Criteria For Demo

Prepare Steps:

- TA will give you a sequence of data randomly picked up from the list. (The list is at the end of the slides.)

- You have 10 minutes to input the data array into either your data memory or your data file.

- Add following signals into waveform window:
  - PC
  - All the input and output ports for IM and DM
  - All the input and output ports for ALU
  - All the control signals.
  - Registers that you use into in your assembly code

- When you are ready, call the TA to demo your project.

Demo Steps:

- Start your simulation.
- Explain the function of the registers that you use in your code.
  - Ex. which register records the address of the data array
  - Ex. which register records the size of the data array
  - Ex. which register records the data that is loaded from data memory
  - Ex. which register records the sum
  - Ex. which register records the PC value for the loop
  - Ex. if there was more registers, explain each of them
- Zoom in to the IM input/output port, show the changes of the PC and the fetch of the instructions. Show the changes of PC when Jump instruction is executed. Explain a little if you can. Such as, the flush of the pipeline when a branch is taken.
- Zoom in to the DM input/output port, show the changes of the address and the fetch of data. Explain a little if you can.
- Explain the flow of your assembly code.
- Show the result of your calculation. If you put the result in one of the register files, show the value of the register.

Demo Steps For Extra Credit:

- If you have implemented 'SUM' instruction, show the waveform for executing this instruction, explain how you implemented this instruction in your design, especially the assertion of the control signals.

- If you have implemented 'data forwarding', show the waveform for data forwarding logic and explain how you detect the scenario and how you forward data.

- If you have implemented 'data hazard detection', show the waveform for data hazard detection logic and explain how you stall the pipeline.

- If you have implemented 'control hazard detection', show the waveform for control hazard detection logic and explain how you flush the stage buffer.

More about Demo:

- If you couldn't get the right answer in your simulation, you could spend some time to debug your design. This will not decrease your grade as long as you decide to work on it and make it right. After you get the right answer, you will be asked to explain what changes you have made to your design to make it right. Then you will be given a new data array to test your design to make sure that your design works for the old data array and the new data array.

Data Array list 1:

- List 1: ('0x' means hex number) – Answer: 0x7000_0000
  - Put your data into data memory at address: 0x100, array size is 8 words
  - Data Array:
    - 0x0000_000F
    - 0x0000_00F0
    - 0x0000_0F00
    - 0x0000_F000
    - 0x000F_0000
    - 0x00F0_0000
    - 0x0F00_0000
    - 0x6000_0001

Data Array list 2:

- List 2: ('0x' means hex number) – Answer: 0xDDDD_DDDD
  - Put your data into data memory at address: 0x80, array size is 10 words
  - Data Array:
    - 0x0000_1111
    - 0x0000_2222
    - 0x0000_3333
    - 0x0000_4444
    - 0x1111_0000
    - 0x2222_0000
    - 0x3333_0000
    - 0x4444_0000
    - 0x1111_1111
    - 0x2222_2222

Data Array list 3:

- List 3: ('0x' means hex number) – Answer: 0x5555_5555
  - Put your data into data memory at address: 0x40, array size is 6 words
  - Data Array:
    - 0x0101_0101
    - 0x1010_1010
    - 0x1111_1111
    - 0x0DDD_DDDE
    - 0x0333_3333
    - 0x2222_2222

Data Array list 4:

- List 4: ('0x' means hex number) – Answer: 0xFFFF_FFFF
  - Put your data into data memory at address: 0x20, array size is 12 words
  - Data Array:
    - 0x1234_5678
    - 0x8765_4321
    - 0x0000_0001
    - 0x0000_0010
    - 0x0000_0100
    - 0x0000_1000
    - 0x0001_0000
    - 0x0010_0000
    - 0x0100_0000
    - 0x1000_0000
    - 0x2222_2222
    - 0x3333_3333

Good Luck ☺