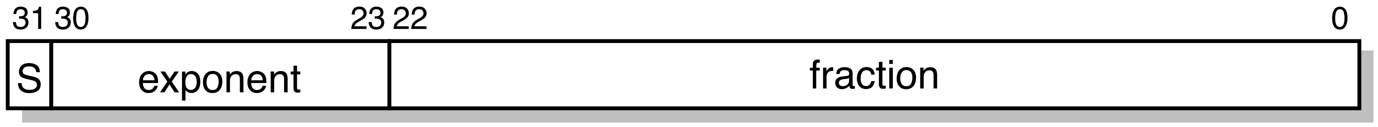
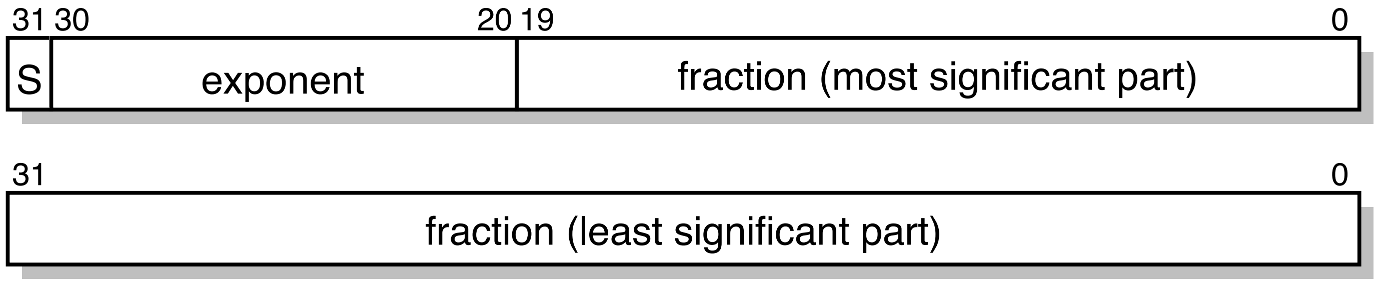
IEEE 754 single precision floating-point number format



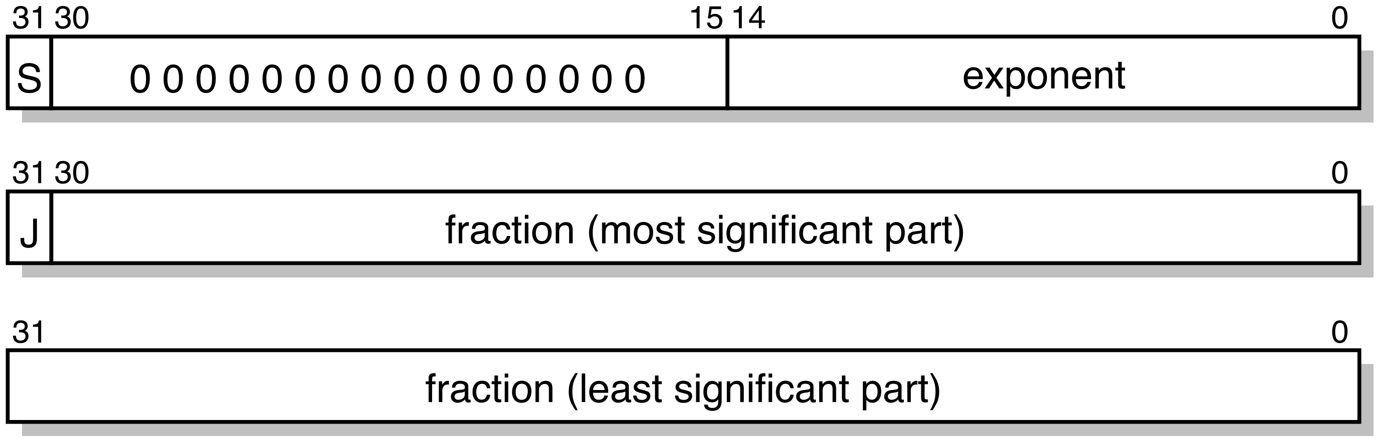
IEEE 754 single precision representation of ‘1995’

