ASSIGNMENT-4

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QUES 1.

VALUES AFTER 5 ITERATIONS

Q-VALUES AFTER 5 ITERATIONS
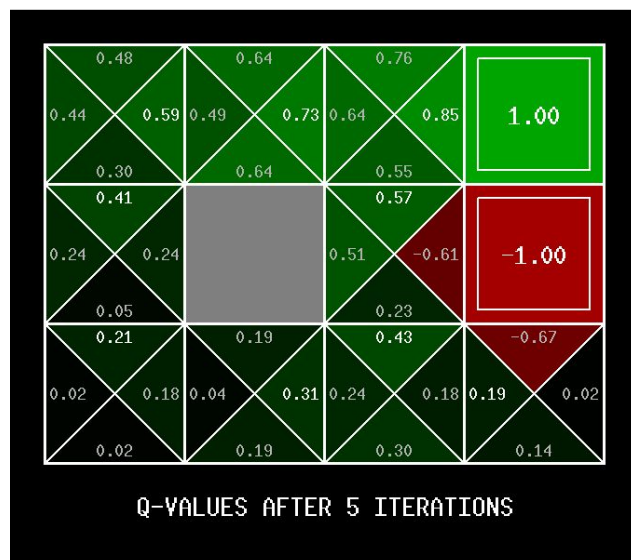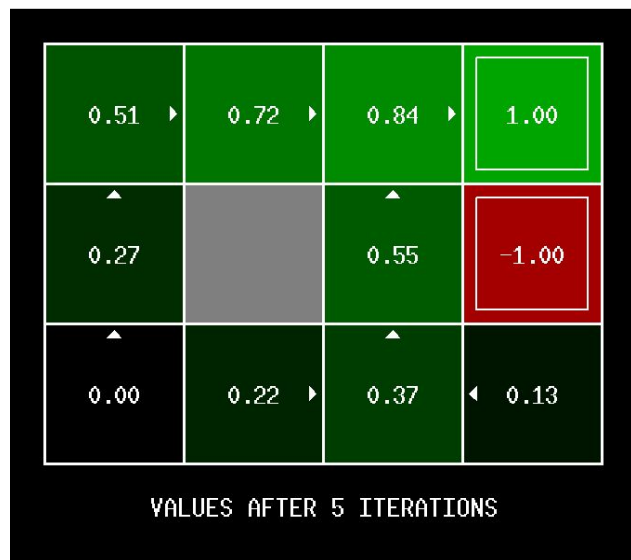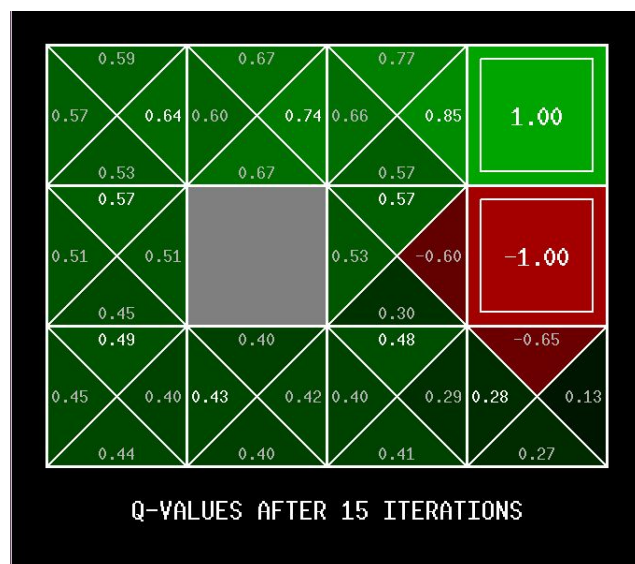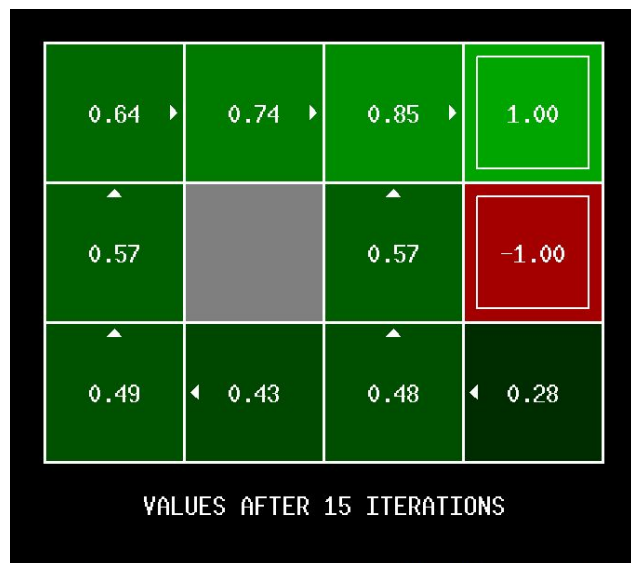
To test my implementation, I have run it for 5 iterations. And the screenshots are above. Q-values are numbers in square quarters, and policies are arrows out from each square.

