24.Question: K-Nearest Neighbors (KNN) Classifier

You are working on a classification problem to predict whether a patient has a certain medical

condition or not based on their symptoms. You have collected a dataset of patients with labeled

data (0 for no condition, 1 for the condition) and various symptom features.

Write a Python program that allows the user to input the features of a new patient and the value of k

(number of neighbors). The program should use the KNN classifier from the scikit-learn library to

predict whether the patient has the medical condition or not based on the input features.

Code:

**import** pandas **as** pd

**from** sklearn.model\_selection **import** train\_test\_split

**from** sklearn.neighbors **import** KNeighborsClassifier

**from** sklearn.preprocessing **import** StandardScaler

df **=** pd.read\_csv(r"C:\Users\vara prasad\Downloads\medical\_condition\_data.csv")

X **=** df.drop('condition', axis**=**1)

y **=** df['condition']

scaler **=** StandardScaler()

X\_scaled **=** scaler.fit\_transform(X)

X\_train, X\_test, y\_train, y\_test **=** train\_test\_split(X\_scaled, y, test\_size**=**0.2, random\_state**=**42)

print("Enter symptom values for a new patient:")

input\_features **=** []

**for** col **in** X.columns:

val **=** float(input(f"{col}: "))

input\_features.append(val)

k **=** int(input("Enter the value of k (number of neighbors): "))

input\_df **=** pd.DataFrame([input\_features], columns**=**X.columns)

input\_scaled **=** scaler.transform(input\_df)

knn **=** KNeighborsClassifier(n\_neighbors**=**k)

knn.fit(X\_train, y\_train)

prediction **=** knn.predict(input\_scaled)

print("\nPrediction:")

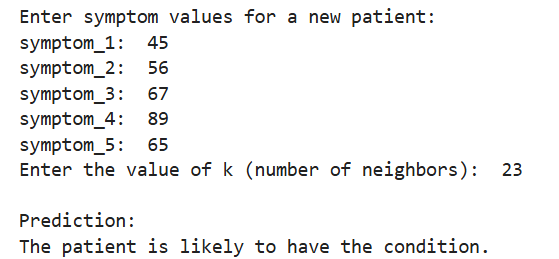
**if** prediction[0] **==** 1:

print("The patient is likely to have the condition.")

**else**:

print("The patient is unlikely to have the condition.")

output:



Dataset:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| symptom\_1 | symptom\_2 | symptom\_3 | symptom\_4 | symptom\_5 | condition |
| 0.62181 | -1.65195 | -1.57022 | -1.44223 | 2.085088 | 0 |
| -0.70434 | -1.79983 | -1.40846 | -0.96551 | 1.906484 | 0 |
| -0.0953 | 0.481188 | 0.279022 | -0.93401 | 1.924062 | 1 |
| -0.24124 | -0.72872 | 0.352055 | -0.4672 | 0.131468 | 1 |
| -1.2803 | 0.708512 | 0.872457 | 0.887858 | -0.69771 | 0 |
| 0.05963 | 1.768863 | -0.64694 | -0.78038 | 1.541053 | 1 |
| 1.665474 | -1.2281 | 1.01437 | -1.56762 | 1.658235 | 0 |
| 1.073632 | -0.82413 | -1.02652 | -1.44093 | 1.199015 | 1 |
| -1.22213 | -1.19404 | 0.712998 | -1.04597 | 1.235794 | 0 |
| 0.271579 | -2.22631 | -1.27675 | -1.86256 | 3.061595 | 0 |
| -1.84087 | -1.01957 | -1.27958 | -0.16659 | 0.459516 | 0 |
| -0.48944 | -0.42948 | 1.044161 | -0.02366 | 1.303374 | 1 |
| 2.075261 | -0.18786 | -0.68919 | -1.55245 | 1.044643 | 1 |
| -0.51761 | 2.787565 | 0.223788 | -0.05252 | 2.595828 | 1 |
| -0.17695 | -1.47114 | -0.7983 | -0.30077 | 1.041536 | 1 |
| -0.44618 | 2.515364 | -1.88954 | -1.10402 | 1.838404 | 1 |
| -0.44643 | 0.436654 | 0.19409 | -0.90161 | 1.658764 | 1 |
| 0.984322 | 1.256203 | -0.21399 | -2.42225 | 1.202365 | 1 |
| -0.62482 | -1.40179 | 0.026091 | -1.62597 | 1.904975 | 0 |
| -0.52452 | -1.47636 | 0.489375 | -0.78511 | 1.385009 | 0 |
| -1.08106 | -1.06723 | 0.615936 | -0.72038 | 0.910761 | 0 |
| 1.593187 | -1.30361 | -0.51122 | 0.046448 | 0.583396 | 0 |
| -0.24574 | -0.78057 | -0.27272 | 0.058544 | -0.00364 | 0 |
| -0.07443 | -1.44157 | 0.620672 | -0.79537 | 1.358665 | 0 |
| 0.186767 | -1.38058 | -0.75538 | -1.18496 | 1.559904 | 0 |
| 0.569767 | 0.865743 | 0.447709 | 0.001168 | 0.237752 | 1 |
| -0.72714 | -1.05596 | -0.24752 | -1.50306 | 1.403693 | 0 |
| -0.03468 | 1.556602 | 0.234215 | -1.30322 | 0.500454 | 1 |
| -0.01642 | 0.774566 | 1.188393 | -3.40284 | 1.432424 | 1 |
| 1.579572 | 1.847658 | -0.52286 | -1.2618 | 1.458866 | 1 |
| -0.30778 | -1.82136 | 0.21915 | -0.71388 | 0.559413 | 1 |
| 0.028745 | -0.28303 | 1.278452 | -0.86704 | 2.726211 | 1 |
| 0.7858 | 0.373219 | 0.425458 | -1.29848 | 0.528601 | 1 |
| 0.096121 | -0.89578 | -0.46228 | -1.72645 | 1.364026 | 0 |
| 0.055725 | -2.03779 | 1.094192 | -2.00924 | 2.915517 | 0 |
| 0.342725 | 0.276792 | 0.456753 | -1.80278 | 1.103404 | 1 |
| 0.380198 | -1.41841 | 0.610586 | -2.11306 | 2.214448 | 0 |
| -1.28043 | -1.06875 | 1.754794 | -1.02316 | 1.063898 | 0 |
| 0.481009 | -0.75518 | 0.223884 | -1.18406 | 0.804966 | 0 |
| -0.54492 | -0.53523 | 0.399136 | 0.116345 | -0.29823 | 0 |
| 0.642723 | 0.6859 | 1.329153 | 0.349255 | 0.833557 | 1 |
| 0.326133 | -2.01947 | -1.25111 | -1.69303 | 2.70389 | 0 |
| -0.34269 | -1.4223 | -0.37144 | -1.691 | 1.971885 | 0 |
| -0.03275 | -1.34044 | -0.54342 | -1.94144 | 2.079749 | 0 |
| -0.61152 | -1.46024 | -1.40666 | -1.43671 | 1.817036 | 0 |
| -0.36361 | -0.35468 | -0.05695 | -0.89003 | 0.129187 | 0 |
| -0.62697 | -0.47489 | 1.812449 | -0.51975 | 0.049561 | 0 |
| 0.013929 | -0.9301 | -0.02413 | -0.07414 | 0.279293 | 0 |
