CPSC 319
Data Structures, Algorithms, and Their Applications

Winter 2024

Question 1

- Write a Java method, isMultiple, that takes two long values, n and m, and returns true if and only if n is a multiple of m, that is, n = mi for some integer i.

- Test case:
  n = 10, m = 5 -> true
  n = 7, m = 3 -> false
  n = -1, m = 1 -> true
  n = 4, m = 0 -> false
  n = 0, m = 0 -> true

Question 2

- Write a Java method, isEven, that takes an int i and returns true if and only if i is even. Your method cannot use the multiplication, modulus, or division operators.

- Test case:
  i = 4 -> true
  i = 1 -> false
  i = 0 -> true
  i = -1 -> false
  i = -4 -> true

Question 3

- Write a Java method, summation, that takes an integer n and returns the sum of all the odd positive integers less than or equal to n.

- Test case:
  n = -10 -> 0
  n = 0 -> 0
  n = 1 -> 1
  n = 5 -> 9
  n = 1000000 -> 250000000000

Question 4

- Write a Java method, summation, that takes an integer n and returns the sum of the squares of all positive integers less than or equal to n.

- Test case:
  n = -10 -> 0
  n = 0 -> 0
  n = 3 -> 14
  n = 100 -> 338350
  n = 1000000 -> 333333833333500000