4. For Part 2, using the PoV formula and the values from the eigenvalue matrix, show that the program calculated the PoV correctly. (see "Deliverable 4 (PoV) Example" on Canvas).

Ans: `Eigenvalue = [4.22824171 0.24267075 0.0782095  0.02383509]`

`PoV = 4.22824171/sum(4.22824171 0.24267075 0.0782095 0.02383509)`
`    = 0.92461`

Therefore, PoV is correct.

5. a. Based on accuracy which dimensionality reduction method, PCA, simulate annealing, or the genetic algorithm worked the best?
Ans. PCA = 0.92, Simulated annealing = 0.913, genetic = 0.9266. Therefore, genetic worked better in comparison to the rest.

b. For each of the two other methods, explain why you think it did not perform as well as the best one.
Ans. Although Principal Components try to cover maximum variance among the features in a dataset, if we don't select the number of Principal Components with care, it may miss some information as compared to the original list of features.
(https://www.i2tutorials.com/what-are-the-pros-and-cons-of-the-pca/)

Simulated Annealing can be very computation heavy if it's tasked with many iterations.
(https://towardsdatascience.com/optimization-techniques-simulated-annealing-d6a4785a1de7)

c. Did the best dimensionality reduction method produce a better accuracy than using none (i.e. the results of Part 1)? Explain possible reasons why it did or did not.
Ans. There wasn't much difference in the accuracy results. We had very few features in our sample, so it's not a good way to actually test these optimization methods. We need a bigger problem set to actually see them in effect.

d. Did Part 2 produce the same set of best features as Part 3? Explain possible reasons why it did or did not.
Ans. No, there is a difference in feature selection.Simulated and genetic algorithms work differently. Simulated annealing is not greedy algorithm, it used all features for accuracy.

e. Did Part 2 produce the same set of best features as Part 4? Explain possible reasons why it did or did not.
Ans. No, it's different again. It chose lambda values and petal length and sepal length probably due to the population size.

f. Did Part 3 produce the same set of best features as Part 4? Explain possible reasons why it did or did not.

Ans. No, it's different as simulated annealing uses a greedy approach.