

### 3.1

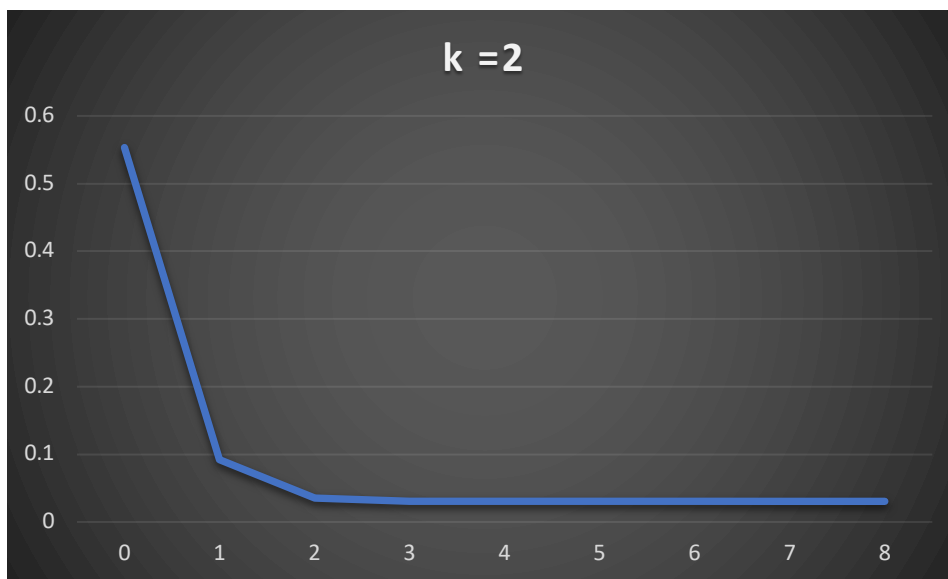
The Centroids initialization was made random by a function that I added for this part only.  
Given a number n – we generate n centroids

```
def genPixels(amount):  
    k = []  
    def gen():  
        r = random.randrange(0,10000,1)/10000.  
        g = random.randrange(0,10000,1)/10000.  
        b = random.randrange(0,10000,1)/10000.  
        return [r, g, b]  
    for i in range(amount):  
        k.append(gen())  
    return k
```

Plots:

