Is it a Prime Number?

What is a Prime Number?
In mathematics a Prime Number is a number that is only evenly divisible by itself and the number one (1) with no remainder. So for example the number 7 is prime because it only divides evenly by the numbers [7, 1], and if you divide it by all of the numbers in between [6, 5, 4, 3, 2], it gives a remainder. To give an alternative example the number 9 is not prime because it divides evenly by the numbers [9, 1], but if you divide it by all of the numbers in between [8, 7, 6, 5, 4, 3, 2], you find that there is one number (three) that divides evenly into 9, and therefore 9 is not a prime number. So a general statement of how to check if a number is prime or not is as follows:

```
For any number N, it is a prime number if we divide it
by all the numbers less than it but greater than one
[N-1, N-2, … 3, 2], and they all give some remainder.
```

So the code below shows how we could write this program:

- we start by getting the number to be tested, and call it `CheckNum`. Then we create a variable for the divider (the *denominator*), and we call that `Countdown`, which starts at `CheckNum-1` and we keep taking one (1) off it each time the program loops until we get to two (2).
- To check if a division gives a remainder, we use the Remainder Division (%) operator, which will be zero (0) if it gives no remainder, and not zero if there is a remainder, so our IF statement is: `if (CheckNum % Countdown == 0):`
- Lastly, we have a Boolean variable called `IsPrime` that we set to `True` at the start of the program, which assumes the number is going to be prime, and then only can we set it to `False` if we are inside the WHILE loop and if the division returns a zero (0) remainder, which would mean that the number input is not prime.

Summing Numbers Using the WHILE Statement

```
# PROGRAM CheckPrime:
CheckNum = int(input("Please input value:"))
Countdown = CheckNum - 1
IsPrime = True
while (Countdown > 1):
    if (CheckNum % Countdown == 0):
        IsPrime = False
    # EndIf;
    Countdown = Countdown - 1
# EndWhile;
print(IsPrime)
# END.
```

So, the output we will get from this program is “True” if the number is prime, and “False” if the number isn’t prime.

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