```
import requests
import pandas as pd
import numpy as np
url = (
"https://raw.githubusercontent.com/changyaochen/MECE4520/"
"master/data/random_numbers.txt"
)
response = requests.get(url)
values = [int(x.strip()) for x in response.text.split("\n") if len(x)
> 0]


def find_pairs(sum, values: list):
    pairs = []
    for x in values:
        target = sum - x
        if target in values and x < target:
            pairs.append((x, target))
    return pairs, len(pairs)

pairs, number_of_pairs = find_pairs(5000,values)
print(f"There are {number_of_pairs} pairs that sum to 5000 in the
values provided are {pairs}")
```

```
There are 6 pairs that sum to 5000 in the values provided are [(1030,
3970), (1510, 3490), (610, 4390), (1024, 3976), (187, 4813), (1570,
3430)]
```

```
iris_csv = (

"https://raw.githubusercontent.com/changyaochen/MECE4520/master/data/
iris.csv"
)
df = pd.read_csv(iris_csv)


def petal_length(df, species):
    species_df = df[df["Species"] == species]
    petal_lengths = species_df["PetalLengthCm"]
    min_petal_length, max_petal_length = petal_lengths.min(),
petal_lengths.max()
    return min_petal_length, max_petal_length

species = "Iris-versicolor"
min_petal_length, max_petal_length = petal_length(df, species)

print(f"For the {species} the minimal and maximal Petal length in cm
are {min_petal_length} and {max_petal_length} respectively")

def min_sepal_width(df):
```

```
    species_dfs = {}
    for species in df['Species'].unique():
        species_dfs[species] = df[df['Species'] == species]

    setosa_df = species_dfs['Iris-setosa']
    versicolor_df = species_dfs['Iris-versicolor']
    virginica_df = species_dfs['Iris-virginica']

    # Calculate means with species names
    species_means = {
        'Iris-setosa': setosa_df['SepalWidthCm'].mean(),
        'Iris-versicolor': versicolor_df['SepalWidthCm'].mean(),
        'Iris-virginica': virginica_df['SepalWidthCm'].mean()
    }

    # Find the species with the lowest mean
    min_species = min(species_means, key=species_means.get)
    min_mean = species_means[min_species]

    return min_species, min_mean

min_species, min_mean = min_sepal_width(df)
print(f"Among the 3 species, the species with the smallest average
SepalWidth in cm is {min_species} with a Sepal Width of {min_mean}
cm")
```

```
For the Iris-versicolor the minimal and maximal Petal length in cm are
3.0 and 5.1 respectively
Among the 3 species, the species with the smallest average SepalWidth
in cm is Iris-versicolor with a Sepal Width of 2.7700000000000005 cm
```