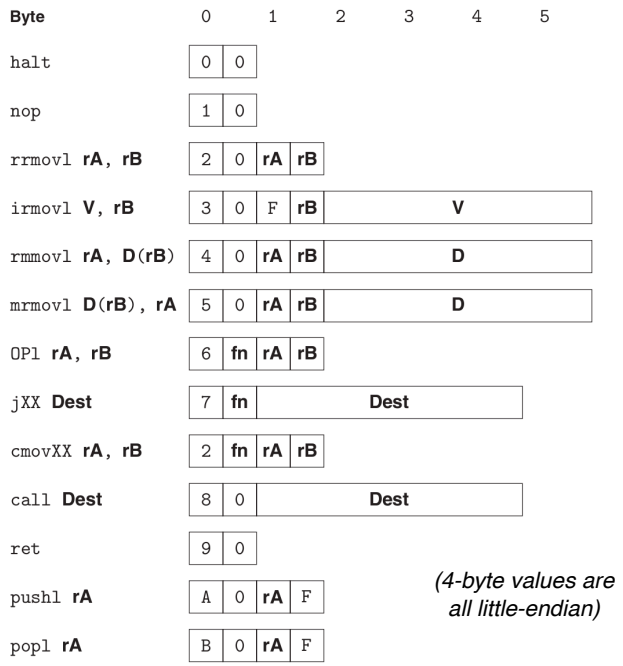
Figure 4.2
Y86 instruction set. Instruction encodings range between 1 and 6 bytes. An instruction consists of a 1-byte instruction specifier, possibly a 1-byte register specifier, and possibly a 4-byte constant word. Field `fn` specifies a particular integer operation (`OPl`), data movement condition (`cmovXX`), or branch condition (`jXX`). All numeric values are shown in hexadecimal.



Number	Register name
0	%eax
1	%ecx
2	%edx
3	%ebx
4	%esp
5	%ebp
6	%esi
7	%edi
F	No register

Figure 4.4

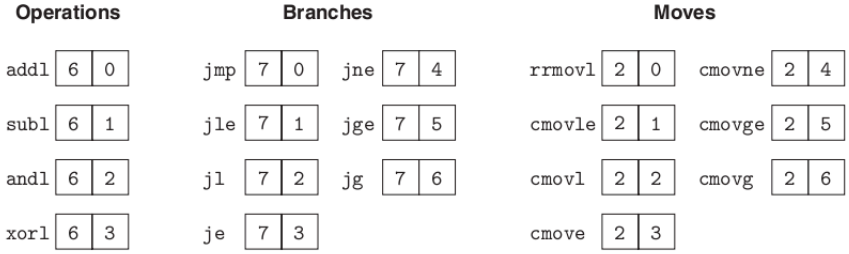


Figure 4.3 **Function codes for Y86 instruction set.** The code specifies a particular integer operation, branch condition, or data transfer condition. These instructions are shown as `OPl`, `jXX`, and `cmovXX` in Figure 4.2.

(X86 material inherited by the Y86)

Type	Form	Operand value	Name
Immediate	$\$Imm$	Imm	Immediate
Register	E_a	$R[E_a]$	Register
Memory	Imm	$M[Imm]$	Absolute
Memory	(E_a)	$M[R[E_a]]$	Indirect
Memory	$Imm(E_b)$	$M[Imm + R[E_b]]$	Base + displacement
Memory	(E_b, E_i)	$M[R[E_b] + R[E_i]]$	Indexed
Memory	$Imm(E_b, E_i)$	$M[Imm + R[E_b] + R[E_i]]$	Indexed
Memory	$(, E_i, s)$	$M[R[E_i] \cdot s]$	Scaled indexed
Memory	$Imm(, E_i, s)$	$M[Imm + R[E_i] \cdot s]$	Scaled indexed
Memory	(E_b, E_i, s)	$M[R[E_b] + R[E_i] \cdot s]$	Scaled indexed
Memory	$Imm(E_b, E_i, s)$	$M[Imm + R[E_b] + R[E_i] \cdot s]$	Scaled indexed

Figure 3.3 **Operand forms.** Operands can denote immediate (constant) values, register values, or values from memory. The scaling factor s must be either 1, 2, 4, or 8.

Instruction		Synonym	Jump condition	Description
`jmp`	*Label*		1	Direct jump
`jmp`	**Operand*		1	Indirect jump
`je`	*Label*	`jz`	`ZF`	Equal / zero
`jne`	*Label*	`jnz`	`~ZF`	Not equal / not zero
`js`	*Label*		`SF`	Negative
`jns`	*Label*		`~SF`	Nonnegative
`jg`	*Label*	`jnle`	`~(SF ^ OF) & ~ZF`	Greater (signed >)
`jge`	*Label*	`jnl`	`~(SF ^ OF)`	Greater or equal (signed >=)
`jl`	*Label*	`jnge`	`SF ^ OF`	Less (signed <)
`jle`	*Label*	`jng`	`(SF ^ OF) | ZF`	Less or equal (signed <=)
`ja`	*Label*	`jnbe`	`~CF & ~ZF`	Above (unsigned >)
`jae`	*Label*	`jnb`	`~CF`	Above or equal (unsigned >=)
`jb`	*Label*	`jnae`	`CF`	Below (unsigned <)
`jbe`	*Label*	`jna`	`CF | ZF`	Below or equal (unsigned <=)

Figure 3.12 **The jump instructions.** These instructions jump to a labeled destination when the jump condition holds. Some instructions have "synonyms," alternate names for the same machine instruction.