1. Explain the heap property of a tree

No child can ever be larger than its parent.

2. List and describe the 3 methods most often associated with a stack.

Push: Push an item to the top of the stack

Pop: Removes and returns top item of the stack

Peak: Look at the top without removing the item

3. Identify 3 errors in the following code snippet:

num = input()

def factorial[n]🡨- Should be parens:

if n == 0:

return 1; 🡨 No semi colon

else:

return n \* factorial(n-1)

num(factorial) 🡨 Parens on the method call

4. Suppose there are 2 circles on a cartesian plane at (1,1) and (4,1), with a radius of m and n respectively. Write psuedocode that determines if the two circles overlap.

The circles

If sum of radius is greater then 3, then the circles overlap

5. Use pseudocode to design a class that represents a car.

Class car():

Def character(self):

Self.wheels

Self.make

Self.model

Self.condition

Self.hp

Self.color

Self.fuel

Self.transmission

Def aspects(self):

Self.mpg

Self.drive

Self.distance

6. Explain the meaning and use of the global keyword in python

Global is a scope type that means that a variable can be applied anywhere in a program. Must define that it is a specific global variable.

7. Draw a binary search tree containing the items added in order of [14, 5, 21, 3, 7, 8, 9, 1, 12]:

14

5 21

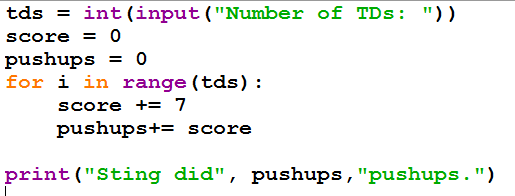
3 7

1 8

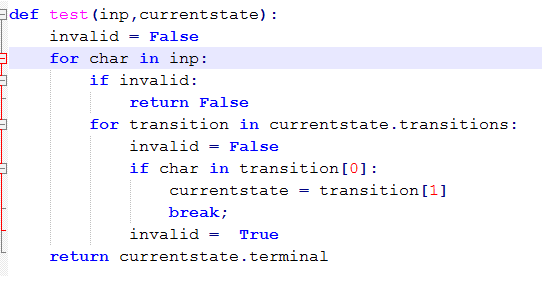
9

12

8. Give the Big-O performance of the following code fragment:



9.Give the Big-O runtime of the following code snippet:



10. Write a python program that uses **a dictionary** to store the following states and capitals.

Des Moines, Iowa  
Jefferson City, Missouri  
Albany, New York  
Sacramento, California  
Austin, Texas  
Lincoln, Nebraska

Finally, print the capital of california from your dictionary.  
  
stateCapitals = {}

def addStates(num):

   #your solution here

print()  # modify this line as well

11. Define the following terms in the context of computer science:

a. Complexity = Measure of the general case of the runtime of an algorithm. Measured thru big O.

b. Heuristic = A short cut to an otherwise challenging problem. Something that reduces the size of n.

c. Linear =

d. Tree =

e. Stack =

f. Node =

g. Graph =

h. Queue =

i. Quadratic =

j. Exception =

k. Dictionary =