31	30 … 23	22 … 0
0	1 0 0 0 1 0 0 1	1 1 1 1 0 0 1 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0

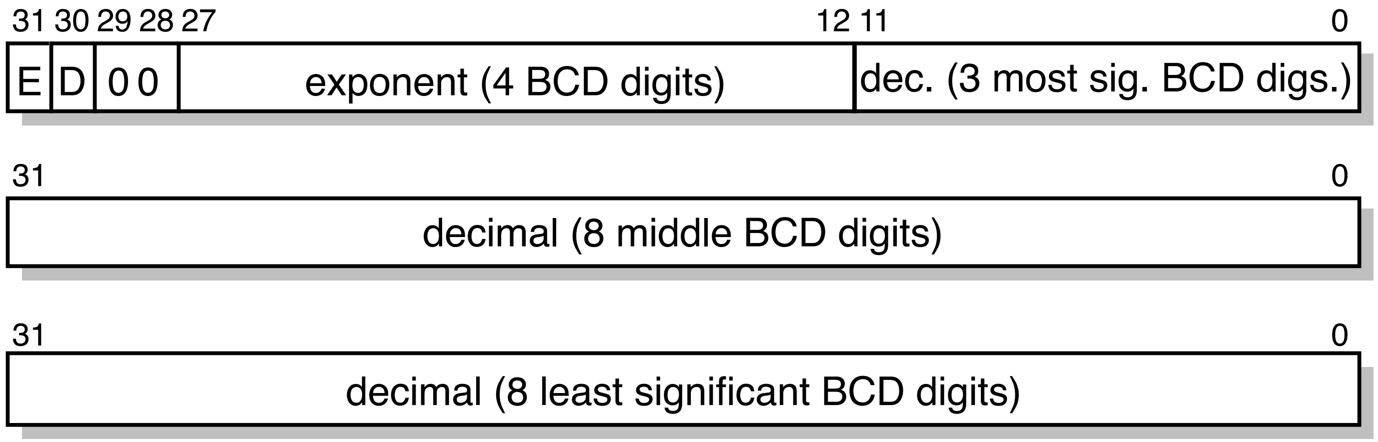
IEEE 754 double precision floating-point number format



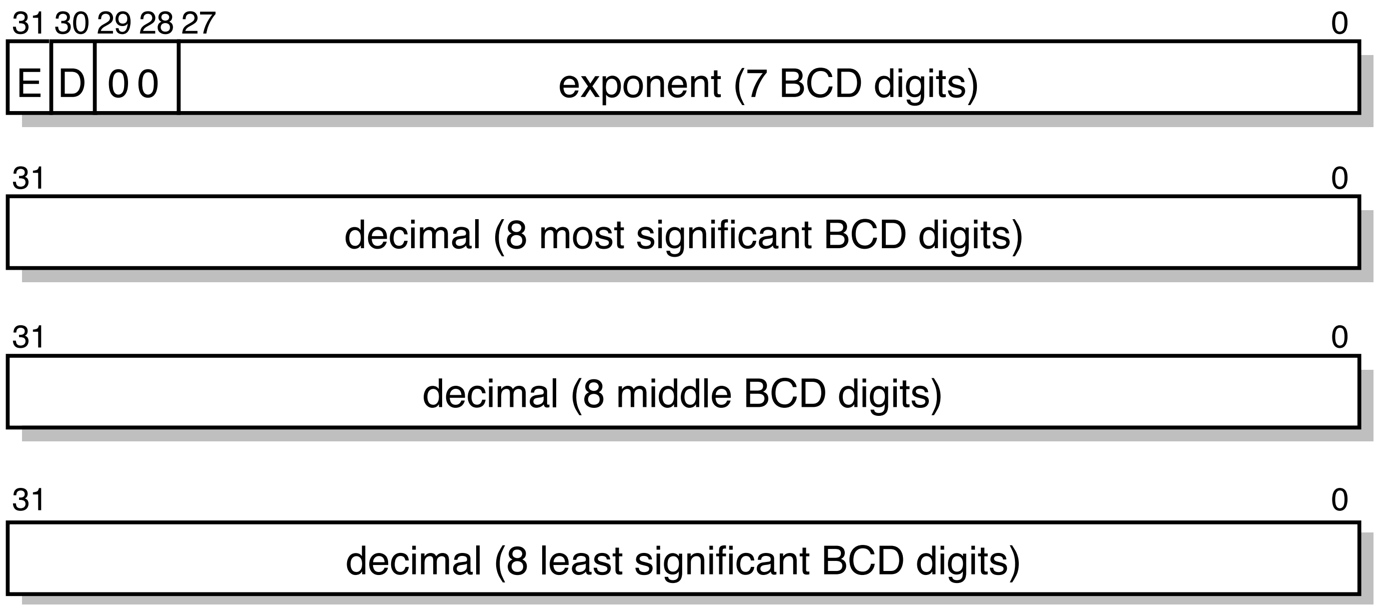
IEEE 754 double extended precision floating-point number format



