COMP130 Midterm Exam 1, Practice exam

Time allowed: *50 minutes*
Total points: *50 points (approximately 1 point per minute)*
Write solutions on blank paper, not on this exam.
No devices are permitted. No materials may be consulted, except for one page (one side of US letter paper) of your own handwritten notes. Solutions must employ methods we have studied in class; other approaches will receive little credit.

Question 1. Data Types (5 points)

What is the data type of each variable in the following code?

```
x = 42.8
y = '-5'
z = True
w = int(x)
v = y + str(w) + str(x)
```

List the data types of `x`, `y`, `z`, `w`, and `v`.

Question 2. Code Completion (11 points)

Complete the blanks in the code below so that it outputs:

```
1 is odd
1 squared is 1
2 is even
2 squared is 4
3 is odd
3 squared is 9
```

```
for _________________:
    if ____________________:
        print(i, "is even")
    else:
        print(i, "is odd")
    i_squared = ________________
    print(i, 'squared is', i_squared)
```

(a) (4 pts) What goes in the first blank?

(b) (4 pts) What goes in the second blank?

(c) (3 pts) What goes in the third blank?

Question 3. Boolean Logic (4 points)

For each expression, list the integer values of `x` from 0 to 10 that make it `True`.

(a) `(x > 2 and x < 5) or x == 10`

(b) `x == 0 or (x % 2 == 0 and x <= 6)`

Question 4. Stack diagram (10 points)

Draw a stack diagram of the following code as it begins to execute line 4.

```
1  def f(x, y):
2      a = x+y
3      b = x*y
4      print(b - a)
5
6  def g(x, y):
7      p = y+x
8      f(x, x)
9      if p > 2*x:
10         print(p+1)
11     else:
12         print(p-1)
13
14 a = 5
15 g(a, 7)
```

Question 5. Loop Tracing (10 points)

What is the complete output of the following code?

```
for a in range(4):
    print('a is', a)
    for b in range(a):
        print('b is', b)
    print('Z')
```

Question 6. Computing & Algorithms (10 points)

This question refers to our reading about Computing & Algorithms, which was the introductory chapter of a book about algorithms (*Nine Algorithms That Changed the Future*). You must answer based on the content of that reading. Information from other sources will receive little credit.

(a) (3 pts) According to the author, what is the definition of an algorithm?

(b) (3 pts) Give an example of one of the main "nine algorithms" discussed in the book and referred to in the book's title.

(c) (4 pts) Explain why the algorithm you named in part (b) has a significant impact on our society.

Total points in exam: **50**