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MacBook-Air:CadenKroonenberg_Assignment4 cskroonenberg$ python3 CompareFeatureSelectionMethods.py
Original Features:
Confusion Matrix:
[[50  0  0]
 [ 0 43  7]
 [ 0  2 48]]
Accuracy: 0.94
Features: ['sepal-length' 'sepal-width' 'petal-length' 'petal-width']

PCA Transformation:
eigenvectors:
[[ 0.36158968 -0.65653988 -0.58099728  0.31725455]
 [-0.08226889 -0.72971237  0.59641809 -0.32409435]
 [ 0.85657211  0.1757674   0.07252408 -0.47971899]
 [ 0.35884393  0.07470647  0.54906091  0.75112056]]
eigenvalues:
[4.22484077 0.24224357 0.07852391 0.02368303]
PoV: 0.9246162071742686
Confusion Matrix:
[[50  0  0]
 [ 2 40  8]
 [ 0  1 49]]
Accuracy: 0.9266666666666666
Features: ['z1']

Simulated Annealing

0)
    Features: ['sepal-length' 'sepal-width' 'petal-length' 'petal-width' 'z2' 'z3' 'z4']
    Accuracy: 0.9266666666666666
    Pr[accept]: -
    Rand Uniform: -
    Restart Val: 0
    Status: IMPROVED

1)
    Features: ['sepal-length' 'sepal-width' 'petal-length' 'petal-width' 'z1' 'z2' 'z3' 'z4']
    Accuracy: 0.9333333333333333
    Pr[accept]: -
    Rand Uniform: -
    Restart Val: 0
    Status: IMPROVED

2)
    Features: ['sepal-length' 'sepal-width' 'petal-length' 'petal-width' 'z2' 'z3' 'z4']
    Accuracy: 0.9266666666666666
    Pr[accept]: 0.9858158423524045
    Rand Uniform: 0.37067879642183577
    Restart Val: 1
    Status: ACCEPTED

3)
    Features: ['sepal-length' 'sepal-width' 'petal-length' 'petal-width' 'z1' 'z2' 'z3' 'z4']
    Accuracy: 0.9333333333333333
    Pr[accept]: -
    Rand Uniform: -
    Restart Val: 0
    Status: IMPROVED

4)
    Features: ['sepal-length' 'sepal-width' 'petal-length' 'petal-width' 'z2' 'z3' 'z4']
    Accuracy: 0.9266666666666666
    Pr[accept]: 0.9718328750329809
    Rand Uniform: 0.5055164225622116
    Restart Val: 1
    Status: ACCEPTED

5)
    Features: ['sepal-length' 'sepal-width' 'petal-length' 'petal-width' 'z1' 'z2' 'z3' 'z4']
    Accuracy: 0.9333333333333333
    Pr[accept]: -
    Rand Uniform: -
    Restart Val: 0
    Status: IMPROVED

6)
    Features: ['sepal-length' 'sepal-width' 'petal-length' 'z2' 'z3' 'z4']
    Accuracy: 0.9133333333333333
    Pr[accept]: 0.879350749407306
    Rand Uniform: 0.8624968031918802
    Restart Val: 1
    Status: ACCEPTED

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7)
  Features: ['sepal-length' 'sepal-width' 'petal-length' 'petal-width' 'z2' 'z3' 'z4']
  Accuracy: 0.9266666666666666
  Pr[accept]:      -
  Rand Uniform:   -
  Restart Val:    2
  Status:         IMPROVED

8)
  Features: ['sepal-length' 'sepal-width' 'petal-length' 'petal-width' 'z1' 'z2' 'z3'
  'z4']
  Accuracy: 0.9333333333333333
  Pr[accept]:      -
  Rand Uniform:   -
  Restart Val:    0
  Status:         IMPROVED

9)
  Features: ['sepal-length' 'sepal-width' 'petal-width' 'z1' 'z2' 'z4']
  Accuracy: 0.9333333333333333
  Pr[accept]:      -
  Rand Uniform:   -
  Restart Val:    0
  Status:         IMPROVED

10)
  Features: ['sepal-length' 'sepal-width' 'petal-width' 'z1' 'z2' 'z3' 'z4']
  Accuracy: 0.9266666666666666
  Pr[accept]:      0.9310627797040223
  Rand Uniform:   0.6212477885274876
  Restart Val:    1
  Status:         ACCEPTED

11)
  Features: ['sepal-length' 'sepal-width' 'petal-length' 'petal-width' 'z1' 'z2' 'z3'
  'z4']
  Accuracy: 0.9333333333333333
  Pr[accept]:      -
  Rand Uniform:   -
  Restart Val:    0
  Status:         IMPROVED

12)
  Features: ['sepal-length' 'sepal-width' 'petal-width' 'z1' 'z2' 'z3' 'z4']
  Accuracy: 0.9266666666666666
  Pr[accept]:      0.917856438456892
  Rand Uniform:   0.9755063333047037
  Restart Val:    1
  Status:         DISCARDED

13)
  Features: ['sepal-length' 'sepal-width' 'petal-width' 'z1' 'z2' 'z4']
  Accuracy: 0.9333333333333333
  Pr[accept]:      -
  Rand Uniform:   -
  Restart Val:    0
  Status:         IMPROVED

14)
  Features: ['sepal-width' 'petal-width' 'z1' 'z2' 'z4']
  Accuracy: 0.94
  Pr[accept]:      -
  Rand Uniform:   -
  Restart Val:    0
  Status:         IMPROVED

