

CISC 340 – HW 1

(5 points)

Instructions:

Work individually.

Submissions must be typed, preferably typeset in LaTeX. Submit your solution pdf via Canvas. Your submission should contain a pdf version of a “hardcopy” that you would normally hand in. This pdf should consist of your MIPS code for each problem and a screenshot of successful execution in MARS for problems 1-4. No need to hand in an actual hard copy.

For problems 1-3 below, the variables are initialized to $a = 1$, $b = 2$, $c = 3$, and $d = 4$. The variables a, b, c , and d should reside in registers $\$t0-\$t3$, respectively. Make sure to store your initial values in the .data segment and load them to the register file appropriately. Make a new (standalone) program for every problem.

1. Generate MIPS instructions that compute $a = b - (c - d)$.
2. Generate MIPS instructions that compute $a = 15 * (b+c)$.
(For full credit, your solution should consist of just *three* instructions, none of which is a multiplication.)
3. Generate MIPS instructions that accomplish the following:

```
int n = 10;
int A[10];

while(n > 0){
    A[n-1] = 1 << n + b;
    - n; // this is a minus minus n, a pre-fix decrement
}
```
- 4) Problem 2.27 from the textbook (page 170). Assume that initial values should be: $a=3$, $b = 4$, and D should have 20 elements.
- 5) Suppose we want to add the instruction *bne* to the single-cycle datapath. Add any necessary datapaths and control signals to the single-cycle datapath figure below (different page) to implement this instruction. What is the control logic for *bne* as you implemented it? Give your answer as a table and mark any don't cares as X.

