

2347138_P9

September 20, 2023

```
[ ]: import pandas as pd
import csv

data = pd.read_csv("D:\PRATHAM FILES\Web design Project\Python_
↪new\studentsdetails.csv")
print(data.head(20))
```

	YearofStudy	Course	Age	ApproxHeight	ApproxWeight	\
0	Second Year	MATHEMATICS	20	152	80	
1	First Year	ECONOMICS AND STATISTICS	29	182	79	
2	Fourth Year	MATHEMATICS	22	167	64	
3	Second Year	ECONOMICS AND STATISTICS	23	149	52	
4	Second Year	MATHEMATICS	18	150	70	
5	Third Year	URBAN PLANNING	20	154	56	
6	Third Year	MATHEMATICS	21	165	79	
7	Third Year	MATHEMATICS	21	162	57	
8	Fourth Year	ACTUARIAL SCIENCE	22	154	53	
9	Fourth Year	ECONOMICS	21	172	57	
10	Third Year	MATHEMATICS	22	172	78	
11	Second Year	MATHEMATICS	22	160	60	
12	Fourth Year	MATHEMATICS	23	170	66	
13	First Year	ECONOMICS AND STATISTICS	20	167	79	
14	Second Year	ECONOMICS AND STATISTICS	34	176	80	
15	Third Year	STATISTICS	20	150	54	
16	Third Year	ECONOMICS AND STATISTICS	21	167	45	
17	Third Year	APPLIED MATHEMATICS	20	122	52	
18	Third Year	STATISTICS	21	160	52	
19	Second Year	STATISTICS	21	200	65	

	KCSE	Yr_JoinCampus	SitKCSE	Expense_Semester	Expense_Accommodation	\
0	2016	2018	Central	8744	6043	
1	2010	2010	Rift Valley	26293	14782	
2	2015	2016	Western	44105	19224	
3	2016	2018	Coast	33954	18795	
4	2013	2018	Western	18113	25569	
5	2016	2017	Central	11648	41028	
6	2016	2017	Rift Valley	39252	44024	
7	2016	2017	Nyanza	38174	36925	

8	2015	2016	Nyanza	40833	27034
9	2015	2016	Rift Valley	42264	26059
10	2016	2017	Coast	6811	39242
11	2015	2016	Coast	34148	37578
12	2015	2016	Nairobi	49155	21501
13	2010	2010	Nairobi	23654	17407
14	2012	2012	Eastern	32733	39019
15	2016	2017	Central	45232	35910
16	2016	2017	Nairobi	28393	9384
17	2016	2017	Central	24691	28958
18	2016	2017	Central	36282	48476
19	2018	2019	Nairobi	9726	20195

	Previous_Exam_MeanGrade
0	B
1	B
2	B
3	B
4	A
5	A
6	A
7	B
8	B
9	B
10	C
11	B
12	B
13	C
14	E
15	B
16	B
17	B
18	B
19	B

```
[ ]: print(data.isnull())
```

	YearofStudy	Course	Age	ApproxHeight	ApproxWeight	KCSE	\
0	False	False	False	False	False	False	
1	False	False	False	False	False	False	
2	False	False	False	False	False	False	
3	False	False	False	False	False	False	
4	False	False	False	False	False	False	
..	
57	False	False	False	False	False	False	
58	False	False	False	False	False	False	
59	False	False	False	False	False	False	
60	False	False	False	False	False	False	

```

61      False  False  False      False      False  False
      Yr_JoinCampus  SitKCSE  Expense_Semester  Expense_Accommodation  \
0      False      False      False      False      False
1      False      False      False      False      False
2      False      False      False      False      False
3      False      False      False      False      False
4      False      False      False      False      False
..      ...      ...      ...      ...
57      False      False      False      False      False
58      False      False      False      False      False
59      False      False      False      False      False
60      False      False      False      False      False
61      False      False      False      False      False

```

```

      Previous_Exam_MeanGrade
0      False
1      False
2      False
3      False
4      False
..      ...
57      False
58      False
59      False
60      False
61      False