15)
  Features: ['sepal-width' 'z1' 'z2' 'z4']
  Accuracy: 0.94
  Pr[accept]:      -
  Rand Uniform:   -
  Restart Val:    0
  Status:         IMPROVED

16)
  Features: ['sepal-length' 'sepal-width' 'petal-width' 'z1' 'z2' 'z4']
  Accuracy: 0.9333333333333333
  Pr[accept]:      0.8927263560102399
  Rand Uniform:   0.09793133193076586
  Restart Val:    1
  Status:         ACCEPTED

17)
  Features: ['sepal-length' 'z1' 'z2' 'z4']

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Accuracy: 0.94
Pr[accept]: -
Rand Uniform: -
Restart Val: 0
Status: IMPROVED

18)
Features: ['sepal-length' 'z1' 'z2']
Accuracy: 0.94
Pr[accept]: -
Rand Uniform: -
Restart Val: 0
Status: IMPROVED

19)
Features: ['sepal-length' 'petal-width' 'z1' 'z2']
Accuracy: 0.973333333333334
Pr[accept]: -
Rand Uniform: -
Restart Val: 0
Status: IMPROVED

20)
Features: ['sepal-length' 'petal-width']
Accuracy: 0.92
Pr[accept]: 0.33424186179383925
Rand Uniform: 0.1164441767984713
Restart Val: 1
Status: ACCEPTED

21)
Features: ['sepal-length' 'petal-length' 'petal-width' 'z2']
Accuracy: 0.933333333333333
Pr[accept]: -
Rand Uniform: -
Restart Val: 2
Status: IMPROVED

22)
Features: ['sepal-length' 'petal-length' 'petal-width' 'z1' 'z2' 'z4']
Accuracy: 0.953333333333334
Pr[accept]: -
Rand Uniform: -
Restart Val: 3
Status: IMPROVED

23)
Features: ['sepal-length' 'petal-length' 'petal-width' 'z1']
Accuracy: 0.966666666666667
Pr[accept]: -
Rand Uniform: -
Restart Val: 4
Status: IMPROVED

24)
Features: ['sepal-length' 'petal-length' 'z1']
Accuracy: 0.94
Pr[accept]: 0.43958780049272206
Rand Uniform: 0.8502167630547752
Restart Val: 5
Status: DISCARDED

25)
Features: ['sepal-length' 'petal-length' 'z1' 'z4']
Accuracy: 0.946666666666667
Pr[accept]: 0.504124757485327
Rand Uniform: 0.13285830827739298
Restart Val: 6
Status: ACCEPTED

26)
Features: ['petal-length' 'z1']
Accuracy: 0.94
Pr[accept]: 0.4104870247867316
Rand Uniform: 0.3314968762173798
Restart Val: 7
Status: ACCEPTED

27)
Features: ['sepal-width' 'petal-length' 'z1' 'z2']
Accuracy: 0.94
Pr[accept]: -
Rand Uniform: -
Restart Val: 8
Status: IMPROVED

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28)
Features: ['sepal-width' 'petal-length']
Accuracy: 0.9466666666666667
Pr[accept]: -
Rand Uniform: -
Restart Val: 9
Status: IMPROVED

29)
Features: ['sepal-length' 'petal-width' 'z1' 'z2']
Accuracy: 0.973333333333334
Pr[accept]: 0.13720194740693104
Rand Uniform: 0.08774417719860228
Restart Val: 0
Status: RESTART

30)
Features: ['sepal-length' 'petal-width' 'z2']
Accuracy: 0.893333333333333
Pr[accept]: 0.08494481873526988
Rand Uniform: 0.3318119264218462
Restart Val: 1
Status: DISCARDED

31)
Features: ['sepal-length' 'sepal-width' 'petal-width' 'z2']
Accuracy: 0.9
Pr[accept]: 0.0967508232217831
Rand Uniform: 0.08738888704293091
Restart Val: 2
Status: ACCEPTED

32)
Features: ['sepal-length' 'petal-width']
Accuracy: 0.92
Pr[accept]: -
Rand Uniform: -
Restart Val: 3
Status: IMPROVED

33)
Features: ['sepal-length' 'petal-width' 'z4']
Accuracy: 0.9
Pr[accept]: 0.08321718767458407
Rand Uniform: 0.8890814956041354
Restart Val: 4
Status: DISCARDED

34)
Features: ['sepal-length' 'petal-width' 'z1' 'z2' 'z4']
Accuracy: 0.9666666666666667
Pr[accept]: -
Rand Uniform: -
Restart Val: 5
Status: IMPROVED

35)
Features: ['sepal-length' 'petal-length' 'petal-width' 'z1' 'z2' 'z4']
Accuracy: 0.953333333333334
Pr[accept]: 0.48715249076486106
Rand Uniform: 0.24038701124847683
Restart Val: 6
Status: ACCEPTED

36)
Features: ['sepal-length' 'petal-width' 'z1' 'z2' 'z4']
Accuracy: 0.9666666666666667
Pr[accept]: -
Rand Uniform: -
Restart Val: 7
Status: IMPROVED

37)
Features: ['petal-width' 'z1' 'z2' 'z4']
Accuracy: 0.9266666666666666
Pr[accept]: 0.16965766581050307
Rand Uniform: 0.02176187502620608
Restart Val: 8
Status: ACCEPTED

38)
Features: ['petal-width' 'z1' 'z2']
Accuracy: 0.953333333333334
Pr[accept]: -

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Rand Uniform:      -
Restart Val:      9
Status:           IMPROVED

