,1,2,3 on the waveform. The output basically becomes 2^input through the one hot because only one of the 4 bits in the output is “1”.