**Loops Practice** *(find and work with a partner)*

1. Write a function `sum1(n: int) -> int` which calculates the following:

$$\sum_{i=1}^{n} i$$

Then write a function `sum1_check(n: int) -> bool` to check your result for `sum1(n)` with the formula below, which is equal to the above summation.

$$\frac{n(n+1)}{2}$$

2. Write a function `sum_logi(n)` which calculates the below formula to the left of the equal sign, and, as above, write a function `sum_logi_check` to verify that the equality holds:

$$\sum_{i=1}^{n} \log i = \log(n!)$$

You can write `from math import log, factorial` to gain access to the necessary math functions.

3. Write a program to calculate the below formula to the left of the equals sign and check it with the right-hand side of the equals sign, taken from here:

$$\sum_{i=1}^{5} \sum_{j=1}^{4} j = 50$$

4. Write a function `matrix_init(m: int, n: int)` to create an $m \times n$ matrix initialized with all 0s as elements. For example, `matrix_init(2,3)` should return the multidimensional list `[[0, 0, 0], [0, 0, 0]]` which represents the following matrix:

$$\begin{bmatrix} 0 & 0 & 0 \\ 0 & 0 & 0 \end{bmatrix}$$

5. Write a function `matrix1(m:int, n:int)` to create an $m \times n$ matrix with the following format:

$$\begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{bmatrix}$$

6. Use the function from question 4 to create an initialized matrix. Then, write another function to set the diagonal elements of the initialized matrix to 1s.