

# Application of ML in Industries Lab

## Experiment 2

### Using NumPy and Pandas

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# Pandas

Spyder (Python 3.7)

File Edit Search Source Run Debug Consoles Projects Tools View Help

B:\3rd year\5th sem\P&AD lab\LABexp1.py

labexp1.2.py x LABexp1.py x

```
1 import pandas as pd
2 ### Q1
3 fruits=pd.DataFrame({'Apples':[30], 'Bananas':[21]})
4 print(fruits)
5
6 ### Q2
7 data={'Apples':[35,41], 'Bananas':[21,34]}
8 fruit_sales=pd.DataFrame(data,index=['2017 Sales', '2018 Sales'])
9 print(fruit_sales)
10
11 ### Q3
12 ingredients={'Dinner':pd.Series(['4 cups', '1 cup', '2 large', '1 can'],
13                                index=['Flour', 'Milk', 'Eggs', 'Spam'])}
14 df=pd.DataFrame(ingredients)
15 print(df['Dinner'])
16
17 ### Q4
18 data=pd.read_csv('C:/Users/Dhruv Singhal/winemag-data_first150k.csv')
19 df=pd.DataFrame(data)
20 print(df)
21
22 ### Q5
23 animals = pd.DataFrame({'Cows': [12, 20], 'Goats': [22, 19]}, index=['Year 1', 'Year 2'])
24 print(animals)
25 print(type(animals))
26 animals.to_csv("B:/3rd year/5th sem/P&AD lab/hello.csv")
27
```

Source Console Object

Usage

Help Variable Explorer Plots Files

Console 5/A x

Python 3.7.6 (default, Jan 8 2020, 20:23:39) [MSC v.1916 64 bit (AMD64)]  
Type "copyright", "credits" or "license()" for more information.

IPython 7.26.0 -- An enhanced Interactive Python.

In [1]: runcell(0, 'B:/3rd year/5th sem/P&AD lab/LABexp1.py')

In [2]: runcell('Q1', 'B:/3rd year/5th sem/P&AD lab/LABexp1.py')

```
Apples Bananas
0      30      21
```

In [3]: runcell('Q2', 'B:/3rd year/5th sem/P&AD lab/LABexp1.py')

```
Apples Bananas
2017 Sales    35    21
2018 Sales    41    34
```

In [4]: runcell('Q3', 'B:/3rd year/5th sem/P&AD lab/LABexp1.py')

```
Flour    4 cups
Milk     1 cup
Eggs     2 large
Spam     1 can
Name: Dinner, dtype: object
```

In [5]: runcell('Q4', 'B:/3rd year/5th sem/P&AD lab/LABexp1.py')

```
Unnamed: 0 country ... variety winery
0          0    US ... Cabernet Sauvignon    Heitz
1          1  Spain ... Tinta de Toro    Bodega Carmen Rodríguez
2          2    US ... Sauvignon Blanc    Macauley
3          3    US ... Pinot Noir    Ponzi
4          4  France ... Provence red blend    Domaine de la Bégude
...      ...    ...    ...    ...
150925    150925  Italy ... White Blend    Feudi di San Gregorio
150926    150926  France ... Champagne Blend    H.Germain
150927    150927  Italy ... White Blend    Terredora
150928    150928  France ... Champagne Blend    Gosset
150929    150929  Italy ... Pinot Grigio    Alois Lageder
```

[150930 rows x 11 columns]

In [6]: runcell('Q5', 'B:/3rd year/5th sem/P&AD lab/LABexp1.py')

```
Cows Goats
Year 1    12    22
Year 2    20    19
<class 'pandas.core.frame.DataFrame'>
```

