Homework 5

Quiz date: beginning of class, Thursday, November 5.

1. Consider the following algorithm:

```
ALG
val <- 1                              // line 1
for i <- 5 to 20                      // line 2
   val <- i * i + i + val             // line 3
display val                           // line 4
END
```

   (a) Write a summation for the number of times line 3 executes.

   (b) Solve the above summation.

   (c) What is the Big-O of this algorithm?

   (d) Write a summation for computing the **value** of `val`. (Summations can be used for many things.)

   (e) Solve the above summation; that is, what will `val` be at line 4? Use summation formulas.

2. Consider this next algorithm:

```
ALG
enter x                               // line 1
enter y                               // line 2
bob <- 1                              // line 3
while bob < 20                        // line 4
   for jim <- 3 to bob                // line 5
      x <- y * x                      // line 6
   bob <- bob * 2                     // line 7
END
```

   (a) Write a summation for counting the number of times line 6 executes.

   (b) Solve the above summation. Use summation formulas.

   (c) What is the Big-O of this algorithm?

3. Solve the following summations:

   (a) $\sum_{i=1}^{50} 6i$

   (b) $\sum_{i=0}^{10} (4^i + 4i)$

   (c) $\sum_{i=0}^{15} 10i^2$

4. Give the Big-O for each of the following:

   (a) $T(n) = 5n + 3n + n$

   (b) $T(n) = (4n + 3)(2n + 8)$

   (c) $T(n) = 24352342n^2$