Computer Exam 3B

This is same as Homework 10, except the centers of Gaussian disstributions are changed to (3,5), (-5,2) and (1,-4). Submit the ten figures and your codes.

---------- Homework 10 ----------

Homework 10 (Computer) . Due Dec 1, midnight.

(A) Generate Three Gaussian distributions, each with 100 data points in 2 dimensions, with centers at (5,5), (-5, 5), and (-5,-5) and standard deviation \sigma = 2. Draw them in a Figure. Set K=3, do K-means clustering. Show the results in the same Figure. Repeat this 5 times. Submit the 5 figures, each represent the results of each K-means clustering.

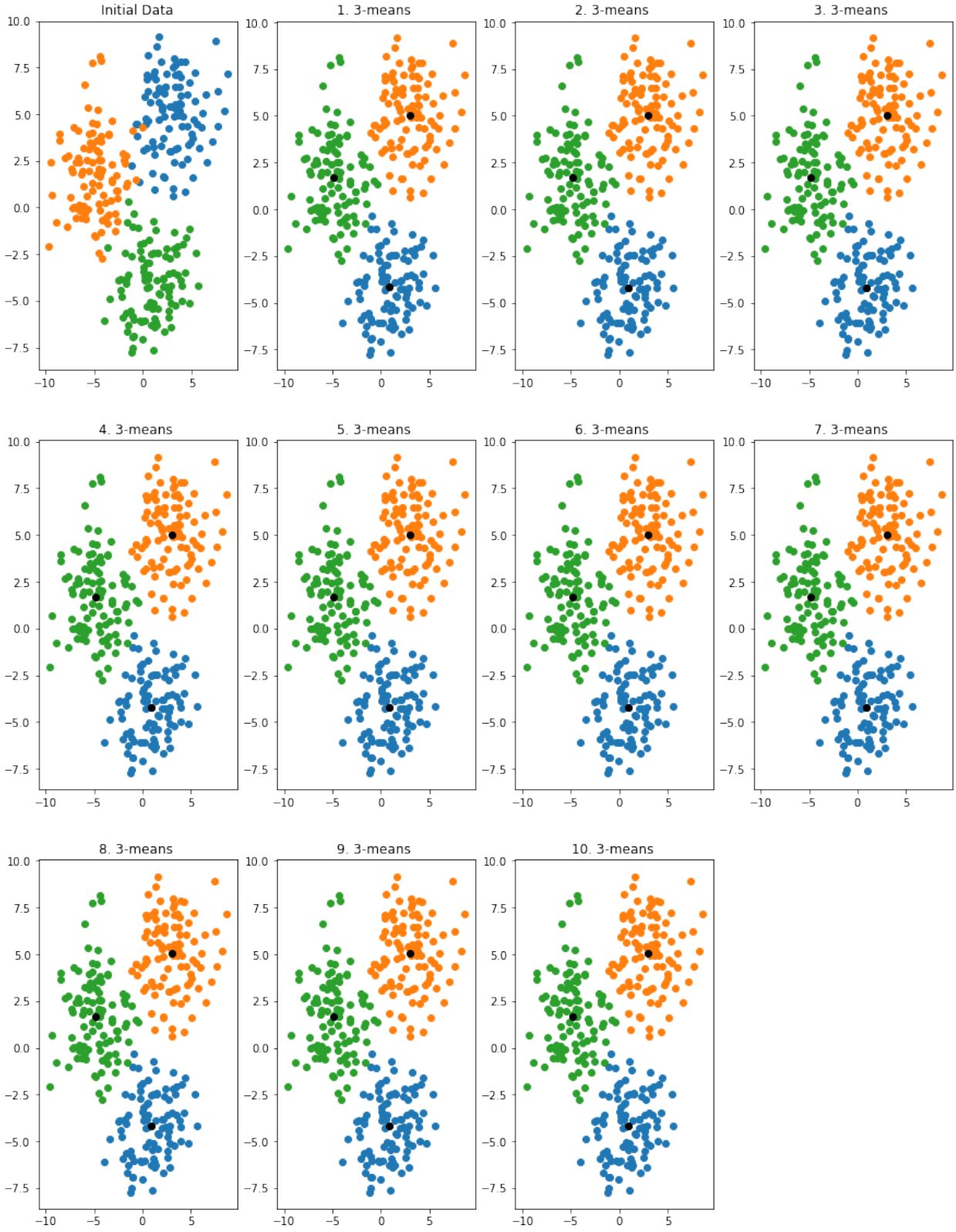
(B) Everything are same as (A), but with \sigma=4. Submit the 5 figures.

