

1. What is the purpose of a loop structure

A loop structure is designed to repeat a specified set of statements based on a condition. It can be used in tasks such as summing numbers while being entered, offering a user multiple reminders until correct information is provided, or processing items in order.

2. Explain the difference between a while statement and do-while statement

In a while statement, the condition is checked before the loop runs, so the loop might not run at all if the condition is false at the start. In a do-while statement, the condition is checked after the loop runs once, so the loop will always run at least one time, even if the condition is false.

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 data is entered in which review of this chapter did your write code for an input validation code

The review that had done this was prompter because it makes a minimum and maximum range and if the user does not input any valid data it will repeatedly ask the user to put in data until it is valid

4. a) What is an infinite loop

A loop that will keep going because the condition will never become false and example code of an infinite loop is:

```
Int num=-1;
While (num<0) {
    num=-1;
}
```

This is an example of an infinite loop because the condition checks if num is less than 0, and num is always set to -1. Since -1 is less than 0, the condition never becomes false, so the loop keeps running forever.

b) List two types of errors that can lead to an infinite loop.

A common syntax error is putting a semicolon right after the loop condition, which causes the loop to check the condition and do nothing forever. Another syntax error is forgetting curly brackets, which can make only one line run inside the loop and prevent the variable from updating. Logic errors can also happen in an infinite loop when there are scenarios like never changing the loop control variable so that the condition remains true.

c) what is meant by overflow

An overflow occurs when there are not enough bits to store a number. An overflow can generate a run time error or cause the condition to become invalid or it can be represented in the available bits in an invalid bit

5. How many times will the do-while loop execute?

The do while loop can execute 60 times

6. Any value less than 120 will make the loop go infinite

7. Compare and contrast counters and accumulators. List two uses for each

Although they are both variables used inside loops, counters and accumulators have different functions. The number of times something occurs is counted using a counter, which typically rises by one each time the loop is repeated. For instance, a counter can be used to count how many times a loop executes or how many inputs a user enters. In contrast, a running total is maintained via an accumulator. Depending on what values are put to it, it increases by varying amounts. An accumulator, for example, can be used to determine the total of many integers in a list or to add up all the scores a user enters. Accumulators record how much, whereas counters record how many.

8. Write a for statement that sums the integer from 3 to 10 inclusive.

```
int sum = 0;

for (int num = 3; num <= 10; num++) {
    sum = sum + num;
}
```

9. List two factors that should be considered when determining which loop structures to choose

If the number of iterations is known, use for; if not, use while/do-while.

If the loop body needs to execute at least once, use do-while; if code does not execute at all, use while.

11. Consider the following assignment

String x= "my string";

Determine the value returned by each of the following methods

- a) x.length() ←10
- b) x.substring(0,3)←my
- c) x.toLowerCase()←my string.

- d) `x.toUpperCase←MY STRING.`
- e) `x.trim()←my string.`