lab 8a: **Addition and Subtraction Instructions**

1. Indicate whether or not each of the following instructions is valid. (notate: V = valid, I = invalid) Assume that all operations are unsigned.

a. add ax,bx; V
b. add dx,bl; V
c. add ecx,dx; V
d. sub si,di; V
e. add bx,90000 I
f. sub ds,1; V
g. dec ip; I
h. dec edx; V
i. add edx,1000h; V
j. sub ah,126h; V
k. sub al,256; I
l. inc ax,1; I

2. What will be the value of the Carry flag after each of the following instruction sequences has executed?
(notate: CY = carry, NC = no carry)

a.
```
mov ax,0FFFFh
add ax,1
```
CF = CY

b.
```
mov bh,2
sub bh,2
```
CF = NC

c.
```
mov dx,0
dec dx
```
CF = NC

d.
```
mov al,0DFh
```

add al,32h

CF = CY

e. **mov si,0B9F6h**
sub si,9874h

CF = NC

f. **mov cx,695Fh**
sub cx,A218h

CF = CY

3. What will be the value of the Zero flag after each of the following instruction sequences has executed?
(notate: ZR = zero, NZ = not zero)

a. **mov ax,0FFFFh**
add ax,1

ZF = ZR

b. **mov bh,2**
sub bh,2

ZF = ZR

c. **mov dx,0**
dec dx

ZF = NZ

d. **mov al,0DFh**
add al,32h

ZF = NZ

e. **mov si,0B9F6**
sub si,9874h

ZF = NZ

f. **mov cx,695F**
add cx,96A1h

ZF = ZR

4. What will be the value of the Sign flag after each of the following instruction sequences has executed?
(notate: PL = positive, NG = negative)

a. **mov ax,0FFFFh**
sub ax,1

SF = PL

b. **mov bh,2**
sub bh,3

SF = NG

c. **mov dx,0**
dec dx

SF = NG

d. **mov ax,7FFEh**
add ax,22h

SF = NG

e. **mov si,0B9F6h**
sub si,9874h

SF = PL

f. **mov cx,8000h**
add cx,A69Fh

SF = PL

5. What will be the values of the Carry, Sign, and Zero flags after the following instructions have executed?
(notate: CY/NC, PL/NG, ZR/NZ)
mov ax,620h
sub ah,0F6h

CF = CY
SF = NG
ZF = NZ

6. What will be the values of the Carry, Sign, and Zero flags after the following instructions have executed?
(notate: CY/NC, PL/NG, ZR/NZ)
mov ax,720h
sub ax,0E6h

CF = NC
SF = PL
ZF = NZ

7. What will be the values of the Carry, Sign, and Zero flags after the following instructions have executed?
(notate: CY/NC, PL/NG, ZR/NZ)
mov ax,0B6D4h
add al,0B3h

CF = CY
SF = NG
ZF = NZ

8. What will be the values of the Overflow, Sign, and Zero flags after the following instructions have executed?
(notate: OV/NV, PL/NG, ZR/NZ)
mov bl,- 127
dec bl

OF = OV
SF = NG
ZF = NZ

9. What will be the values of the Carry, Overflow, Sign, and Zero flags after the following instructions have executed?
(notate: CY/NC, OV/NV, PL/NG, ZR/NZ)
mov cx,- 4097
add cx,1001h

CF = NC
OF = NV
SF = NG
ZF = NZ

10. What will be the values of the Carry, Overflow, Sign, and Zero flags after the following instructions have executed?
(notate: CY/NC, OV/NV, PL/NG, ZR/NZ)
mov ah,- 56
add ah,- 60

CF = NC
OF = NV
SF = NG
ZF = NZ