Sample problems for CSE 1310 that a student should be capable of completing after studying statements, conditionals, and loops. September 29, 2011

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1. What does the following program print?

```
a = 99
b = 0
c = 74

if a or b :
    print "first"
else:
    print "second"

if a and c :
    print "third"
else:
    print "fourth"

if not a :
    print "fifth"
else:
    print "sixth"

if (a and b) or c :
    print "seventh"
else:
    print "eighth"

if (not c) or (not b) :
    print "nineth"
else:
    print "tenth"
```

2. What does the following program print?

```
x = 4

if x > 3 :
    print "one"
    x += 2
    if x < 10 :
        print "two"
        x = 2*x + 1
        if 15 < x and x < 25 :
            print "three"
            x = x - 1
            if x < 100 :
                print "four"
            else :
                print "five"
        else :
            print "six"
    else :
        print "seven"
else :
    print "eight"
```

3. What does the following program print?

```
k = 5
count = 0

while  count <= 6 :
    if  (k%5 == 0) and (k%10 != 0) :
        print "%d   %d" % ( count, k )

    count += 1
    k = k + 5
```

4. What does the following program print?

```
count = 0
mysum = 0

k = 5

while  k <= 60 :
    if  k%10 == 0 :
        mysum += k
        print k    ,  # ends with a comma

    count += 1

    if  count == 4 :
        print mysum
        mysum = 0
        count = 0

    k = k + 5
```

5. What does the following program print?

```
x = input("Enter an integer:  ")  # assume user enters 50

i = 1

while  i <= 5 :
    if  i%2 == 0 :
        x = x + 5
    else :
        x = x - 5

    print "%d, " % ( x )   ,  # comma
    i += 1
```

6. What does the following program print?

```
x = input("Enter an integer:  ")  # assume user enters 6

if x > 3 :
    print "one"
    if x > 5 :
        print "two"
        if x > 7 :
            print "three"
            if x > 9 :
                print "four"

if 0 < x and x < 10 :
    print "five"
else :
    print "six"
```

7. What does the following program print?

```
age = input("Enter your age:  ")  #  assume user enters 15

if  age < 10 :
    print "child"

if  age < 20 :
    print "teenager"

if  age < 60 :
    print "adult"

if  age < 100 :
    print "old"
```

8. What does the following program print?

```
i = 7
sum = 0

while True :
    sum = sum + i
    print sum

    if i%10 == 0 :
        break
    i = i + 1

print "final sum is", sum
```

9. What does the following program print?

```
#  you must pay attention to the positioning of the
#  output on this problem
i = 1
while i < 10 :
    x = i%3 + 1
    k = 1
    while k < x :
        print ""  ,
        k += 1

    print "X"
    i += 1
```

10. What does the following program print?

```
mysum = 0

i = 3
while i < 8 :
    if i%3 == 1 :
        mysum = mysum - i
    else :
        mysum = mysum + i

    print "%d %3d" % (i, mysum)
    i += 1
```

11. What does the following program print?

```
# assume user enters 15
n = input("Enter a number evenly divisible by 5: ")

stop = n + 25

if n % 5 != 0 :
    print "that number is not evenly divisible by 5"
else :
    while n <= stop :
        print n
        n = n + 5
```

12. What does the following program print?

```
x = 0
i = 5
while i > 0 :
    if x > 6 :
        break
    print i, x
    x = x + i
    i = i - 1

print i, x
```

13. What does the following program print?

```
r = 2
while  r < 5 :
    c = 1
    while  c < 5 :
        print "%2d," % (r*c)  ,  # comma
        if r == c :
            print
            break
        c += 1
    r += 1
```

14. What does the following program print?

```
k = 5

while  k < 15 :
    if  k%3 == 0 :
        print "red:  ", k
        if  k%4 == 0 :
            print "blue:  ", k

    k += 1
```

15. What does the following program print?

```
i = 1.0
x = 0.5

while i < 3.25 :
    if x < 1.75 :
        x = x + 0.5

    print "%.1f, %.1f" % (i, x)
    i = i + 0.5
```