IPython console History

LSP Python: ready conda (Python 3.7.6) Line 27, Col 1 ASCII CRLF RW Mem 44%

File Edit Search Source Run Debug Consoles Projects Tools View Help

labexp1.2.py x LABexp1.py x

```
24 print(animals)
25 print(type(animals))
26 animals.to_csv("B:/3rd year/5th sem/P&AD lab/hello.csv")
27
28 """
29 reviews=pd.read_csv('C:/Users/Dhruv Singhal/winemag-data_first150k.csv')
30 reviews.head()
31
32 """ Q1: Select the description column from reviews and assign the result to the variable desc
33 desc = reviews.description
34 print(desc)
35 """
36 #Q2: Select the first value from the description column of reviews , assigning it to the variable
37 first_desc=reviews.description.iloc[0]
38 print(first_desc)
39 """
40 #Q3: Select the first row of data from reviews , assigning it to the variable
41 first_row=reviews.iloc[0]
42 print(first_row)
43
44 """
45 #Q4: Select the first 10 values from description column in review, assigning the result to the variable
46 first_desc=reviews['description'].head(10)
47 print(first_desc)
48
49 """
50 #Q5: Select the records with index labels 1,2,3,5,8 assigning the result to variable
51 Sample_reviews=reviews.iloc[[1,2,3,5,8]]
52 print(Sample_reviews)
53
54
55
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69
```

Source Editor Object

5

Help Variable Explorer Plots Files

Console 7/A x

```
In [3]: runcell(1, 'B:/3rd year/5th sem/P&AD lab/Labexp1.py')
0 This tremendous 300% varietal wine hails from ...
1 Ripe aromas of fig, blackberry and cassia are ...
2 Pac Hatson honors the memory of a wine once ma...
3 This spent 20 months in 30% new French oak, an...
4 This is the top wine from La Bégude, named aft...
...
150025 Many people feel Fiano represents southern Ita...
150026 Offers an intriguing nose with ginger, lime an...
150027 This classic example comes from a cru vineyard...
150028 A perfect salmon shade, with scents of paches...
150029 More Pinot Grigios should taste like this. A r...
Name: description, Length: 150030, dtype: object

In [4]: runcell(9, 'B:/3rd year/5th sem/P&AD lab/Labexp1.py')
This tremendous 300% varietal wine hails from oakville and was aged over three years in oak. Juicy red-cherry fruit and a compelling hint of caramel greet the palate, framed by elegant, fine tannins and a subtle minty tone in the background. Balanced and rewarding from start to finish, it has years ahead of it to develop further nuance. Enjoy 2022-2030.

In [5]: runcell(9, 'B:/3rd year/5th sem/P&AD lab/Labexp1.py')
Unnamed: 0 0
country US
description This tremendous 300% varietal wine hails from ...
designation Martha's Vineyard
points 96
price 235.0
province California
region_1 Napa Valley
region_2 Napa
variety Cabernet Sauvignon
winery Heitz
Name: 0, dtype: object

In [6]: runcell(20, 'B:/3rd year/5th sem/P&AD lab/Labexp1.py')
0 This tremendous 300% varietal wine hails from ...
1 Ripe aromas of fig, blackberry and cassia are ...
2 Pac Hatson honors the memory of a wine once ma...
3 This spent 20 months in 30% new French oak, an...
4 This is the top wine from La Bégude, named aft...
5 Deep, dense and pure from the opening bell, th...
6 Slightly gritty black-fruit aromas include a s...
7 Lush cedary black-fruit aromas are lush and of...
8 This re-named vineyard was formerly bottled as...
9 The producer sources from two blocks of the vi...
Name: description, dtype: object

In [7]: runcell(11, 'B:/3rd year/5th sem/P&AD lab/Labexp1.py')

In [8]: runcell(11, 'B:/3rd year/5th sem/P&AD lab/Labexp1.py')
Unnamed: 0 country ... variety winery
1 1 Spain ... Tinta de Toro Bodega Carmen Rodríguez
2 2 US ... Sauvignon blanc Bodega Carmen Rodríguez
3 3 US ... Pinot Noir Ponzi
5 5 Spain ... Tinta de Toro Numanthia
8 8 US ... Pinot Noir Bengtström

[5 rows x 11 columns]
```

IPython console History

LSP Python: ready conda (Python 3.7.6) Line 58, Col 1 ASCII CRLF RW Mem 4396

Spyder (Python 3.7)

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B:\3rd year\5th sem\PSAD lab\LABexp1.py

LABexp1.py x

```
54 #Q6: Create a variable df containing the country,province,region_1 and region_2 column of records
55 cols=['country','province','region_1','region_2']
56 indices=[0,1,10,100]
57 df=reviews.loc[indices,cols]
58 print(df)
59 #Q7: Create a variable containing the country and variety col of first 100 records
60 cols_in=['country','variety']
61 df=reviews.loc[:100,cols_in]
62 print(df)
63 #Q8: create a dataframe italian_wines containing reviews of wine made3 in Italy
64 italian_wine=reviews[reviews['country']=='Italy']
65 print(italian_wine)
66 #Q9:create a dataframe containing all reviews with at least 95 points (out of 100) for wines from Australia
67 top_oceania_wines = reviews.loc[reviews.country.isin(['Australia','New Zealand']) & (reviews.points >= 95)]
68 print(top_oceania_wines)
```

