Exercise 1

3.10 Compare and contrast the if single-selection statement and the while repetition statement.

Similarities:

Both use a condition to determine whether to execute a block of code.

Both can alter the flow of execution in a program.

Differences:

if is a single-selection statement; it executes a block of code once if the condition is true.

while is a repetition statement; it continues executing a block of code as long as the condition remains true.

3.11 What happens when a Java program divides one integer by another?

In Java, dividing one integer by another using / results in integer division (the fractional part is discarded).

3.12 Describe the two ways in which control statements can be combined.

Sequential execution: One statement follows another in sequence.

Control structures combination:

Selection (if, if-else, switch) for decision-making.

Repetition (while, for, do-while) for loops.

3.13 Which type of repetition is appropriate?

Sum of first 100 positive integers: A counter-controlled for loop is best:

Sum of an arbitrary number of positive integers: A sentinel-controlled while loop is appropriate:

3.14 Difference between preincrement and postincrement

Preincrement (++x): Increments x before using its value.

Postincrement (x++): Uses the current value of x before incrementing.

3.15 Identify and correct errors in the code

(a) Incorrect semicolon and mismatched quotes

(b) Variable total is not initialized

(c) Missing braces ({})

(d) Infinite loop (y keeps increasing)