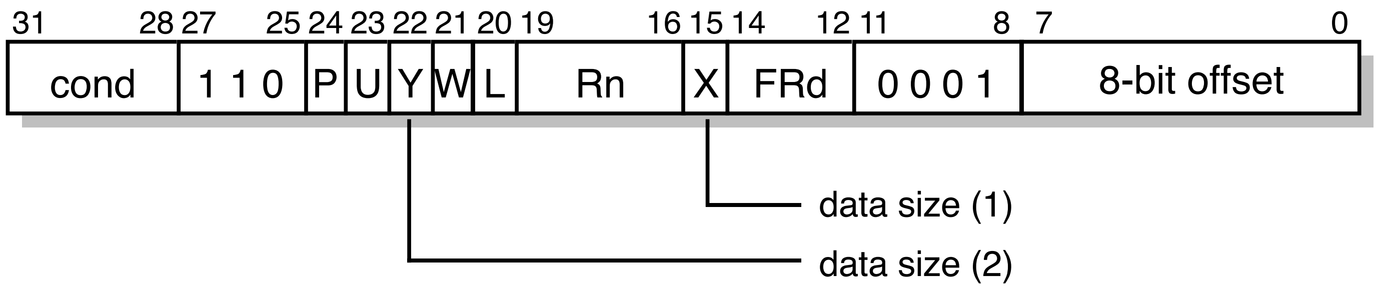
IEEE 754 packed decimal floating-point number format



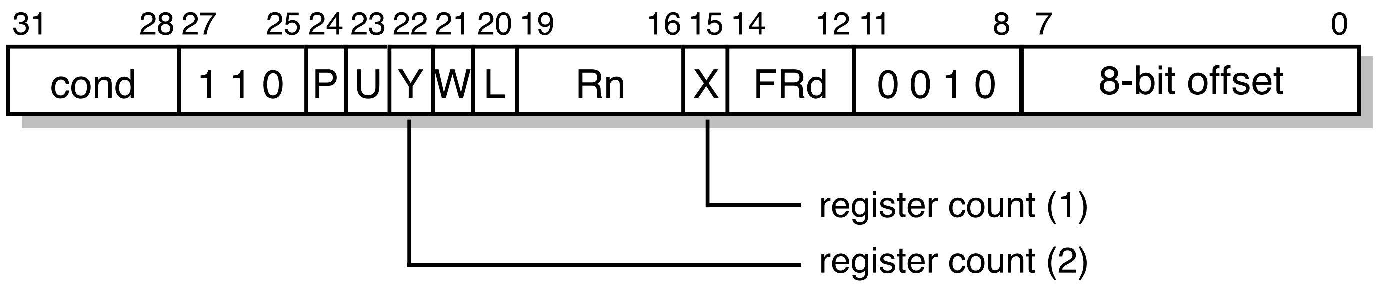
IEEE 754 extended packed decimal floating-point number format



