

CS 315-02 RISC-V Memory and Functions

Lab 02 - solutions

Lab 02 - Exam problems

Project 02 - posted due Mon Sep, 18th 11:59pm

Project 02 - exam probs due Wed Sep, 20th 11:57pm

Lab 02 solutions

sum-array

$arr + 0$ $\&arr[0]$

$arr + 4$ $\&arr[1]$

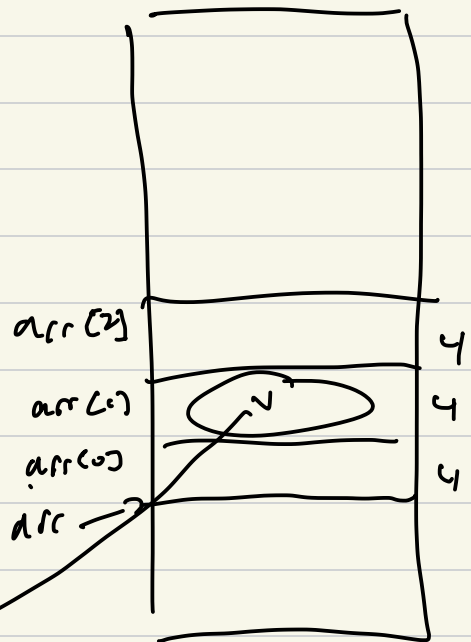
$arr + 8$ $\&arr[2]$

addr

$\&arr[i] =$

$arr + (i * 4)$

$lw t3, \underline{(addr)}$



Functions in RISC-V

↓
 a_0, a_1, a_2, \dots args

a_0 is return value

caller

foo :

⋮

PC → call bar

PC+4

ra = PC+4

main() → ret

callee

bar :

add a_0, a_0, a_1

}

PC →

PC+4

PC+8

PC = ?

ret

return address (ra)

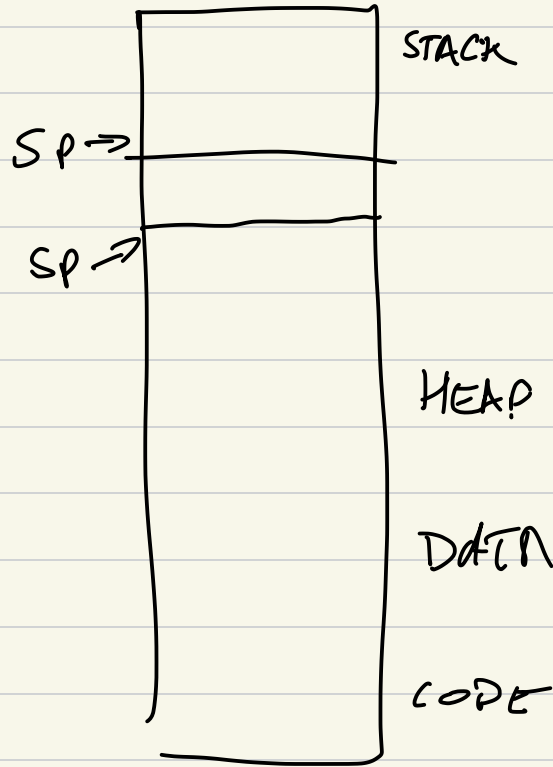
Call func

$$ra \rightarrow PC + 4$$

$$PC = \text{addr of func}$$

Memory

add: sp, sp, -8



lw / sw

load word / store word
word = 4 bytes

ld / sd

load double / store double
double = 8 bytes

lw t0, (a0)

t = *a0;

ld t0, (a0)
↑

long long x;
long long *p; p = &x;
x = *a0

x = *p;

sw t0, (a0)

sd t0, (a0)

Calling convention

caller-saved regs

a0 - a7 t0 - t6
8 7

callee-saved regs

ra, sp, s0 - s11, fp, tp
1 1 12

foo:

addi sp, sp, 32

sd ra, (sp)

sd s0, 8(sp)

sd s1, 16(sp)

sd s2, 24(sp)