**Question 1 (15 Points)**

Compute the [euclidean distance](https://en.wikipedia.org/wiki/Euclidean_distance) between series (points) p and q, without using a packaged formula.

Input

p = pd.Series([1, 2, 3, 4, 5, 6, 7, 8, 9, 10])

q = pd.Series([10, 9, 8, 7, 6, 5, 4, 3, 2, 1])

**Question 2 (15 Points)**

Change the order of columns of a dataframe. Interchange columns 'a' and 'c'.

Input

df = pd.DataFrame(np.arange(20).reshape(-1, 5), columns=list('abcde'))

**Question 3 (15 Points)**

Change the order of columns of a dataframe. Create a generic function to interchange two columns, without hardcoding column names.

Input

df = pd.DataFrame(np.arange(20).reshape(-1, 5), columns=list('abcde'))

**Question 4 (15 Points)**

Format or suppress scientific notations in a pandas dataframe. Suppress scientific notations like ‘e-03’ in df and print upto 4 numbers after decimal.

Input

df = pd.DataFrame(np.random.random(4)\*\*10, columns=['random'])

df

#> random

#> 0 3.474280e-03

#> 1 3.951517e-05

#> 2 7.469702e-02

#> 3 5.541282e-28

Desired Output

#> random

#> 0 0.0035

#> 1 0.0000

#> 2 0.0747

#> 3 0.0000

**Question 5 (15 Points)**

Create a new column that contains the row number of nearest column by euclidean distance. Create a new column such that, each row contains the row number of nearest row-record by euclidean distance.

Input

df = pd.DataFrame(np.random.randint(1,100, 40).reshape(10, -1), columns=list('pqrs'), index=list('abcdefghij'))

df

# p q r s

# a 57 77 13 62

# b 68 5 92 24

# c 74 40 18 37

# d 80 17 39 60

# e 93 48 85 33

# f 69 55 8 11

# g 39 23 88 53

# h 63 28 25 61

# i 18 4 73 7

# j 79 12 45 34

Desired Output

df

# p q r s nearest\_row dist

# a 57 77 13 62 i 116.0

# b 68 5 92 24 a 114.0

# c 74 40 18 37 i 91.0

# d 80 17 39 60 i 89.0

# e 93 48 85 33 i 92.0

# f 69 55 8 11 g 100.0

# g 39 23 88 53 f 100.0

# h 63 28 25 61 i 88.0

# i 18 4 73 7 a 116.0

# j 79 12 45 34 a 81.0

**Question 6 (15 Points)**

**Correlation** is a statistical technique that shows how two variables are related. [Pandas dataframe.corr()](https://www.geeksforgeeks.org/python-pandas-dataframe-corr/) method is used for creating the correlation matrix. It is used to find the pairwise correlation of all columns in the dataframe. Any na values are automatically excluded. For any non-numeric data type columns in the dataframe it is ignored.

Input

data = {'A': [45, 37, 0, 42, 50],

        'B': [38, 31, 1, 26, 90],

        'C': [10, 15, -10, 17, 100],

        'D': [60, 99, 15, 23, 56],

        'E': [76, 98, -0.03, 78, 90]

        }