Princeton University
COS 217: Introduction to Programming Systems
Examples of x86-64 Instruction Operands

Type of Operand	Syntax	Semantics
Immediate	`$4` `$i`	`4` `i (that is, the address denoted by i)`
Register	`%rax`	`reg[RAX]`
Memory: Direct/ Absolute Addressing	`4` `i`	`mem[4]` `mem[i]`
Memory: Indirect Addressing	`(%rax)`	`mem[reg[RAX]]`
Memory: Base + Displacement Addressing	`4(%rax)` `i(%rax)`	`mem[4 + reg[RAX]]` `mem[i + reg[RAX]]`

Memory: Indexed Addressing	`(%rax,%r10)`
	`4(%rax,%r10)`
	`i(%rax,%r10)`
		`mem[reg[RAX] + reg[R10]]`
		`mem[4 + reg[RAX] + reg[R10]]`
		`mem[i + reg[RAX] + reg[R10]]`

Memory: Scaled Indexed Addressing	`(,%r10,8)`
	`4(,%r10,8)`
	`i(,%r10,8)`
	`(%rax,%r10,8)`
	`4(%rax,%r10,8)`
	`i(%rax,%r10,8)`
		`mem[reg[R10] * 8]`
		`mem[4 + (reg[R10] * 8)]`
		`mem[i + (reg[R10] * 8)]`
		`mem[reg[RAX] + (reg[R10] * 8)]`
		`mem[4 + reg[RAX] + (reg[R10] * 8)]`
		`mem[i + reg[RAX] + (reg[R10] * 8)]`