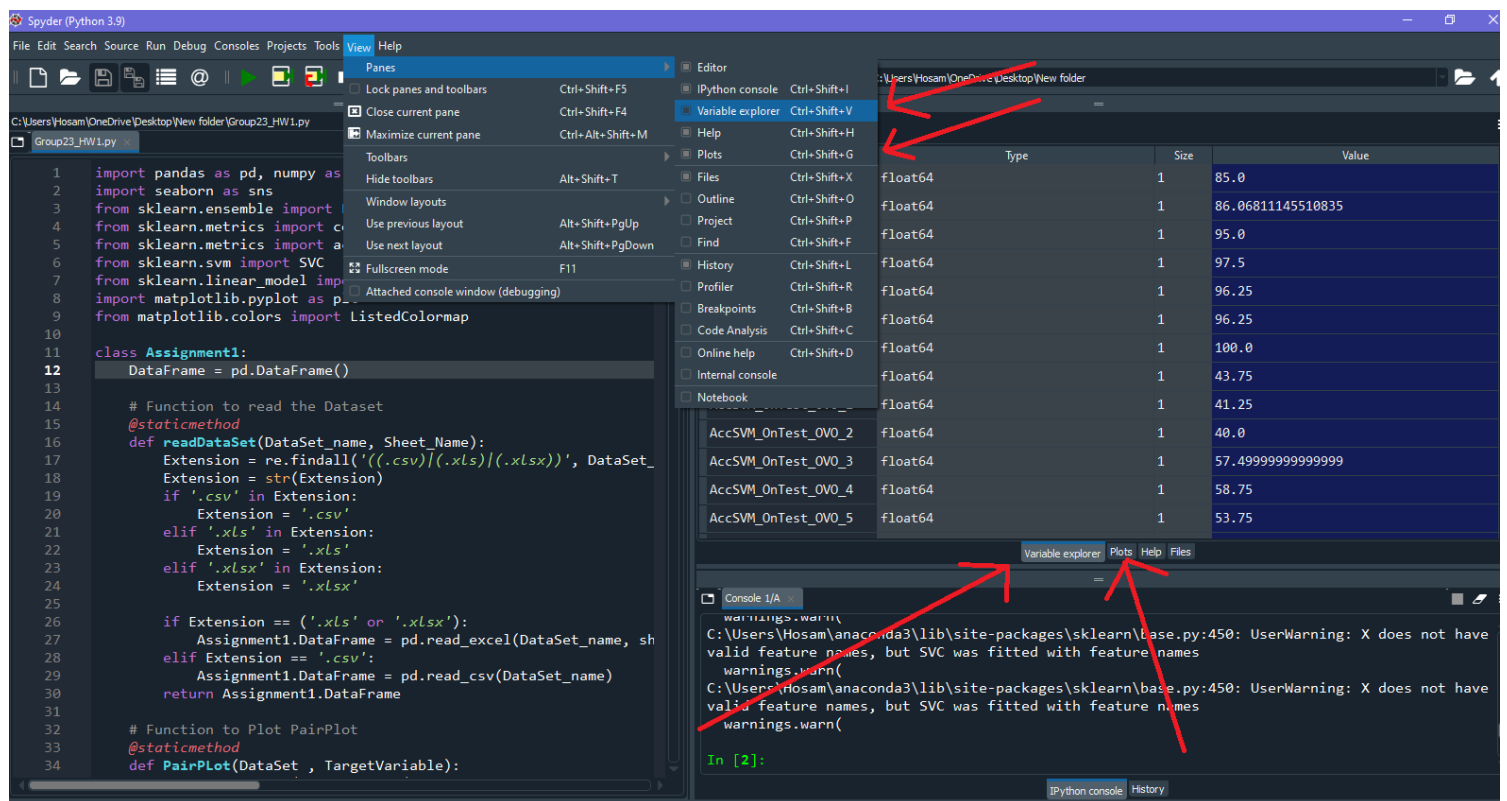
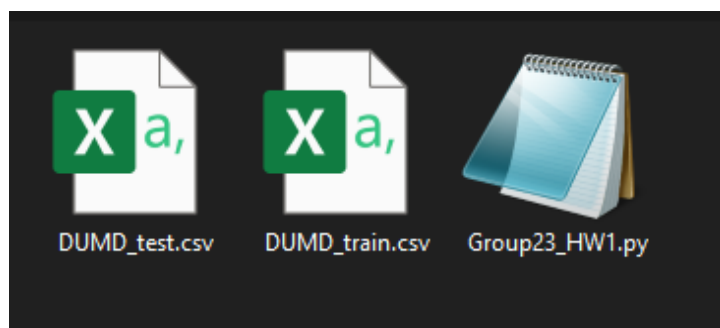


For best experience please consider to run **Group23_HW1.py** on Spyder to see all created variables on variables explorer tab and see all plots on plots tab.