Console 10/A x

In [135]: runcell(15, 'B:\3rd year\5th sem\PSAD lab\LABexp1.py')

Unnamed: 0	country	...	variety	winery
2348	Australia	...	Shiraz	Torbreck
2458	Australia	...	Cabernet-Shiraz	Hickinbotham
3033	Australia	...	Cabernet Sauvignon	Penfolds
3044	Australia	...	Shiraz	Henschke
3047	Australia	...	Red Blend	Heartland
...	...	...	...	...
122779	Australia	...	Shiraz	Standish
127634	Australia	...	Shiraz	Henschke
137383	Australia	...	Syrah	Clarendon Hills
150562	Australia	...	Shiraz	Penfolds
150563	Australia	...	Shiraz	Penfolds

[82 rows x 11 columns]

In [141]: runcell(14, 'B:\3rd year\5th sem\PSAD lab\LABexp1.py')

country	variety
0 US	Cabernet Sauvignon
1 Spain	Tinta de Toro
2 US	Sauvignon Blanc
3 US	Pinot Noir
4 France	Provence red blend
...	...
96 US	Chardonnay
97 US	Cabernet Sauvignon
98 France	Merlot-Malbec
99 France	Ugni Blanc-Colombard
100 US	Vignier

[101 rows x 2 columns]

In [145]: runcell(14, 'B:\3rd year\5th sem\PSAD lab\LABexp1.py')

Unnamed: 0	country	...	variety	winery
30	Italy	...	Friulano	Borgo del Taglio
32	Italy	...	Sangiovese	Abbadia d'Angelo
35	Italy	...	Sangiovese	Cavillon
37	Italy	...	Sangiovese	Avignonesi
38	Italy	...	Sangiovese	Casina di Cornia
...	...	...	...	...
150920	Italy	...	Champagne Blend	Le Fari
150922	Italy	...	Tocai	Ronchi di Montano
150925	Italy	...	White Blend	Feudi di San Gregorio
150927	Italy	...	White Blend	Terredora
150929	Italy	...	Pinot Grigio	Alois Lageder

[13478 rows x 11 columns]

In [146]: runcell(15, 'B:\3rd year\5th sem\PSAD lab\LABexp1.py')

Unnamed: 0	country	...	variety	winery
2348	Australia	...	Shiraz	Torbreck
2458	Australia	...	Cabernet-Shiraz	Hickinbotham
3033	Australia	...	Cabernet Sauvignon	Penfolds
3044	Australia	...	Shiraz	Henschke
3047	Australia	...	Red Blend	Heartland
...	...	...	...	...
122779	Australia	...	Shiraz	Standish

IPython console History

LSP Python: ready conda (Python 3.7.6) Line 89, Col 1 ASCII CRLF RW Mem 46%

Spyder (Python 3.7)

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B:\3rd year\5th sem\P&AD lab\LABexp1.py

LABexp1.py x

```
113
114
115 """ What is the median of the points column in the reviews DataFrame?
116 med_points=reviews['points'].median()
117 print(med_points)
118
119 """What countries are represented in the dataset? (Your answer should not include any duplicates)
120 countries=reviews.country.unique()
121 print(countries)
122
123 """ How often does each country appear in the dataset? Create a Series reviews_per_country map
124
125 reviews_per_country=reviews.country.value_counts()
126 print(reviews_per_country)
127
128 """ Create variable centered_price containing a version of the price column with the mean price
129
130 centered_price = reviews.price- reviews.price.mean()
131 print(centered_price)
132
133 """ I'm an economical wine buyer. Which wine is the "best bargain"? Create a variable bargain_idx
134 bargain_idx=(reviews.points/reviews.price).idxmax()
135 bargain_wine = reviews.loc[bargain_idx]
136 print(bargain_wine)
137
138 """ There are only so many words you can use when describing a bottle of wine. Is a wine more
139 n_trop = reviews['description'].map(lambda desc: "tropical" in desc).sum()
140 n_fruity = reviews['description'].map(lambda desc: "fruity" in desc).sum()
141 descriptor_counts=pd.Series([n_trop,n_fruity],index=["tropical","fruity"])
142 print(descriptor_counts)
143
144
145
146
147
148
149
150
151
152
153
154
155
156
157
```

