

Critical Thinking Chapter 5

1.

The purpose of a loop structure is to repeat a set of instructions multiple times, either for a predetermined number of iterations or until a specific condition is met.

2.

The while loop checks its condition before executing the loop body.

The do-while loop executes the loop body at least once and then checks its condition.

3.

I write input validation loops for all 3 reviews: Evens, NumbersSum, OddSum

4.

- a) An infinite loop is a sequence of instructions that repeats infinitely because the condition to exit the loop is never met.
- b) Logic error and missing variable updates
- c) An overflow occurs when a calculation or data transfer results in a value that is too large to be stored in the memory or data type.

5.

There is an initial run.

After that, the total of executions is $(118 - 2) / 2 + 1 = 59$.

Therefore, the total of the do-while loop execute is $59 + 1 = 60$

6.

Because the x value is increasing by 3, so at some point, the value will always reach or exceed 120. Therefore, there is no value of x such that the loop goes infinitely.

7.

The counters track the number of events.

The accumulators store the sum of values.

For example:

The uses of counters are: controlling the number of times a loop runs, tracking the number of occurring events.

The uses of accumulators: calculating the sum of numbers entered by a user, finding a type of value a user wants (average, bill, ...)

8.

```
int sum = 0;
```

```
int count = 3;
```

```
for (count <= 10)
```

```
{
```

```
    sum += count;
```

```
        count += 1;  
    }
```

```
System.out.println("The sum of integers from 3 to 10 is: " + sum);
```

9.

- We generally prefer the number of times the loop needs to execute.
- We choose suitable uncertain variables which depend on a condition during the loop's execution.

11.

- a) There are 10 characters in "my string.", so the string's length is 10.
- b) The 0th character is "m" and the 3rd character is " ", the substring is "my ".