39)
Features: ['sepal-length' 'petal-width' 'z1' 'z2']
Accuracy: 0.97333333333334
Pr[accept]:      0.04053946025012048
Rand Uniform:    0.7055363421746288
Restart Val:     0
Status:          RESTART

40)
Features: ['sepal-length' 'petal-width' 'z1']
Accuracy: 0.95333333333334
Pr[accept]:      0.43958780049272284
Rand Uniform:    0.7352444948466408
Restart Val:     1
Status:          DISCARDED

41)
Features: ['sepal-length' 'petal-width' 'z1' 'z2' 'z3']
Accuracy: 0.96
Pr[accept]:      0.5702708613818083
Rand Uniform:    0.19398304933992494
Restart Val:     2
Status:          ACCEPTED

42)
Features: ['sepal-length' 'petal-width' 'z2']
Accuracy: 0.89333333333333
Pr[accept]:      0.03168047259041158
Rand Uniform:    0.0605755625987483
Restart Val:     3
Status:          DISCARDED

43)
Features: ['sepal-length' 'petal-width']
Accuracy: 0.92
Pr[accept]:      0.09478307839833718
Rand Uniform:    0.7671645689206023
Restart Val:     4
Status:          DISCARDED

44)
Features: ['sepal-length' 'petal-width' 'z3']
Accuracy: 0.9066666666666666
Pr[accept]:      0.049109703808366226
Rand Uniform:    0.7220382272385446
Restart Val:     5
Status:          DISCARDED

45)
Features: ['sepal-length' 'sepal-width' 'petal-width' 'z1' 'z3']
Accuracy: 0.9466666666666667
Pr[accept]:      0.2914529442899309
Rand Uniform:    0.028367465918347046
Restart Val:     6
Status:          ACCEPTED

46)
Features: ['sepal-length' 'sepal-width' 'petal-width' 'z1' 'z2' 'z3' 'z4']
Accuracy: 0.9266666666666666
Pr[accept]:      0.11019767813344011
Rand Uniform:    0.6564470062863017
Restart Val:     7
Status:          DISCARDED

47)
Features: ['sepal-length' 'sepal-width' 'petal-length' 'petal-width' 'z1' 'z2' 'z3'
'z4']
Accuracy: 0.93333333333333
Pr[accept]:      0.1449296467237934
Rand Uniform:    0.10757737480127705
Restart Val:     8
Status:          ACCEPTED

48)
Features: ['sepal-width' 'petal-length' 'petal-width' 'z1' 'z2' 'z3']
Accuracy: 0.95333333333334
Pr[accept]:      -
Rand Uniform:    -
Restart Val:     9
Status:          IMPROVED

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49)
Features: ['sepal-length' 'petal-width' 'z1' 'z2']
Accuracy: 0.973333333333334
Pr[accept]: 0.009107744923050746
Rand Uniform: 0.44017269353372335
Restart Val: 0
Status: RESTART

50)
Features: ['sepal-length' 'petal-length' 'petal-width' 'z1' 'z2']
Accuracy: 0.98
Pr[accept]: -
Rand Uniform: -
Restart Val: 0
Status: IMPROVED

51)
Features: ['sepal-length' 'petal-length' 'petal-width' 'z1' 'z2' 'z4']
Accuracy: 0.95333333333334
Pr[accept]: 0.2496350813604515
Rand Uniform: 0.8158746992489482
Restart Val: 1
Status: DISCARDED

52)
Features: ['sepal-length' 'petal-width' 'z1' 'z2' 'z4']
Accuracy: 0.9666666666666667
Pr[accept]: 0.49288322792040284
Rand Uniform: 0.6838193372566603
Restart Val: 2
Status: DISCARDED

53)
Features: ['sepal-length' 'z1' 'z2']
Accuracy: 0.94
Pr[accept]: 0.11494916335676918
Rand Uniform: 0.6238012651541792
Restart Val: 3
Status: DISCARDED

54)
Features: ['sepal-length' 'petal-width' 'z1' 'z2']
Accuracy: 0.97333333333334
Pr[accept]: 0.6925693242052003
Rand Uniform: 0.3886483289688456
Restart Val: 4
Status: ACCEPTED

55)
Features: ['sepal-length' 'petal-width' 'z1' 'z2' 'z4']
Accuracy: 0.9666666666666667
Pr[accept]: 0.4731705807219371
Rand Uniform: 0.17539023349924077
Restart Val: 5
Status: ACCEPTED

56)
Features: ['sepal-length' 'petal-width' 'z1' 'z2' 'z3' 'z4']
Accuracy: 0.93333333333333
Pr[accept]: 0.06948345122280165
Rand Uniform: 0.07508145024916535
Restart Val: 6
Status: DISCARDED

57)
Features: ['sepal-length' 'petal-length' 'petal-width' 'z1' 'z2' 'z3' 'z4']
Accuracy: 0.92
Pr[accept]: 0.030507097474221038
Rand Uniform: 0.936508963796599
Restart Val: 7
Status: DISCARDED

58)
Features: ['sepal-length' 'petal-length' 'z1' 'z2' 'z3' 'z4']
Accuracy: 0.9266666666666666
Pr[accept]: 0.042576084288335155
Rand Uniform: 0.7313493791551073
Restart Val: 8
Status: DISCARDED

59)
Features: ['sepal-length' 'sepal-width' 'petal-length' 'petal-width' 'z1' 'z2' 'z3'
'z4']
Accuracy: 0.93333333333333
Pr[accept]: 0.06023368263416515