VALUES AFTER 15 ITERATIONS

Q-VALUES AFTER 15 ITERATIONS

It converges at 15th iteration.

1.2.

Running it to the default values.

Unsuccessful Attempts

- Discount same, noise = 0.1, 0.3

VALUES AFTER 100 ITERATIONS

- noise = 0.2 , discount = 1 , 0.8

VALUES AFTER 100 ITERATIONS

VALUES AFTER 100 ITERATIONS

Successful Attempt

VALUES AFTER 100 ITERATIONS

Noise = 0.01 Discount = 0.9 (same) : As, the fig shows the agent will cross the bridge. Changing discount doesn't help because the goal is fixed. And the path between source and goal is fixed i.e. straight line.

We have to reduce the noise, so that the agent goes to west and doesn't move to north or south. We are reducing degree of randomness.
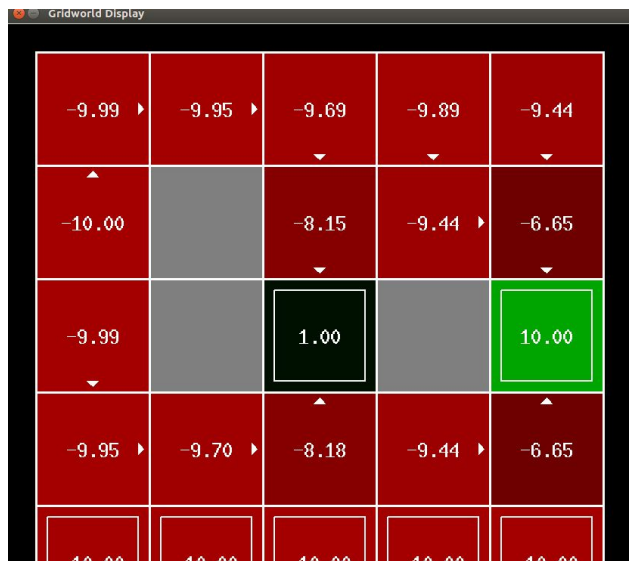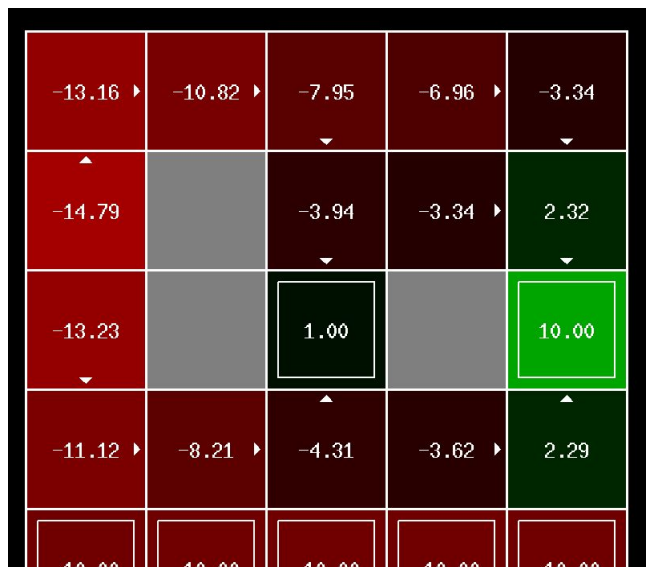
1.3.

1. Wrong attempts.

- Taking too much discount

Final : 0.2, 0.18, -6.99, because we want to go to close terminal, therefore discount is small. To avoid going into cliff, our noise is less. Living reward should be negative and big number because we want to be closer to cliff.