```

[62 rows x 11 columns]

```
[ ]: print(data.describe())
```

```

      Age  ApproxHeight  ApproxWeight      KCSE  Yr_JoinCampus  \
count  62.00000      62.000000      62.000000      62.000000      62.000000
mean   22.16129      158.064516      62.161290      2015.290323      2016.419355
std     2.47077       13.583827       9.970766       1.796053       2.076791
min    18.00000      122.000000      45.000000      2010.000000      2010.000000
25%    21.00000      149.250000      54.000000      2015.000000      2016.000000
50%    22.00000      157.000000      59.500000      2016.000000      2017.000000
75%    23.00000      167.000000      68.750000      2016.000000      2017.000000
max     34.00000      200.000000      80.000000      2018.000000      2019.000000

```

```

      Expense_Semester  Expense_Accommodation
count      62.000000      62.000000
mean     28208.209677      25530.564516
std     13259.171599      12728.001670
min       6171.000000      3536.000000
25%     18199.250000      14706.250000

```

50%	28424.000000	25814.000000
75%	37753.500000	35681.250000
max	49155.000000	48633.000000

```
[ ]: print(data.info())
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 62 entries, 0 to 61
Data columns (total 11 columns):
#   Column                                Non-Null Count  Dtype
---  -
0   YearofStudy                          62 non-null     object
1   Course                               62 non-null     object
2   Age                                  62 non-null     int64
3   ApproxHeight                        62 non-null     int64
4   ApproxWeight                        62 non-null     int64
5   KCSE                                62 non-null     int64
6   Yr_JoinCampus                       62 non-null     int64
7   SitKCSE                             62 non-null     object
8   Expense_Semester                    62 non-null     int64
9   Expense_Accommodation               62 non-null     int64
10  Previous_Exam_MeanGrade             62 non-null     object
dtypes: int64(7), object(4)
memory usage: 5.5+ KB
None
```

```
[ ]: print(data.shape)
```

```
(62, 11)
```

```
[ ]: print(data.dropna())
```

	YearofStudy	Course	Age	ApproxHeight	ApproxWeight	\
0	Second Year	MATHEMATICS	20	152	80	
1	First Year	ECONOMICS AND STATISTICS	29	182	79	
2	Fourth Year	MATHEMATICS	22	167	64	
3	Second Year	ECONOMICS AND STATISTICS	23	149	52	
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..	
57	Fourth Year	MATHEMATICS	25	142	66	
58	Fourth Year	MATHEMATICS	23	171	55	
59	Third Year	ECONOMICS AND STATISTICS	22	174	77	
60	Third Year	STATISTICS	21	142	64	
61	Third Year	STATISTICS	22	141	58	

	KCSE	Yr_JoinCampus	SitKCSE	Expense_Semester	Expense_Accommodation	\
0	2016	2018	Central	8744	6043	
1	2010	2010	Rift Valley	26293	14782	
2	2015	2016	Western	44105	19224	

3	2016	2018	Coast	33954	18795
4	2013	2018	Western	18113	25569
..
57	2015	2016	Eastern	21556	15814
58	2015	2016	Rift Valley	36226	3536
59	2016	2017	Coast	48495	31425
60	2016	2017	Nyanza	36492	34995
61	2016	2017	Eastern	9222	31360

```

Previous_Exam_MeanGrade
0          B
1          B
2          B
3          B
4          A
..         ...
57         C
58         C
59         B
60         B
61         B

```

[62 rows x 11 columns]

```
[ ]: print(data.fillna(12))
      print(data.fillna(method="ffill"))
      print(data.fillna(method="bfill"))
```

	YearofStudy	Course	Age	ApproxHeight	ApproxWeight	\
0	Second Year	MATHEMATICS	20	152	80	
1	First Year	ECONOMICS AND STATISTICS	29	182	79	
2	Fourth Year	MATHEMATICS	22	167	64	
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61	2016	2017	Eastern	9222	31360

Previous_Exam_MeanGrade	
0	B
1	B
2	B
3	B
4	A
..	...
57	C
58	C
59	B
60	B
61	B

[62 rows x 11 columns]

	YearofStudy	Course	Age	ApproxHeight	ApproxWeight	\
0	Second Year	MATHEMATICS	20	152	80	
1	First Year	ECONOMICS AND STATISTICS	29	182	79	
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2	2015	2016	Western	44105	19224	
3	2016	2018	Coast	33954	18795	
4	2013	2018	Western	18113	25569	
..	
57	2015	2016	Eastern	21556	15814	
58	2015	2016	Rift Valley	36226	3536	
59	2016	2017	Coast	48495	31425	
60	2016	2017	Nyanza	36492	34995	
61	2016	2017	Eastern	9222	31360	

