

Princeton University

COS 217: Introduction to Programming Systems

SPARC Architecture Summary

Registers		
		Global Registers:
%r0	%g0	Zero
%r1	%g1	Temporary value (destroyed)
%r2	%g2	Global variable (saved?)
%r3	%g3	Global variable (saved?)
%r4	%g4	Global variable (saved?)
%r5	%g5	Global variable (saved?)
%r6	%g6	Global variable (saved?)
%r7	%g7	Global variable (saved?)
		Output Registers:
%r8	%o0	Function actual parameter or return value from caller (destroyed)
%r9	%o1	Function actual parameter (destroyed)
%r10	%o2	Function actual parameter (destroyed)
%r11	%o3	Function actual parameter (destroyed)
%r12	%o4	Function actual parameter (destroyed)
%r13	%o5	Function actual parameter (destroyed)
%r14	%o6	%sp Stack pointer (saved)
%r15	%o7	Addr of call instruction / temporary value (destroyed)
		Local Registers:
%r16	%l0	Local variable (saved) (used by interrupt handler)
%r17	%l1	Local variable (saved) (used by interrupt handler)
%r18	%l2	Local variable (saved)
%r19	%l3	Local variable (saved)
%r20	%l4	Local variable (saved)
%r21	%l5	Local variable (saved)
%r22	%l6	Local variable (saved)
%r23	%l7	Local variable (saved)
		Input Registers:
%r24	%i0	Function formal parameter or return value to caller (saved)
%r25	%i1	Function formal parameter (saved)
%r26	%i2	Function formal parameter (saved)
%r27	%i3	Function formal parameter (saved)
%r28	%i4	Function formal parameter (saved)
%r29	%i5	Function formal parameter (saved)
%r30	%i6	%fp Frame pointer (saved)
%r31	%i7	Return addr - 8 (saved)
		Floating-Point Registers:
%f0		Floating-point value (saved)
...		...
%f31		Floating-point value (saved)

Stack Structure	
%sp	register window
%sp + 4	register window (cont.)
%sp + 8	register window (cont.)
%sp + 12	register window (cont.)
%sp + 16	register window (cont.)
%sp + 20	register window (cont.)
%sp + 24	register window (cont.)
%sp + 28	register window (cont.)
%sp + 32	register window (cont.)
%sp + 36	register window (cont.)
%sp + 40	register window (cont.)
%sp + 44	register window (cont.)
%sp + 48	register window (cont.)
%sp + 52	register window (cont.)
%sp + 56	register window (cont.)
%sp + 60	register window (cont.)
%sp + 64	structure pointer
%sp + 68	actual parameter 1 (unused)
%sp + 72	actual parameter 2 (unused)
%sp + 76	actual parameter 3 (unused)
%sp + 80	actual parameter 4 (unused)
%sp + 84	actual parameter 5 (unused)
%sp + 88	actual parameter 6 (unused)
%sp + 92	additional actual parameters and saved floating-point registers
...	...
%fp - 4	local variables
%fp	register window
%fp + 4	register window (cont.)
%fp + 8	register window (cont.)
%fp + 12	register window (cont.)
%fp + 16	register window (cont.)
%fp + 20	register window (cont.)
%fp + 24	register window (cont.)
%fp + 28	register window (cont.)
%fp + 32	register window (cont.)
%fp + 36	register window (cont.)
%fp + 40	register window (cont.)
%fp + 44	register window (cont.)
%fp + 48	register window (cont.)
%fp + 52	register window (cont.)
%fp + 56	register window (cont.)
%fp + 60	register window (cont.)
%fp + 64	structure pointer
%fp + 68	formal parameter 1 (unused)
%fp + 72	formal parameter 2 (unused)
%fp + 76	formal parameter 3 (unused)
%fp + 80	formal parameter 4 (unused)
%fp + 84	formal parameter 5 (unused)
%fp + 88	formal parameter 6 (unused)
%fp + 92	additional formal parameters and saved floating-point registers
...	...

92 bytes

Current Function's Stack Frame

??? bytes

92 bytes

Calling Function's Stack Frame

Instruction Format 1 (call)	
31-30	Op code (01)
29-0	Displacement

Instruction Format 2 (sethi)	
31-30	Op code (00)
29-25	Destination register
24-22	Op code continued (100)
21-0	Immediate operand

Instruction Format 2 (branches and nop)	
31-30	Op code (00)
29	Annul bit
28-25	Condition
24-22	Op code continued
21-0	Displacement

Instruction Format 3 (all other instructions, two source registers)	
31-30	Op code (10 or 11)
29-25	Destination register
24-19	Op code continued
18-14	Source register 1
13	0
12-5	(unused)
4-0	Source register 2

Instruction Format 3 (all other instructions, source register and immediate operand)	
31-30	Op code (10 or 11)
29-25	Destination register
24-19	Op code continued
18-14	Source register 1
13	1
12-0	Source immediate constant

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