CS 2400 Midterm 1

Solutions

September 22, 2017

1

(a) True (b) (c) (d)

2

Answer key:
1)– c)
2)– f)
3)– d)
4)– e)

3

since this is worth 18 points, give +3 to the 'x+2' expression blank, and +3 to last row's overflow blank. Give +2 to other 6 blanks.
y = -29
x = 30

Expression	Decimal Representation	Hex Representation	Overflow?
y	-29	0x23	No
x + 1	TMax	**0x1f**	No
x + 2	-32	0x20	Yes
x+y	1	0x01	**No**
x + TMax	**-3**	0x3d	Yes
TMin+y	**3**	**0x03**	**Yes**

4

5

```
push   %ebp
mov    __%ESP__,%ebp
sub    $0x34,%esp
mov    0x8(%ebp),%eax
mov    %al,-0x34(%ebp)
movl   $0xf,-0x20(%ebp)
mov    0xc(__%EBP__),%eax
mov    %ax,-0x22(%ebp)
__JMP__    L1

.L4
__CMPL__   $0x0,-0x20(%ebp)
jns    L2
movzwl -0x22(%ebp),%eax
sub    $0x1,%eax
movsbl -0x34(%ebp),__%ECX__
movzwl -0x22(%ebp),%edx
__ADD__    %ecx,%edx
mov    %edx,-0x1c(%ebp,__%EAX__,4)
jmp    L3

.L2
__MOVZWL__ -0x22(%ebp),%eax          // note: some put movl here, but this is wrong
because it would move the lower 2 bytes from int y into the upper 2 bytes of eax
movsbl -0x34(%ebp),%edx
mov    __%EDX__,-0x1c(%ebp,%eax,4)  // note: some answers put 0x8(%ebp) here,
which is incorrect because an x86 assembly instruction cannot have both operands
referencing memory

.L3
movzwl -0x22(%ebp),%eax
mov    -0x1c(%ebp,%eax,4),%eax
add    %eax,-0x20(%ebp)
movzwl -0x22(%ebp),%eax
__SUB__    $0x1,%eax
mov    %ax,-0x22(%ebp)

.L1
cmpw   $0x0,-0x22(%ebp)
jne    .L4
mov    -0x20(%ebp),%eax
leave
ret
```