Project 2 Report

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1.0: Program Input/Output

Program 1: The input of the program is the user putting in two positive numbers. The output would be the number calculate using multiplication procedures.

Program 2: The input of the program is the user entering in three signed numbers. The output of would be the answer of the equation on the worksheet along with a message saying whether or not here is overflow.

Program 3: The input of the program is the user entering in Instruction Count, CPI (Clock Per Instruction), and Clock Rate in GHz for processor A and the same for processor B. The output be telling the user which one is faster.

2.0: Program Design

Program 1: The program will prompt the use to enter in two positive integers. The program will take the put the first number into a loop. The loop will start at 1 and go till the it is equal to the second number. Within the loop, the first number will add to itself and move the loop to the next number. Once the loop is equal to the second number, the loop will end and print out the number.

Program 2: The program will prompt the user to enter in three signed numbers. It will have a loop so the result of the loop will be the second powered by the third number. Then it will as the first number to the result. It will square the first number and have the third number subtracted from it. The program will take those number and diver the first result by the second result. Next the program will multiple the second number with 3 and have that added to the result we already have. The program will then check for overflow.

Program 3: The program will prompt the user for Instruction Count, CPI, and Clock Rate in GHz for processor A. It will then calculate the CPU time for processor A. The program will prompt the user for the same information but from processor B. It will calculate the CPU time for processor B. The program will compare the two to see which has the bigger CPU time and print out the appropriate one that is fast and how many times it faster than the other.

3.0: Symbol Table

Register	Purpose & Label
$v0	1: prints an integer 2: prints a float 4: prints a string 5: saves an integer from user 6: saves a float from user
$a0	Argument of syscall to print string
$t0	C1: temporary place for the add number C2: temporary place for the second number powered by the third number. temporary place for that number added with the first number
$t1	C2: temporary place for the square root of the first number. Temporary place for the result minus by the third number.
$t2	C2: temporary place for the second number multiplied by 3
$s0	C1: save the first number the user entered C2: save the first number the user entered
$s1	C1: save the second number the user entered C2: save the second number the user entered
$s2	C1: save the number that the loop starts on C2: save the third number the user entered

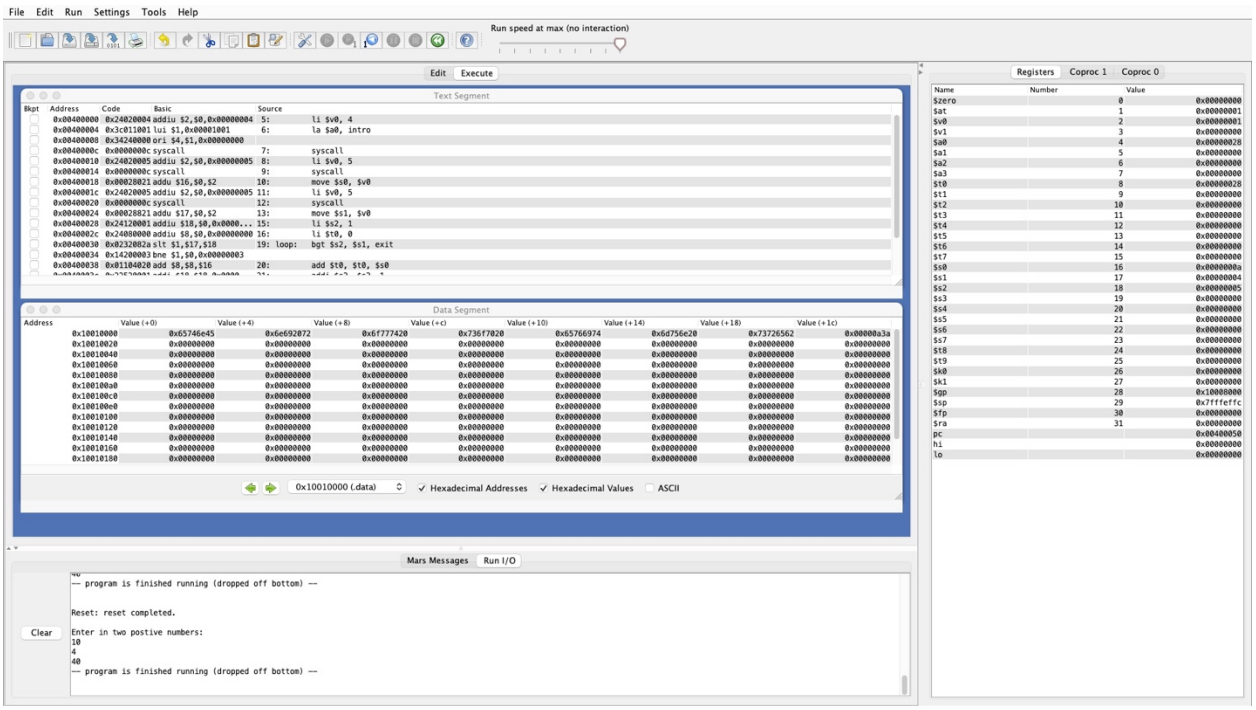
$s4	C2: save the result after the calculations
$f0	C3: used to transfer the user input into a different register
$f1	C3: temporary place for processor A's Instruction Count
$f2	C3: temporary place for processor A's Clock Per Instruction
$f3	C3: temporary place for processor A's Clock Rate in GHz
$f4	C3: temporary zero
$f5	C3: temporary place for processor A's CPU Time
$f6	C3: temporary place for processor B's Instruction Count
$f7	C3: temporary place for processor B's Clock Per Instruction
$f8	C3: temporary place for processor B's Clock Rate in GHz
$f9	C3: temporary place for processor B's CPU Time
$f12	C3: passes the number so it can be printed

