LAB Logbook

Github repository link:
https://github.com/Salimboevm/ML_Finance

Lab 1

For the lab work in week 1, students were asked to create a vector using np.arange method and do some changes on the vector to practice Numpy and Python.

My SID is 1919019, and because of that created 19 elements(last two digits). Then, transformed this vector into a 2 dimensional array with 1 row using the reshape() method. Then, used NumPy's empty_like() method and slicing to create an independent array and save the values of the vector to that independent array. And finally, checked the shape attribute values of both arrays and printed all results at the end of each step.

Results:

```
[302]: vector = np.arange(19)
       print(vector)

       [ 0  1  2  3  4  5  6  7  8  9 10 11 12 13 14 15 16 17 18]
```

```
[306]: vector = vector.reshape(19,1)
       print(vector)

       [[ 0]
        [ 1]
        [ 2]
        [ 3]
        [ 4]
        [ 5]
        [ 6]
        [ 7]
        [ 8]
        [ 9]
        [10]
        [11]
        [12]
        [13]
        [14]
        [15]
        [16]
        [17]
        [18]]
```

```
[308]: new_array_2d = np.empty_like(vector)
       new_array_2d[:,:] = vector
       print(new_array_2d)

       [[ 0]
        [ 1]
        [ 2]
        [ 3]
        [ 4]
        [ 5]
        [ 6]
        [ 7]
        [ 8]
        [ 9]
        [10]
        [11]
        [12]
        [13]
        [14]
        [15]
        [16]
        [17]
        [18]]
```

```
[310]: print(vector.shape)
       print(new_array_2d.shape)

       (19, 1)
       (19, 1)
```

Lab 2

Lab 2 in Week 2, Pandas and its main functions were learnt. Requirements were using "adult_data_mini.csv" dataset and performing several operations.

Lab logbook requirement, n was determined as 9 (n=9) because of my student ID (last digit). Then data was grouped by "relationship" and "hours-per-week". Followed by "hours-per-week" column values were reduced by n=9. At this step, the function change_data(x) was created and used. To apply this function to the dataset, the apply() method was used and the original DataFrame was updated. Lastly, grouping by "relationship" and reduced "hours-per-week" was performed again.

Results:

Student ID: 1919019

```
[223]: group_by_hours = data.groupby(['relationship', 'hours-per-week'])
       group_by_hours.size()
```

```
[223]: relationship   hours-per-week
       Husband        13.0              1
                      40.0              2
                      45.0              1
                      80.0              1
       Not-in-family  16.0              1
                      40.0              2
                      50.0              2
       Own-child      30.0              1
       Wife           40.0              2
       dtype: int64
```

```
[227]: def change_data(x):
           return x - 9

       data['hours-per-week'] = data['hours-per-week'].apply(change_data)
       data
```

[227]:

	age	workclass	fnlwgt	education	education-num	marital-status	occupation	relationship	race	sex	capital-gain	capital-loss	hours-per-week	native-country	Answer	IsHomeles
0	39	State-gov	77516.0	Bachelors	13.0	Never-married	Adm-clerical	Not-in-family	White	Male	2174.0	NaN	31.0	United-States	<=50K	Fals
1	50	Self-emp-not-inc	83311.0	Bachelors	13.0	Married-civ-spouse	Exec-managerial	Husband	White	Male	0.0	0.0	4.0	United-States	<=50K	Fals
2	38	Private	215646.0	HS-grad	9.0	Divorced	Handlers-cleaners	Not-in-family	White	Male	0.0	NaN	31.0	United-States	<=50K	Fals
3	53	Private	234721.0	11th	7.0	Married-civ-spouse	Handlers-cleaners	Husband	Black	Male	0.0	NaN	31.0	United-States	<=50K	Fals
4	28	Private	338409.0	Bachelors	13.0	Married-civ-spouse	Prof-specialty	Wife	Black	Female	0.0	NaN	31.0	Cuba	<=50K	Fals
5	37	Private	284582.0	Masters	14.0	Married-civ-spouse	Exec-managerial	Wife	White	Female	0.0	NaN	31.0	United-States	<=50K	Fals
6	49	Private	160187.0	9th	5.0	Married-spouse-absent	Other-service	Not-in-family	Black	Female	0.0	0.0	7.0	Jamaica	<=50K	Fals
7	52	Self-emp-not-inc	209642.0	HS-grad	9.0	Married-civ-spouse	Exec-managerial	Husband	White	Male	0.0	0.0	36.0	United-States	>50K	Fals
8	31	Private	45781.0	Masters	14.0	Never-married	Prof-specialty	Not-in-family	White	Female	14084.0	NaN	41.0	United-States	>50K	Fals

8	31	Private	45781.0	Masters	14.0	Never-married	Prof-specialty	Not-in-family	White	Female	14084.0	NaN	41.0	United-States	>50K	Fals
10	37	Private	280464.0	Some-college	10.0	Married-civ-spouse	Exec-managerial	Husband	Black	Male	0.0	NaN	71.0	United-States	>50K	Fals
12	23	Private	122272.0	Bachelors	13.0	Never-married	Adm-clerical	Own-child	White	Female	0.0	NaN	21.0	United-States	<=50K	Fals
13	32	Private	205019.0	Assoc-acdm	12.0	Never-married	Sales	Not-in-family	Black	Male	0.0	NaN	41.0	United-States	<=50K	Fals
14	40	Private	121772.0	Assoc-voc	11.0	Married-civ-spouse	Craft-repair	Husband	Asian-Pac-Islander	Male	0.0	NaN	31.0	?	>50K	Fals
15	25	Private	NaN	Some-college	NaN	NaN	NaN	NaN	White	Male	0.0	NaN	NaN	NaN	NaN	Tru

```
[229]: group_by_reduced_hours = data.groupby(['relationship', 'hours-per-week'])
       group_by_reduced_hours.size()
```

```
[229]: relationship   hours-per-week
       Husband        4.0               1
                      31.0              2
                      36.0              1
                      71.0              1
       Not-in-family  7.0               1
                      31.0              2
                      41.0              2
       Own-child      21.0              1
       Wife           31.0              2
       dtype: int64
```

```
[ ]:
```

Lab 3

Lab 3 in Week 3, a bicolour features interaction diagram drawing was requested as a requirement. Because of my student ID, the selected columns are the 1st and 9th columns (based on last two digits: 19).

According to the diagram, the visualisation shows the interaction between these two features using a bicolour scheme. The Seaborn pairplot() function with a hue parameter was used to create the bicolour effect, allowing for clear visual distinction between different categories in the dataset.
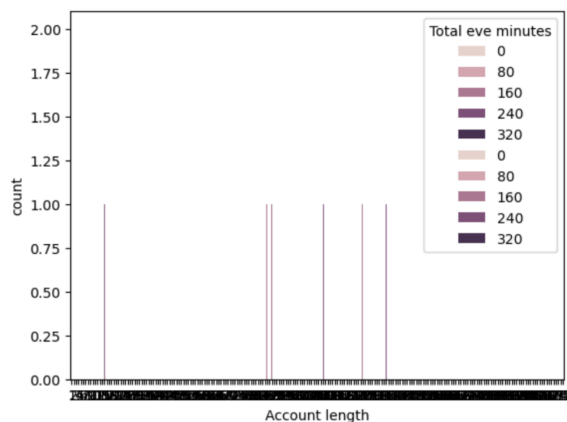
Results:

```
[ ]:
```

Student ID: 1919019

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```
[259]: sns.countplot(x='Account length', hue='Total eve minutes', data=data);
       plt.show()
```


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