-9.99 ▸	-9.95 ▸	-9.69 ▾	-9.89 ▾	-9.44 ▾
-10.00 ▲		-8.15 ▾	-9.44 ▸	-6.65 ▾
-9.99 ▾		1.00		10.00
-9.95 ▸	-9.70 ▸	-8.18 ▲	-9.44 ▸	-6.65 ▲
10.00	10.00	10.00	10.00	10.00

2. Wrong attempt

-13.16 ▸	-10.82 ▸	-7.95 ▾	-6.96 ▸	-3.34 ▾
-14.79 ▲		-3.94 ▾	-3.34 ▸	2.32 ▾
-13.23 ▾		1.00		10.00
-11.12 ▸	-8.21 ▸	-4.31 ▲	-3.62 ▸	2.29 ▲
-10.00	-10.00	-10.00	-10.00	-10.00

Final ans: 0.2, 0.18, -0.3 living reward is kept high to take longer path avoiding the cliffs.

3. Wrong attempt:

Final ans: 0.9, 0.01, 0.01
We are risking the cliff, therefore, noise should be less. Whereas the discount should be kept high to reach 10. And living reward should be low, to follow lower path.

5.33 ▸	5.92 ▸	6.57 ▸	7.29 ▸	8.10
4.80 ▲	(gray)	7.26 ▸	8.10 ▸	9.00 ▾
5.07 ▾	(gray)	1.00	(gray)	10.00
5.63 ▸	6.33 ▸	7.11 ▸	8.02 ▸	9.00 ▲
-10.00	-10.00	-10.00	-10.00	-10.00

4. Wrong answer

5.33 ▸	5.92 ▸	6.57 ▸	7.29 ▸	8.10
4.80 ▲	(gray)	7.26 ▸	8.10 ▸	9.00 ▾
5.07 ▾	(gray)	1.00	(gray)	10.00
5.63 ▸	6.33 ▸	7.11 ▸	8.02 ▸	9.00 ▲
-10.00	-10.00	-10.00	-10.00	-10.00

Final ans: 0.9 , 0.2 , 0.3; going north then east, therefore more discount and living reward.

5. Wrong ans
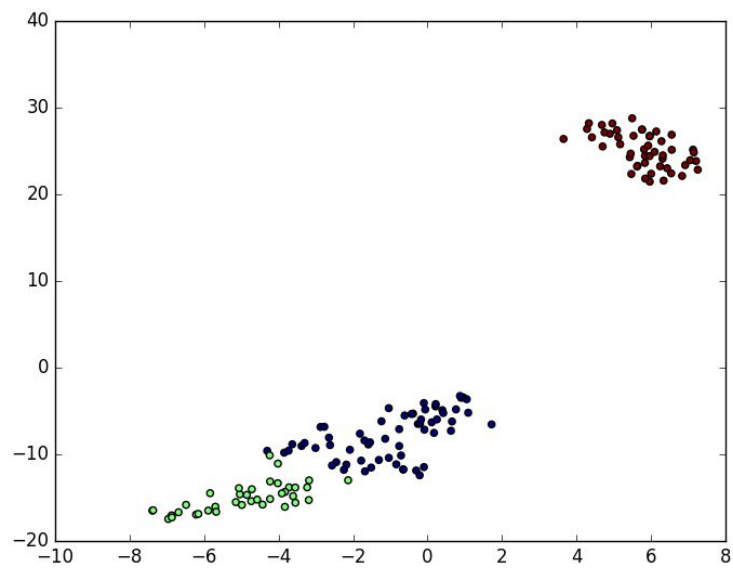

Final ans: 0.99 , 0.12, 1

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QUES 2.

