CSE 101 - Computer Engineering Concepts & Algorithms (2017 Spring)

LAB#7

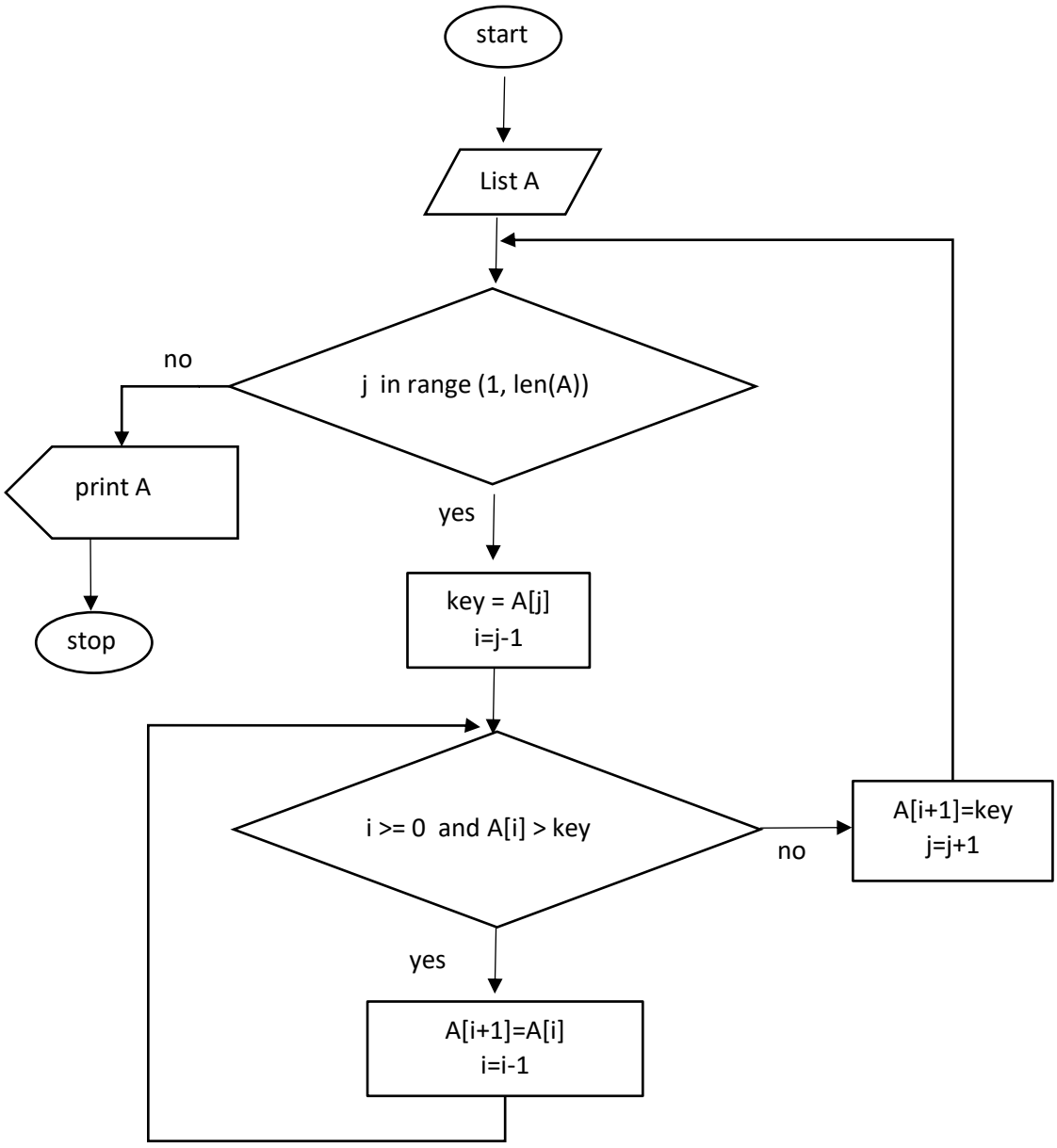
SORTING ALGORITHMS

Q1. Write the Python script for insertion sort using the flow chart below. Then debug your code using Python debugger "pdb". Trace each step of the sorting algorithm. Learn commands in pdb (l: list, b <lineno>: break at line <lineno>, r: run until breakpoint, s: step in , n: next statement, q: quit)

To debug your insertion_sort.py

On the command line type:

pdb insertion_sort.py



Q2. Bubble sort, sometimes referred to as sinking sort, is a simple sorting algorithm that repeatedly steps through the list to be sorted, compares each pair of adjacent items and swaps them if they are in the wrong order. The pass through the list is repeated until no swaps are needed, which indicates that the list is sorted. The algorithm, which is a comparison sort, is named for the way smaller or larger elements "bubble" to the top of the list. Write a Python script for it.

Q3. Create large sets of unsorted integer arrays. Import “random” module to generate random integers shown below. Use a for loop to generate 10000 random integers between -5000 to 5000.

```
import random

random.randint(low, high)
```

Then use this set of integers to compare the runtimes of both Insertion Sort and Bubble Sort with the **time command** in Linux shown below. Which one is faster?

```
sgoren@ubuntu:~/CSE101-Python$ time ./bubblesort.py
[23, 22, 21, 14, 13, 12, 11]
[11, 12, 13, 14, 21, 22, 23]

real    0m0.106s
user    0m0.020s
sys     0m0.007s
```