2019 Numerical Analysis Lab #1

Write in Fortran90 and submit listing and outputs.

1. Write a function is_palindrome(i) to determine whether integer I is palindromic, where the first and last digits are equal, I-th and n-i th digits are equal, like, 11, 313, 2772, 35853. It should return .true. or .false.

2. A prime is an integer that is only divisible only by 1 and itself. 2, 3, 5, 7, 11, 13,...

Your goal is to find all prime numbers that are less than 10,000. To determine whether j is a prime, you can use 2 methods.

a) Divide j by k, k from 2 to j-1. If any of them exactly divides, j is not a prime.

b) Divide j by k, k from 2 to $\sqrt{j}$. If any one of them divides j exactly, j is not a prime.

Use both of the above 2 methods and also report the number of integer divisions used. (Of course, method b) will be more efficient.)

3. A tridiagonal matrix is a matrix where A(i, j) = 0, except A(i,i-1), A(i,i), A(i, I+1), ...

Write a function that returns the sum of all sub-diagonal values of A, I.e, A(2,1), A(3, 2), ..., A(5,4). Assume that the matrix A is 100x100 in main.