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Rand Uniform: 0.14372392800683031
Restart Val: 9
Status: DISCARDED

60)
Features: ['sepal-length' 'petal-length' 'petal-width' 'z1' 'z2']
Accuracy: 0.98
Pr[accept]: 0.025388235342336894
Rand Uniform: 0.39443458684267296
Restart Val: 0
Status: RESTART

61)
Features: ['sepal-length' 'petal-length' 'petal-width' 'z1' 'z2' 'z4']
Accuracy: 0.95333333333334
Pr[accept]: 0.1901648511104072
Rand Uniform: 0.09835542706219069
Restart Val: 1
Status: ACCEPTED

62)
Features: ['sepal-length' 'petal-length' 'z2' 'z4']
Accuracy: 0.9066666666666666
Pr[accept]: 0.009662954947836673
Rand Uniform: 0.4050270704183979
Restart Val: 2
Status: DISCARDED

63)
Features: ['petal-length' 'z2' 'z4']
Accuracy: 0.8266666666666667
Pr[accept]: 5.2371769744699184e-05
Rand Uniform: 0.10521446518739752
Restart Val: 3
Status: DISCARDED

64)
Features: ['petal-length' 'petal-width' 'z2' 'z4']
Accuracy: 0.9
Pr[accept]: 0.005383105741918063
Rand Uniform: 0.522101272219915
Restart Val: 4
Status: DISCARDED

65)
Features: ['petal-length' 'petal-width' 'z4']
Accuracy: 0.91333333333333
Pr[accept]: 0.012012966060438706
Rand Uniform: 0.05658734856165015
Restart Val: 5
Status: DISCARDED

66)
Features: ['petal-length' 'z4']
Accuracy: 0.86
Pr[accept]: 0.00030916586255290456
Rand Uniform: 0.29393319435438836
Restart Val: 6
Status: DISCARDED

67)
Features: ['sepal-width' 'petal-length' 'z2' 'z4']
Accuracy: 0.92
Pr[accept]: 0.016538888103788583
Rand Uniform: 0.08851473808798316
Restart Val: 7
Status: DISCARDED

68)
Features: ['sepal-width' 'z2']
Accuracy: 0.58
Pr[accept]: 8.833083563607416e-13
Rand Uniform: 0.04323906058180571
Restart Val: 8
Status: DISCARDED

69)
Features: ['z2']
Accuracy: 0.4666666666666667
Pr[accept]: 2.0107430795041403e-16
Rand Uniform: 0.0031969321927761696
Restart Val: 9
Status: DISCARDED

70)

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Features: ['sepal-length' 'petal-length' 'petal-width' 'z1' 'z2']
Accuracy: 0.98
Pr[accept]: 1.751626023091239e-05
Rand Uniform: 0.6090743727712267
Restart Val: 0
Status: RESTART

71)
Features: ['sepal-length' 'petal-width' 'z1' 'z2']
Accuracy: 0.973333333333334
Pr[accept]: 0.616934020189345
Rand Uniform: 0.471585176788179
Restart Val: 1
Status: ACCEPTED

72)
Features: ['sepal-length' 'petal-length' 'petal-width' 'z1' 'z2' 'z3']
Accuracy: 0.9466666666666667
Pr[accept]: 0.08638168612061395
Rand Uniform: 0.17734684792324806
Restart Val: 2
Status: DISCARDED

73)
Features: ['sepal-length' 'sepal-width' 'petal-length' 'petal-width' 'z1' 'z2' 'z3']
Accuracy: 0.9466666666666667
Pr[accept]: 0.08349294036062674
Rand Uniform: 0.7929967257534315
Restart Val: 3
Status: DISCARDED

74)
Features: ['sepal-length' 'sepal-width' 'petal-length' 'z1' 'z2' 'z3']
Accuracy: 0.92
Pr[accept]: 0.01077407767894363
Rand Uniform: 0.17489719928121905
Restart Val: 4
Status: DISCARDED

75)
Features: ['sepal-width' 'petal-length' 'z1' 'z2' 'z3']
Accuracy: 0.94
Pr[accept]: 0.04683031685241946
Rand Uniform: 0.021660259248063918
Restart Val: 5
Status: ACCEPTED

76)
Features: ['z1' 'z2' 'z3']
Accuracy: 0.94
Pr[accept]: -
Rand Uniform: -
Restart Val: 6
Status: IMPROVED

77)
Features: ['z1' 'z2']
Accuracy: 0.9333333333333333
Pr[accept]: 0.02556153206507465
Rand Uniform: 0.6520870516872824
Restart Val: 7
Status: DISCARDED

78)
Features: ['sepal-width' 'z1' 'z2']
Accuracy: 0.94
Pr[accept]: -
Rand Uniform: -
Restart Val: 8
Status: IMPROVED

79)
Features: ['sepal-width' 'z2']
Accuracy: 0.58
Pr[accept]: 9.913311359097348e-15
Rand Uniform: 0.7043832428776834
Restart Val: 9
Status: DISCARDED

80)
Features: ['sepal-length' 'petal-length' 'petal-width' 'z1' 'z2']
Accuracy: 0.98
Pr[accept]: 0.002512707158571466
Rand Uniform: 0.514502229194622
Restart Val: 0

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Status:      RESTART
81)
Features: ['sepal-length' 'sepal-width' 'petal-length' 'petal-width' 'z1' 'z2']
Accuracy: 0.9466666666666667
Pr[accept]: 0.06360252928362682
Rand Uniform: 0.6900220345846393
Restart Val: 1
Status:      DISCARDED