4.0: Learning Coverage

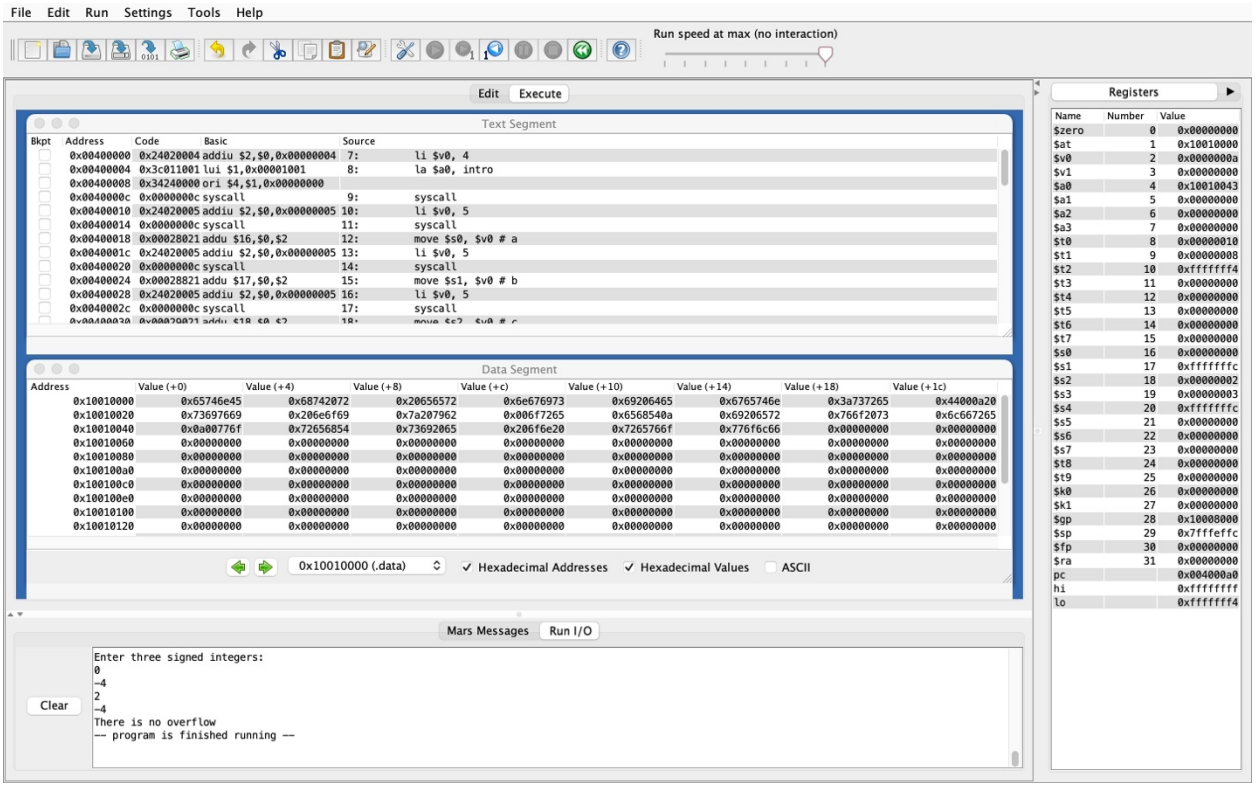
1. CPU Performance
2. Storing multiple floats from user input
3. Printing floats
4. Checking for overflow
5. Using a loop to perform multiplication procedures

