

Homework 3

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Question 1

Implement the following C code in MIPS assembly. Show the contents of the stack after the function call to the function "compare" is made. Assume that the stack pointer is originally at address 0x7FFFFFFc.

Solution:

Address	Value (+0)	Value (+4)	Value (+8)	Value (+12)	Value (+16)	Value (+20)	Value (+24)	Value (+28)	Value (+32)
0x7ffffe0	0	0	0	0	0	0	0	4194316	0
0x7ffff000	0	0	0	0	0	0	0	0	0
0x7ffff020	0	0	0	0	0	0	0	0	0
0x7ffff040	0	0	0	0	0	0	0	0	0
0x7ffff060	0	0	0	0	0	0	0	0	0
0x7ffff080	0	0	0	0	0	0	0	0	0

Question 2

Implement the following C code in the table in MIPS assembly. Suppose that fib_iter was called with n = 4, show the contents of the stack after the function call to the function "fib_iter" is made. Assume that the stack pointer is originally at address 0x7fffffc.

Solution:

Address	Value (+0)	Value (+4)	Value (+8)	Value (+12)	Value (+16)	Value (+20)	Value (+24)	Value (+28)	Value (+32)
0x7ffffc0	0	0	0	0	4194368	2	1	4194368	1
0x7ffff000	1	4194368	1	0	4194324	0	1	0	0
0x7ffff020	0	0	0	0	0	0	0	0	0
0x7ffff040	0	0	0	0	0	0	0	0	0
0x7ffff060	0	0	0	0	0	0	0	0	0

Question 3

1. Translate function f into MIPS assembly code, using the MIPS calling convention. If you need to use register \$t0 through \$t7, use the lower-numbered registers first.
2. Right before your function f of Problem 3 returns, what do you know about contents of registers \$ra, and \$sp? Keep in mind that we know what the entire function f looks like, but for function func we only know its declaration.

Solution:

Address	Value (+0)	Value (+4)	Value (+8)	Value (+12)	Value (+16)	Value (+20)	Value (+24)	Value (+28)	Value (+32)
0x7ffffe0	0	0	0	0	0	0	30	4194320	0
0x7ffff000	0	0	0	0	0	0	0	0	0
0x7ffff020	0	0	0	0	0	0	0	0	0
0x7ffff040	0	0	0	0	0	0	0	0	0
0x7ffff060	0	0	0	0	0	0	0	0	0
0x7ffff080	0	0	0	0	0	0	0	0	0
0x7ffff0a0	0	0	0	0	0	0	0	0	0