3B (A):

```
********** 3B. PartA - Sigma = 2 **********
********************
K-means n Time: 0
Centroid: [ 0.8978247  -4.15624575]
Points Count: 97
Class: 3.0
-------------------
Centroid: [2.9929072  5.03470201]
Points Count: 101
Class: 1.0
-------------------
Centroid: [-4.88646267  1.70214036]
Points Count: 102
Class: 2.0
-------------------
********************
K-means n Time: 1
Centroid: [ 0.92277038 -4.19249529]
Points Count: 97
Class: 3.0
-------------------
Centroid: [2.99563171 5.03426673]
Points Count: 101
Class: 1.0
-------------------
Centroid: [-4.85206105  1.678866  ]
Points Count: 102
Class: 2.0
-------------------
********************
K-means n Time: 2
Centroid: [ 0.92277303 -4.19249914]
Points Count: 97
Class: 3.0
```

```
-------------------
Centroid: [2.99563198 5.03426668]
Points Count: 101
Class: 1.0
-------------------
Centroid: [-4.85205774  1.67886376]
Points Count: 102
Class: 2.0
-------------------
********************
K-means n Time: 3
Centroid: [ 0.92277303 -4.19249914]
Points Count: 97
Class: 3.0
-------------------
Centroid: [2.99563198 5.03426668]
Points Count: 101
Class: 1.0
-------------------
Centroid: [-4.85205774  1.67886376]
Points Count: 102
Class: 2.0
-------------------
********************
K-means n Time: 4
Centroid: [ 0.92277303 -4.19249914]
Points Count: 97
Class: 3.0
-------------------
Centroid: [2.99563198 5.03426668]
Points Count: 101
Class: 1.0
-------------------
Centroid: [-4.85205774  1.67886376]
Points Count: 102
Class: 2.0
-------------------
********************
K-means n Time: 5
Centroid: [ 0.92277303 -4.19249914]
Points Count: 97
Class: 3.0
-------------------
Centroid: [2.99563198 5.03426668]
Points Count: 101
Class: 1.0
-------------------
Centroid: [-4.85205774  1.67886376]
Points Count: 102
Class: 2.0
-------------------
********************
K-means n Time: 6
Centroid: [ 0.92277303 -4.19249914]
Points Count: 97
Class: 3.0
-------------------
```

```
Centroid: [2.99563198 5.03426668]
Points Count: 101
Class: 1.0
-------------------
Centroid: [-4.85205774  1.67886376]
Points Count: 102
Class: 2.0
-------------------
********************
K-means n Time: 7
Centroid: [ 0.92277303 -4.19249914]
Points Count: 97
Class: 3.0
-------------------
Centroid: [2.99563198 5.03426668]
Points Count: 101
Class: 1.0
-------------------
Centroid: [-4.85205774  1.67886376]
Points Count: 102
Class: 2.0
-------------------
********************
K-means n Time: 8
Centroid: [ 0.92277303 -4.19249914]
Points Count: 97
Class: 3.0
-------------------
Centroid: [2.99563198 5.03426668]
Points Count: 101
Class: 1.0
-------------------
Centroid: [-4.85205774  1.67886376]
Points Count: 102
Class: 2.0
-------------------
********************
K-means n Time: 9
Centroid: [ 0.92277303 -4.19249914]
Points Count: 97
Class: 3.0
-------------------
Centroid: [2.99563198 5.03426668]
Points Count: 101
Class: 1.0
-------------------
Centroid: [-4.85205774  1.67886376]
Points Count: 102
Class: 2.0
-------------------
```