82)
Features: ['sepal-length' 'sepal-width' 'petal-width' 'z1']
Accuracy: 0.9466666666666667
Pr[accept]: 0.061475556020613706
Rand Uniform: 0.6641636036981575
Restart Val: 2
Status:      DISCARDED

83)
Features: ['sepal-length' 'sepal-width' 'petal-width' 'z1' 'z2' 'z4']
Accuracy: 0.9333333333333333
Pr[accept]: 0.019208911780880265
Rand Uniform: 0.8490728555549064
Restart Val: 3
Status:      DISCARDED

84)
Features: ['sepal-length' 'sepal-width' 'petal-length' 'petal-width' 'z1' 'z2' 'z3'
'z4']
Accuracy: 0.9333333333333333
Pr[accept]: 0.018315638888734234
Rand Uniform: 0.2791605876328612
Restart Val: 4
Status:      DISCARDED

85)
Features: ['sepal-length' 'petal-length' 'petal-width' 'z1' 'z2' 'z3' 'z4']
Accuracy: 0.92
Pr[accept]: 0.005494093721055432
Rand Uniform: 0.07201611047097944
Restart Val: 5
Status:      DISCARDED

86)
Features: ['petal-length' 'petal-width' 'z1' 'z2' 'z3' 'z4']
Accuracy: 0.9266666666666666
Pr[accept]: 0.009276489328819647
Rand Uniform: 0.434108130839157
Restart Val: 6
Status:      DISCARDED

87)
Features: ['petal-length' 'petal-width' 'z2' 'z3' 'z4']
Accuracy: 0.88
Pr[accept]: 0.0001394853443830099
Rand Uniform: 0.20467692749008437
Restart Val: 7
Status:      DISCARDED

88)
Features: ['sepal-length' 'sepal-width' 'petal-length' 'petal-width' 'z2' 'z3' 'z4']
Accuracy: 0.9266666666666666
Pr[accept]: 0.008319811786177996
Rand Uniform: 0.26463577042863773
Restart Val: 8
Status:      DISCARDED

89)
Features: ['sepal-length' 'sepal-width' 'petal-length' 'petal-width' 'z1' 'z2' 'z3'
'z4']
Accuracy: 0.9333333333333333
Pr[accept]: 0.014435061028017875
Rand Uniform: 0.21553861906684846
Restart Val: 9
Status:      DISCARDED

90)
Features: ['sepal-length' 'petal-length' 'petal-width' 'z1' 'z2']
Accuracy: 0.98
Pr[accept]: 0.007461795697040256
Rand Uniform: 0.32446015635562475
Restart Val: 0
Status:      RESTART

91)

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Features: ['sepal-length' 'sepal-width' 'petal-length' 'petal-width' 'z1' 'z2' 'z3']
Accuracy: 0.9466666666666667
Pr[accept]: 0.04526423397858693
Rand Uniform: 0.6141111965475877
Restart Val: 1
Status: DISCARDED

92)
Features: ['sepal-length' 'petal-length' 'petal-width' 'z1' 'z2' 'z3']
Accuracy: 0.9466666666666667
Pr[accept]: 0.04375052349368002
Rand Uniform: 0.9583151599709283
Restart Val: 2
Status: DISCARDED

93)
'z4')
Features: ['sepal-length' 'sepal-width' 'petal-length' 'petal-width' 'z1' 'z2' 'z3'
'z4']
Accuracy: 0.9333333333333333
Pr[accept]: 0.011931522535756175
Rand Uniform: 0.2807919344707205
Restart Val: 3
Status: DISCARDED

94)
Features: ['sepal-length' 'sepal-width' 'petal-width' 'z1' 'z2' 'z3']
Accuracy: 0.9466666666666667
Pr[accept]: 0.040873272585430935
Rand Uniform: 0.6133542024386076
Restart Val: 4
Status: DISCARDED

95)
'z4')
Features: ['sepal-length' 'sepal-width' 'petal-length' 'petal-width' 'z1' 'z2' 'z3'
'z4']
Accuracy: 0.9333333333333333
Pr[accept]: 0.010847620586711428
Rand Uniform: 0.5172052856313109
Restart Val: 5
Status: DISCARDED

96)
Features: ['sepal-length' 'petal-length' 'petal-width' 'z1' 'z2' 'z4']
Accuracy: 0.953333333333334
Pr[accept]: 0.07336965136838325
Rand Uniform: 0.8304992046683933
Restart Val: 6
Status: DISCARDED

97)
Features: ['sepal-length' 'petal-length' 'petal-width' 'z1' 'z2']
Accuracy: 0.98
Pr[accept]: -
Rand Uniform: -
Restart Val: 0
Status: IMPROVED

98)
Features: ['sepal-length' 'petal-length' 'petal-width' 'z2']
Accuracy: 0.9333333333333333
Pr[accept]: 0.00940356255149524
Rand Uniform: 0.42092843440787087
Restart Val: 1
Status: DISCARDED

99)
Features: ['sepal-length' 'petal-length' 'z2']
Accuracy: 0.9133333333333333
Pr[accept]: 0.001188939105405431
Rand Uniform: 0.6111093468445016
Restart Val: 2
Status: DISCARDED

Final Feature Set (Simulated Annealing):
Confusion Matrix:
[[50  0  0]
 [ 0  48  2]
 [ 0  1  49]]
Accuracy: 0.98
Features: ['sepal-length' 'petal-length' 'petal-width' 'z1' 'z2']

