5 ABI & Register Cheat-Sheet

List all 32 RV32 integer registers with their ABI names and typical calling-convention

Roles

Response

Here is a complete list of all 32 RV32 integer registers, their ABI names, and their calling convention roles:

✅ **RV32 Register Table**

xN	ABI Name	Role / Description	Saved By
x0	zero	Constant 0	— (read-only)
x1	ra	Return address from function calls	Caller
x2	sp	Stack pointer	Callee
x3	gp	Global pointer	—
x4	tp	Thread pointer	—
x5	t0	Temporary register 0	Caller
x6	t1	Temporary register 1	Caller
x7	t2	Temporary register 2	Caller
x8	s0/fp	Saved register 0 / frame pointer	Callee
x9	s1	Saved register 1	Callee
x10	a0	Function argument 0 / return value 0	Caller
x11	a1	Function argument 1 / return value 1	Caller
x12	a2	Function argument 2	Caller
x13	a3	Function argument 3	Caller
x14	a4	Function argument 4	Caller
x15	a5	Function argument 5	Caller
x16	a6	Function argument 6	Caller
x17	a7	Function argument 7	Caller
x18	s2	Saved register 2	Callee
x19	s3	Saved register 3	Callee
x20	s4	Saved register 4	Callee

x21	s5	Saved register 5	Callee
x22	s6	Saved register 6	Callee
x23	s7	Saved register 7	Callee
x24	s8	Saved register 8	Callee
x25	s9	Saved register 9	Callee
x26	s10	Saved register 10	Callee
x27	s11	Saved register 11	Callee
x28	t3	Temporary register 3	Caller
x29	t4	Temporary register 4	Caller
x30	t5	Temporary register 5	Caller
x31	t6	Temporary register 6	Caller

🧠 Calling Convention Summary

a0–a7 (x10–x17): Function arguments and return values — must be saved by the caller.

t0–t6 (x5–x7, x28–x31): Temporary values — not preserved across calls (caller-saved).

s0–s11 (x8–x9, x18–x27): Saved registers — preserved across calls (callee-saved).

sp (x2): Stack pointer — managed by each function.

ra (x1): Return address — saved at function entry, restored at exit.