Load and store floating binary encoding



Load and store multiple floating binary encoding



Floating-point data processing binary encoding

31 28	27 24	23 20	19	18 16	15	14 12	11 8	7 5	4	3	2 0
cond	1 1 1 0	Cop1	e	FRn	j	FRd	0 0 0 1	Cop2	0	i	FRm

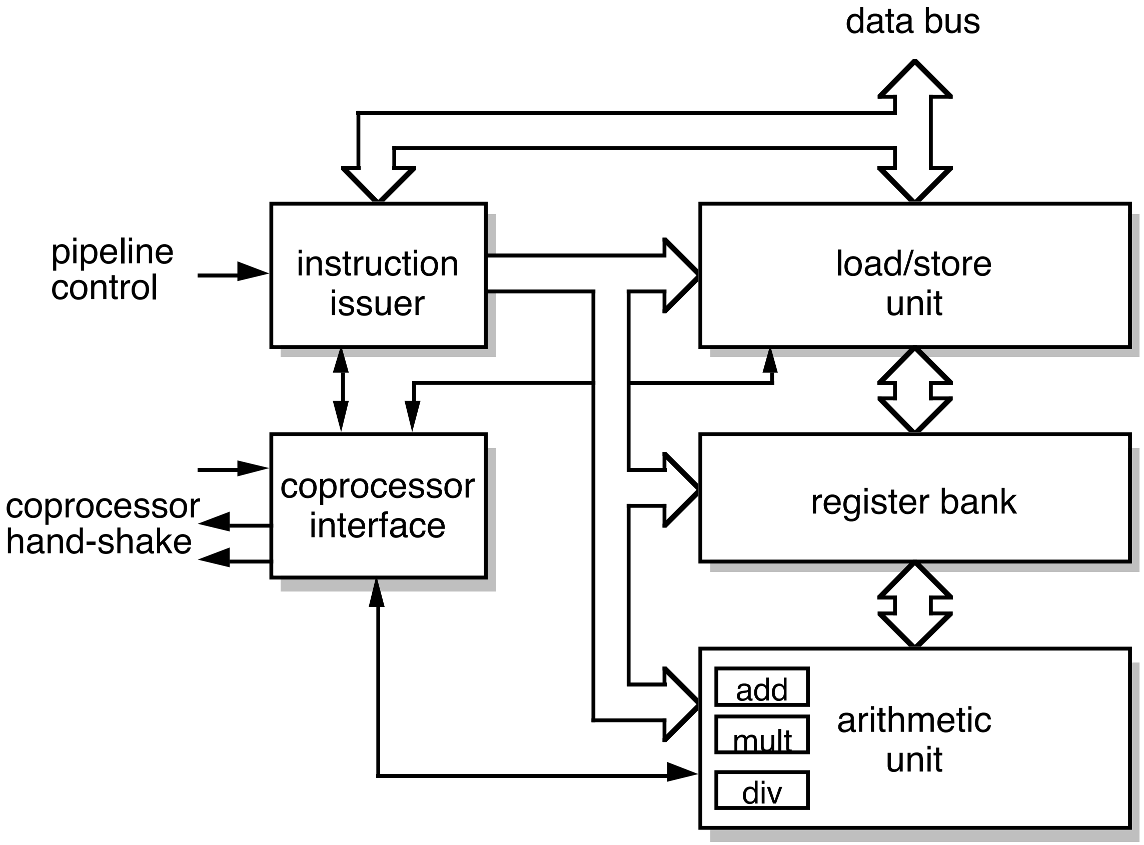
Floating-point register transfer binary encoding