Please make sure that the dataset (**DUMD_test.csv** and **DUMD_train.csv**) are in the same directory path and in the same folder with **Group23_HW1.py** before dragging it into Spyder and run it.



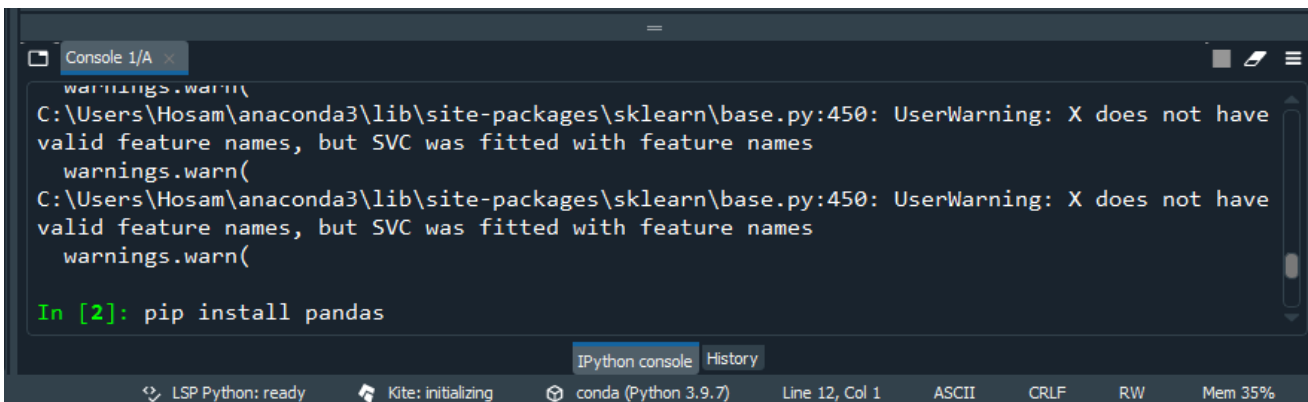
Please make sure that you have installed these libraries before importing it ->

```
import pandas as pd, numpy as np, re  
import seaborn as sns  
from sklearn.ensemble import ExtraTreesClassifier  
from sklearn.metrics import confusion_matrix  
from sklearn.metrics import accuracy_score  
from sklearn.svm import SVC  
from sklearn.linear_model import Perceptron  
import matplotlib.pyplot as plt  
from matplotlib.colors import ListedColormap
```

To install the missing libraries, you have to write something like this ->

```
>>> pip install pandas
```

In Spyder console.



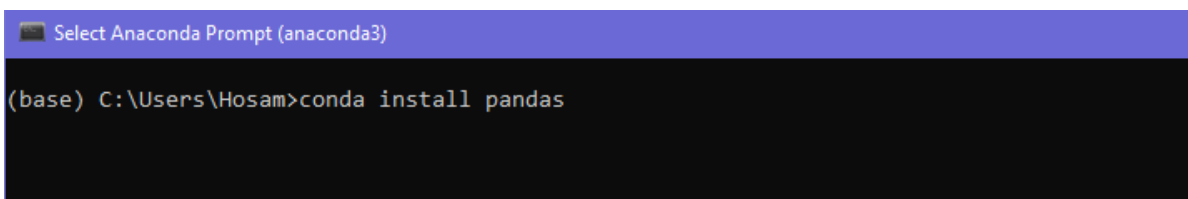
```
warnings.warn(  
C:\Users\Hosam\anaconda3\lib\site-packages\sklearn\base.py:450: UserWarning: X does not have  
valid feature names, but SVC was fitted with feature names  
warnings.warn(  
C:\Users\Hosam\anaconda3\lib\site-packages\sklearn\base.py:450: UserWarning: X does not have  
valid feature names, but SVC was fitted with feature names  
warnings.warn(  
  
In [2]: pip install pandas
```

The screenshot shows the Spyder console window with a dark theme. It displays a warning message from sklearn about feature names and the command 'In [2]: pip install pandas'. The status bar at the bottom indicates 'LSP Python: ready', 'Kite: initializing', 'conda (Python 3.9.7)', 'Line 12, Col 1', 'ASCII', 'CRLF', 'RW', and 'Mem 35%'.

or

```
>>> conda install pandas
```

In Anaconda prompt.



```
Select Anaconda Prompt (anaconda3)  
  
(base) C:\Users\Hosam>conda install pandas
```

The screenshot shows the Anaconda Prompt window with a blue header bar that says 'Select Anaconda Prompt (anaconda3)'. The command prompt shows '(base) C:\Users\Hosam>conda install pandas'.

List of required libraries:

pip install regex

pip install pandas

pip install numpy

pip install seaborn

pip install -U scikit-learn

pip install -U matplotlib