Geo106E
Fundamentals of Programming
Lab-12

2018-2019
Spring Semester

LabWork 12.1 - Sorting
(File name « Lab12.1.py »)

Generate a list with 100 integer between 0-100 randomly and sort the numbers in the list using merge sort quicksort and insertion sort algorithms provided in module «sort.py».

```
#-----------------
import random
from sort import *
#-----------------
myList = [random.randint(0,100) for i in range(100)]
quickSort(myList)
```

```
# Insertion Sort
# https://gist.github.com/ameerkat/731870#file-sorts-py
def insertionSort(myList):
    for i in range(1, len(myList)):
        # Copy the key value so we can overwrite it when shifting
        pivot = myList[i]
        j = i - 1
        while j >= 0 and myList[j] > pivot:
            # Shift over all the entries greater than key
            myList[j+1] = myList[j]
            j = j - 1
        # Now copy the key into the appropriate spot left by
        # shifting all the greater values over
        myList[j+1] = pivot
    return myList
```

Example: Merge Sort Algorithm

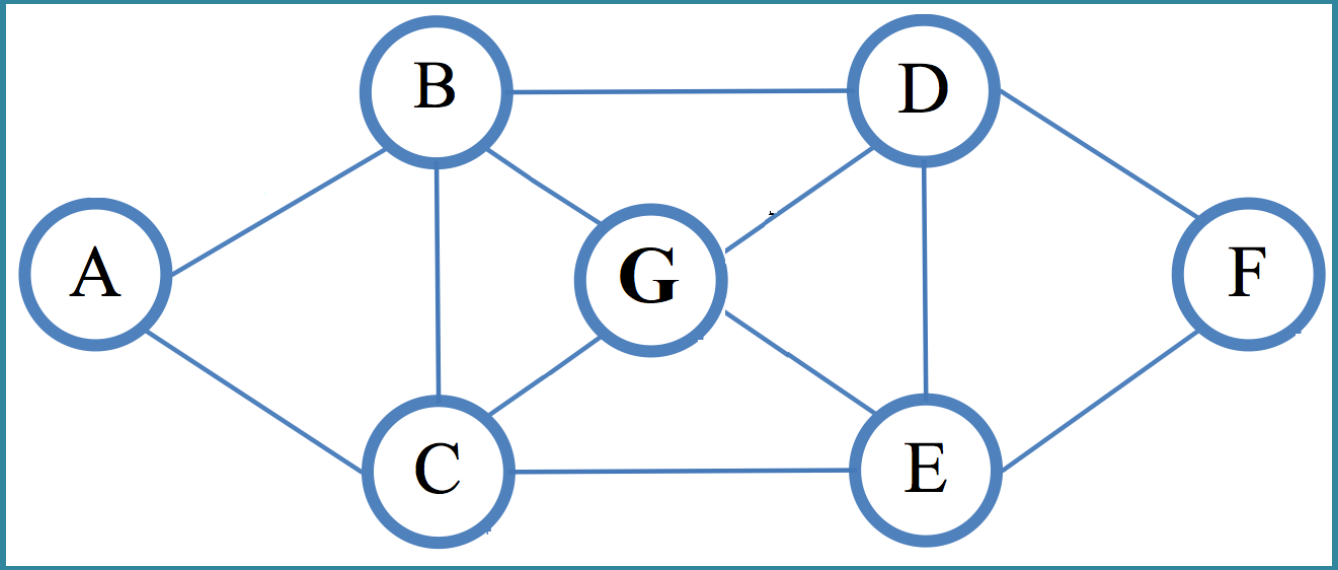
LabWork 12.2
(File name « Lab12.2.py »)

On the above table, for 2016, the population and the population percentage information of big cities in Turkey are given. Sort this table in ascending population using numpy.sort with order keyword argument.

Year	Province	Population	Percent
2016	İstanbul	14804116	18,55
2016	Ankara	5346518	6,70
2016	İzmir	4223545	5,29
2016	Bursa	2901396	3,64

LabWork 12.3 – Shortest Path (File name « Lab12.3.py »)

Find the shortest path between node A and F



Coordinates of nodes →

A (X = 7, Y = 1)
B (X = 9, Y = 4)
C (X = 1, Y = 3)
D (X = 9, Y = 9)
E (X = 1, Y = 10)
F (X = 8, Y = 12)
G (X = 5, Y = 7)

Use the python code «dijsktra.py» First you need to create a graph instance and add edges and nodes of this graph given. Define the points as an instance, too. Than call distance function to calculate the length of the edges.