Genetic Algorithm
0)
1.
    Features: ['sepal-width' 'petal-length' 'petal-width' 'z1' 'z2' 'z3']

```

Accuracy: 0.953333333333334
2. Features: ['sepal-length' 'sepal-width' 'petal-length' 'petal-width' 'z1' 'z2']
Accuracy: 0.946666666666667
3. Features: ['sepal-width' 'petal-width' 'z1']
Accuracy: 0.946666666666667
4. Features: ['sepal-length' 'sepal-width' 'petal-length' 'petal-width' 'z1' 'z2' 'z3']
Accuracy: 0.946666666666667
5. Features: ['sepal-width' 'petal-length' 'petal-width' 'z1' 'z2']
Accuracy: 0.94
1)
1. Features: ['sepal-width' 'petal-width' 'z1' 'z2']
Accuracy: 0.953333333333334
2. Features: ['sepal-width' 'petal-length' 'petal-width' 'z1' 'z2' 'z3']
Accuracy: 0.953333333333334
3. Features: ['sepal-length' 'sepal-width' 'petal-width' 'z1']
Accuracy: 0.946666666666667
4. Features: ['sepal-length' 'sepal-width' 'petal-length' 'petal-width' 'z1' 'z2']
Accuracy: 0.946666666666667
5. Features: ['sepal-width' 'petal-length' 'petal-width']
Accuracy: 0.946666666666667
2)
1. Features: ['sepal-length' 'sepal-width' 'petal-width' 'z1' 'z2']
Accuracy: 0.96
2. Features: ['sepal-width' 'petal-width' 'z1' 'z2']
Accuracy: 0.953333333333334
3. Features: ['petal-length' 'petal-width' 'z1' 'z2']
Accuracy: 0.953333333333334
4. Features: ['sepal-width' 'petal-length' 'petal-width' 'z1' 'z2' 'z3']
Accuracy: 0.953333333333334
5. Features: ['sepal-length' 'sepal-width' 'petal-length' 'petal-width' 'z1' 'z2']
Accuracy: 0.946666666666667
3)
1. Features: ['sepal-length' 'petal-length' 'petal-width' 'z1' 'z2']
Accuracy: 0.98
2. Features: ['sepal-length' 'petal-width' 'z1' 'z2']
Accuracy: 0.973333333333334
3. Features: ['sepal-length' 'sepal-width' 'petal-width' 'z1' 'z2']
Accuracy: 0.96
4. Features: ['sepal-width' 'petal-width' 'z1' 'z2']
Accuracy: 0.953333333333334
5. Features: ['petal-length' 'petal-width' 'z1' 'z2']
Accuracy: 0.953333333333334
4)
1. Features: ['sepal-length' 'petal-length' 'petal-width' 'z1' 'z2']
Accuracy: 0.98
2. Features: ['sepal-length' 'petal-width' 'z1' 'z2']
Accuracy: 0.973333333333334
3. Features: ['sepal-length' 'petal-width' 'z1' 'z2' 'z4']
Accuracy: 0.966666666666667
4. Features: ['sepal-length' 'sepal-width' 'petal-width' 'z1' 'z2']
Accuracy: 0.96
5. Features: ['sepal-length' 'petal-width' 'z1' 'z2' 'z3']
Accuracy: 0.96
5)
1. Features: ['sepal-length' 'petal-length' 'petal-width' 'z1' 'z2']
Accuracy: 0.98
2. Features: ['sepal-length' 'petal-width' 'z1' 'z2']
Accuracy: 0.973333333333334
3.

17)

1. Features: ['sepal-length' 'petal-length' 'petal-width' 'z1' 'z2']
Accuracy: 0.98

2. Features: ['sepal-length' 'petal-width' 'z1' 'z2']
Accuracy: 0.973333333333334

3. Features: ['sepal-length' 'petal-width' 'z1' 'z2' 'z4']
Accuracy: 0.9666666666666667

4. Features: ['sepal-length' 'petal-length' 'petal-width' 'z1']
Accuracy: 0.9666666666666667

5. Features: ['sepal-length' 'sepal-width' 'petal-width' 'z1' 'z2']
Accuracy: 0.96

18)

1. Features: ['sepal-length' 'petal-length' 'petal-width' 'z1' 'z2']
Accuracy: 0.98

2. Features: ['sepal-length' 'petal-width' 'z1' 'z2']
Accuracy: 0.973333333333334

3. Features: ['sepal-length' 'petal-width' 'z1' 'z2' 'z4']
Accuracy: 0.9666666666666667

4. Features: ['sepal-length' 'petal-length' 'petal-width' 'z1']
Accuracy: 0.9666666666666667

5. Features: ['sepal-length' 'sepal-width' 'petal-width' 'z1' 'z2']
Accuracy: 0.96

19)

1. Features: ['sepal-length' 'petal-length' 'petal-width' 'z1' 'z2']
Accuracy: 0.98

2. Features: ['sepal-length' 'petal-width' 'z1' 'z2']
Accuracy: 0.973333333333334

3. Features: ['sepal-length' 'petal-width' 'z1' 'z2' 'z4']
Accuracy: 0.9666666666666667

4. Features: ['sepal-length' 'petal-length' 'petal-width' 'z1']
Accuracy: 0.9666666666666667

5. Features: ['sepal-length' 'sepal-width' 'petal-width' 'z1' 'z2']
Accuracy: 0.96

20)

1. Features: ['sepal-length' 'petal-length' 'petal-width' 'z1' 'z2']
Accuracy: 0.98

2. Features: ['sepal-length' 'petal-width' 'z1' 'z2']
Accuracy: 0.973333333333334

3. Features: ['sepal-length' 'petal-length' 'petal-width' 'z1']
Accuracy: 0.9666666666666667

4. Features: ['sepal-length' 'petal-width' 'z1' 'z2' 'z4']
Accuracy: 0.9666666666666667

5. Features: ['sepal-length' 'petal-width' 'z1' 'z2' 'z3']
Accuracy: 0.96

21)

1. Features: ['sepal-length' 'petal-length' 'petal-width' 'z1' 'z2']
Accuracy: 0.98

2. Features: ['sepal-length' 'petal-width' 'z1' 'z2']
Accuracy: 0.973333333333334

22) 3. Features: ['sepal-length' 'petal-width' 'z1' 'z2' 'z4']
Accuracy: 0.9666666666666667
4. Features: ['sepal-length' 'petal-length' 'petal-width' 'z1']
Accuracy: 0.9666666666666667
5. Features: ['sepal-length' 'sepal-width' 'petal-width' 'z1' 'z2']
Accuracy: 0.96
23) 1. Features: ['sepal-length' 'petal-length' 'petal-width' 'z1' 'z2']
Accuracy: 0.98
2. Features: ['sepal-length' 'petal-width' 'z1' 'z2']
Accuracy: 0.9733333333333334
3. Features: ['sepal-length' 'petal-width' 'z1' 'z2' 'z4']
Accuracy: 0.9666666666666667
4. Features: ['sepal-length' 'petal-length' 'petal-width' 'z1']
Accuracy: 0.9666666666666667
5. Features: ['sepal-length' 'petal-length' 'petal-width' 'z1' 'z4']
Accuracy: 0.96
24) 1. Features: ['sepal-length' 'petal-length' 'petal-width' 'z1' 'z2']
Accuracy: 0.98
2. Features: ['sepal-length' 'petal-width' 'z1' 'z2']