16. What does the following program print?

```
mysum = 0
k = 8

while  (k > 0) and (mysum < 20) :
    mysum += k
    print "%d   %d" % (k, mysum)
    k = k - 1  # subtraction
```

17. What does the following program print?

```
mysum = 0
i = 1
while i < 5 :
    if i%2 == 2 :
        mysum += i
    print mysum
    i += 1
```

18. What does the following program print?

```
a = 1

print "  a = %d" % a
print "2*a = %d" % a
print "3*a = %d" % a
print "48a = %d" % a
```

19. Write a program that prompts the user for two integers, a and b, and then prints the integers from a to b, each on a separate line. For those integers that are even, print the word 'even' also on that line. Example:

```
Enter an integer: 4
Enter an integer (>= the first): 9
4 even
5
6 even
7
8 even
9
```

20. Write a program that prompts the user for integers until it receives a positive, odd integer. At this point the program will count down from this number until it reaches zero. Example:

```
Enter an integer: 8
Enter an integer: -3
Enter an integer: 0
Enter an integer: 66
Enter an integer: 7
7
6
5
4
3
2
1
0
```

21. Write a program that prompts the user for two positive integers, a and b, such that $a < b$. The program should count up from a in increments of 1 and down from b in increments of 1 until the two values pass each other. Example:

```
Enter an integer, a:  4
Enter an integer, b (a < b):  10

a = 4, b = 10
a = 5, b = 9
a = 6, b = 8
a = 7, b = 7
```

22. Write a program that prompts the user for two positive integers, which we will call b and e. The program will calculate b^e. That is, the program will raise a positive integer to a positive integer power. Do not use `b**e` or the `pow()` function. Hint: think about how you would explain to a first-grader what b^e means.

23. Write a program that prompts the user for two positive integers and then determines which of them has more divisors. Print which has more divisors or if they have the same number of divisors. You don't need to do any error-checking.

24. Write a program that prompts the user for a positive integer and then, depending on its divisibility by 8 or 12, prints either "first", "second", "third", or "fourth". Use the truth table below to determine what to print.

div by 8	div by 12	Prints
T	T	first
T	F	second
F	T	third
F	F	fourth

25. Write a program that prompts the user for two positive integers, a and b, and then calculates `a * b` without using multiplication. Hint: think about what multiplication is and how we can replace it with addition.

26. Write a program that prompts the user for a positive integer, n, and then prints a sideways pyramid of stars that is n stars high. Example:

```
Enter a positive integer: 5
*
* *
* * *
* * * *
* * * * *
* * * *
* * *
* *
*
```

27. Write a program that prompts the user for a positive integer n and then sums the integers in the range of 100 to 200 (inclusive) that are evenly divisible by n. The program will print the final sum. You do not have to do any error-checking.
Example:

```
Enter a positive integer:  13
The sum is 1196
```

28. Write a program that prompts the user for positive integers, only stopping when a negative integer or zero is given. The program should then print out how many of the positive integers were odd.
Example:

```
Enter a positive integer (0 or negative to stop):  9
Enter a positive integer (0 or negative to stop):  4
Enter a positive integer (0 or negative to stop):  7
Enter a positive integer (0 or negative to stop):  -3
You entered 2 odd integers.
```

29. Write a program that sums the integers in the range of 10 to 100 (inclusive) if the integer is evenly divisible by 4 or 6, but not both. For example, 16 should be part of the sum and 18 should be part of the sum, but not 24. Print the overall sum.
Hint: Think of the truth table for this.

30. Write a program that prompts the user for a positive integer n and then produces an $n \times n$ multiplication table. You can assume that all values in the table can be printed with no more than three digits You do not have to do any error-checking nor do you need to put row or column labels.
Example:

```
Enter a positive integer:  4

   1   2   3   4
   2   4   6   8
   3   6   9  12
   4   8  12  16
```