Source Editor Object

No documentation available

Help Variable Explorer Plots Files

Console 12/A x

```
88.0
In [4]: runcell('What countries are represented in the dataset? (Your answer should not include any duplicates.)', 'B:/3rd year/5th sem/P&AD lab/LABexp1.py')
['US' 'Spain' 'France' 'Italy' 'New Zealand' 'Bulgaria' 'Argentina'
 'Australia' 'Portugal' 'Israel' 'South Africa' 'Greece' 'Chile' 'Morocco'
 'Romania' 'Germany' 'Canada' 'Moldova' 'Hungary' 'Austria' 'Croatia'
 'Slovenia' 'nan' 'India' 'Turkey' 'Macedonia' 'Lebanon' 'Serbia' 'Uruguay'
 'Switzerland' 'Albania' 'Bosnia and Herzegovina' 'Brazil' 'Cyprus'
 'Lithuania' 'Japan' 'China' 'South Korea' 'Ukraine' 'England' 'Mexico'
 'Georgia' 'Montenegro' 'Luxembourg' 'Slovakia' 'Czech Republic' 'Egypt'
 'Tunisia' 'US-France']

In [5]: runcell('How often does each country appear in the dataset? Create a Series reviews_per_country mapping countries to the count of reviews of wines from that country.', 'B:/3rd year/5th sem/P&AD lab/LABexp1.py')
US                62397
Italy              23478
France             21098
Spain              8268
Chile              5816
Argentina          5631
Portugal           5322
Australia          4957
New Zealand        3320
Austria            3057
Germany            2452
South Africa       2258
Greece             884
Israel             630
Hungary            231
Canada             196
Romania            139
Slovenia           94
Uruguay            92
Croatia            89
Bulgaria           77
Moldova            71
Mexico             63
Turkey            52
Georgia            43
Lebanon            37
Cyprus             31
Brazil            25
Macedonia          16
Serbia             14
Morocco            12
```

IPython console History

LSP Python: ready conda (Python 3.7.6) Line 147, Col 1 ASCII CRLF RW Mem 44%



Spyder (Python 3.7)

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B:\3rd year\5th sem\P&AD lab\LABexp1.py

LABexp1.py x

```
93 #####What is the best wine I can buy for a given amount of money? Create a Series whose index is wine prices an
94 best_rating_per_price = reviews.groupby('price')['points'].max().sort_index()
95 print(best_rating_per_price)
96
97 ##### What are the minimum and maximum prices for each variety of wine? Create a DataFrame whose index is the v
98 price_extremes = reviews.groupby('variety').price.agg([min, max])
99 print(price_extremes)
100
101 ##### What are the most expensive wine varieties? Create a variable sorted_varieties containing a copy of the
102 sorted_varieties = price_extremes.sort_values(by=[ 'min', 'max'], ascending=False)
103 print(sorted_varieties)
104
105 ##### What combination of countries and varieties are most common? Create a Series whose index is a MultiIndex
106 country_variety_counts = reviews.groupby(['country', 'variety']).size().sort_values(ascending=False)
107 print(country_variety_counts)
108
109
110
111
112
113
114
115
116
117
118
119
120
121
122
123
124
125
126
127
128
129
130
131
132
133
134
135
136
137
138
139
140
141
142
143
144
145
146
```

Variable Explorer

Plots

Files

Name	Type	Size	Value
best_rating_per_price	Series	(357,)	Series object of pandas.core.series module
price_extremes	DataFrame	4	['country', 'variety', 'region_1', 'region_2']

