Homework 3

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CS270 Fall 2020

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1 Practice Problems, 3.1, 3.5, 3.6, 3.8, 3.9, 3.10, 3.18,3.21

(3.1)

Operand	Value
$\%rax$	0x100
$0x104$	0xAB
$\$0x108$	0x108
$(\%rax)$	0xFF
$4(\%rax)$	0xAB
$9(\%rax, \%rdx)$	0x11
$260(\%rcx, \%rdx)$	0x13
$0xFC(, \%rcx, 4)$	0xFF
$(\%rax, \%rdx, 4)$	0x11

(3.5)
```
void decode1(long *xp, long *yp, long *zp) {
    long regEight = *xp;
    long regRCX = *yp;
    long regRAX = *zp;
    *yp = regEight;
    *zp = regRCX;
    *xp = regRAX;
}
```

(3.6)

Instruction	Result
$leaq 9(\%rdx), \%rax$	9 + q
$leaq(\%rdx, \%rbx), \%rax$	q + p
$leaq(\%rdx, \%rbx, 3), \%rax$	q + 3p
$leaq 2(\%rbx, \%rbx, 7), \%rax$	2 + q + 7p
$leaq 0xE(, \%rdx, 3), \%rax$	0xE + 3q
$leaq 6(\%rbx, \%rdx, 7), \%rax$	6 + p + 7q

(3.8)

Instruction	Destination	Value
$addq \%rcx, (\%rax)$	0x100	0x100
$subq \%rdx, 8(\%rax)$	0x108	0xA8
$imulq \$16, (\%rax, \%rdx, 8)$	0x118	0x110
$incq 16(\%rax)$	0x110	0x14
$decq \%rcx$	%rcx	0
$subq \%rdx, \%rax$	%rax	0xFD

(3.9)
```
shift_left4_rightn:
    movq %rdi, %rax
    shl 4, %rax
    movl %rsi, %rcx
    shr %rcx, %rax
```

(3.10)
```
short arith3(short x, short y, short z) {
    short p1 = y | z;
    short p2 = z >> 9;
    short p3 = !z;
    short p4 = z - y;
    return p4;
}
```

(3.18)
```
short test(short x, short y, short z) {
    short val = z + y - x;
    if (z <= 5) {
        if (z >= 3)
            val = z / y;
        else
            val = x / y;
    } else if (y <= 2)
        val = x / z;
    return val;
}
```

(3.21)
```
short test(short x, short y) {
        short val = x ^ y;
        if (val < -3) {
            if (y < x)
                val = x*y;
            else
                val = x+y;
        } else if (x > 2)
            val = x-y;
        return val;
    }
```

2 Homework Problems, 3.58

```
long decode2(long x, long y, long z) {
    y = y - z;
    x = x * y;
    long temp = y;
    temp = temp << 63;
    temp = temp >> 63;
    temp = temp ^ x;
    return temp;
}
```