1. The purpose of a loop structure is to repeat a block of code multiple times.

2. The while statement is a loop structure, which executes a set of statements over and over again based on a condition. The do while statement is an alternative form of the while statement and the condition is not evaluated until the first execution of the loop.
3. An input validation loop keeps asking the user for input until the value entered is valid.

4a. A loop that continues forever.
4b. Syntax error and logic error.
4c. A condition that occurs when a number is too large to be stored in a specified number of bits.

5. The loop executes 60 times.
6. There is no initial integer value of x that will make this loop infinite, because adding 3 repeatedly will eventually reach 120 or more.

7. A counter and an accumulator are both variables commonly used in loop structures, but they serve different purposes. A counter is used to keep track of how many times something happens, typically increasing by a fixed amount, such as one, each time the loop executes. For example, a counter might be used to count how many times a user enters input or how many items have been processed in a program. In contrast, an accumulator is used to keep a running total of values. Instead of just counting, it adds varying amounts to itself each time the loop runs. An accumulator is useful when calculating the total cost of items, summing scores, or adding together user inputs to eventually compute an average. While a counter simply tracks occurrences, an accumulator builds up a total value that changes based on the data being processed.

8.
```
int sum = 0;

for (int i = 3; i <= 10; i++) {

    sum += i;

}
```

9. When deciding which loop structure to use in a program, two key factors should be considered. First, determine whether the number of times the loop needs to execute is known ahead of time. If you already know how many repetitions are required such as looping exactly ten times or iterating over a fixed-size array a for loop is typically the best choice because its structure neatly incorporates a counter, stopping condition, and update in one line. On the other hand, if the number of repetitions depends on a condition that may vary at runtime, like user input or changing data, a while loop or do-while loop is more suitable. Second, consider whether the loop should execute at least once, even if the condition is false to begin with. If the loop body must run at least one time for example, to prompt the user for input before checking if it is valid a do-while loop is appropriate, since its condition is checked after the loop executes. If it is acceptable for the loop not to run at all when the condition is false initially, a while loop or for loop is a more appropriate structure.

11a: 10

11b: my