Inf2C Computer Systems

Tutorial 2, Week 4

1. **Describing functionality of MIPS code.**

   Adapted from P&H 4/e.

   Given below is a MIPS assembly program where: (i) integer variables `x` and `y` are assigned to registers `$s0` and `$s1` respectively (ii) integer arrays A and B have their base addresses stored in `$s2` and `$s3` respectively. Describe in simple terms what the program computes.

   ```
   sll $t0, $s0, 2
   add $t0, $s2, $t0
   sll $t1, $s1, 2
   add $t1, $s3, $t1
   lw $s0, 0($t0)
   addi $t2, $t0, 4
   lw $t0, 0($t2)
   add $t0, $t0, $s0
   sw $t0, 0($t1)
   ```

2. **Memory copy function.** Write a function in MIPS assembly that will perform a copy of a block of given words from one memory location to another. The function input parameters are the initial (lowest) source address, the initial target address and the number of words to copy.

3. **Memory copy function refinement.** Suppose we want to change the granularity of the memory copy function from words to bytes. How can the above program be converted to do this efficiently? Note that a load or store word (4 bytes) takes one cycle, as does loading or storing a byte.