**Name:**

**C++ Programming**

**Lab Exercise 4.22.2021**

Solve these problems and turn in your source code and a sample output attached to this sheet.

**1. Factorial Challenge**

Write a program that determines the number of trailing zeros at the end of X! (X factorial), where X is an arbitrary number. For instance, 5! is 120, so it has one trailing zero. (How can you handle extremely values, such as 100!?) The input format should be that the program asks the user to enter a number. Hint: To find the number of trailing zeros, count the number of multiples of 5 there are in the number you are taking the factorial of. For example, 100! Has 20 multiples of 5 (5, 10, 15, 20 … 95, 100). Be sure to write your program to handle the factorial of any integer.

**2. Dual Primes**

A dual prime is 2 prime numbers that are exactly “2” apart. Example: 3, 5 // 11, 13, etc.

In his challenge you will do the following things:

Create a program that will:

* Allow a user to input a number to iterate up to
* Allow the user to see all the dual primes, and a list of the numbers that are NOT dual prime

**3. Day of Year**

Write a program that, given a date, three ints (for example, 11 27 1997), will print the number of that day within its year: i.e. Jan 1st is always 1, Dec 31st is either 365 or 366.

**4. How Old are the Doritos?**

The law requires that food product manufacturers place expiration dates on their products, but there is a loophole in the law: it does not require the expiration date to be in any particular form. So, it can be written in Swahili and still be legal.

Ralph Nader's third cousin, Nadine is a self-appointed Food Quality Spy. She has learned that many food product manufacturers have started encoding the product expiration dates to keep customers from knowing how old the stuff is.

But the encoding does allow grocers to figure out the expiration dates if for some reason, they want to.

One popular encoding method:

* encode the months from Jan to Dec as 'A' through 'L'
* encode each digit of the date as 'Q' through 'Z'
* encode the year as 'A' through 'Z' meaning 1 through 26 which is then added to 2000.

Nadine found a particularly questionable loaf of bread with this date: ARZM. Write a program to determine the date.