

# CIS 351 Sample AL4 Problem Solutions

Mon 21<sup>st</sup> Mar, 2022

## AL4: Intermediate Assembly

- (a) Write an assembly function that will compute the sum of all values in an array. Assume that the location of the array is stored in `$a0` and the length of the array is in `$a1`.

There are many correct answers. Here is one:

```
sumArray:
    li $v0, 0    # sum = 0

    sll $a1, $a1, 2    # turn # of elements into size in bytes
    addi $a1, $a0, $a1    # end of the array
    beq $a1, $zero, endOfLoop
topOfLoop:
    lw $t1, 0($a0)
    add $v0, $v0, $t1
    addi $a0, $a0, 4
    bne $a0, $a1, topOfLoop
endOfLoop:
    jr $ra
```

- (b) Write an assembly function that will iterate through an array and change any negative values to 0. Assume that the location of the array is stored in `$a0` and the length of the array is in `$a1`.

There are many correct answers. Here is one:

```
lower_bound:
    li $v0, 0    # sum = 0

    sll $a1, $a1, 2    # turn # of elements into size in bytes
    addi $a1, $a0, $a1    # end of the array
    beq $a1, $zero, endOfLoop
topOfLoop:
```

```
        lw $t1, 0($a0)
        slt $t2, $t1, $zero
        beq $t2, $zero, keepGoing
        sw $zero 0($a0)
keepGoing:
        addi $a0, $a0, 4
        bne $a0, $a1, topOfLoop
endOfLoop:
        jr $ra
```