Accuracy: 0.9733333333333334
3. Features: ['sepal-length' 'petal-width' 'z1' 'z2' 'z4']
Accuracy: 0.9666666666666667
4. Features: ['sepal-length' 'petal-length' 'petal-width' 'z1']
Accuracy: 0.9666666666666667
5. Features: ['sepal-length' 'sepal-width' 'petal-width' 'z1' 'z2']
Accuracy: 0.96
25) 1. Features: ['sepal-length' 'petal-length' 'petal-width' 'z1' 'z2']
Accuracy: 0.98
2. Features: ['sepal-length' 'petal-width' 'z1' 'z2']
Accuracy: 0.9733333333333334
3. Features: ['sepal-length' 'petal-width' 'z1' 'z2' 'z4']
Accuracy: 0.9666666666666667
4. Features: ['sepal-length' 'petal-length' 'petal-width' 'z1']
Accuracy: 0.9666666666666667
5. Features: ['sepal-length' 'petal-length' 'petal-width' 'z1' 'z4']
Accuracy: 0.96
26) 1. Features: ['sepal-length' 'petal-length' 'petal-width' 'z1' 'z2']
Accuracy: 0.98
2. Features: ['sepal-length' 'petal-width' 'z1' 'z2']
Accuracy: 0.9733333333333334
3. Features: ['sepal-length' 'petal-length' 'petal-width' 'z1']
Accuracy: 0.9666666666666667
4. Features: ['sepal-length' 'petal-width' 'z1' 'z2' 'z4']

33) 1. Features: ['sepal-length' 'petal-length' 'petal-width' 'z1' 'z2']
Accuracy: 0.98
2. Features: ['sepal-length' 'petal-width' 'z1' 'z2']
Accuracy: 0.973333333333334
3. Features: ['sepal-length' 'petal-width' 'z1' 'z2' 'z4']
Accuracy: 0.9666666666666667
4. Features: ['sepal-length' 'petal-length' 'petal-width' 'z1']
Accuracy: 0.9666666666666667
5. Features: ['sepal-length' 'sepal-width' 'petal-width' 'z1' 'z2']
Accuracy: 0.96
34) 1. Features: ['sepal-length' 'petal-length' 'petal-width' 'z1' 'z2']
Accuracy: 0.98
2. Features: ['sepal-length' 'petal-width' 'z1' 'z2']
Accuracy: 0.973333333333334
3. Features: ['sepal-length' 'petal-width' 'z1' 'z2' 'z4']
Accuracy: 0.9666666666666667
4. Features: ['sepal-length' 'petal-length' 'petal-width' 'z1']
Accuracy: 0.9666666666666667
5. Features: ['sepal-length' 'petal-width' 'z1' 'z2' 'z3']
Accuracy: 0.96
35) 1. Features: ['sepal-length' 'petal-length' 'petal-width' 'z1' 'z2']
Accuracy: 0.98
2. Features: ['sepal-length' 'petal-width' 'z1' 'z2']
Accuracy: 0.973333333333334
3. Features: ['sepal-length' 'petal-length' 'petal-width' 'z1']
Accuracy: 0.9666666666666667
4. Features: ['sepal-length' 'petal-width' 'z1' 'z2' 'z4']
Accuracy: 0.9666666666666667
5. Features: ['sepal-length' 'petal-width' 'z1' 'z2' 'z3']
Accuracy: 0.96
36) 1. Features: ['sepal-length' 'petal-length' 'petal-width' 'z1' 'z2']
Accuracy: 0.98
2. Features: ['sepal-length' 'petal-width' 'z1' 'z2']
Accuracy: 0.973333333333334
3. Features: ['sepal-length' 'petal-width' 'z1' 'z2' 'z4']
Accuracy: 0.9666666666666667
4. Features: ['sepal-length' 'petal-length' 'petal-width' 'z1']
Accuracy: 0.9666666666666667
5. Features: ['sepal-length' 'petal-width' 'z1' 'z2' 'z3']
Accuracy: 0.96
37) 1. Features: ['sepal-length' 'petal-length' 'petal-width' 'z1' 'z2']
Accuracy: 0.98
2. Features: ['sepal-length' 'petal-width' 'z1' 'z2']

43) 5. Features: ['sepal-length' 'petal-width' 'z1' 'z2' 'z4']
Accuracy: 0.9666666666666667

1. Features: ['sepal-length' 'petal-length' 'petal-width' 'z1' 'z4']
Accuracy: 0.96

2. Features: ['sepal-length' 'petal-width' 'z1' 'z2']
Accuracy: 0.973333333333334

3. Features: ['sepal-length' 'petal-width' 'z1' 'z2' 'z4']
Accuracy: 0.9666666666666667

4. Features: ['sepal-length' 'petal-length' 'petal-width' 'z1']
Accuracy: 0.9666666666666667

5. Features: ['sepal-length' 'petal-length' 'petal-width' 'z1' 'z4']
Accuracy: 0.96

44) 1. Features: ['sepal-length' 'petal-length' 'petal-width' 'z1' 'z2']
Accuracy: 0.98

2. Features: ['sepal-length' 'petal-width' 'z1' 'z2']
Accuracy: 0.973333333333334

3. Features: ['sepal-length' 'petal-width' 'z1' 'z2' 'z4']
Accuracy: 0.9666666666666667

4. Features: ['sepal-length' 'petal-length' 'petal-width' 'z1']
Accuracy: 0.9666666666666667

5. Features: ['sepal-length' 'petal-width' 'z1' 'z2' 'z3']
Accuracy: 0.96

45) 1. Features: ['sepal-length' 'petal-length' 'petal-width' 'z1' 'z2']
Accuracy: 0.98

2. Features: ['sepal-length' 'petal-width' 'z1' 'z2']
Accuracy: 0.973333333333334

3. Features: ['sepal-length' 'petal-length' 'petal-width' 'z1']
Accuracy: 0.9666666666666667

4. Features: ['sepal-length' 'petal-width' 'z1' 'z2' 'z4']
Accuracy: 0.9666666666666667

5. Features: ['sepal-length' 'sepal-width' 'petal-width' 'z1' 'z2']
Accuracy: 0.96

46) 1. Features: ['sepal-length' 'petal-length' 'petal-width' 'z1' 'z2']
Accuracy: 0.98

2. Features: ['sepal-length' 'petal-width' 'z1' 'z2']
Accuracy: 0.973333333333334

3. Features: ['sepal-length' 'petal-width' 'z1' 'z2' 'z4']
Accuracy: 0.9666666666666667

4. Features: ['sepal-length' 'petal-length' 'petal-width' 'z1']
Accuracy: 0.9666666666666667

5. Features: ['sepal-length' 'sepal-width' 'petal-width' 'z1' 'z2']
Accuracy: 0.96

47) 1. Features: ['sepal-length' 'petal-length' 'petal-width' 'z1' 'z2']
Accuracy: 0.98

2. Features: ['sepal-length' 'petal-width' 'z1' 'z2']
Accuracy: 0.973333333333334

3. Features: ['sepal-length' 'petal-width' 'z1' 'z2' 'z4']
Accuracy: 0.9666666666666667

4. Features: ['sepal-length' 'petal-length' 'petal-width' 'z1']
Accuracy: 0.9666666666666667

5. Features: ['sepal-length' 'sepal-width' 'petal-width' 'z1' 'z2']
Accuracy: 0.96

