

B. Hierarchical Clustering:

(1) Use hierarchical agglomerative clustering with single linkage.

	10	20	40	80	85	121	160	168	195
10	0	10	30	70	75	111	150	158	185
20	10	0	20	60	65	101	140	148	175
40	30	20	0	40	45	81	120	128	155
80	70	60	40	0	5	41	80	88	115
85	75	65	45	5	0	36	75	83	110
121	111	101	81	41	36	0	39	47	74
160	150	140	120	80	75	39	0	8	35
168	158	148	128	88	83	47	8	0	27
195	185	175	155	115	110	74	35	27	0

The smallest distance is 5, between cluster 80 and cluster 85

. Merged cluster: {80, 85}

	10	20	40	80,85	121	160	168	195
10	0	10	30	70	111	150	158	185
20	10	0	20	60	101	140	148	175
40	30	20	0	40	81	120	128	155
80,85	70	60	40	0	36	75	83	110
121	111	101	81	36	0	39	47	74
160	150	140	120	75	39	0	8	35
168	158	148	128	83	47	8	0	27
195	185	175	155	110	74	35	27	0

The smallest distance is 8, between cluster 160 and cluster 168

. Merged cluster: {160, 168}

	10	20	40	80,85	121	160,168	195
10	0	10	30	70	111	150	185
20	10	0	20	60	101	140	175
40	30	20	0	40	81	120	155
80,85	70	60	40	0	36	75	110
121	111	101	81	36	0	39	74
160,168	150	140	120	75	39	0	27
195	185	175	155	110	74	27	0

The smallest distance is 10, between cluster 10 and cluster 20

. Merged cluster: {10, 20}

	10,20	40	80 ,85	121	160,168	195
10,20	0	20	60	101	140	175
40	20	0	40	81	120	155
80,85	60	40	0	36	75	110
121	101	81	36	0	39	74
160 ,168	140	120	75	39	0	27
195	175	155	110	74	27	0

The smallest distance is 20, between cluster 10,20 and cluster 40

. Merged cluster: {10, 20,40}

	10,20,40	80 ,85	121	160,168	195
10,20,40	0	40	81	120	155
80,85	40	0	36	75	110
121	81	36	0	39	74
160 ,168	120	75	39	0	27
195	155	110	74	27	0

The smallest distance is 27, between cluster 160,168 and cluster 195

. Merged cluster: {160, 168,195}

	10,20,40	80 ,85	121	160,168,195
10,20,40	0	40	81	120
80,85	40	0	36	75
121	81	36	0	39
160 ,168,195	120	75	39	0

The smallest distance is 36, between cluster 80,85 and cluster 121

. Merged cluster: {80, 85,121}

	10,20,40	80,85,121	160,168,195
10,20,40	0	40	120
80,85,121	40	0	39
160,168,195	120	39	0

The smallest distance is 39, between cluster 80,85,121 and cluster 160,168,195

. Merged cluster: {80, 85,121,160,168,195}

	10,20,40	80,85,121, 160,168,195
10,20,40	0	40
80,85,121, 160,168,195	40	0

The remaining distance is 40 between cluster 10,20,40 and cluster 160,168,19580,85,121, 160,168,195

. Merged cluster: {10,20,40, 160,168,19580,85,121, 160,168,195}

	10,20,40, 80,85,121, 160,168,195
10,20,40, 80,85,121, 160,168,195	0

(2) use complete linkage

The smallest distance is 5, between cluster 80 and cluster 85

. Merged cluster: {80, 85}

	10	20	40	80	85	121	160	168	195
10	0	10	30	70	75	111	150	158	185
20	10	0	20	60	65	101	140	148	175
40	30	20	0	40	45	81	120	128	155
80	70	60	40	0	5	41	80	88	115
85	75	65	45	5	0	36	75	83	110
121	111	101	81	41	36	0	39	47	74
160	150	140	120	80	75	39	0	8	35
168	158	148	128	88	83	47	8	0	27
195	185	175	155	115	110	74	35	27	0

The smallest distance is 8, between cluster 160 and cluster 168

. Merged cluster: {160,168}

	10	20	40	80,85	121	160	168	195
10	0	10	30	75	111	150	158	185
20	10	0	20	65	101	140	148	175
40	30	20	0	45	81	120	128	155
80,85	75	65	45	0	41	80	88	115
121	111	101	81	41	0	39	47	74
160	150	140	120	80	39	0	8	35
168	158	148	128	88	47	8	0	27
195	185	175	155	115	74	35	27	0

The smallest distance is 10, between cluster 10 and cluster 20

. Merged cluster: {10,20}

	10	20	40	80,85	121	160,168	195
10	0	10	30	75	111	158	185
20	10	0	20	65	101	148	175
40	30	20	0	45	81	128	155
80,85	75	65	45	0	41	88	115
121	111	101	81	41	0	47	74
160,168	158	148	128	88	47	0	35
195	185	175	155	115	74	35	0

The smallest distance is 30, between cluster 10,20 and cluster 40

. Merged cluster: {10,20,40}

	10,20	40	80,85	121	160,168	195
10,20	0	30	75	111	158	185
40	30	0	45	81	128	155
80,85	75	45	0	41	88	115
121	111	81	41	0	47	74
160,168	158	128	88	47	0	35
195	185	155	115	74	35	0

