# My code demonstrating how to find if a number is proth and proth prime  
  
  
# function to check if a number is a power of 2  
def is\_a\_power\_of\_2(x):  
 return x and (not (x & (x - 1)))  
  
  
# function to check if the number is Proth  
def checkifproth(x):  
 # create variable used to test proth theorem  
 k = 1 # starting from 1 to use only odd numbers  
  
 while k < (x // k):  
  
 # check if k can divide x or not  
 if x % k == 0:  
  
 # next check if (x/k) is a power of 2  
 if is\_a\_power\_of\_2(x // k):  
 print("Number is proth")  
 return True  
 k = k + 2  
  
 print("Number is not proth")  
 return False  
  
  
# function to check if Proth number is prime  
  
def checkifprothprime(p):  
 import math  
 a = 1  
 power = (p - 1) / 2  
  
 # while loop used to test proth theorem for varies values of a  
 while a < p:  
 # check if 'a power p' is divisible by p  
 if ((math.pow(a, power)) + 1) % p == 0:  
 print("number is a prime proth!!")  
 return True  
 break  
 a = a + 1  
  
  
 # if proth number is not proth prime return false  
 return False  
  
  
  
# driver code  
  
# random list of odd number for testing  
list\_of\_numbers = [3, 5, 7, 9, 11, 15, 17, 41]  
  
# checking if the numbers in the list are proth prime or not  
for n in list\_of\_numbers:  
 print(str(n) + "")  
 if checkifproth(n-1):  
 if checkifprothprime(n):  
 print("")  
  
 else:  
 print("number is not prime proth")