

1. (a) Iteration 1:

City	Cluster 1 distance <sup>2</sup>	Cluster 2 distance <sup>2</sup>	Cluster 3 distance <sup>2</sup>	Placement
BOS	47.06	275.81	2652.85	1
NY	16.84	187.73	2357.77	1
DC	0.00	123.49	2062.37	1
MIA	181.85	315.46	1924.84	1
CHI	123.49	0.00	1220.90	2
SEA	2127.78	1229.65	96.05	3
SF	2062.37	1220.90	0.00	3
LA	1720.48	991.09	31.33	3
DEN	784.64	304.13	306.37	2

New latitude and longitude for cluster center 1:

$$lat = \frac{42.4 + 41.7 + 38.9 + 25.8}{4} = 37.2; lon = \frac{71.1 + 74.0 + 77.0 + 80.2}{4} = 75.575$$

Center 2:

$$lat = \frac{41.9 + 39.7}{2} = 40.8; lon = \frac{87.7 + 105.0}{2} = 96.35$$

Center 3:

$$lat = \frac{47.6 + 37.8 + 34.1}{3} = 39.83; lon = \frac{122.3 + 122.4 + 118.2}{3} = 120.97$$

Iteration 2:

City	Cluster 1 distance <sup>2</sup>	Cluster 2 distance <sup>2</sup>	Cluster 3 distance <sup>2</sup>	Placement
BOS	47.07	640.12	2493.62	1
NY	22.73	500.33	2209.68	1
DC	4.92	378.03	1934.23	1
MIA	151.35	485.82	1859.03	1
CHI	169.11	76.03	1111.18	2
SEA	2291.39	719.64	62.14	3
SF	2192.94	687.60	6.17	3
LA	1826.50	522.31	40.51	3
DEN	872.08	76.03	255.06	2

(b)