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 give 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.