Dept. of Computer Science and Engineering
IIT Delhi
COL216 : Assignment 3
II Semester 2020-2021

Release date: 03 March 2021
Submission deadline: 11:55 pm, 13 March 2021

General Instructions

1. The assignment will be done individually or in groups of 2. Only one member of each group should submit the assignment on Moodle.
2. Each group member should understand the problem and contribute equally to the solution. Demos (online/phone) would be held for all the lab assignments.
3. You will be awarded marks according to your design, implementation, and testing strategy. Extensive testing is expected as part of the assignment.
4. Adopting any unfair means will lead to -MAX marks (MAX=10 for this assignment).
5. **MAX marks = 10. Late Penalty: same as in Assignment 2.**

Submission instructions

- Prepare a small write-up (1-2 pages) on the approach taken to solve the problem along with test cases you have considered.
- Explain the testing strategy.
- Zip the document along with the C++ file and test cases and submit at the Moodle submission link.

Problem Statement:

Develop an interpreter for a subset of MIPS assembly language instructions.

Input: MIPS assembly language program (text file, NOT machine instructions).

Write a C++ program that reads a MIPS assembly language program as input and interprets ("executes") it by maintaining internal data structures representing processor components such as Register File and Memory, and executing the operations indicated by the instructions. Your interpreter should handle the following instructions: **add, sub, mul, beq, bne, slt, j, lw, sw, addi.**

Output:

1. Print the Register File contents (32 register values in Hexadecimal format) after executing each instruction.
2. After execution completes, print the relevant statistics such as the number of clock cycles and the number of times each instruction was executed.

Assume the following:

1. Each instruction occupies 4 bytes and is executed in one clock cycle.
2. Instruction format follows the MIPS convention.
3. Register file has 32 registers
4. Memory has 2^{20} Bytes. Instructions start at address 0. The space after the instructions can be occupied by data.

Breakup of marks:

Input reading and correct output display : 1M
Approach & Code : 3M
Testcases : 3M
Viva : 2M
Document : 1M

Late Penalty: Penalty will be deducted from your original score.

- Up to 30 mins after deadline: No penalty (for network issues)
- 30 mins to 12 hours after deadline: 10% = -1M
- 12 hours to 1 day after deadline: 30% = -3M
- 1-2 days after deadline: 50% = -5M
- 2-3 days after deadline: 70% = -7M
- >3 days after deadline: 100% = -10M