16/4/21
EC413
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Lab 9

In the hazard unit module, I created a mux that stores the process in IF stage when the instruction in the EX stage is LW and its Rt reg value is equal to Rs reg value of the instruction of the ID stage.

For the forwarding, I created a mux which outputs the corresponding values needed for the instructions when there is a hazard. These values then select the inputs for the ALU.
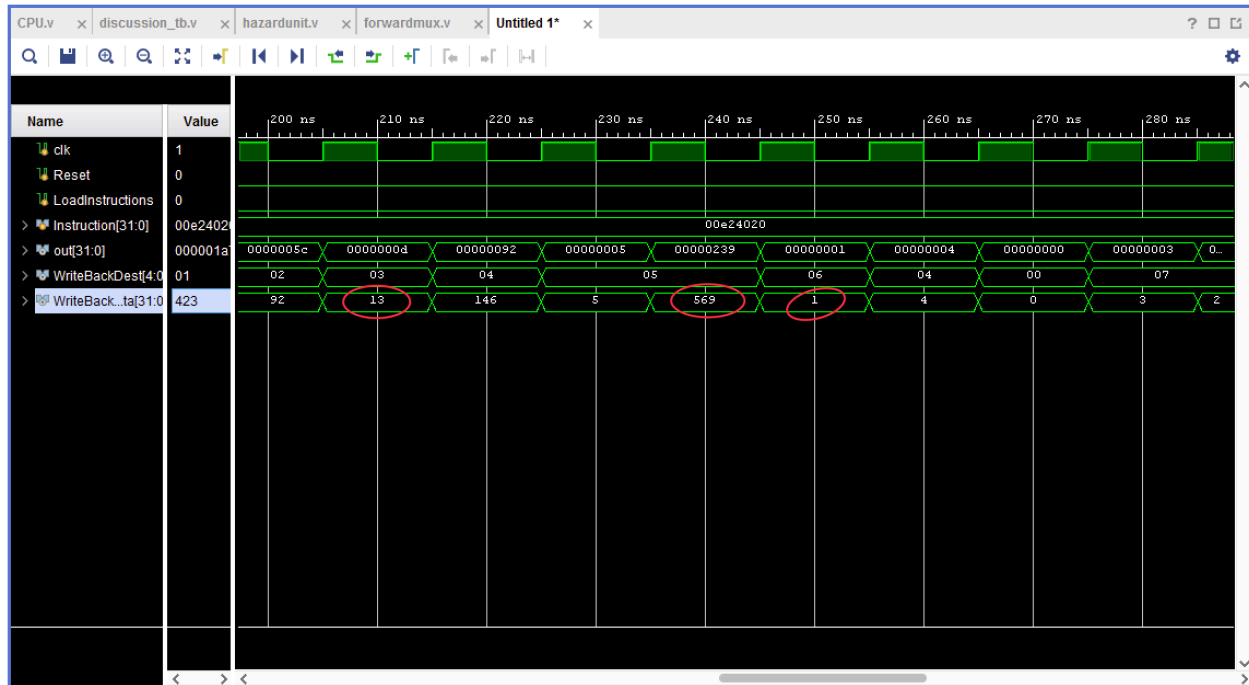
Hazards:

