**Part 1 Result Format**

K-Means Clustering

For k= 1 total within sum of squares/total sum of squares= 1.0000000000000002

For k= 2 total within sum of squares/total sum of squares= 0.6584850467058518

For k= 3 total within sum of squares/total sum of squares= 0.5303531912183984

For k= 4 total within sum of squares/total sum of squares= 0.46660132577458086

For k= 5 total within sum of squares/total sum of squares= 0.42089511187065076

For k= 6 total within sum of squares/total sum of squares= 0.388914282168457

For k= 7 total within sum of squares/total sum of squares= 0.35789363101678234

For k= 8 total within sum of squares/total sum of squares= 0.33060144345315245

For k= 9 total within sum of squares/total sum of squares= 0.3094970593322418

For k= 10 total within sum of squares/total sum of squares= 0.28956087743177633

H-Clustering

For k= 1 total within sum of squares/total sum of squares= 1.0

For k= 2 total within sum of squares/total sum of squares= 0.6627921553377006

For k= 3 total within sum of squares/total sum of squares= 0.5549805607077856

For k= 4 total within sum of squares/total sum of squares= 0.48130348442994947

For k= 5 total within sum of squares/total sum of squares= 0.4267721055557141

For k= 6 total within sum of squares/total sum of squares= 0.38856566261423087

For k= 7 total within sum of squares/total sum of squares= 0.3622004054856775

For k= 8 total within sum of squares/total sum of squares= 0.3389011165136607

For k= 9 total within sum of squares/total sum of squares= 0.31641535950554867

For k= 10 total within sum of squares/total sum of squares= 0.30056773025965355

Gaussian Mixture Models

For k= 1 total within sum of squares/total sum of squares= 1.0

For k= 2 total within sum of squares/total sum of squares= 0.6972745750248325

For k= 3 total within sum of squares/total sum of squares= 0.6134034859977475

For k= 4 total within sum of squares/total sum of squares= 0.5632981136742243

For k= 5 total within sum of squares/total sum of squares= 0.6598766270051774

For k= 6 total within sum of squares/total sum of squares= 0.4660743632868852

For k= 7 total within sum of squares/total sum of squares= 0.41203341053823545

For k= 8 total within sum of squares/total sum of squares= 0.3967960618127207

For k= 9 total within sum of squares/total sum of squares= 0.3899079998749755

For k= 10 total within sum of squares/total sum of squares= 0.3759276633997933

**Part 2 Result Format**

K-Means Clustering

For k= 1 total within sum of squares/total sum of squares= 1.0000000000000002

For k= 2 total within sum of squares/total sum of squares= 0.4218295697372187

For k= 3 total within sum of squares/total sum of squares= 0.20559159729380097

For k= 4 total within sum of squares/total sum of squares= 0.13893094177631723

For k= 5 total within sum of squares/total sum of squares= 0.09925650124223634

For k= 6 total within sum of squares/total sum of squares= 0.07205460575989185

For k= 7 total within sum of squares/total sum of squares= 0.054014971304570954

For k= 8 total within sum of squares/total sum of squares= 0.040997314987684656

For k= 9 total within sum of squares/total sum of squares= 0.03427696459958252

For k= 10 total within sum of squares/total sum of squares= 0.028749153052166847

H-Clustering

For k= 1 total within sum of squares/total sum of squares= 1.0

For k= 2 total within sum of squares/total sum of squares= 0.4218295697372187

For k= 3 total within sum of squares/total sum of squares= 0.20988978791170604

For k= 4 total within sum of squares/total sum of squares= 0.1406854628175006

For k= 5 total within sum of squares/total sum of squares= 0.10101102228341968

For k= 6 total within sum of squares/total sum of squares= 0.07297862905979668

For k= 7 total within sum of squares/total sum of squares= 0.054952118013899674

For k= 8 total within sum of squares/total sum of squares= 0.045891171448596155

For k= 9 total within sum of squares/total sum of squares= 0.03697644221153005

For k= 10 total within sum of squares/total sum of squares= 0.030236784707162036

Gaussian Mixture Models

For k= 1 total within sum of squares/total sum of squares= 1.0

For k= 2 total within sum of squares/total sum of squares= 0.4218295697372187

For k= 3 total within sum of squares/total sum of squares= 0.21479997257237857

For k= 4 total within sum of squares/total sum of squares= 0.21276438608632445

For k= 5 total within sum of squares/total sum of squares= 0.12724563299645558

For k= 6 total within sum of squares/total sum of squares= 0.11825720086491838

For k= 7 total within sum of squares/total sum of squares= 0.07395488845928191

For k= 8 total within sum of squares/total sum of squares= 0.06806746016547731

For k= 9 total within sum of squares/total sum of squares= 0.05144811636386741

For k= 10 total within sum of squares/total sum of squares= 0.04638378817334704