The smallest distance is 35, between cluster 160,168 and cluster 195

. Merged cluster: {160,168,195}

	10,20,40	80,85	121	160,168	195
10,20,40	0	75	111	158	185
80,85	75	0	41	88	115
121	111	41	0	47	74
160,168	158	88	47	0	35
195	185	115	74	35	0

	10,20,40	80,85	121	160,168,195
10,20,40	0	75	111	185
80,85	75	0	41	115
121	111	41	0	74
160,168,195	185	115	74	0

The smallest distance is 41, between cluster 80,85 and cluster 121

. Merged cluster: {80,85,121}

	10,20,40	80,85,121	160,168,195
10,20,40	0	111	185
80,85,121	111	0	115
160,168,195	185	115	0

The smallest distance is 111, between cluster 10,20,40 and cluster 80,85,121

. Merged cluster: {10,20,40 , 80,85,121}

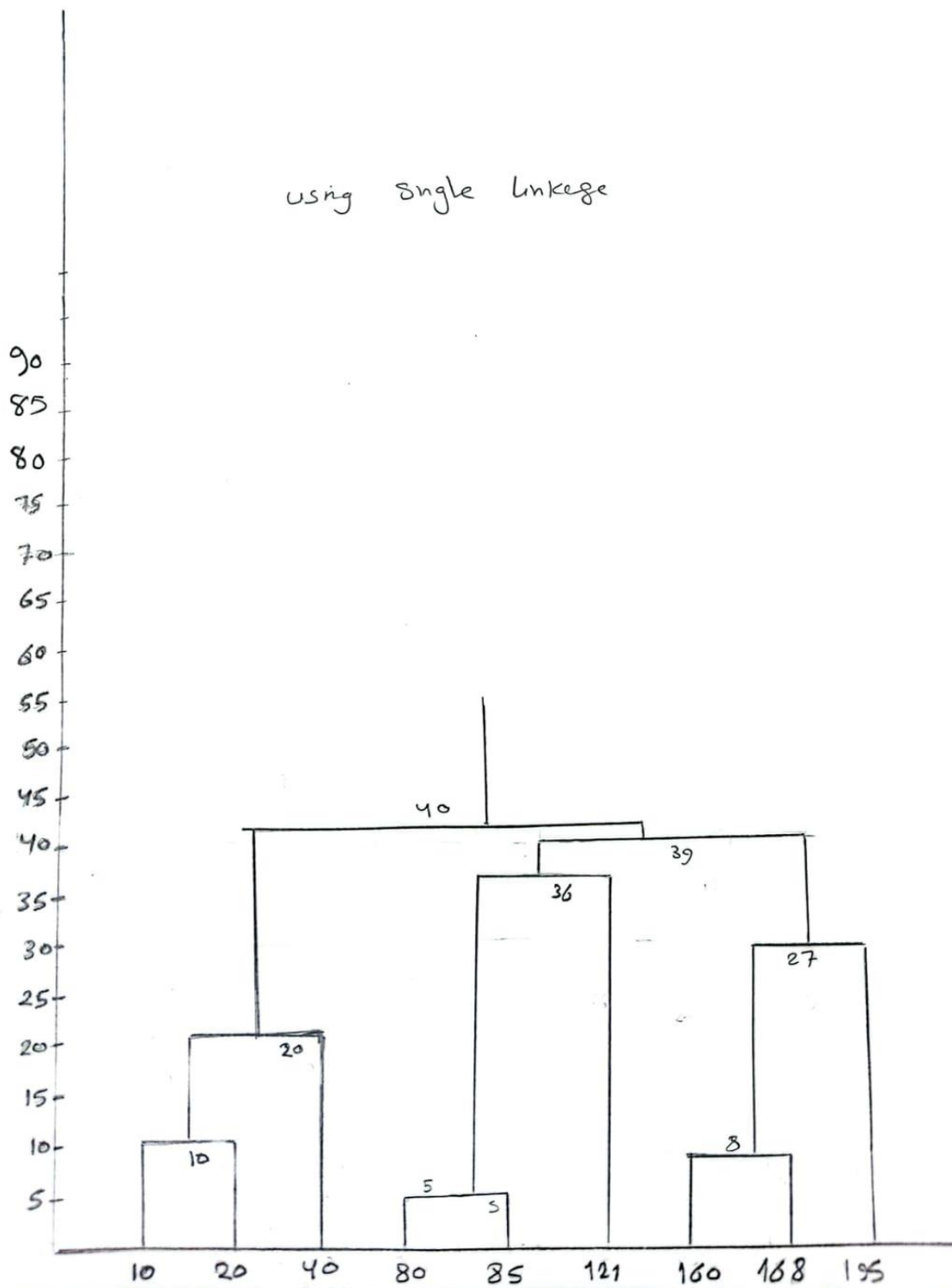
	10,20,40,80,85,121	160,168,195
10,20,40,80,85,121	0	185
160,168,195	185	0

The remaining distance is 185, between cluster 10,20,40, 80,85,121 and cluster 160,168,195

. Merged cluster: {10,20,40, 80,85,121 , 160,168,195}

	10,20,40,80,85,121,160,168,195
10,20,40,80,85,121,160,168,195	0

using single linkage



using Complete linkage

