```
[Running] python -u "/Users/davidluong18/Documents/College/CPSC
483 ML/FINAL EXAM:PROJECT/PCA_Starter.py"
PCA:
Variance:  0.6458762209796629 0.1712658879905261
PCA principal components:
 [ 0.26375044  0.26231864  0.34708049  0.33418876  0.31860226
-0.31048173
 -0.30658864  0.33632937  0.26621003  0.25679019  0.29605459]
 [ 0.4685087   0.47014659 -0.01534719  0.07803201  0.29221348
-0.00336594
 -0.01096446 -0.16746357 -0.41817711 -0.40841138 -0.31289135]
SVD:
Variance:  0.3473206851613562 0.1788510263142143
SVD principal components:
 [-0.26375044 -0.4685087  -0.25497414  0.27988372 -0.04974519
-0.03249278
 -0.22241966  0.05173334  0.09069774 -0.0242228  -0.70929441]
 [-0.26231864 -0.47014659 -0.25725039  0.28771958 -0.03681996
-0.04855776
 -0.21944375  0.06692496  0.08668442 -0.02829668  0.70464731]
Projected points are NOT matching between SVD and PCA
Projected Components are NOT matching between SVD and PCA

PCA Projected points:
 [[ 1.56744306e+00 -4.47272458e-01]
 [ 1.63564834e+00 -3.39731947e-01]
 [ 1.90661858e+00 -4.11138604e-01]
 [ 1.59019865e+00  3.86257937e+00]
 [-2.65476353e+00  6.54451333e-01]
 [ 4.41242547e-01  8.11070504e-02]
 [-1.53811110e+00  2.83394434e-02]
 [-2.03640834e+00 -6.19046098e-02]
 [-1.53394298e+00  2.32204207e-01]
 [ 1.50991568e-01  8.01869007e-01]
 [-4.10093263e-01  4.70936361e-01]
 [-2.26164654e-02  5.25802776e-01]
```

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[ 5.22114268e-01   8.47423195e-01]
[ 9.05782150e-01   2.53106125e-01]
[ 3.47286547e-01  -1.13869504e-01]
[ 9.14388643e-01  -1.80059778e-02]
[ 8.08716278e-01  -3.78180128e-02]
[ 2.49964082e+00   7.93726953e-01]
[ 4.38344059e+00   3.93265772e-01]
[ 2.35761304e+00   1.78208990e+00]
[ 2.39109462e+00   1.76266442e+00]
[ 4.91430218e+00   2.49237832e+00]
[-1.96412664e+00   1.36078254e+00]
[-1.78272147e+00   1.60971348e+00]
[-5.64239760e-01   1.84375837e+00]
[-1.03294129e+00   2.42470970e-01]
[-9.62551800e-01   3.26467767e-01]
[-4.28806109e-01   5.88408164e-01]
[-7.02732308e-01   2.72964337e-01]
[-5.15310364e-01   3.67353740e-01]
[-4.71163505e-01   7.93574640e-01]
[ 6.93272831e-02   1.03683746e+00]
[-5.11275112e-01   7.22003815e-01]
[-3.15599993e-01   7.60359057e-01]
[ 3.94494823e-01  -5.04894522e-01]
[ 7.38639027e-01  -1.18152709e-01]
[ 2.88802054e+00   7.86909826e-01]
[ 3.99822210e+00   6.92305960e-01]
[ 4.45177167e+00   3.81480982e-01]
[ 1.15868104e+00   1.57737651e+00]
[ 1.61237188e+00   1.89322005e+00]
[ 1.04083449e+00  -3.87099227e-02]
[ 3.47011998e+00   7.22935891e-01]
[-1.51289496e+00   1.47226832e+00]
[-1.04624342e+00   1.95840983e+00]
[-2.32194350e-01  -1.21785109e+00]
[ 7.13481551e-01  -1.37173033e+00]
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[ 8.02687562e-01 -7.30544679e-01]
[ 2.64888170e-01 -1.05099786e+00]
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[ 5.17444141e+00 -7.27837069e-01]
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[ 2.90772571e+00  2.81013148e+00]
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[ 2.64643439e+00  1.57046505e+00]
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[ 6.99209943e-01  8.85814496e-02]
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[ 1.05713434e+00  2.69640846e-02]
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[ 8.52162044e-01 -8.74458274e-01]