```

48)
1. Features: ['sepal-length' 'petal-length' 'petal-width' 'z1' 'z2']
Accuracy: 0.98
2. Features: ['sepal-length' 'petal-width' 'z1' 'z2']
Accuracy: 0.973333333333334
3. Features: ['sepal-length' 'petal-width' 'z1' 'z2' 'z4']
Accuracy: 0.9666666666666667
4. Features: ['sepal-length' 'petal-length' 'petal-width' 'z1']
Accuracy: 0.9666666666666667
5. Features: ['sepal-length' 'sepal-width' 'petal-width' 'z1' 'z2']
Accuracy: 0.96
49)
1. Features: ['sepal-length' 'petal-length' 'petal-width' 'z1' 'z2']
Accuracy: 0.98
2. Features: ['sepal-length' 'petal-width' 'z1' 'z2']
Accuracy: 0.973333333333334
3. Features: ['sepal-length' 'petal-width' 'z1' 'z2' 'z4']
Accuracy: 0.9666666666666667
4. Features: ['sepal-length' 'petal-length' 'petal-width' 'z1']
Accuracy: 0.9666666666666667
5. Features: ['sepal-length' 'sepal-width' 'petal-width' 'z1' 'z2']
Accuracy: 0.96

Final Feature Set (Genetic Algorithm):
Confusion Matrix:
[[50  0  0]
 [ 0 48  2]
 [ 0  1 49]]
Accuracy: 0.98
Features: ['sepal-length' 'petal-length' 'petal-width' 'z1' 'z2']
MacBook-Air:CadenKroonenberg_Assignment4 cskroonenberg$
```