Previous_Exam_MeanGrade	
0	B

1	B
2	B
3	B
4	A
..	...
57	C
58	C
59	B
60	B
61	B

[62 rows x 11 columns]

	YearofStudy	Course	Age	ApproxHeight	ApproxWeight	\
0	Second Year	MATHEMATICS	20	152	80	
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2	2015	2016	Western	44105	19224	
3	2016	2018	Coast	33954	18795	
4	2013	2018	Western	18113	25569	
..	
57	2015	2016	Eastern	21556	15814	
58	2015	2016	Rift Valley	36226	3536	
59	2016	2017	Coast	48495	31425	
60	2016	2017	Nyanza	36492	34995	
61	2016	2017	Eastern	9222	31360	

	Previous_Exam_MeanGrade
0	B
1	B
2	B
3	B
4	A
..	...
57	C
58	C
59	B

```
60                                     B
61                                     B
```

```
[62 rows x 11 columns]
```

```
C:\Users\Pratham m\AppData\Local\Temp\ipykernel_7680\3243905285.py:2:
```

```
FutureWarning: DataFrame.fillna with 'method' is deprecated and will raise in a
future version. Use obj.ffill() or obj.bfill() instead.
```

```
print(data.fillna(method="ffill"))
```

```
C:\Users\Pratham m\AppData\Local\Temp\ipykernel_7680\3243905285.py:3:
```

```
FutureWarning: DataFrame.fillna with 'method' is deprecated and will raise in a
future version. Use obj.ffill() or obj.bfill() instead.
```

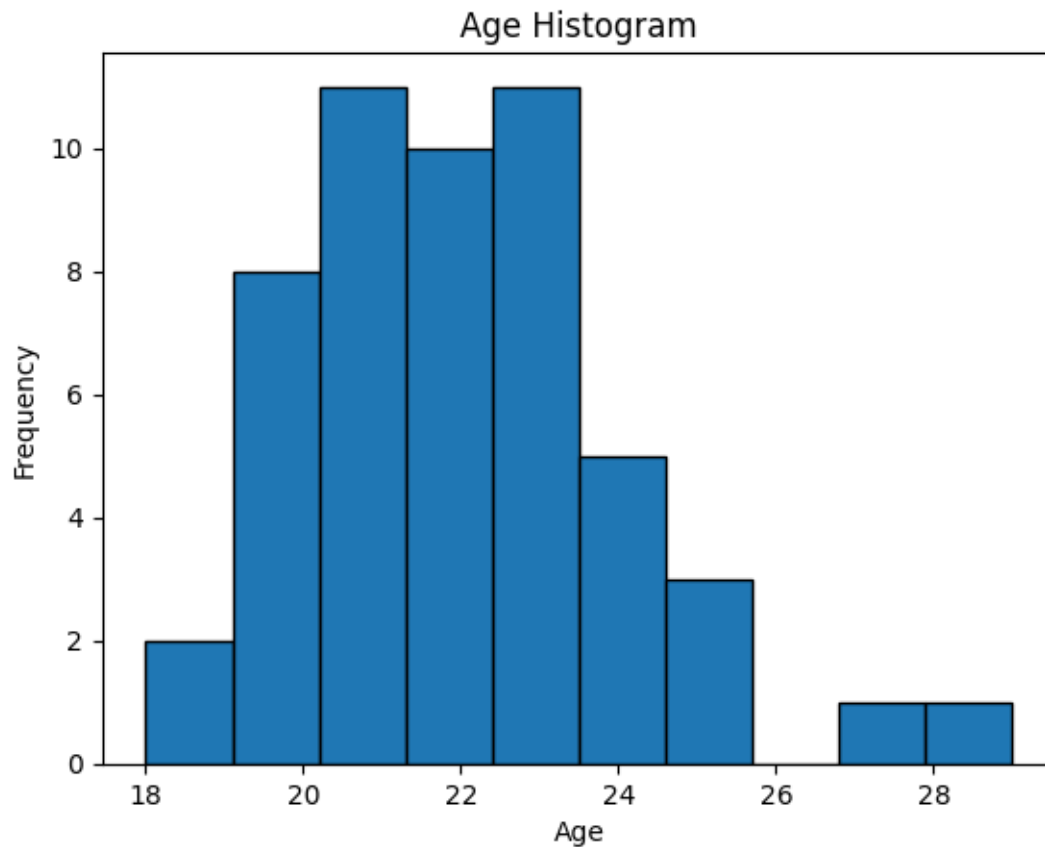
```
print(data.fillna(method="bfill"))
```

```
[ ]: import matplotlib.pyplot as plt

# Assuming your data is in a list called 'data'
data = [
    20,
    29,
    22,
    23,
    18,
    20,
    21,
    21,
    22,
    21,
    22,
    22,
    23,
    20,
    21,
    21,
    20,
    21,
    27,
    20,
    20,
    21,
    18,
    23,
    24,
    22,
    21,
    20,
    25,
    24,
```