31–28	27–24	23–21	20	19	18–16	15–12	11–8	7–5	4	3	2–0
cond	1 1 1 0	Cop1	L	e	FRn	Rd	0 0 0 1	Cop2	1	i	FRm

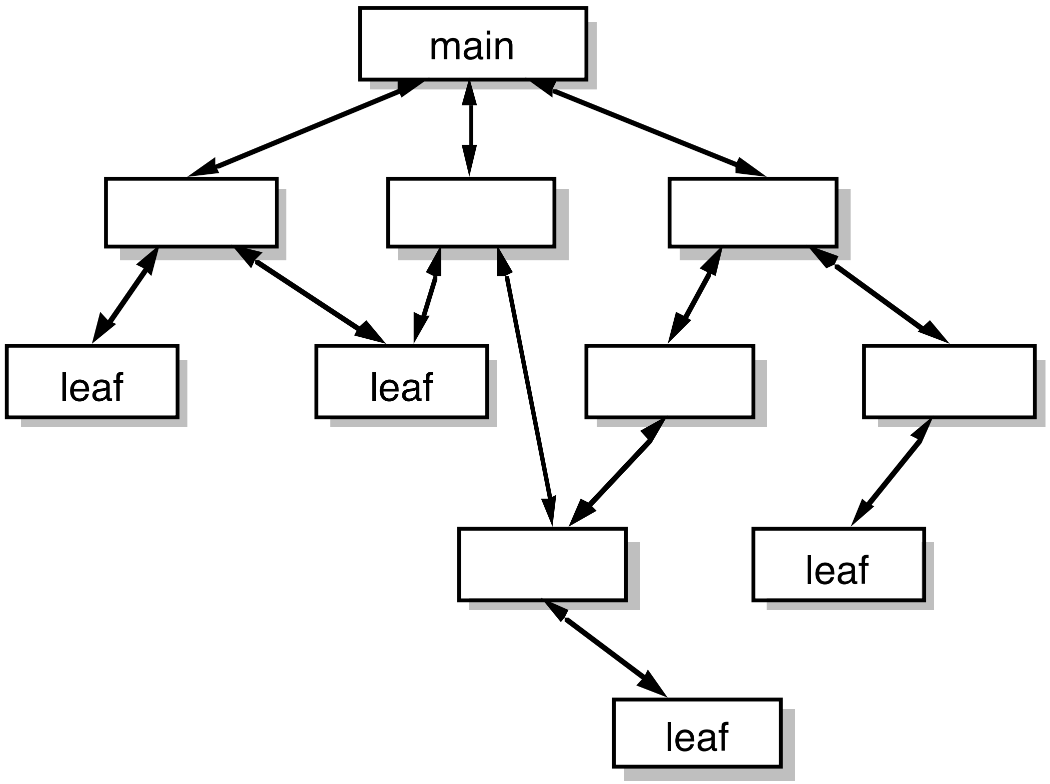
Floating-point instruction frequencies

Instruction	Frequency
Load/store	67%
Add	13%
Multiply	10.5%
Compare	3%
Fix and float	2%
Divide	1.5%
Others	3%

