CS 631-01 RISC-V Functions

Lab 03

array indexing

$$x = a[i]$$

$$addr = base + (i \times sizeof(int))$$

$$a + (i \times 4)$$

slli t2, f0, 2   #   to << 2
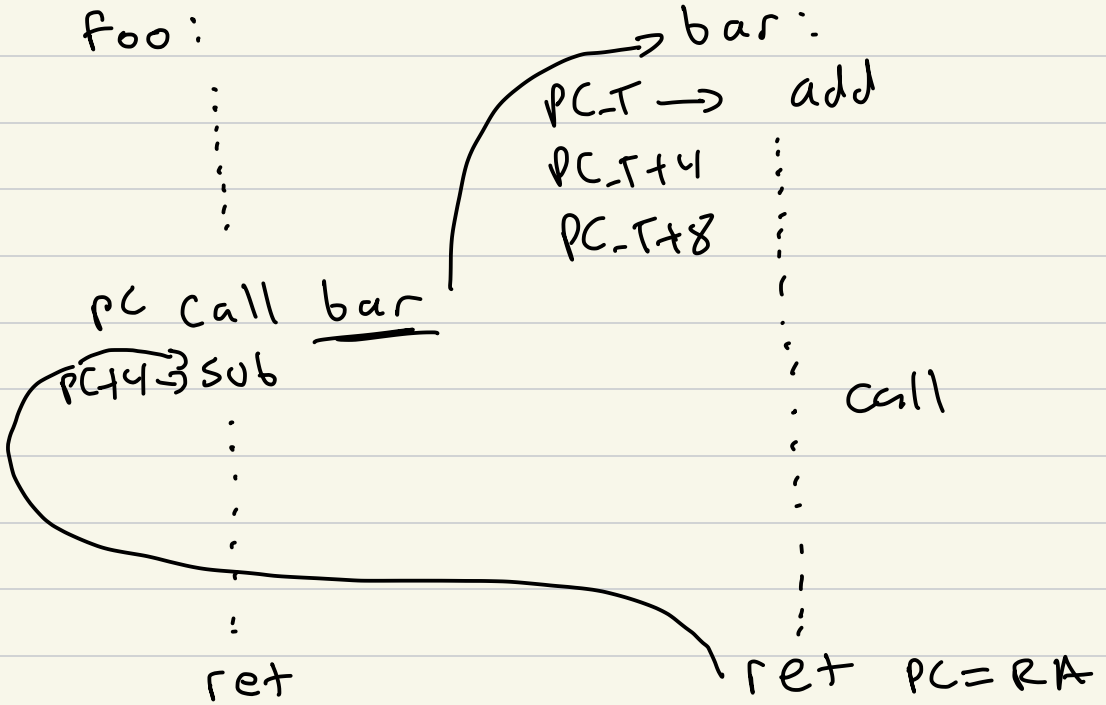

Function Calls

caller   callee

foo: → bar:
 ⋮   PC_T → add
                          PC_T+4
                          PC_T+8   ⋮
 pc call bar
 PC+4→ sub   call

 ⋮

 ⋮
 ret   ret   PC = RA

PC   program counter
RA   return address
_____

call (jal)   RA = PC+4 , PC = target
                                addr
ret (jalr)   PC = RA

Code

N

←— 32 bits —→
4 bytes!

	ret
PC+4	sub
PC	add
0	

The Stack

SP

grow down
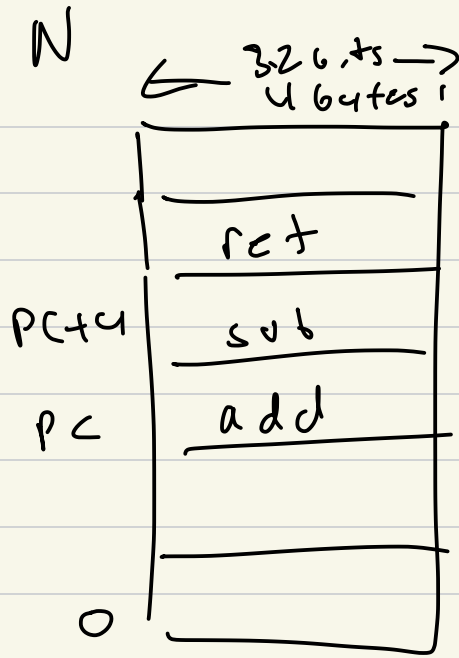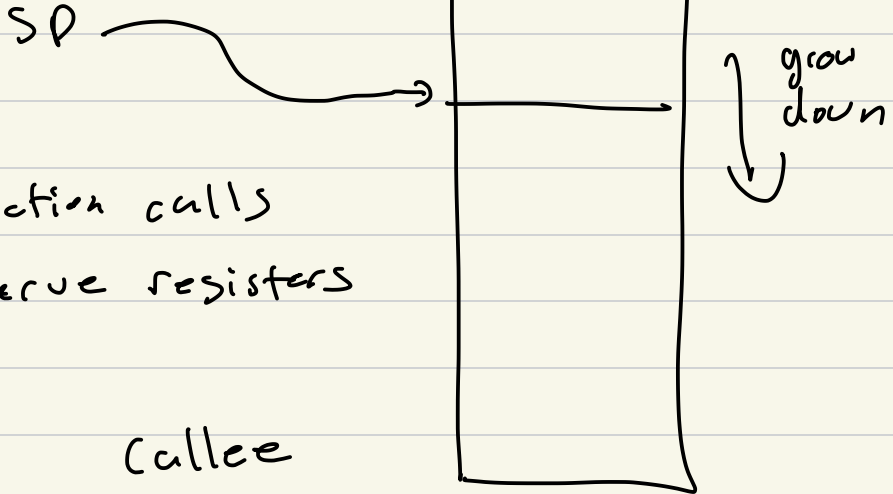
For function calls

preserve registers

Caller   Callee
saved   saved
regs   regs

a regs ra reg   SP
t regs   s reg

sd ra, (sp)

sp →
8 bytes
unused	8
ra	8

sp-16→

24
16
8
sp ⟶

tmp 0
a3
a2
ra