K = 2

**The Centroids generated:** [[0.451, 0.2638, 0.9152], [0.5887, 0.7766, 0.0432]]

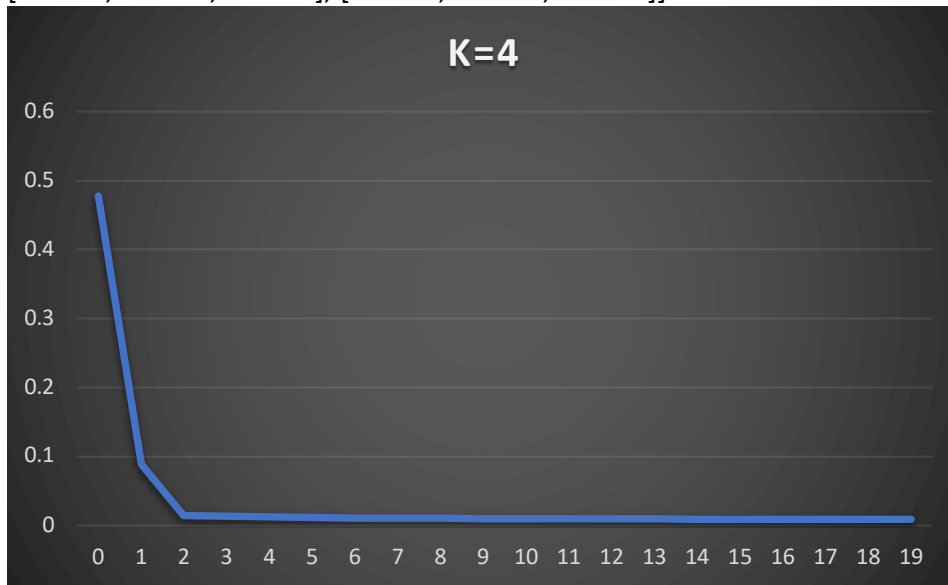


K = 2	
0	0.5532229
1	0.0919225
2	0.0356256
3	0.0308491
4	0.0305052
5	0.0304813
6	0.0304791
7	0.0304789
8	0.0304788

### 3.1

K=4

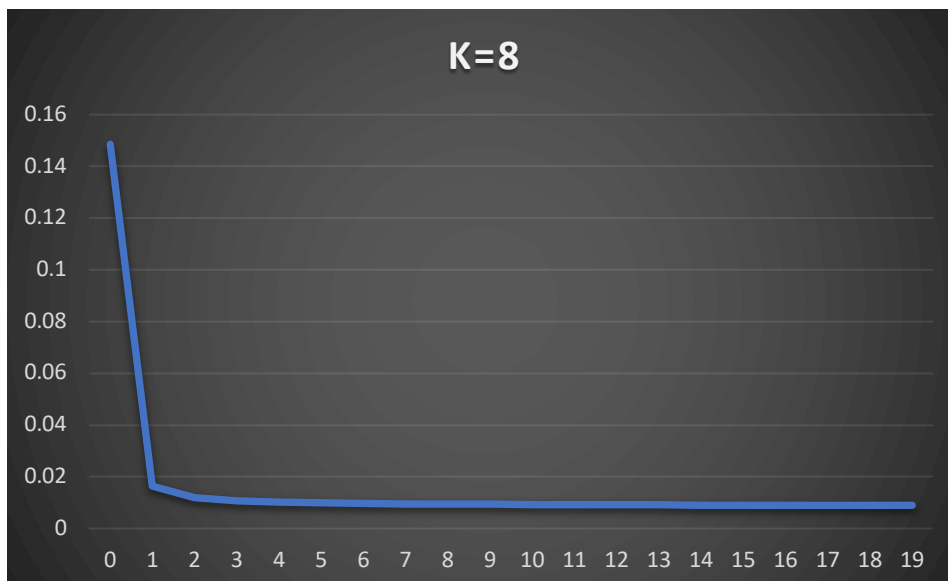
**The Centroids generated:** [[0.7939, 0.6209, 0.7245], [0.7293, 0.1141, 0.3362], [0.0097, 0.7309, 0.1439], [0.9764, 0.6557, 0.8958]]



k=4	
0	0.4777042
1	0.0885035
2	0.0146094
3	0.0132991
4	0.0123941
5	0.0116897
6	0.0111259
7	0.0106957
8	0.0103539
9	0.0100794
10	0.0098624
11	0.0096877
12	0.0095366
13	0.0094161
14	0.0093178
15	0.0092404
16	0.0091755
17	0.0091295
18	0.0090898
19	0.0090593

K=8

**The Centroids generated:** [[0.4019, 0.5345, 0.2475], [0.2972, 0.3595, 0.3727], [0.4538, 0.7283, 0.6478], [0.747, 0.165, 0.73], [0.3683, 0.6884, 0.8586], [0.7385, 0.6521, 0.1815], [0.6818, 0.3585, 0.1759], [0.6738, 0.5997, 0.7083]]



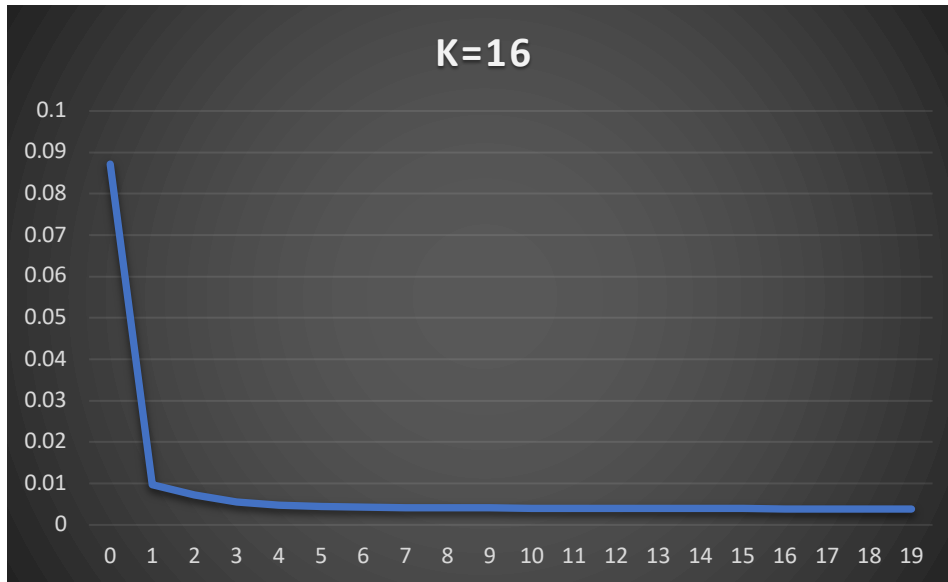
k=8	
0	0.1485633
1	0.0163509
2	0.011996
3	0.0107843
4	0.0102715
5	0.0099712
6	0.0097562
7	0.0095928
8	0.009462
9	0.0093604
10	0.0092768
11	0.0092042
12	0.009151
13	0.0091071
14	0.0090738
15	0.0090423
16	0.0090174
17	0.0090036
18	0.0089941
19	0.0089879

### 3.1

K=16

**The Centroids generated:**

[[0.9532, 0.9953, 0.6688], [0.4254, 0.3303, 0.1264],  
[0.3356, 0.3468, 0.5643], [0.2676, 0.7848, 0.7401], [0.7051, 0.8455, 0.7762],  
[0.7113, 0.6459, 0.4511], [0.4093, 0.2603, 0.5527], [0.4888, 0.16, 0.4734],  
[0.3555, 0.6271, 0.9798], [0.6493, 0.1046, 0.5356], [0.237, 0.3749, 0.1184],  
[0.9811, 0.2468, 0.7209], [0.0365, 0.4671, 0.0027], [0.6548, 0.0215, 0.8583],  
[0.5338, 0.887, 0.1797], [0.8064, 0.381, 0.8681]]



k=16	
0	0.0871621
1	0.0097584
2	0.007163
3	0.0055542
4	0.0047502
5	0.0044145
6	0.0042573
7	0.004171
8	0.0041088
9	0.0040638
10	0.0040281
11	0.0039978
12	0.0039733
13	0.0039531
14	0.0039315
15	0.0039104
16	0.0038935
17	0.0038753
18	0.0038533
19	0.0038305