

Here are the mnemonics and binary encodings for the Y86 instruction set. This is intended to resolve inconsistencies in the multiple PowerPoint slides and the textbook, while remaining as consistent as possible with the original source material.

Y86 machine instructions may be 1 to 6 bytes long. The first byte is always the OPCODE byte. The opcode is divided into two 4-bit values as shown below. There may be zero, one or two operands. Instructions that use registers will specify one or two registers in a REGISTER byte immediately after the opcode byte. The register byte uses two 4-bit fields to encode the specified register(s) shown below as rA and rB. An instruction that uses only one register will have a hex F in the register byte to represent the unused register.

All displacements and immediate values are 32-bit signed integers.

nop		0	0			
halt		1	0			
rrmovl	rA,rB	2	0	rA	rB	
irmovl	V,rB	3	0	F	rB	32-bit value
rmmovl	rA,D(rB)	4	0	rA	rB	32-bit displacement
mrmovl	D(rB),rA	5	0	rA	rB	32-bit displacement
op1	rA,rB	6	fn	rA	rB	
jXX	destination	7	fn			32-bit destination
call	destination	8	0			32-bit destination
ret		9	0			
pushl	rA	A	0	rA	F	
popl	rA	B	0	rA	F	
readX	D(rA)	C	fn	rA	F	32-bit displacement
writeX	D(rA)	D	fn	rA	F	32-bit displacement
movsbl	D(rB),rA	E	0	rA	rB	32-bit displacement

The opcodes for the op1 set of instructions are shown below:

addl	6	0
subl	6	1
andl	6	2
xorl	6	3
mull	6	4
cmpl	6	5

The opcodes for the jump instruction are shown below:

jmp	7	0
jle	7	1
jl	7	2
je	7	3

jne	7	4
jge	7	5
lg	7	6

The opcodes for the read instruction are shown below

readb	C	0
readl	C	1

The opcodes for the write instructions are shown below:

writeb	D	0
writel	D	1

If you have further questions or suggestions as to how to improve this document, please let me know.

--BKR