FPA10 internal organization



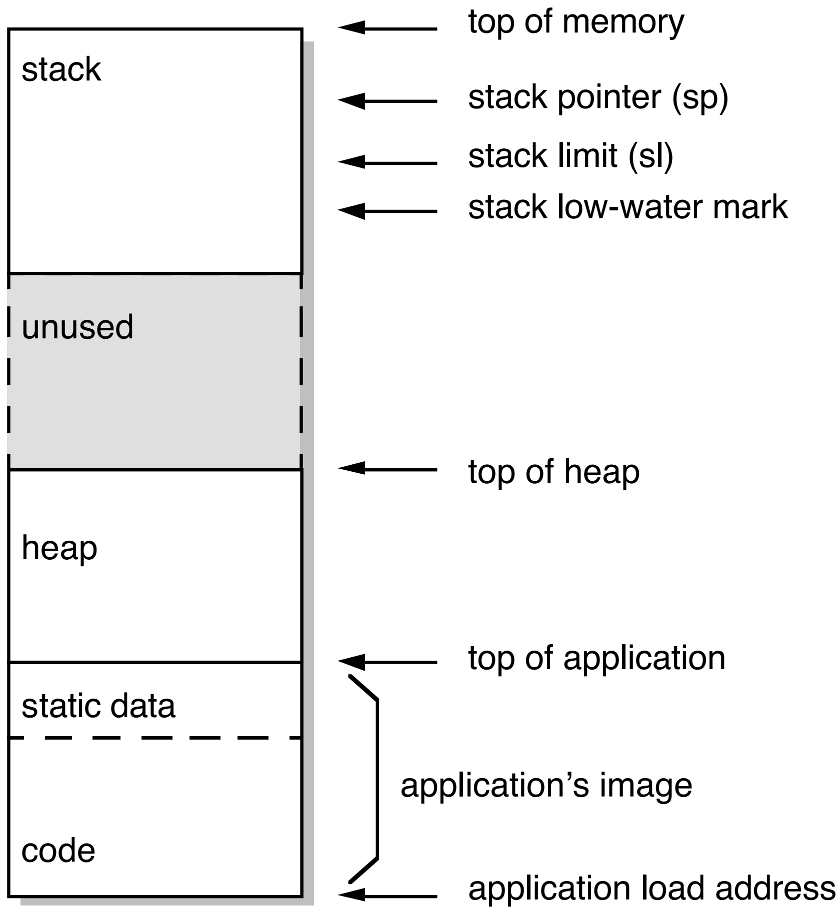
Typical hierarchical program structure



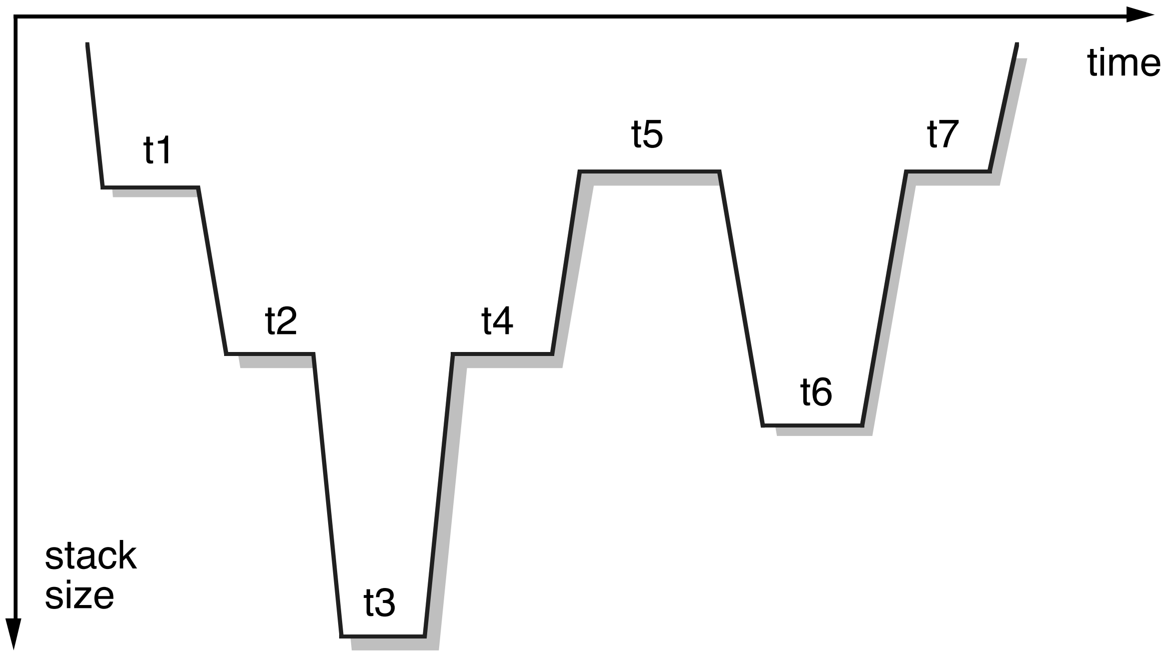
APCS register use convention

Register	APCS name	APCS role
0	a1	Argument 1 / integer result / scratch register
1	a2	Argument 2 / scratch register
2	a3	Argument 3 / scratch register
3	a4	Argument 4 / scratch register
4	v1	Register variable 1
5	v2	Register variable 2
6	v3	Register variable 3
7	v4	Register variable 4
8	v5	Register variable 5
9	sb/v6	Static base / register variable 6