• A hazard occurs here:
ADDI $R4, 146
ADDI $R5, 5
ADD $R5, $R1, $R4

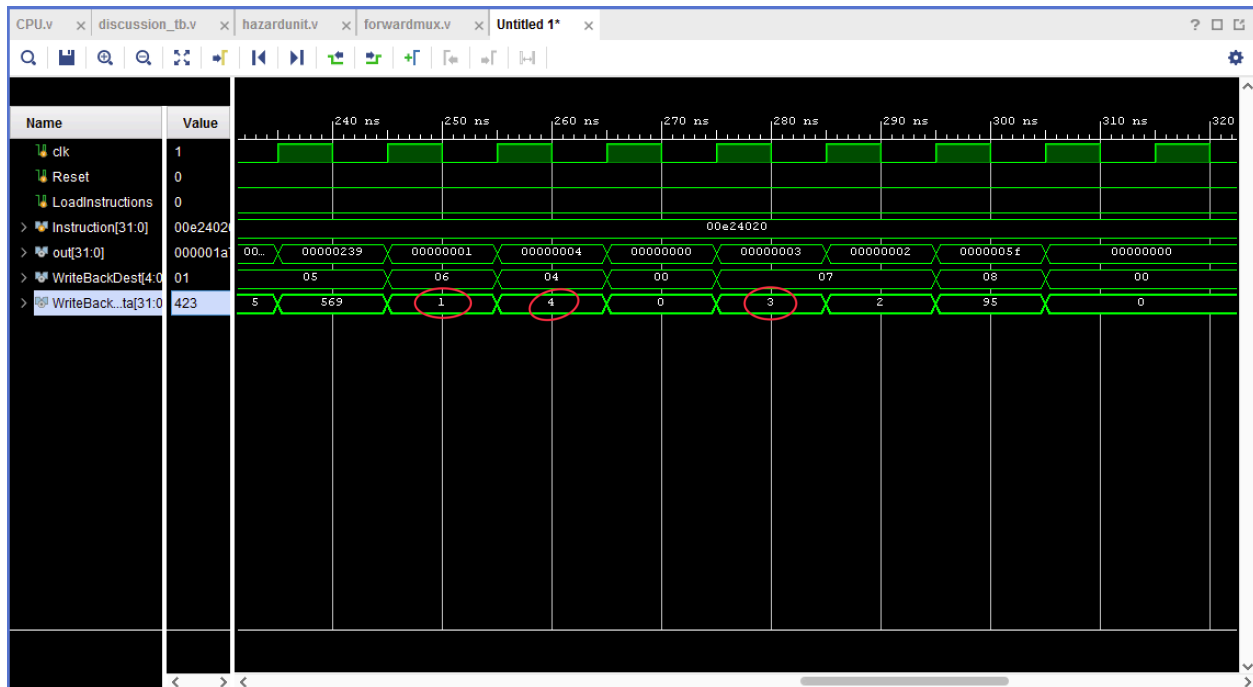The correct answer to these instructions is: 423 + 146 = 569, which is confirmed in the waveform below
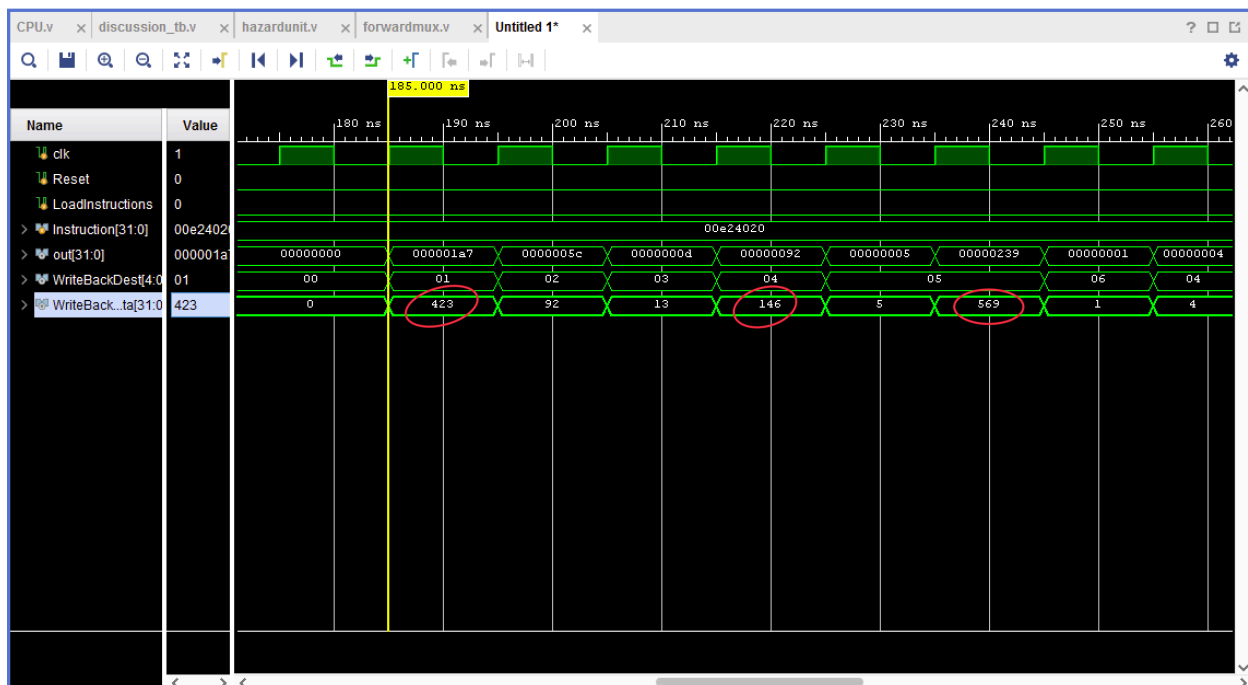
• A hazard occurs here:
ADD $R5, $R1, $R4
SLT $R6, $R3, $R5

The correct answer to these instructions is: if (13 < 569) -> 1, o/w -> 0, as confirmed in the waveform below

• A hazard occurs here:
SLT $R6, $R3, $R5
LW $R4, 4($R0)
SUB $R7, $R4, $R6

The correct answer to these instructions is: 4 - 1 = 3, which is conformed in the waveform below

• A hazard occurs here:
SUB $R7, $R4, $R6
SW $R7, 2($R0)
ADD $R8, $R7, $R2

The correct answer to these instructions is: 3 + 92 = 95, which is confirmed in the waveform below