1. A loop structure is meant to repeat a given set of statements, depending on a condition. It is applicable in activities like adding numbers as they are typed, giving a user repeated prompts till valid information is typed, or sequentially processing items.

2. A while statement compares the condition prior to the execution of the loop body. In case the condition is not true at the very beginning, the loop body is never executed.

   Do-while statement first executes the loop body, and thereafter the evaluation of the condition is carried out. The loop body will at least execute once, even in the case that the condition is initially false.

3. I used an input validation loop on the Skill Builder: Odd Sum. I also used it in my mastery project: Necklace.

4a. An infinite loop is a loop which repeats indefinitely since its condition will never be false.

4b. An infinite loop may be caused by a syntax error, e.g. by putting a semicolon at the end of the condition, and a logic error, e.g. by never changing the loop control variable so that the condition remains true.

4c. When a number is too large to be represented in the allotted bits, overflow may be experienced (resulting in the number wrapping around), or it may be represented in the available bits in an invalid number.

5. It will execute 60 times

6. Any initial value less than 120 will give the loop an infinite value.

7. A counter and an accumulator are two variables that are used to track values in a loop or a program; however, they have different purposes. An event is counted by adding or subtracting a certain number (typically 1) to a counter, which is typically a number. As an example, it could be applied to trace the number of loop iterations or the number of items processed. Conversely, an accumulator holds a running total or sum of some changing values. It does not add a constant amount, but rather a variable amount every time, i.e. user inputs, scores, or prices. Whereas both normally begin at zero, a counter deals with the number of incidences, whereas an accumulator deals with the cumulative value.

   Uses of a Counter:

- Measuring the repetition of a loop.
- There are items or events which satisfy a condition, and the number of those items or events is counted.

Uses of an Accumulator:
- Combining a sequence of numbers to obtain a total, e.g. total sales, total marks.
- Computing an average by adding the values and then dividing them by the entries.

8.
```
int sum = 0;
for (int i = 3; i <= 10; i++) {
sum += i;
}
```

9. Known number of iterations - Use for if known; use while/do-while if unknown.
Should the loop body be run at least once - Use do-while if yes; use while if it might not run at all.

11a. 10
11b. “my “
11c. “my string.”
11d. “MY STRING.”
11e. “my string.”

https://grok.com/share/c2hhcmQtNA%3D%3D_c2301fa2-1ebb-404d-b634-cc15800f78c8