Console 10/A x

```
2013.0 91
2300.0 99
Name: points, Length: 357, dtype: int64

In [30]: runcell('What are the minimum and maximum prices for each variety of wine? Create a DataFrame whose index is the variety category from the dataset and whose values are the min and max values thereof.', '61/3rd year/5th sem/P&AD lab/LABexp1.py')

variety      min      max
Agdopitiko    5.0    65.0
Aghlanico     6.0   130.0
Aidani        27.0    27.0
Airen         5.0    30.0
Albana        5.0    66.0
...          ...    ...
Zierfandler-Rotgipfler  20.0    25.0
Zinfandel     4.0   300.0
Zlahtina     13.0    17.0
Zweigelt      9.0    70.0
Zilavka       13.0    15.0

[632 rows x 2 columns]

In [30]: runcell('What are the most expensive wine varieties? Create a variable sorted_varieties containing a copy of the dataframe from the previous question where varieties are sorted in descending order based on minimum price, then on maximum price (to break ties).', '61/3rd year/5th sem/P&AD lab/LABexp1.py')

variety      min      max
Cabernet-Shiraz  150.0   150.0
petzello       92.0   105.0
Carignan-Syrah   80.0    80.0
Syrah-Cabernet Franc  60.0    60.0
Nasco          65.0    65.0
...          ...    ...
Rabigato       NaN     NaN
Sacy           NaN     NaN
Sauvignon Blanc-Sauvignon Gris  NaN     NaN
Terret Blanc    NaN     NaN
Zelen          NaN     NaN

[632 rows x 2 columns]

In [30]: runcell('What combination of countries and varieties are most common? Create a Series whose index is a MultiIndex (country, variety) pairs. For example, a pinot noir produced in the US should map to ("US", "Pinot noir"). Sort the values in the Series in descending order based on wine count.', '61/3rd year/5th sem/P&AD lab/LABexp1.py')

country      variety      count
US           Pinot noir    30340
US           Cabernet Sauvignon  9178
US           Chardonnay    8127
France       Bordeaux-style Red Blend  4060
US           Syrah        4274
...          ...          ...
France       Pied de Poudre    1
Tunisia      White Blend       1
US           Rosé            1
Switzerland  White Blend       1
US           Carignan-Grenache  1
Length: 1475, dtype: int64

In [31]:
```

IPython console

History

LSP Python: readyconda (Python 3.7.6)Line 122, Col 1 ASCII CRLF RW Mem 45%

Spyder (Python 3.7)

File Edit Search Source Run Debug Consoles Projects Tools View Help

B:\3rd year\5th sem\P&AD lab

B:\3rd year\5th sem\P&AD lab\LABexp1.py

LABexp1.py x

```
79
80 ##### What is the data type of the points column in the dataset?
81 print(reviews['points'].dtype)
82 ##### Create a Series from entries in the points column, but convert the entries to strings. Hint: st
83 point_strings=reviews['points'].astype(str)
84 print(type(point_strings[0]))
85 ##### Sometimes the price column is null. How many reviews in the dataset are missing a price?
86 n_missing_prices=reviews['price'].isnull().sum()
87 print(n_missing_prices)
88 ##### What are the most common wine-producing regions? Create a Series counting the number of times ea
89 rev_pregion=reviews['region_1'].fillna('Unknown').value_counts().sort_values(ascending=False)
90 print(rev_pregion)
91
92
93
94
95
96
97
98
99
100
101
102
103
104
105
106
107
108
109
110
111
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113
114
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116
117
118
119
120
121
122
123
```

Name	Type	Size	Value
n_missing_prices	int64	1	13695
point_strings	Series	(150030)	Series object of pandas core series module

Help Variable Explorer Plots Files

Console 10/A x

```
In [8]: runcell('What is the data type of the points column in the dataset?', 'B:/3rd year/5th sem/P&AD
lab/LABexp1.py')
int64

In [9]: runcell('Create a Series from entries in the points column, but convert the entries to strings.
Hint: strings are str in native Python.', 'B:/3rd year/5th sem/P&AD lab/LABexp1.py')
<class 'str'>

In [10]: runcell('Sometimes the price column is null. How many reviews in the dataset are missing a
price?', 'B:/3rd year/5th sem/P&AD lab/LABexp1.py')
13695

In [11]: runcell('What are the most common wine-producing regions? Create a Series counting the number of
times each value occurs in the region_1 field. This field is often missing data, so replace missing values
with Unknown. Sort in descending order. Your output should look something like this:', 'B:/3rd year/5th
sem/P&AD lab/LABexp1.py')
Unknown                25060
Napa Valley            6209
Columbia Valley (WA)   4975
Mendoza               3586
Russian River Valley   3571
...
Vin de Pays de Côtes du Tarn    1
Clos de Lambrays              1
California-Oregon             1
Mâcon-Mancey                  1
Coteaux du Tricastin          1
Name: region_1, Length: 1237, dtype: int64

In [12]:
```

