

CRITICAL THINKING

1. What is the purpose of a loop structure?
 - Loop structure is a set of statements repeatedly based on a condition
2. Explain the difference between a while statement and a do-while statement
 - The difference between the loops is when the condition is evaluated. The while statement evaluates the condition before any iterations are performed. The do-while statement does not evaluate the condition until after the first iteration.
3. An input validation loop is a loop that checks user input for valid data. If valid data is not entered, the loop iterates until valid data is entered. In which review of this chapter did you write code for an input validation loop?
4. a) What is an infinite loop?
 - Infinite loop is a loop that executes forever causing the application to just hangb) List two types of errors that can lead to an infinite loop
 - Syntax errors and logic errorsc) What is meant by overflow?
 - Overflow is when there are not enough bits to store a number, that can be caused by logic errors
5. How many times will the do-while loop execute?

```
int x = 0;
do {
    x = x + 2;
} while (x<200); ⇒ 99 times
```
6. What initial value of x would make the loop infinite?

```
do {
    x = x - 3;
} while (x<120); ⇒ x=0
```
7. Compare and contrast counters and accumulators. List two uses for each
 - Counters: Variables that are incremented by a fixed value.
 - Counter: To count things so it records a count that is non-negative whole number
 - Counter: Keep track of count-how many times a piece of code is executed
 - Accumulator: A variable that is incremented by varying amounts.
 - Accumulator: To accumulate (add up) values or perform calculations iteratively
 - Accumulator: Adds up/accumulates the values provided.
8. Write a for statement that sums the integers from 3 to 10, inclusive

```
int total = 0;
for (int x = 3; x<=10; x++) {
    total+=x;
}
System.out.print(total);
```
9. List two factors that should be considered when determining which loop structure to choose
 - Whether the number of times the loop will be executed is fixed
 - Whether the loop should execute at least one