IRIS
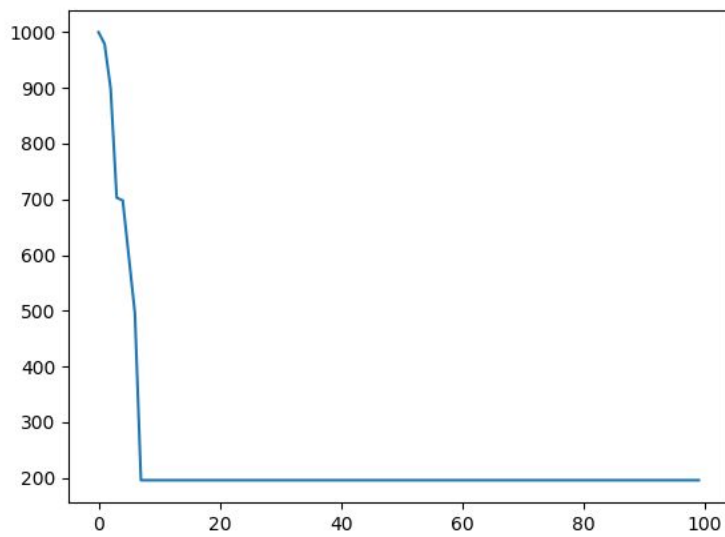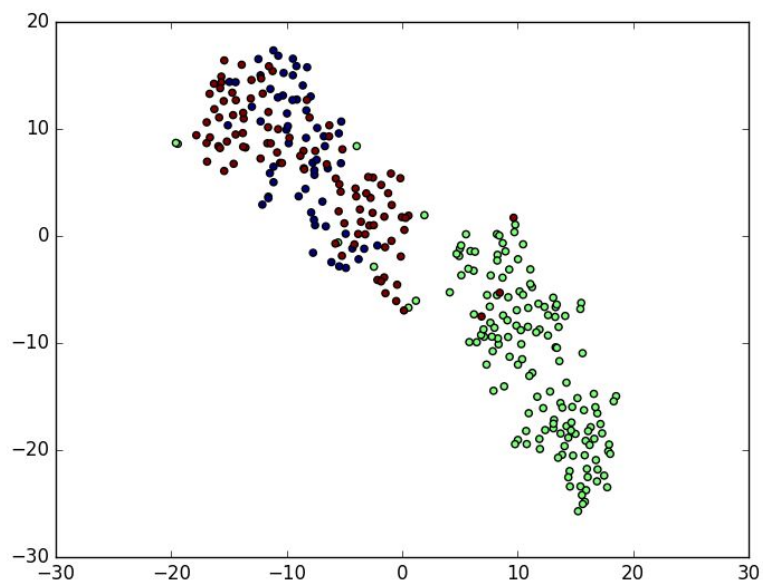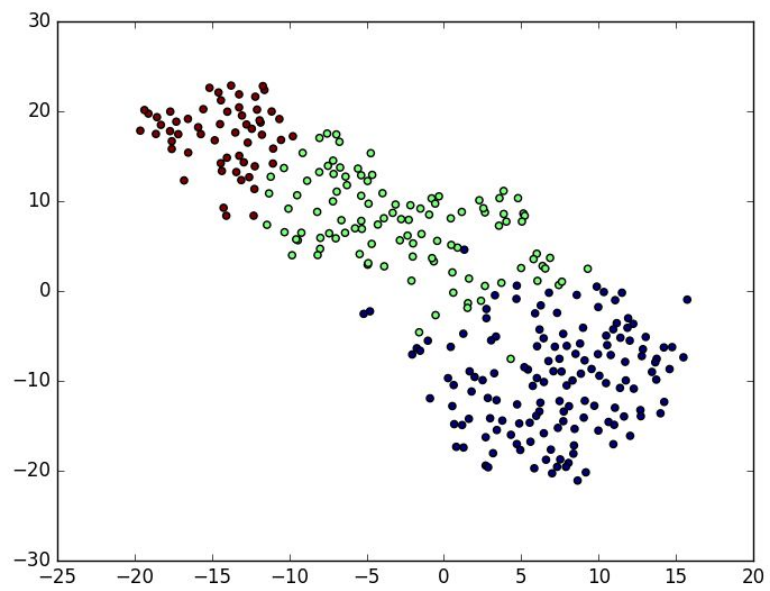
W/O K MEANS
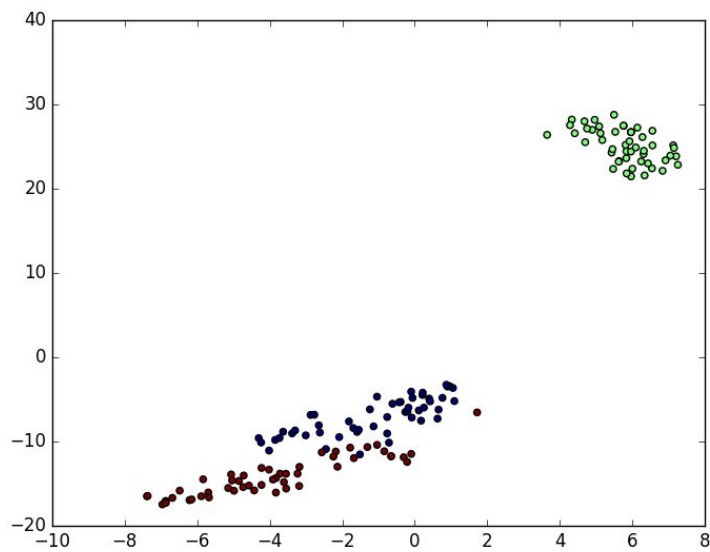
WITH K MEANS