10	sl/v7	Stack limit / register variable 7
11	fp	Frame pointer
12	ip	Scratch reg. / new sb in inter-link-unit calls
13	sp	Lower end of current stack frame
14	lr	Link address / scratch register
15	pc	Program counter

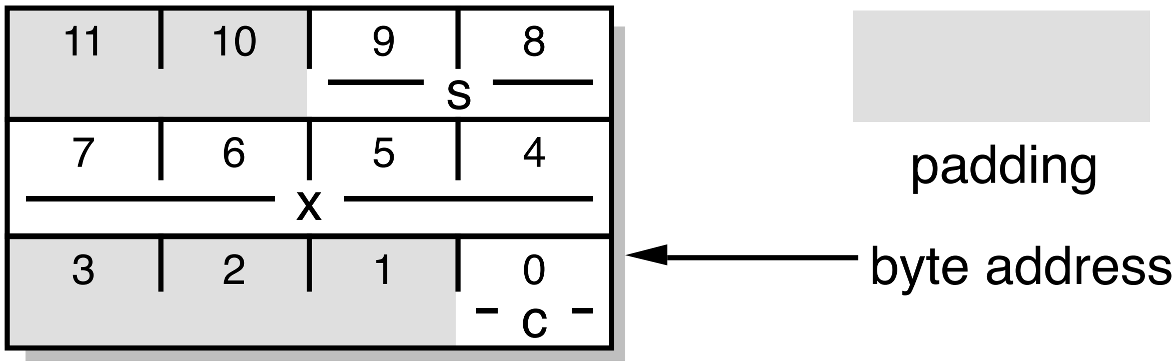
The standard ARM C program address space model



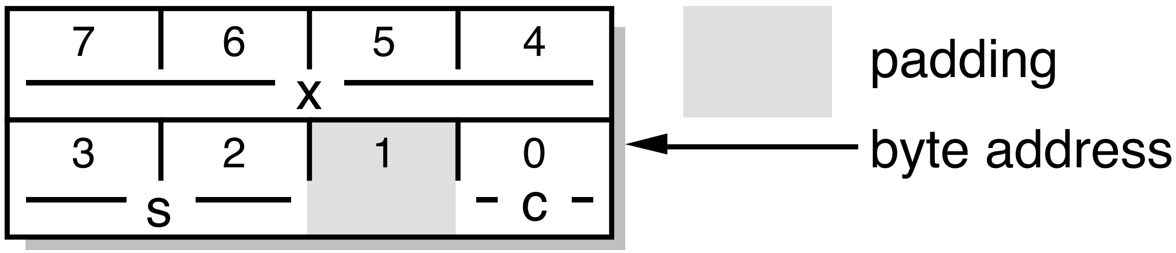
Example stack behaviour



An example of normal struct memory allocation



An example of more efficient struct memory allocation



An example of packed struct memory allocation