DSC 430: Python Programming
Assignment 0302: Happy Primes

A prime number (or a prime) is a natural number greater than 1 that cannot be formed by multiplying two smaller natural numbers.

"Happy" has many definitions (even in mathematics). For our purposes, a happy number is a number defined by the following process: Starting with any positive integer, replace the number by the sum of the squares of its digits, and repeat the process until the number either equals 1 (where it will stay), or it loops endlessly in a cycle that does not include 1. Those numbers for which this process ends in 1 are happy numbers, while those that do not end in 1 are unhappy numbers (or sad numbers). For example, 19 is happy, as the associated sequence is:

$1^2 + 9^2 = 82$
$8^2 + 2^2 = 68$
$6^2 + 8^2 = 100$
$1^2 + 0^2 + 0^2 = 1$

Write code that endless loops, requesting/accepting an int from the user. Given the input, your code should print out whether it is a happy prime, sad prime, happy non-prime, or sad non-prime.

Record a three minute video in which you run the code. Then, present your code. Specifically, answer the following questions:

- How does your code know when to stop when operating on a sad number?
- Show how using the top-down method resulted in clean readable code.

Submission: Submit a single .py file containing all the code to the D2L. Do not zip or archive the file. Your code must include comments at the top including your name, date, video link, and the honor statement, "I have not given or received any unauthorized assistance on this assignment." Each function must include a docstring and be commented appropriately.