OBJECTIVE FUNCTION - ITERATIONS
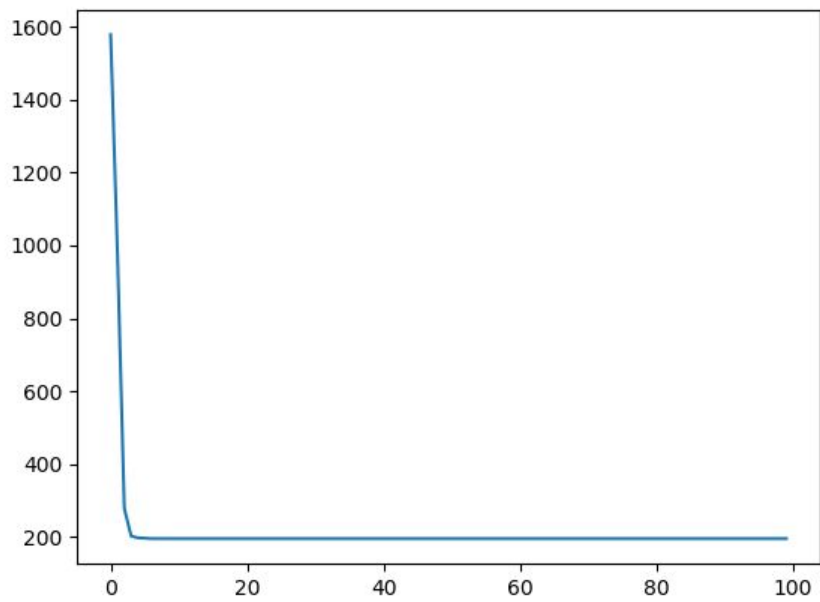

VERTEBRAL
W/O K MEANS

WITH K MEANS
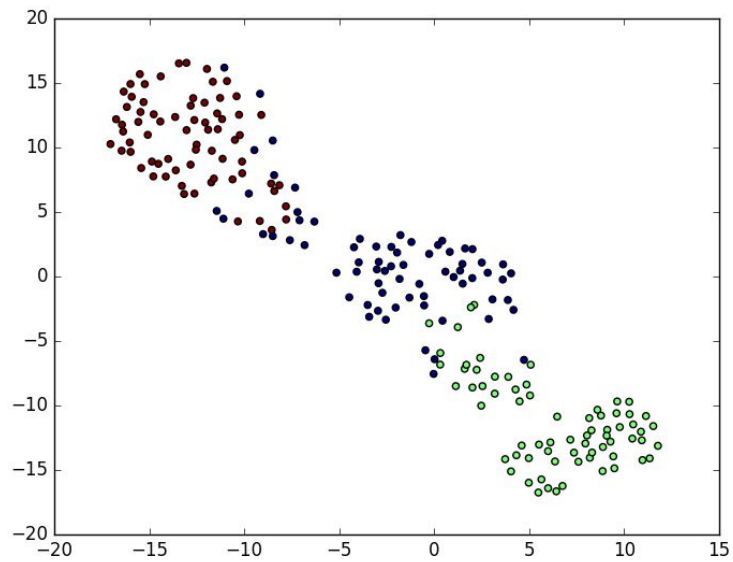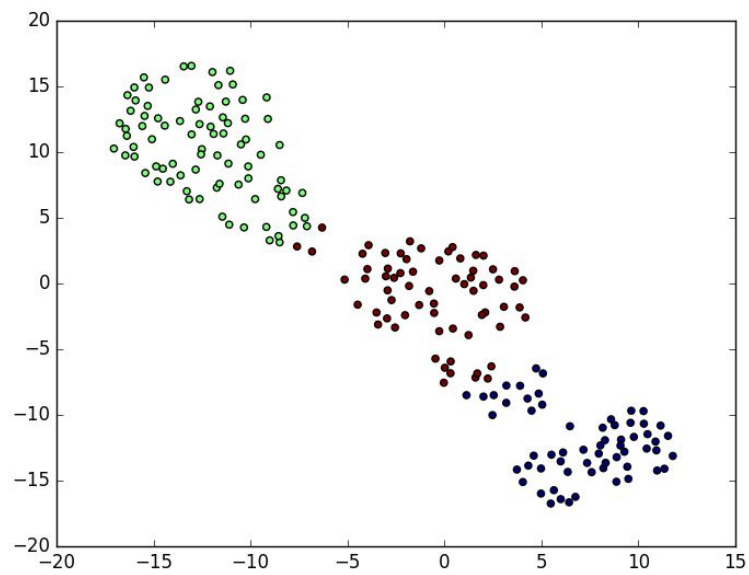

