CS224

Section No.: 02

Spring 2020

Lab No.: 3

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#Solution to part 2 of the prelim

.data

num1: .word 0

num2: .word 0

numForSum: .word 0

multiplicationResult: .word 0

summationResult: .word 0

resultMsg1: .asciiz "\nThe result of recursive multiplication is: "

resultMsg2: .asciiz "\nThe result of recursive summation is: "

inputMsgMultipl1: .asciiz "Enter the first number for multiplication: "

inputMsgMultipl2: .asciiz "Enter the second number for multiplication: "

inputMsgSum: .asciiz "Enter the number you want to recursively add: "

.text

main:

li $v0, 4

la $a0, inputMsgMultipl1

syscall

li $v0, 5

syscall #first input

sw $v0, num1 #number is stored inside num1

li $v0, 4

la $a0, inputMsgMultipl2

syscall

li $v0, 5

syscall #second input

sw $v0, num2

lw $a0, num1

lw $a1, num2

jal recursiveMultiplication

sw $v0, multiplicationResult #now the result is inside this static variable

li $v0, 4

la $a0, inputMsgSum

syscall

li $v0, 5

syscall

sw $v0, numForSum

lw $a0, numForSum

jal recursiveSummation

sw $v0, summationResult

#print everything

li $v0, 4

la $a0, resultMsg1

syscall

li $v0, 1

lw $a0, multiplicationResult

syscall

li $v0, 4

la $a0, resultMsg2

syscall

li $v0, 1

lw $a0, summationResult

syscall

li $v0, 10

syscall

recursiveMultiplication:

subu $sp, $sp, 8

sw $ra, ($sp)

sw $s0, 4($sp)

li $v0, 0

beq $a0, 0, multipleDone

move $s0, $a0

subu $a0, $a0, 1

jal recursiveMultiplication

add $v0, $v0, $a1

multipleDone:

lw $ra, ($sp)

lw $s0, 4($sp)

addi $sp, $sp, 8

jr $ra

recursiveSummation:

subu $sp, $sp, 8

sw $ra, ($sp)

sw $s0, 4($sp)

li $v0, 0

beq $a0, 0, sumDone

move $s0, $a0

subi $a0, $a0, 1

jal recursiveSummation

add $v0, $s0, $v0

sumDone:

lw $ra, ($sp)

lw $s0, 4($sp)

addi $sp, $sp, 8

jr $ra