IPython console History

LSP Python: ready conda (Python 3.7.6) Line 100, Col 1 ASCII CRLF RW Mem 46%

Spyder (Python 3.7)

File Edit Search Source Run Debug Consoles Projects Tools View Help

B:\3rd year\5th sem\P&AD lab

B:\3rd year\5th sem\P&AD lab\LABexp1.py

LABexp1.py x

```
73 ### region_1 and region_2 are pretty uninformative names for locale columns in the dataset. Create a copy of reviews with these columns renamed to region and locale, respectively.
74 renamed=reviews.rename(columns=dict(region_1='region',region_2='Locale'))
75 print(renamed.head())
76 ### Set the index name in the dataset to wines.
77 reindexed=reviews.rename_axis('wine',axis=0)
78 print(reindexed.head())
79
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
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Source Editor Object

arr

Help Variable Explorer Plots Files

Console 10/A x

Python 3.7.6 (default, Jan 8 2020, 20:23:39) [MSC v.1916 64 bit (AMD64)]  
Type "copyright", "credits" or "license()" for more information.

IPython 7.26.0 -- An enhanced Interactive Python.

In [1]: runcell(0, 'B:/3rd year/5th sem/P&AD lab/LABexp1.py')

In [2]: runcell(6, 'B:/3rd year/5th sem/P&AD lab/LABexp1.py')

In [3]: runcell('region\_1 and region\_2 are pretty uninformative names for locale columns in the dataset. Create a copy of reviews with these columns renamed to region and locale, respectively.', 'B:/3rd year/5th sem/P&AD lab/LABexp1.py')

	Unnamed: 0	country	...	variety	winery
0	0	US	...	Cabernet Sauvignon	Heitz
1	1	Spain	...	Tinta de Toro	Bodega Carmen Rodriguez
2	2	US	...	Sauvignon Blanc	Macauley
3	3	US	...	Pinot Noir	Ponzi
4	4	France	...	Provence red blend	Domaine de la Bégude

[5 rows x 11 columns]

In [4]: runcell('Set the index name in the dataset to wines.', 'B:/3rd year/5th sem/P&AD lab/LABexp1.py')

	Unnamed: 0	country	...	variety	winery
wine	0	US	...	Cabernet Sauvignon	Heitz
1	1	Spain	...	Tinta de Toro	Bodega Carmen Rodriguez
2	2	US	...	Sauvignon Blanc	Macauley
3	3	US	...	Pinot Noir	Ponzi
4	4	France	...	Provence red blend	Domaine de la Bégude

[5 rows x 11 columns]

In [5]:

IPython console History

LSP Python: ready conda (Python 3.7.6) Line 97, Col 1 ASCII CRLF RW Mem 45%



# NumPy

Spyder (Python 3.7)

File Edit Search Source Run Debug Consoles Projects Tools View Help

B:\3rd year\5th sem\P&AD lab\labexp1.2.py

labexp1.2.py x LABexp1.py x

```
1 import numpy as np
2 ### Insert the correct method for creating a NumPy array.
3 arr = np.array([1, 2, 3, 4, 5])
4 print(arr)
5 ### Insert the correct argument for creating a NumPy array with 2 dimensions.
6 arr = np.array([1, 2, 3, 4], ndmin=2)
7 print(arr)
8 ### Insert the correct syntax for checking the number of dimension of a NumPy array.
9 arr = np.array([1, 2, 3, 4])
10 print(arr.ndim)
11 ### Insert the correct syntax for printing the first item in the array.
12 arr = np.array([1, 2, 3, 4, 5])
13 print(arr[0])
14 ### Insert the correct syntax for printing the number 50 from the array.
15 arr = np.array([1, 2, 3, 4, 5])
16 print(arr[4])
17 ### Insert the correct syntax for printing the number 50 from the array.
18 arr = np.array([[10, 20, 30, 40], [50, 60, 70, 80]])
19 print(arr[1,0])
20 ### Use negative index to print the last item in the array.
21 arr = np.array([10, 20, 30, 40, 50])
22 print(arr[-1])
23 ### Insert the correct slicing syntax to print the following selection of the array:
24 #Everything from (including) the second item to (not including) the fifth item.
25 arr = np.array([10, 15, 20, 25, 30, 35, 40])
26 print(arr[1:4])
27 ### Insert the correct slicing syntax to print the following selection of the array:
28 #Everything from (including) the third item to (not including) the fifth item.
29 arr = np.array([10, 15, 20, 25, 30, 35, 40])
30 print(arr[2:4])
31 ### Insert the correct slicing syntax to print the following selection of the array:
32 #Every other item from (including) the second item to (not including) the fifth item.
33 arr = np.array([10, 15, 20, 25, 30, 35, 40])
34 print(arr[1:5:2])
35 ### Insert the correct slicing syntax to print the following selection of the array:
36 #Every other item from the entire array
37 arr = np.array([10, 15, 20, 25, 30, 35, 40])
38 print(arr[::2])
39
40
41
42
43
44
45
46
```

Source Editor Object

arr

Help Variable Explorer Plots Files

Console 9/A x

Python 3.7.6 (default, Jan 8 2020, 20:23:39) [MSC v.1916 64 bit (AMD64)]  
Type "copyright", "credits" or "license" for more information.

IPython 7.26.0 -- An enhanced Interactive Python.