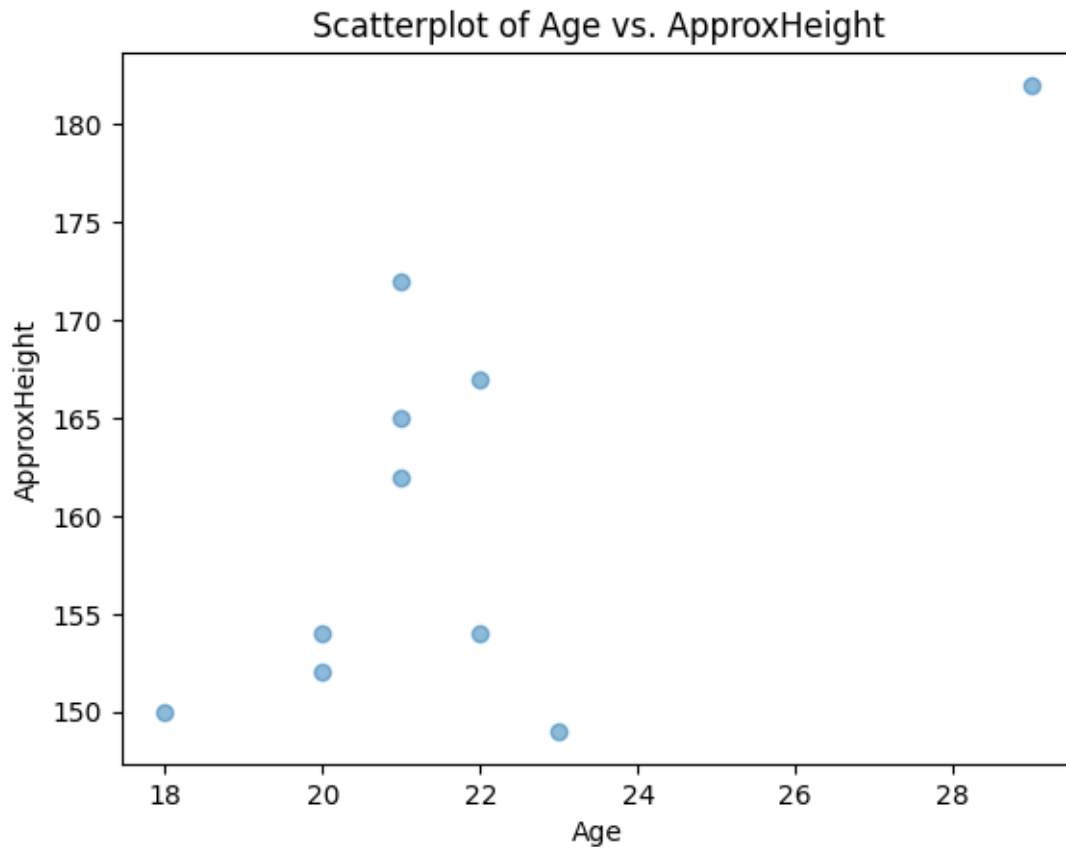
```
21,  
24,  
24,  
22,  
23,  
22,  
23,  
22,  
23,  
20,  
21,  
23,  
25,  
23,  
25,  
21,  
22,  
23,  
22,  
24,  
23,  
23,  
]  
  
plt.hist(data, bins=10, edgecolor="k")  
plt.xlabel("Age")  
plt.ylabel("Frequency")  
plt.title("Age Histogram")  
plt.show()
```



```
[ ]: import matplotlib.pyplot as plt

# Example data with matching sizes
Age = [20, 29, 22, 23, 18, 20, 21, 21, 22, 21]
ApproxHeight = [152, 182, 167, 149, 150, 154, 165, 162, 154, 172]

plt.scatter(Age, ApproxHeight, alpha=0.5)
plt.xlabel("Age")
plt.ylabel("ApproxHeight")
plt.title("Scatterplot of Age vs. ApproxHeight")
plt.show()
```