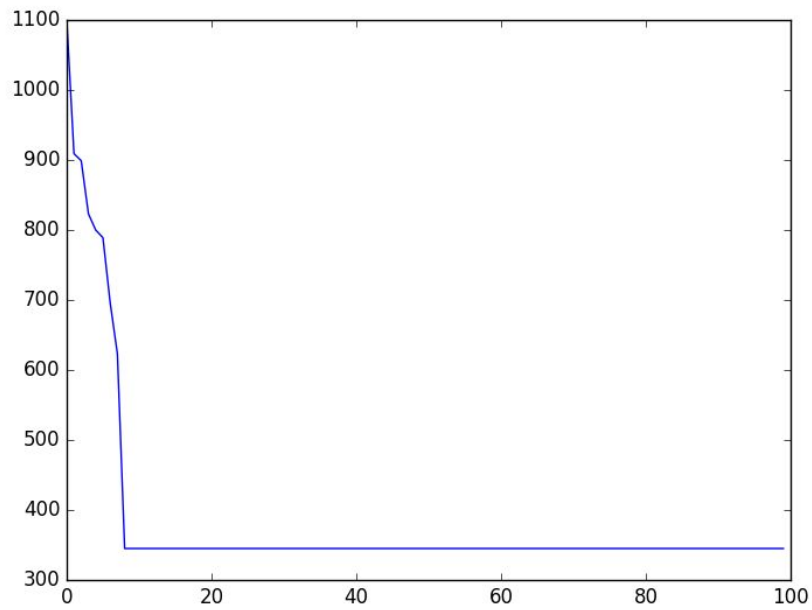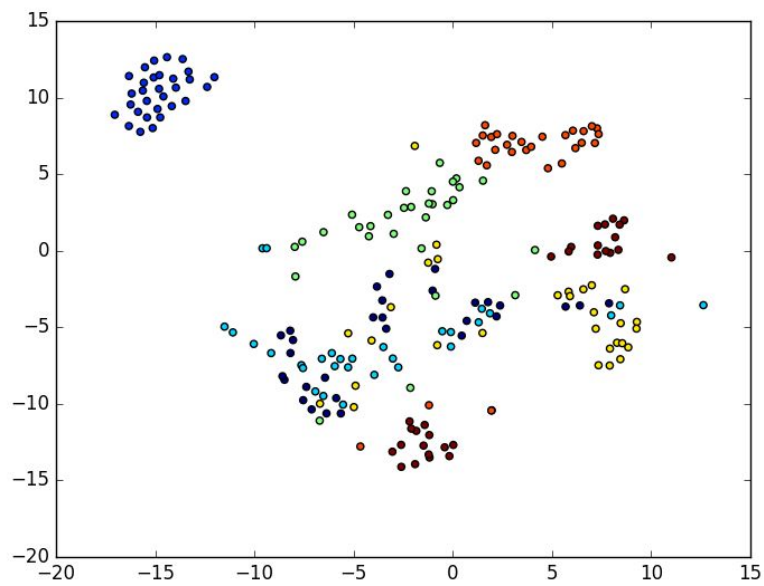OBJECTIVE FUNCTION - ITERATIONS