5.0: Test Results

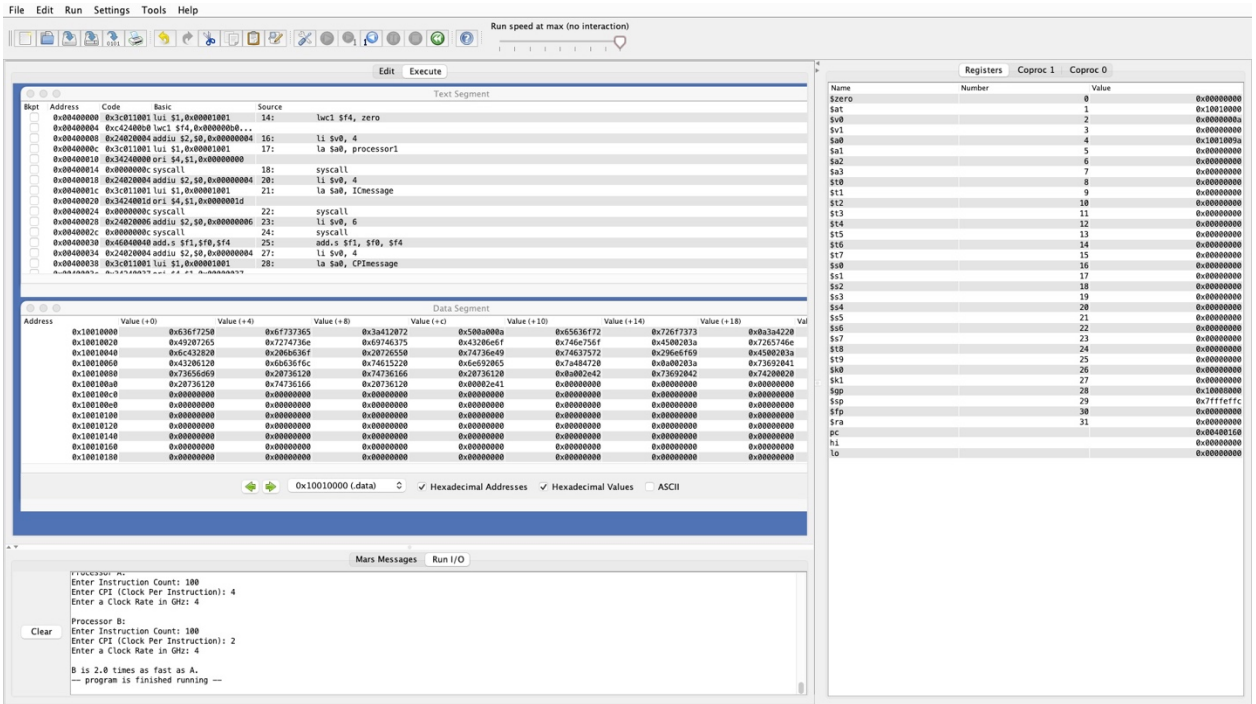
Program 1:



Program 2:


File Edit Run Settings Tools Help
Run speed at max (no interaction)
Edit Execute
Text Segment
Bkpt Address Code Basic Source
0x00400000 0x24020004 addiu $2,$0,0x00000004 7: li $v0, 4
0x00400004 0x3c011001 lui $1,0x00001001 8: la $a0, intro
0x00400008 0x34240000 ori $4,$1,0x00000000
0x0040000c 0x0000000c syscall 9: syscall
0x00400010 0x24020005 addiu $2,$0,0x00000005 10: li $v0, 5
0x00400014 0x0000000c syscall 11: syscall
0x00400018 0x00028021 addu $16,$0,$2 12: move $s0, $v0 # a
0x0040001c 0x24020005 addiu $2,$0,0x00000005 13: li $v0, 5
0x00400020 0x0000000c syscall 14: syscall
0x00400024 0x00028821 addu $17,$0,$2 15: move $s1, $v0 # b
0x00400028 0x24020005 addiu $2,$0,0x00000005 16: li $v0, 5
0x0040002c 0x0000000c syscall 17: syscall
Data Segment
Address Value (+0) Value (+4) Value (+8) Value (+c) Value (+10) Value (+14) Value (+18) Value (+1c)
0x10010000 0x65746e45 0x68742072 0x20656572 0x6e676973 0x69206465 0x6765746e 0x3a737265 0x44000a20
0x10010020 0x73697669 0x206e6f69 0x7a207962 0x006f7265 0x6568540a 0x69206572 0x766f2073 0x6c667265
0x10010040 0x0a00776f 0x72656854 0x73692065 0x206f6e20 0x7265766f 0x776f6c66 0x00000000 0x00000000
0x10010060 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x10010080 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x100100a0 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x100100c0 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x100100e0 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x10010100 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x10010120 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x10010000 (.data)
Hexadecimal Addresses
Hexadecimal Values
ASCII
Registers
Name Number Value
$zero 0 0x00000000
$at 1 0x10010000
$v0 2 0x0000000a
$v1 3 0x00000000
$a0 4 0x10010043
$a1 5 0x00000000
$a2 6 0x00000000
$a3 7 0x00000000
$t0 8 0x00000010
$t1 9 0x00000000
$t2 10 0xfffffff4
$t3 11 0x00000000
$t4 12 0x00000000
$t5 13 0x00000000
$t6 14 0x00000000
$t7 15 0x00000000
$s0 16 0x00000000
$s1 17 0xfffffffc
$s2 18 0x00000002
$s3 19 0x00000003
$s4 20 0xfffffffc
$s5 21 0x00000000
$s6 22 0x00000000
$s7 23 0x00000000
$t8 24 0x00000000
$t9 25 0x00000000
$k0 26 0x00000000
$k1 27 0x00000000
$gp 28 0x10008000
$sp 29 0x7fffeffc
$fp 30 0x00000000
$ra 31 0x00000000
pc 0x004000a0
hi 0xffffffff
lo 0xfffffff4
Mars Messages Run I/O
Clear
Enter three signed integers:
0
-4
2
-4
There is no overflow
-- program is finished running --

Program 3:


File Edit Run Settings Tools Help
Run speed at max (no interaction)
Edit Execute
Text Segment
Data Segment
0x10010000 (.data)
Hexadecimal Addresses
Hexadecimal Values
ASCII
Registers Coproc 1 Coproc 0
Mars Messages Run I/O
Clear
Enter Instruction Count: 100
Enter CPI (Clock Per Instruction): 4
Enter a Clock Rate in GHz: 4
Processor B:
Enter Instruction Count: 100
Enter CPI (Clock Per Instruction): 2
Enter a Clock Rate in GHz: 4
B is 2.0 times as fast as A.
-- program is finished running --