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[ 1.14053547e+00  3.79264873e-01]
[ 9.15061679e-01  3.37279899e-01]
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[ 2.60267189e+00 -2.08480223e+00]
[ 1.65841641e+00 -9.87046802e-01]
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[ 5.89437533e-01 -6.14670872e-01]
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[-7.40832655e-02 -3.96002689e-01]
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[ 3.48001230e-01 -1.68772556e-01]
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 [ 4.52276688e-01 -5.23671390e-01]
 [ 3.74718624e-01 -1.81729109e-01]
 [ 7.76660526e-02 -4.75023261e-01]
 [ 2.61198368e-02 -4.98206736e-01]
 [ 3.40792249e-01 -1.89620148e-01]
 [ 3.86126968e-01 -1.33589167e-01]
 [ 3.81847125e-01 -1.40523794e-01]
 [ 6.28253472e-02 -4.52190623e-01]
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 [ 4.04721257e-02 -7.49017110e-02]
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[ 7.95273330e-01 -1.56941517e-01]
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[ 5.83377134e-01  4.56137765e-01]
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[ 9.85042481e-01 -4.22920101e-01]
[ 1.18905104e+00 -2.34062499e-01]
[ 1.11531328e+00 -3.01089458e-01]
[ 6.37890085e-01  9.31084373e-01]
[ 1.80973041e+00  8.07142546e-03]
[ 1.04930476e+00  5.14940942e-01]
[-2.21151273e-01  9.40414542e-01]
[ 9.75410424e-02  3.96808147e-01]
[-5.29849964e-02  2.46745216e-01]
[ 1.79958211e-01  2.67526910e-02]
[ 4.43948114e-01  3.21247193e-01]
```

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[ 3.33306096e-01  2.11999256e-01]
[-3.69924828e-02  2.30796300e-01]
[ 1.78791050e-01  4.82916520e-01]
[ 1.23968814e-02  3.16952090e-01]
[ 7.59324353e-01 -6.53535229e-01]
[ 9.71729770e-01 -8.93473674e-01]
[ 9.45360983e-01 -9.19353366e-01]
[ 9.35549723e-01 -9.29167261e-01]
[ 1.34639042e+00 -1.37072336e+00]
[ 1.49006684e+00 -1.22198167e+00]
[ 1.32771121e+00 -1.38897877e+00]
[ 2.24441137e-01  5.46550061e-01]
[-1.16275820e+00  9.02977290e-01]
[ 4.51858013e-01 -1.39364597e-01]
[ 8.75824876e-01 -9.69957565e-01]
[ 9.45802951e-02 -1.42308539e+00]
[ 9.50673005e-01 -4.47255478e-01]
[-8.03664826e-01  2.07471212e+00]
[-6.57877811e-01  1.75693209e+00]
[-8.43320982e-01  1.57243252e+00]
[ 9.62987219e-01 -4.51264006e-01]
[ 9.33069377e-01 -4.68864219e-01]
[ 9.93518466e-01 -4.21057215e-01]
[ 9.65265001e-01 -4.12053611e-01]
[ 2.26524900e-01 -1.22502983e+00]
[ 9.02260218e-01 -5.05549088e-01]
[ 8.52801742e-01 -5.56818399e-01]
[ 6.40063780e-01 -3.37531546e-01]
[ 6.68167412e-01 -3.11815936e-01]
[ 6.78642410e-01 -2.72630269e-01]
[ 5.07459415e-01 -4.11024020e-01]
[ 5.34341942e-01 -3.86895698e-01]
[-5.58821731e-01  1.47122836e+00]
[-4.70743515e-01 -1.74933969e-01]
[-4.68305992e-01 -1.62010527e-01]
[ 7.83801209e-01 -6.23082873e-01]
```

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[ 1.57954781e-01  4.83679763e-02]
[ 1.13244912e-02 -9.31006479e-02]
[-6.31579900e-02 -1.58282232e-01]
[-2.71869706e-01  2.68508755e-02]
[-2.36464770e-01  6.72539089e-02]
[-4.72538933e-01 -1.54210720e-01]
[ 7.46149887e-01 -6.60178899e-01]
[-3.84254117e-01  3.42044537e-01]
[-5.80161688e-01  1.02806060e+00]]
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[Done] exited with code=0 in 33.42 seconds