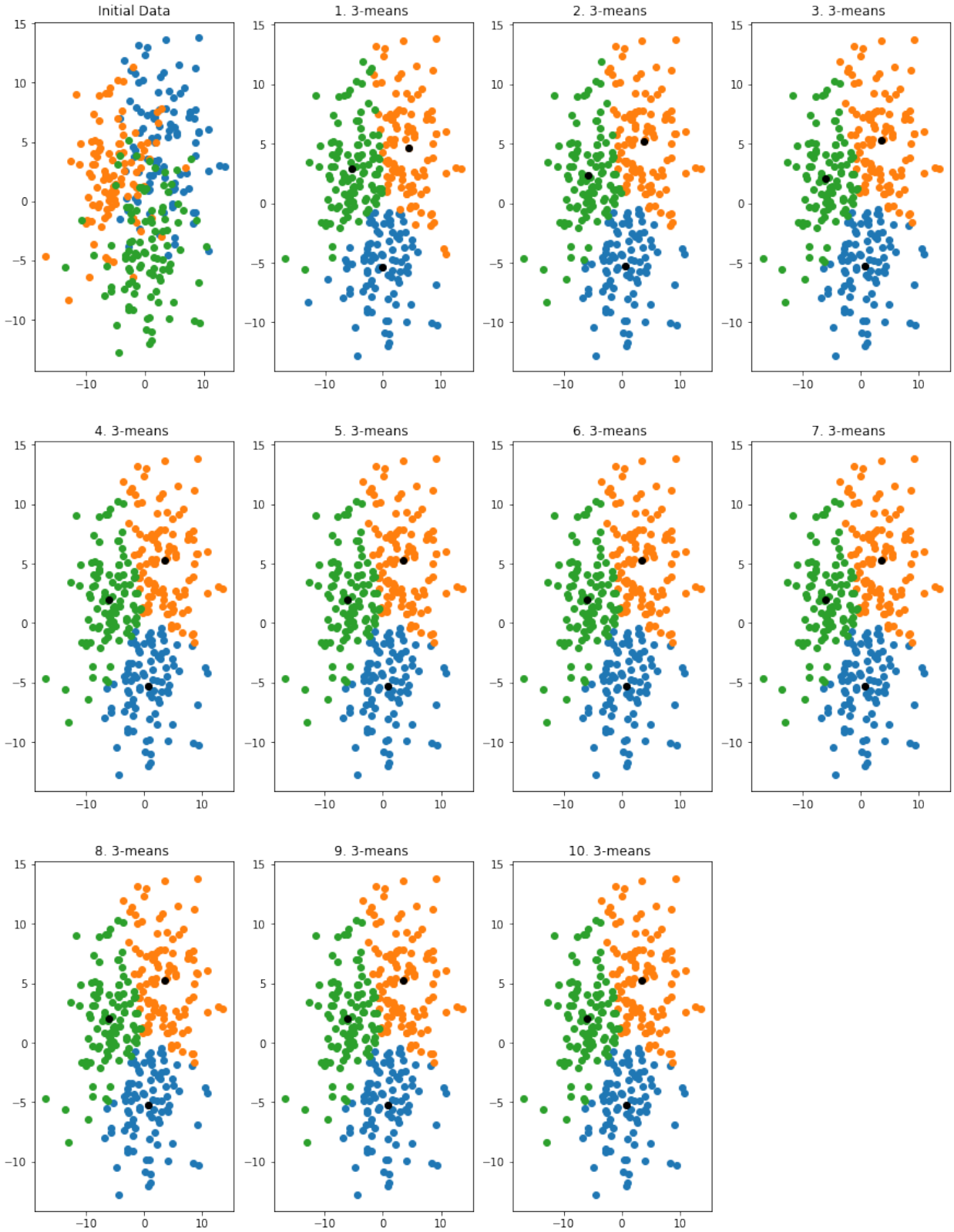
3B (B):

