Yıldız Technical University
Computer Engineering
2023-2024 Spring
BLM2022 Computer Organization
Homework 3

Question 1)

You are given an array of twenty 32-bit different positive integers (ARR), and another array (COUNT) of twenty elements each has the number of cells that are greater than the correponding element of array ARR. You are asked to write a RISC-V assembly code that sorts array ARR in array RESULT, in an descending order, in O(n) complexity. You can only use the implemented assembly instructions on architecture from HW2.

You should initialize arrays ARR, COUNT and RESULT accordingly and use it in your tests.

Having the machine code for your assembly code load it to architecture from Homework 2, run it and show your results.

Test:

ARR	3	7	2	6	5	4	1	1000	999	25	90	100	30	20	10	200	3300	250	12	75
COUNT	17	13	18	14	15	16	19	1	2	9	6	5	8	10	12	4	0	3	11	7

Result:

RESULT	3300	1000	999	250	200	100	90	75	30	25	20	12	10	7	6	5	4	3	2	1

Note: Turn in your answers as [StudentNo].zip file structured as follows with a maximum of 5-minute video ([StudentNo].mkv) explaining your design and testbench ([StudentNo].v, [StudentNo]_tb.v, [StudentNo].vcd) results. Grading:

CODE/RESULTS/FILE	
Description	**Penalty**
RISC-V assembly instructions sets used other than from HW2	-15
Code compilation error	-30
Not sorting in descending order	-10
O(n) complexity criterion was not met	-20
For each file; incorrect file naming and missing files inside the [StudentNo].zip (Required files: [StudentNo].v, [StudentNo]_tb.v, [StudentNo].vcd)	-5
Incorrect sorting/result	-50
VIDEO	
Description	**Penalty**
Missing video (video sound should be sufficiently clear and not sped up)	-50
Video exceeds 5 minutes, penalized for each additional minute (additional 30 seconds is an acceptable margin)	-5
Test results were not shown on GTKWave	-25
Insufficient explanation of the method/code	0 to -25