Bonus Assignment: Programming

Due date: December 15, 2020. 11:59 PM

Points: 3% (Bonus)

Submission Instructions/policies:

1. Use any programming language (e.g., C, C++, Java, etc.) to complete this assignment.
2. You must submit your assignment via Blackboard. Submissions via emails will not be graded.
3. You must name your submission file in the following format. "LastName_Firstname_Bonus-Assignment_CUNYFirstIDnumber.pdf"
4. Your file must be in PDF format (containing the outputs + source code).
5. No partial points will be given.
6. Late submissions will not be graded.

Problem Description:

Given a 32-bit binary number $b_{31}b_{30}b_{29}\ldots\ldots b_2b_1b_0$ that represents a MIPS instruction, identify the following fields from it.

a. The format of the instruction (e.g., R-Format/I-Format/J-Format)
b. Operation (e.g., add, sub, and, or, etc.)
c. The Source register number/s (in decimal, separated by comma if two operands exist)
d. The destination register number (in decimal)
e. Shift amount (in decimal)
f. Constant/Offset (in decimal)

If a field does not exist for a given input, print "none" for that field. You may only consider the `add, addi, sub, and, or, slt, lw, sw,` and `beq` instructions of the MIPS architecture. You must show your outputs for the following test cases. You will not get any points even if you miss a single test case.

Test cases (inputs):

00000010001100100100000000100000
00100010001010000000000000000101
00000010010100111000100000100010
10001110010100010000000001100100
00000001010010111001000000100101
00000001001010101001100000100100
00000001010010110100100000101010
10101110001100110000000001100100
00010010001100100000000001100100

The sample outputs for the first two cases are as follows.

Example 1:
Input:
00000010001100100100000000100000

Outputs:
Instruction Format: R
Operation: add
Source Registers: 17, 18
Destination Register: 8
Shift amount: 0
Constant/Offset: none

Example 2:
Input:
00100010001010000000000000000101

Outputs:
Instruction Format: I
Operation: addi
Source Registers: 17
Destination Register: 8
Shift amount: none
Constant/Offset: 5