```
In [1]: runcell(0, 'B:/3rd year/5th sem/P&AD Lab/Labexp1.2.py')

In [2]: runcell('Insert the correct method for creating a NumPy array.', 'B:/3rd year/5th sem/P&AD Lab/Labexp1.2.py')
[1 2 3 4 5]

In [3]: runcell('Insert the correct argument for creating a NumPy array with 2 dimensions.', 'B:/3rd year/5th sem/P&AD Lab/Labexp1.2.py')
[[1 2 3 4]]

In [4]: runcell('Insert the correct syntax for checking the number of dimension of a NumPy array.', 'B:/3rd year/5th sem/P&AD Lab/Labexp1.2.py')
1

In [5]: runcell('Insert the correct syntax for printing the first item in the array.', 'B:/3rd year/5th sem/P&AD Lab/Labexp1.2.py')
1

In [6]: runcell('Insert the correct syntax for printing the number 50 from the array., #1', 'B:/3rd year/5th sem/P&AD Lab/Labexp1.2.py')
5

In [7]: runcell('Insert the correct syntax for printing the number 50 from the array., #2', 'B:/3rd year/5th sem/P&AD Lab/Labexp1.2.py')
50

In [8]: runcell('Use negative index to print the last item in the array.', 'B:/3rd year/5th sem/P&AD Lab/Labexp1.2.py')
50

In [9]: runcell('Insert the correct slicing syntax to print the following selection of the array:, #1', 'B:/3rd year/5th sem/P&AD Lab/Labexp1.2.py')
[15 20 25]

In [10]: runcell('Insert the correct slicing syntax to print the following selection of the array:, #2', 'B:/3rd year/5th sem/P&AD Lab/Labexp1.2.py')
[20 25]

In [11]: runcell('Insert the correct slicing syntax to print the following selection of the array:, #3', 'B:/3rd year/5th sem/P&AD Lab/Labexp1.2.py')
[15 25]

In [12]: runcell('Insert the correct slicing syntax to print the following selection of the array:, #4', 'B:/3rd year/5th sem/P&AD Lab/Labexp1.2.py')
[10 20 30 40]

In [13]:
```

IPython console History

LSP Python: ready conda (Python 3.7.6) Line 39, Col 1 ASCII CRLF RW Mem 43%

Spyder (Python 3.7)

File Edit Search Source Run Debug Consoles Projects Tools View Help

B:\3rd year\5th sem\P&AD lab\labexp1.2.py

labexp1.2.py x LABexp1.py x

