COE 301: Computer Organization – Term 211

Quiz 3: MIPS Arrays and Loops, Thursday, October 13, 2021

SOLUTION

Translate the following loop into MIPS assembly code, where **A**, **B**, and **C** are arrays of words (unsigned integers) whose base addresses are in **$a0**, **$a1**, and **$a2**, respectively.

```
for (i=0; i<99; i++) {
   A[i+1] = A[i] + B[i+1];
   C[i] = (A[i+1]<<2) / B[i];
}
```

```
      li    $t0, 0          # i = 0
      li    $t1, 99         # t1 = 99
for:  lw    $t2, 0($a0)     # load t2 = A[i]
      lw    $t3, 4($a1)     # load t3 = B[i+1]
      addu  $t4, $t2, $t3   # t4 = A[i] + B[i+1]
      sw    $t4, 4($a0)     # store A[i+1] = t4
      sll   $t5 = $t4, 2    # t5 = A[i+1]<<2
      lw    $t6, 0($a1)     # load t6 = B[i]
      divu  $t5, $t6        # Divide (A[i+1]<<2) / B[i]
      mflo  $t7             # t7 = quotient
      sw    $t7, 0($a2)     # store C[i] = t7
      addiu $a0, $a0, 4     # point to next A[i]
      addiu $a1, $a1, 4     # point to next B[i]
      addiu $a2, $a2, 4     # point to next C[i]
      addiu $t0, $t0, 1     # i++
      bne   $t0, $t1, for   # loop back if (i!=99)
```