| 0.583928 | 0.132795 | -0.35929 | -0.1876 | 0.968771 | 1 |
| -1.34819 | -1.42774 | 0.743264 | -1.81425 | 2.038764 | 0 |
| -0.24718 | -0.13932 | -0.68198 | -2.04262 | 2.762607 | 1 |
| 1.848956 | -1.27939 | 1.126565 | -1.6518 | 1.75736 | 0 |
| -0.33578 | -1.31743 | 1.669022 | -0.36069 | 0.872828 | 0 |
| 1.029156 | -1.83777 | 0.472597 | -2.8789 | 3.305942 | 0 |
| 0.166452 | 0.713661 | 0.492451 | -0.55299 | 1.396778 | 1 |
| -0.4455 | 1.758746 | 1.453384 | -1.25485 | -0.11516 | 1 |
| -0.23093 | -1.84812 | 0.696206 | -1.28067 | 2.169183 | 0 |
| 0.018434 | -1.30742 | 0.347582 | -2.08898 | 2.160067 | 0 |
| 0.658544 | -0.17906 | 2.010205 | -1.14481 | 1.591827 | 1 |
| -1.02123 | 0.277713 | 0.708356 | -0.51978 | 2.409973 | 1 |
| 0.935678 | -0.65106 | 1.271555 | -0.16025 | -0.02341 | 0 |
| -1.40751 | -1.3477 | -0.77782 | -1.39137 | 1.674886 | 0 |
| 0.938284 | -1.31863 | -0.51604 | -1.01933 | 1.38425 | 0 |
| 0.429618 | -1.98327 | 0.207688 | -0.57454 | 1.79134 | 0 |
| 1.031845 | -1.01726 | -1.48556 | -1.1671 | 1.173832 | 0 |
| -1.37932 | 2.534898 | -0.73093 | 0.593368 | 0.940961 | 1 |
| 1.066675 | 0.434788 | 1.169296 | -0.03534 | -0.60898 | 1 |
| -0.57366 | -0.82993 | -0.54686 | -1.01662 | 0.846287 | 0 |
| 0.177701 | -1.73071 | -1.33534 | -2.26038 | 2.735742 | 0 |
| -1.11058 | -0.46226 | 1.75227 | -0.40519 | -0.02945 | 0 |
| 0.249384 | 0.903881 | 1.577453 | -2.19484 | 0.639737 | 1 |
| -0.67639 | -0.26208 | 1.80094 | 0.363551 | 0.706804 | 1 |
| 0.650201 | 1.067879 | -0.09918 | -0.59772 | -0.41764 | 1 |
| -0.57118 | 1.891273 | 0.572583 | -1.86428 | 3.304779 | 1 |
| -0.0036 | 0.925034 | -1.15836 | -1.45709 | 0.664849 | 1 |
| 1.446978 | -1.49515 | 0.196555 | -1.69301 | 2.055495 | 0 |
| 0.408253 | -0.44073 | -1.70258 | -1.22583 | 0.489554 | 0 |
| -0.07017 | -0.42339 | -1.66096 | -0.33173 | -0.13722 | 0 |
| -0.55892 | 1.16351 | 0.377212 | -1.71542 | 0.306742 | 1 |
| -0.16712 | 3.290427 | 0.146714 | -1.4328 | 1.669235 | 1 |
| -1.35986 | 1.172913 | 0.746254 | -3.90888 | 2.389091 | 1 |
| 1.255756 | -1.25954 | -0.89461 | -0.82292 | 1.176556 | 0 |
| 1.195047 | 1.02564 | -1.52319 | -1.36436 | 1.116377 | 1 |
| -0.04946 | 0.297811 | 0.674819 | -1.17233 | 0.473165 | 1 |
| 0.895193 | 1.197038 | 0.635172 | -0.15336 | 1.848006 | 1 |
| -1.55663 | -0.27405 | 0.60601 | -0.68139 | -0.10395 | 0 |
| -0.9896 | -1.6413 | -0.12579 | -1.1066 | 1.82848 | 0 |
| 0.243801 | -0.17457 | -0.56408 | -1.35145 | 2.156072 | 1 |
| -0.61279 | 1.312394 | -0.3877 | -1.84827 | -1.00972 | 1 |
| 1.5505 | -0.30574 | -0.99835 | -0.94627 | 0.68399 | 1 |
| 0.681891 | 1.500281 | 1.846707 | -0.59461 | 1.523003 | 1 |
| -0.25959 | -0.78572 | -1.50314 | -1.02309 | 0.782203 | 0 |
| -1.34445 | -0.45604 | -0.91865 | -0.83576 | -1.28876 | 1 |
| 0.289169 | -0.84668 | 2.4553 | -0.93069 | 2.01316 | 1 |
| 0.493318 | -0.74529 | 0.184836 | -1.63965 | 1.16613 | 0 |
| -0.15801 | -0.53911 | -0.42688 | -0.33206 | -0.02386 | 0 |
| 2.560085 | 0.588559 | -0.09606 | 0.250785 | -1.72652 | 0 |
| 1.882024 | -0.99568 | 1.34542 | -0.791 | 0.8312 | 0 |
| 0.082284 | 1.933583 | 1.06548 | 0.144849 | 1.049754 | 1 |
