

Name: _____

CSCI 224 / ECE 317
Due: Monday, March 2
at start of class

Homework #3

(1.5 points each) Match the following assembly code sections with their equivalent C expressions

(1)

```
movl    x, %eax
incl    %eax
shll    $3, %eax
subl    $3, %eax
movl    %eax, y
```

- (a) $y = 0;$
- (b) $y = 8 * x + 5;$
- (c) $y = (4 * x) + (x \% 16);$

(2)

```
movl    $25, %eax
sarl    $3, %eax
addl    $-2, %eax
movl    %eax, y
```

- (d) $y = (8 * x) + 1;$
- (e) $y = \sim x;$
- (f) $y = 23 * x;$

(3)

```
movl    x, %eax
xorl    $0xffffffff, %eax
movl    %eax, y
```

- (g) $y = (x / 4) + (x \% 16);$
- (h) $y = (x / 4) << x;$
- (i) $y = 5 * x / 2;$

(4)

```
movl    x, %eax
movl    %eax, %ebx
shll    $4, %ebx
sarl    $2, %eax
subl    %eax, %ebx
movl    %ebx, y
```

- (j) $y = (3 * x) << x;$
- (k) $y = (8 * x) - (x - 3);$
- (l) $y = -25 * x;$
- (m) $y = (4 * x) - (x / 16);$

(5)

```
movl    x, %eax
movl    %eax, %ecx
subl    $3, %eax
shll    %cl, %eax
movl    %eax, y
```

- (n) $y = (8 * x) << x;$
- (o) $y = (x - 3) << 4;$
- (p) $y = (16 * x) - (x / 4);$
- (q) $y = -3 * x;$

(6)

```
movl    x, %eax
movl    %eax, %ebx
shll    $1, %ebx
addl    %eax, %ebx
shll    $3, %ebx
subl    %ebx, %eax
movl    %eax, y
```

- (r) $y = 1;$
- (s) $y = -23 * x;$
- (t) $y = 8 * x - 3;$
- (u) $y = (x - 3) << x;$
- (v) $y = 4 * x - 3;$

(2 points each)

For each instruction below, indicate:

- whether the data for that operand is found/stored in:
 - register
 - memory
 - in the instruction itself
- size of the data (1, 2, 4, or 8 bytes)
- what addressing mode is used for each operand (see Fig. 3.3)

(7) `addl $5, %eax`

Operand 1:

data found/stored in: _____
size of data: _____
addressing mode: _____

Operand 2:

data found/stored in: _____
size of data: _____
addressing mode: _____

(8) `subw var, %cx`

Operand 1:

data found/stored in: _____
size of data: _____
addressing mode: _____

Operand 2:

data found/stored in: _____
size of data: _____
addressing mode: _____

(9) `movl $ptr, %edx`

Operand 1:

data found/stored in: _____
size of data: _____
addressing mode: _____

Operand 2:

data found/stored in: _____
size of data: _____
addressing mode: _____

(10) `movb %cl, 8(%esp)`

Operand 1:

data found/stored in: _____
size of data: _____
addressing mode: _____

Operand 2:

data found/stored in: _____
size of data: _____
addressing mode: _____

(11) `addw 6(%ebx, %eax, 4), %si`

Operand 1:

data found/stored in: _____
size of data: _____
addressing mode: _____

Operand 2:

data found/stored in: _____
size of data: _____
addressing mode: _____