********** 3B. PartA - Sigma = 4 **********

```
********************
K-means n Time: 0
Centroid: [-0.13649528 -5.40955825]
Points Count: 92
Class: 3.0
-------------------
Centroid: [4.3944986  4.69118308]
Points Count: 99
Class: 1.0
-------------------
Centroid: [-5.39382091  2.94580688]
Points Count: 109
Class: 2.0
-------------------
********************
K-means n Time: 1
Centroid: [ 0.52745844 -5.3070739 ]
Points Count: 91
Class: 3.0
-------------------
Centroid: [3.77983576 5.15746874]
Points Count: 104
Class: 1.0
-------------------
Centroid: [-5.84341774  2.31768602]
Points Count: 105
Class: 2.0
-------------------
********************
K-means n Time: 2
Centroid: [ 0.69254102 -5.27674084]
Points Count: 91
Class: 3.0
-------------------
Centroid: [3.51197105 5.30267195]
Points Count: 107
Class: 1.0
-------------------
Centroid: [-5.9979583   2.05185471]
Points Count: 102
Class: 2.0
-------------------
********************
K-means n Time: 3
/usr/local/lib/python3.6/dist-packages/ipykernel_launcher.py:11:
MatplotlibDeprecationWarning: Adding an axes using the same arguments as a
previous axes currently reuses the earlier instance.  In a future version, a
new instance will always be created and returned.  Meanwhile, this warning
can be suppressed, and the future behavior ensured, by passing a unique label
to each axes instance.
  # This is added back by InteractiveShellApp.init_path()
Centroid: [ 0.77092889 -5.28050413]
Points Count: 91
Class: 3.0
-------------------
Centroid: [3.47509245 5.26173849]
Points Count: 107
```

```
Class: 1.0
--------------------
Centroid: [-6.05845213  1.99385276]
Points Count: 102
Class: 2.0
--------------------
********************
K-means n Time: 4
Centroid: [ 0.77093835 -5.28050459]
Points Count: 91
Class: 3.0
--------------------
Centroid: [3.47508923 5.26173492]
Points Count: 107
Class: 1.0
--------------------
Centroid: [-6.05845795  1.99384718]
Points Count: 102
Class: 2.0
--------------------
********************
K-means n Time: 5
Centroid: [ 0.77093835 -5.28050459]
Points Count: 91
Class: 3.0
--------------------
Centroid: [3.47508923 5.26173492]
Points Count: 107
Class: 1.0
--------------------
Centroid: [-6.05845795  1.99384718]
Points Count: 102
Class: 2.0
--------------------
********************
K-means n Time: 6
Centroid: [ 0.77093835 -5.28050459]
Points Count: 91
Class: 3.0
--------------------
Centroid: [3.47508923 5.26173492]
Points Count: 107
Class: 1.0
--------------------
Centroid: [-6.05845795  1.99384718]
Points Count: 102
Class: 2.0
--------------------
********************
K-means n Time: 7
Centroid: [ 0.77093835 -5.28050459]
Points Count: 91
Class: 3.0
--------------------
Centroid: [3.47508923 5.26173492]
Points Count: 107
Class: 1.0
```

```
--------------------
Centroid: [-6.05845795  1.99384718]
Points Count: 102
Class: 2.0
--------------------
********************
K-means n Time: 8
Centroid: [ 0.77093835 -5.28050459]
Points Count: 91
Class: 3.0
--------------------
Centroid: [3.47508923 5.26173492]
Points Count: 107
Class: 1.0
--------------------
Centroid: [-6.05845795  1.99384718]
Points Count: 102
Class: 2.0
--------------------
********************
K-means n Time: 9
Centroid: [ 0.77093835 -5.28050459]
Points Count: 91
Class: 3.0
--------------------
Centroid: [3.47508923 5.26173492]
Points Count: 107
Class: 1.0
--------------------
Centroid: [-6.05845795  1.99384718]
Points Count: 102
Class: 2.0
--------------------
```


Initial Data
1. 3-means
2. 3-means
3. 3-means
4. 3-means
5. 3-means
6. 3-means
7. 3-means
8. 3-means
9. 3-means
10. 3-means