```
48
49  """ NumPy uses a character to represent each of the following data types, which one?
50  # i = integer
51  # b = boolean
52  # u = unsigned integer
53  # f = float
54  # c = complex float
55  # m = timedelta
56  # M = datetime
57  # O = object
58  # S = string
59  """ Insert the correct NumPy syntax to print the data type of an array.
60  arr = np.array([1, 2, 3, 4])
61  print(arr.dtype)
62  """ Insert the correct argument to specify that the array should be of type STRING.
63  arr = np.array([1, 2, 3, 4], dtype='S')
64  print(arr)
65  """ Insert the correct method to change the data type to integer.
66  arr = np.array([1.1, 2.1, 3.1])
67  newarr = arr.astype('i')
68  print(newarr)
69  """ Use the correct method to make a copy of the array.
70  arr = np.array([1, 2, 3, 4, 5])
71  x = arr.copy()
72  print(x)
73  """ Use the correct method to make a view of the array.
74  arr = np.array([1, 2, 3, 4, 5])
75  x = arr.view()
76  print(x)
77  """ Use the correct NumPy syntax to check the shape of an array.
78  arr = np.array([1, 2, 3, 4, 5])
79  print(arr.shape)
80  """ Use the correct NumPy method to change the shape of an array from 1-D to 2-D.
81  arr = np.array([1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12])
82  newarr = arr.reshape(4, 3)
83  print(newarr)
84  """ Use a correct NumPy method to change the shape of an array from 2-D to 1-D.
85  arr = np.array([1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12])
86  newarr = arr.reshape(-1)
87  print(newarr)
88  """ Use a correct NumPy method to join two arrays into a single array.
89  arr1 = np.array([1, 2, 3])
90  arr2 = np.array([4, 5, 6])
91  arr = np.concatenate((arr1, arr2))
92  print(arr)
93
```

Source Editor Object

arr

Help Variable Explorer Plots Files

Console 9/A x

```
In [13]: runcell('NumPy uses a character to represent each of the following data types, which one?', 'B:/3rd year/5th sem/P&AD lab/labexp1.2.py')
Nothing to execute, this cell is empty.

In [14]: runcell('Insert the correct NumPy syntax to print the data type of an array.', 'B:/3rd year/5th sem/P&AD lab/labexp1.2.py')
int32

In [15]: runcell('Insert the correct argument to specify that the array should be of type STRING.', 'B:/3rd year/5th sem/P&AD lab/labexp1.2.py')
[b'1' b'2' b'3' b'4']

In [16]: runcell('Insert the correct method to change the data type to integer.', 'B:/3rd year/5th sem/P&AD lab/labexp1.2.py')
[1 2 3]

In [17]: runcell('Use the correct method to make a copy of the array.', 'B:/3rd year/5th sem/P&AD lab/labexp1.2.py')
[1 2 3 4 5]

In [18]: runcell('Use the correct NumPy syntax to check the shape of an array.', 'B:/3rd year/5th sem/P&AD lab/labexp1.2.py')
(5,)

In [19]: runcell('Use the correct NumPy method to change the shape of an array from 1-D to 2-D.', 'B:/3rd year/5th sem/P&AD lab/labexp1.2.py')
[[ 1  2  3]
 [ 4  5  6]
 [ 7  8  9]
 [10 11 12]]

In [20]: runcell('Use a correct NumPy method to change the shape of an array from 2-D to 1-D.', 'B:/3rd year/5th sem/P&AD lab/labexp1.2.py')
[ 1  2  3  4  5  6  7  8  9 10 11 12]

In [21]: runcell('Use a correct NumPy method to join two arrays into a single array.', 'B:/3rd year/5th sem/P&AD lab/labexp1.2.py')
[1 2 3 4 5 6]

In [22]:
```

Python console History

LSP Python: ready conda (Python 3.7.6) Line 94, Col 1 ASCII CRLF RW Mem 44%

Spyder (Python 3.7)

File Edit Search Source Run Debug Consoles Projects Tools View Help

B:\3rd year\5th sem\P&AD lab

B:\3rd year\5th sem\P&AD lab\labexp1.2.py

labexp1.2.py x LABexp1.py x

```
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126   """ Use the correct NumPy method to find all items with the value 4.
127   arr = np.array([1, 2, 3, 4, 5, 4, 4])
128   x = np.where(arr == 4)
129   print(x)
130   """
131   """ Use the correct NumPy method to return a sorted array.
132   arr = np.array([3, 2, 0, 1])
133   x = np.sort(arr)
134   print(x)
135
136
137
138
139
```

Source Editor Object

arr

Help Variable Explorer Plots Files

Console 9/A x

```
In [23]: runcell('Use the correct NumPy method to find all items with the value 4.', 'B:/3rd year/5th sem/P&AD lab/labexp1.2.py')
(array([3, 5, 6], dtype=int64),)

In [24]: runcell('Use the correct NumPy method to return a sorted array.', 'B:/3rd year/5th sem/P&AD lab/labexp1.2.py')
[0 1 2 3]

In [25]:
```

Python console History

LSP Python: ready conda (Python 3.7.6) Line 113, Col 1 ASCII CRLF RW Mem 44%