Review Questions for Reading #4

1. What is a bound function for a while loop?

2. Briefly describe a process that you can follow to establish that a given function is a bound function for a given while loop in an algorithm.
3. Describe a process that you can follow to prove that a given algorithm always terminates whenever its computational problem’s precondition is satisfied.

4. Describe the relationship between partial correctness, termination and correctness — briefly describing how you can prove that an algorithm with a while loop is correct.
5. What is the **uniform cost criterion**, and how (or why) is it useful?

6. Describe a process — involving a bound function for a *while* loop — that can be used to establish an upper bound for the number of steps that are carried out when a *while* loop is executed, if the precondition of the problem the algorithm solves is satisfied when this execution of the algorithm began.
7. Describe a mathematical technique that is often useful to prove that a given summation has a given value.

8. Describe at least two or three summations that you might expect to discover when analyzing algorithms with while loops and give the values for these.

   *Hint:* These include arithmetic series, sums of squares and cubes.

9. Describe at least two other resources that one might be interested in bounding when analyzing the efficiency of an algorithm.