SEEDS DATASET
W/O K MEANS
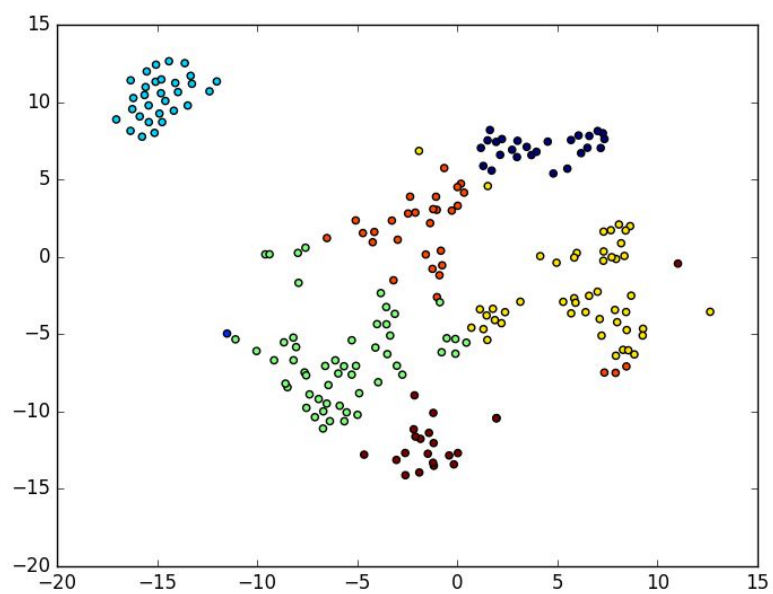

WITH K MEANS

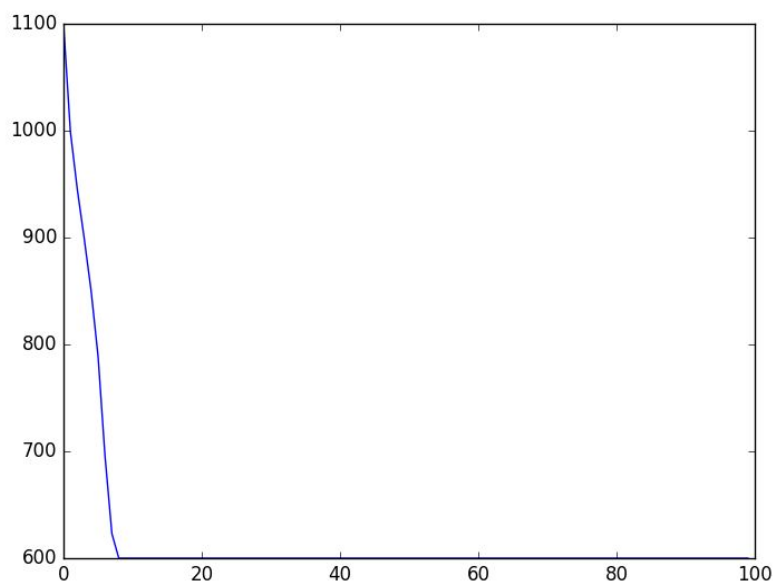# OBJECTIVE FUNCTION - ITERATIONS

SEGMENTATION
W/O K MEANS

WITH K MEANS

OBJECTIVE FUNCTION - ITERATIONS

INFERENCE:
The division was pretty much same as the one obtained in the original graphs and the best division was when k = truth value. The outliers were removed, which provided such a clear division.

TABLE:

DATA	K=2			K= True			K=12		
	ARI	**NMI**	**AMI**	**ARI**	**NMI**	**AMI**	**ARI**	**NMI**	**AMI**
IRIS	0.528 3712	0.6290 48024	0.4972 1491	0.73071 892874	0.73768 173981	0.7291 83278	0.532163 8716	0.66351 263921	0.513129 379712
SEGM ENTAT ION	0.093 8196	0.3818 291873	0.1790 28398	0.10982 78311`	0.48920 390230	0.2152 78367	0.041923 1231123	0.04272 692712	0.101783 6876764
SEEDS	0.452 3921	0.5429 738493	0.4227 31231`	0.69297 133428	0.70298 1131227	0.6928 89171	0.323471 3242178	0.57236 8124236	0.398374 891469
VERTE BRAL	0.063 8712	0.2187 837981	0.1817 39871	0.28173 2891318	0.37248 246745	0.3283 17811	0.138783 979873	0.21287 e38921	0.237863 786987

The results were the best for k = truth value. The values were closer to 1, when we had the correct value of k.

Consistency between qualitative and quantitative analysis:
As in the graphs, best results were obtained when k= truth value was chosen and also, the qualitative and qualitative analysis were consistent.