**Joy and Beauty of Data, Second Practicum – March 30, 2017**

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Question One. 25 points. Supply the missing function so that when this code runs:

**stranger\_things = {}**

**stranger\_things["The Vanishing of Will Byers"] = "The Duffer Brothers" stranger\_things["The Weirdo on Maple Street"] = "The Duffer Brothers" stranger\_things["Holly, Jolly"] = "Shawn Levy"**

**stranger\_things["The Body"] = "Shawn Levy"**

**stranger\_things["The Flea and the Acrobat"] = "The Duffer Brothers" stranger\_things["The Monster"] = "The Duffer Brothers" stranger\_things["The Bathtub"] = "The Duffer Brothers" stranger\_things["The Upside Down"] = "The Duffer Brothers"**

**episodes\_directed(stranger\_things, "The Duffer Brothers") episodes\_directed(stranger\_things, "Shawn Levy") episodes\_directed(stranger\_things, "Kerri Cobb")**

The following output is produced:

**The Duffer Brothers directed 6 episodes**

**Shawn Levy directed 2 episodes**

**Kerri Cobb directed 0 episodes**

def episodes\_directed(episodes\_dict, director):

count = 0

for i in range(len(episodes\_dict)):

if(director == episodes\_dict[i]):

count +=1

return count

Question Two. 50 points. Supply the missing class and methods so that when this code runs:

**# “Stranger Things” is the title of the series.**

**# “The Duffer Brothers” is the creator of the series.**

**# 1 is the number of seasons that the series has run.**

**# 8 is the number of episodes that the series contains.**

**stranger\_things = Series("Stranger Things", "The Duffer Brothers", 1, 8)**

**print(stranger\_things)**

**stranger\_things.addSeason() # here comes the next season stranger\_things.addEpisodes(9) # there are now 9 more episodes print(stranger\_things)**

The following output is produced:

**Stranger Things has aired 8 episodes over 1 seasons. Stranger Things has aired 17 episodes over 2 seasons.**

class Series:

def \_\_init\_\_(self, title, creator, seasons, episodes):

self.title = title

self.creator = creator

self.seasons = seasons

self.episodes = episodes

def \_\_str\_\_(self):

return self.title + " has aired " + str(self.episodes) + " episodes over " + str(self.seasons) + " seasons."

def addSeason(self):

self.seasons += 1

def addEpisodes(self, new\_episodes):

self.episodes += new\_episodes

stranger\_things = Series("Stranger Things", "The Duffer Brothers", 1, 8)

print(stranger\_things)

stranger\_things.addSeason() # here comes the next season

stranger\_things.addEpisodes(9) # there are now 9 more episodes

print(stranger\_things)

Question Three. 25 points. Object Oriented Concepts.

(a) What is the name of the constructor method in a class?

\_\_init\_\_

(b) Suppose the class **Athlete** is already defined and we want to define a new class called

**Runner** that is a subclass of **Athlete**. Complete the following one line of Python:

**class Runner(Athlete)**

(c) In the context of the **Athlete** class, give a concrete example of the difference between an instance and an instance variable.

An instance is the object defined in the athlete class. An instance variable is a variable stored in the instance

(d) Describe briefly the difference between a **reader method** and a **writer method**.

A reader method returns the value of an instance variable, a writer method sets the value

(e) To override the **+** operator, an **add** method can be defined in a class. What method must be defined to override the **\*\*** operator?

\_\_pow\_\_