

# Exercise 2.18

- For these problems, the table holds some C code. You will be asked to evaluate these C code statements in MIPS assembly code.

a.	for(i=0; i<a; i++) a += b;
b.	for(i=0; i<a; i++) for(j=0; j<b; j++) D[4*j] = i + j;

- 2.18.1 [5] <2.7> For the table above, draw a control-flow graph of the C code.
- 2.18.2 [5] <2.7> For the table above, translate the C code to MIPS assembly code. Use a minimum number of instructions. Assume that the values of a, b, i, and j are in registers \$s0, \$s1, \$t0, and \$t1, respectively. Also, assume that register \$s2 holds the base address of the array D.
- 2.18.3 [5] <2.7> How many MIPS instructions does it take to implement the C code? If the variables a and b are initialized to 10 and 1 and all elements of D are initially 0, what is the total number of MIPS instructions that is executed to complete the loop?



# Exercise 2.18 (cont.)

- For these problems, the table holds MIPS assembly code fragments. You will be asked to evaluate each of the code fragments, familiarizing you with the different MIPS branch instructions.

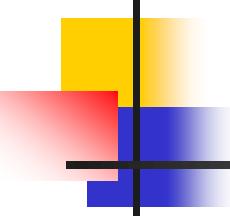
2.18.4 [5] <2.7> What is the total number of MIPS instructions executed?

2.18.5 [5] <2.7> Translate the loops above into C. Assume that the C-level integer *i* is held in register \$t1, \$s2 holds the C-level integer called *result*, and \$s0 holds the base address of the integer MemArray.

2.18.6 [5] <2.7> Rewrite the loop to reduce the number of MIPS instructions executed.

a.	addi \$t1, \$0, 50 LOOP: lw \$s1, 0(\$s0) add \$s2, \$s2, \$s1 lw \$s1, 4(\$s0) add \$s2, \$s2, \$s1 addi \$s0, \$s0, 8 subi \$t1, \$t1, 1 bne \$t1, \$0, LOOP
b.	addi \$t1, \$0, \$0 LOOP: lw \$s1, 0(\$s0) add \$s2, \$s2, \$s1 addi \$s0, \$s0, 4 addi \$t1, \$t1, 1 slti \$t2, \$t1, 100 bne \$t2, \$s0, LOOP





# Exercise 2.18 (cont.)

- Home work: The Class is divided into groups (Given Student list). Upper half do the part 1 (2.18.1-2.18.3) and Lower half do the part 2 (2.18.4-2.18-6).
- Sent by Email with file attched: “Name-Student code” as file name.
- Deadline: til Midnight Tuesday (22<sup>nd</sup> March 2016)