| -0.18687 | -1.43126 | -0.43973 | -1.66219 | 1.959474 | 0 |
| -1.25154 | -0.08577 | 1.443765 | -1.54102 | 1.374379 | 1 |
| -0.63774 | 1.91075 | -0.531 | 0.492343 | 0.855732 | 1 |
| 0.721672 | -0.93944 | -1.12905 | -0.93443 | 0.892415 | 0 |
| 1.317394 | 2.204596 | 0.1976 | -0.36102 | 0.896185 | 1 |
| -0.51729 | 0.326762 | 1.409347 | -0.64265 | 0.344358 | 1 |
| -1.5839 | -0.79095 | 0.760415 | 1.034676 | 1.416946 | 1 |
| 0.208383 | 2.66944 | -2.04173 | -0.63849 | 1.620926 | 1 |
| 1.382159 | 3.589462 | 0.64871 | -0.02158 | 1.406754 | 1 |
| -2.08193 | -1.32963 | 1.696456 | -1.50923 | 1.697488 | 0 |
| 0.13297 | 2.237224 | -0.70012 | -2.95901 | 1.213699 | 1 |
| -0.71285 | 0.552475 | 0.10643 | 0.638982 | -1.97922 | 0 |
| 2.298898 | 1.432525 | -0.36284 | 0.109199 | 0.011004 | 1 |
| -0.03499 | -0.76177 | 1.770801 | -0.16635 | 0.142035 | 0 |
| -1.12272 | 0.449655 | 0.38241 | -0.16393 | 0.65525 | 1 |
| 0.924027 | -1.61356 | -0.1849 | -2.14833 | 2.573338 | 0 |
| -0.08974 | 0.15817 | 1.440117 | -3.12558 | 1.598903 | 1 |
| -0.08215 | 1.234906 | 1.117296 | -0.98513 | 1.844452 | 1 |
| -0.92323 | -1.13487 | -1.35168 | -1.30533 | 1.42791 | 0 |
| -0.26889 | -0.43134 | -1.10653 | -0.32469 | -0.12435 | 0 |
| 0.833922 | -0.21615 | 0.45918 | -0.5291 | -0.24072 | 0 |
| -1.52553 | -0.5818 | -0.69191 | -1.08005 | 0.890498 | 1 |
| 1.399355 | 2.523413 | 0.924634 | -0.87555 | 2.706967 | 1 |
| 0.517659 | -1.4724 | -0.72574 | -1.29314 | 1.730579 | 0 |
| 1.503398 | 0.852279 | 0.877362 | -0.41746 | 1.384182 | 1 |
| -0.25498 | -0.85865 | 1.503993 | -0.82035 | 0.705557 | 0 |
| 0.195845 | -1.08904 | -0.97837 | -1.2787 | 1.295936 | 0 |
| -0.22096 | 2.171427 | 0.026886 | 1.150098 | 0.918473 | 1 |
| -0.96698 | 1.944746 | -0.04771 | -0.08549 | 1.317095 | 1 |
| -0.65142 | 1.194234 | -0.48389 | 1.004769 | 0.179449 | 1 |
| -1.28996 | -0.26934 | -1.29508 | -0.19369 | -0.42149 | 0 |
| 0.368673 | 0.317246 | -0.39334 | -2.75967 | -0.13088 | 1 |
| 0.698223 | 3.218166 | 0.393485 | -2.3192 | 1.248659 | 1 |
| -0.04016 | -1.03803 | -1.43078 | -1.66664 | 0.012139 | 1 |
| 1.797687 | 2.34047 | 0.640843 | -2.27875 | 0.94549 | 1 |
| -0.9494 | -1.89398 | 2.632382 | -3.52263 | 3.848249 | 0 |
| -0.45231 | 1.068526 | -2.42388 | 1.147177 | 0.482345 | 1 |
| 0.25603 | -0.92153 | 0.982691 | -0.48697 | 0.514019 | 0 |
| 0.26705 | -1.34611 | 0.889631 | -1.64478 | 1.842159 | 0 |
| 2.57336 | -1.25248 | 0.059218 | -1.49791 | 1.668896 | 0 |
| 0.114228 | -0.61702 | 0.150302 | -0.58341 | 0.254861 | 0 |
| -0.97587 | -1.43703 | 1.053642 | -1.51 | 1.847229 | 0 |
| -0.36097 | -1.7689 | 1.15933 | -2.52531 | 2.996944 | 0 |
| 0.028318 | -1.49013 | 0.029756 | -1.41761 | 1.849589 | 0 |
| -0.03763 | -0.84741 | 1.103302 | -1.19419 | 0.96448 | 0 |
| -0.57564 | -0.92842 | 0.12201 | -0.72739 | 0.714842 | 0 |
| 1.735964 | 1.170381 | 0.197911 | 0.046348 | 0.658353 | 1 |
| -0.55222 | 1.779435 | 0.632932 | -1.37424 | 1.534902 | 1 |
| 0.202923 | 0.437104 | -1.51574 | -1.65502 | 0.807336 | 1 |
| 0.823171 | -0.45375 | 0.073318 | -0.62339 | 0.149873 | 0 |
| -2.69689 | -1.44761 | -0.05429 | -1.78068 | 2.066115 | 0 |
| -1.0121 | -1.24332 | -1.65486 | -0.74626 | 1.105596 | 0 |
| -2.65097 | -1.64362 | 1.091507 | -1.10076 | 1.780046 | 0 |
| 0.820482 | -0.11 | 0.507274 | 0.6356 | -0.45268 | 1 |
| 0.198085 | -1.11538 | -0.14436 | -1.77995 | 1.710047 | 0 |
| -0.04559 | 1.194981 | 0.243339 | 1.815332 | 0.117625 | 1 |
| 0.607897 | 2.217965 | 0.186609 | -1.44631 | 2.180407 | 1 |
| 1.420504 | 1.665473 | -0.57075 | -0.9593 | 1.920578 | 1 |
| 0.196521 | -0.98015 | 0.709004 | -0.29415 | 0.102098 | 1 |
| 1.547505 | 2.107802 | 1.795878 | 0.348147 | 0.713302 | 1 |
| 0.211017 | -1.63717 | -0.09671 | -1.30647 | 1.929037 | 0 |
| -1.00162 | -0.66398 | -0.2811 | 0.234577 | 1.018545 | 1 |
| -0.83236 | 2.668829 | 0.471416 | -1.73971 | 1.421486 | 1 |
| -0.03313 | 1.17478 | 1.794558 | -2.56397 | 1.602885 | 1 |
| 0.170865 | -1.5468 | -0.18398 | -1.76546 | 2.163005 | 0 |
| 0.840644 | 0.746063 | -0.65262 | -1.557 | 1.787329 | 1 |
| -0.63739 | -0.11188 | 1.189017 | -0.55855 | 0.807344 | 1 |
| 0.55979 | -0.21138 | 1.080781 | 0.151787 | -0.7169 | 0 |
| 0.71096 | -0.44115 | 0.444263 | 0.220779 | -0.52848 | 0 |
| -0.52272 | -1.33439 | 1.049009 | -1.01201 | 1.400775 | 0 |
| -0.53976 | -1.15392 | -0.7783 | -0.33619 | 0.709503 | 0 |
| -0.85836 | -1.48541 | 0.70031 | -1.35701 | 1.835229 | 0 |
| 0.440014 | 3.672247 | -0.50205 | -2.99557 | 0.435296 | 1 |
| 1.206509 | 0.875309 | -0.81694 | -1.97628 | -0.33345 | 1 |
| 0.593101 | -0.65682 | -0.30955 | -1.53804 | 0.986846 | 0 |
| 1.149273 | -1.29831 | -0.70318 | -1.05321 | 1.332286 | 0 |
| -1.00414 | 0.51666 | -0.7678 | 0.78413 | -0.22244 | 1 |
| 0.222134 | -1.19357 | -0.47875 | -1.44333 | 1.534591 | 0 |
| -1.69246 | -0.62491 | 1.52955 | 0.021006 | -0.15603 | 0 |
| -0.4345 | -2.46399 | -0.30917 | -2.077 | 3.505267 | 0 |
| -1.08106 | -0.97066 | 1.053153 | -1.40666 | 1.215721 | 0 |
| -0.03956 | -1.91422 | 0.681501 | -1.86543 | 2.662177 | 0 |
| 2.526932 | 3.131022 | -0.53087 | -0.8944 | 1.505125 | 1 |
| 0.707752 | -0.42366 | -0.56247 | -1.0063 | 0.28217 | 0 |
| 0.128104 | 0.441497 | -0.68105 | -1.78747 | 2.070844 | 1 |
| -0.79047 | -0.46694 | 0.471468 | -0.74305 | 0.194302 | 0 |
| 0.645484 | 0.930499 | 2.163255 | -0.90413 | 0.616007 | 1 |
| -1.44801 | 1.015658 | -2.19881 | -0.42983 | 0.441923 | 1 |
| 1.846637 | 0.648545 | -1.07008 | 0.402389 | -0.54629 | 1 |
| -0.42019 | 1.327665 | -0.28178 | -0.37379 | 0.961602 | 1 |
| 0.191099 | 1.714728 | 0.046437 | -1.09855 | -0.31454 | 1 |
| 0.590655 | 0.631568 | 1.108704 | -2.16999 | 0.256377 | 1 |
| -0.24033 | -0.27928 | -0.37482 | -1.00107 | 0.186736 | 0 |
| 1.565524 | -1.23155 | -0.06575 | -2.6515 | 0.865921 | 1 |
| -0.5552 | 0.884922 | 1.881157 | 1.776807 | -0.36439 | 1 |
| 1.246085 | -0.40163 | -2.07339 | -0.38336 | -0.09557 | 0 |
| 0.307802 | -0.33905 | -1.71017 | -0.33108 | -0.25828 | 0 |
| -0.62314 | 1.751197 | -0.55548 | -1.6467 | 1.29958 | 1 |
| 1.049553 | -0.12048 | -0.53524 | -0.80334 | 0.721163 | 1 |
| 0.285865 | 3.412264 | 0.334457 | 0.328599 | 1.258997 | 1 |
| 0.632408 | -0.09803 | 0.972554 | 0.306814 | -0.98319 | 0 |