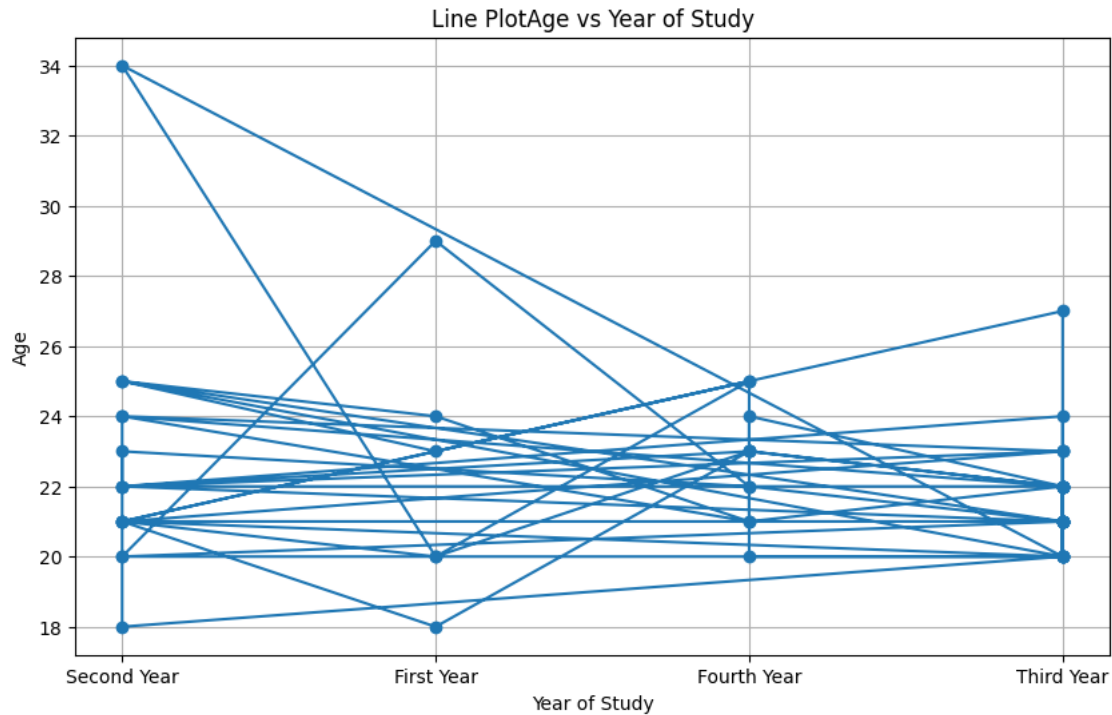


```
[ ]: import pandas as pd
import matplotlib.pyplot as plt

# Assuming you have your data in a CSV file named 'student_data.csv'
df = pd.read_csv("D:\PRATHAM FILES\Web design Project\Python_
↳new\studentsdetails.csv")

plt.figure(figsize=(10, 6))
plt.plot(df["YearofStudy"], df["Age"], marker="o")
plt.xlabel("Year of Study")
plt.ylabel("Age")

plt.title("Line Plot" "" "Age vs Year of Study")
plt.grid(True)
plt.show()
```



```
[ ]: import seaborn as sns
import matplotlib.pyplot as plt

plt.figure(figsize=(10, 6))
sns.countplot(data=df, x="YearofStudy")
plt.xlabel("Year of Study")
plt.ylabel("Count")
plt.title("Bar Graph Count of Students in Each Year of Study")
plt.xticks(rotation=45)
plt.show()
```

```
C:\Users\Pratham m\AppData\Local\Packages\PythonSoftwareFoundation.Python.3.11_q
bz5n2kfra8p0\LocalCache\local-packages\Python311\site-
packages\seaborn\_oldcore.py:1498: FutureWarning: is_categorical_dtype is
deprecated and will be removed in a future version. Use isinstance(dtype,
CategoricalDtype) instead
```

```
if pd.api.types.is_categorical_dtype(vector):
```

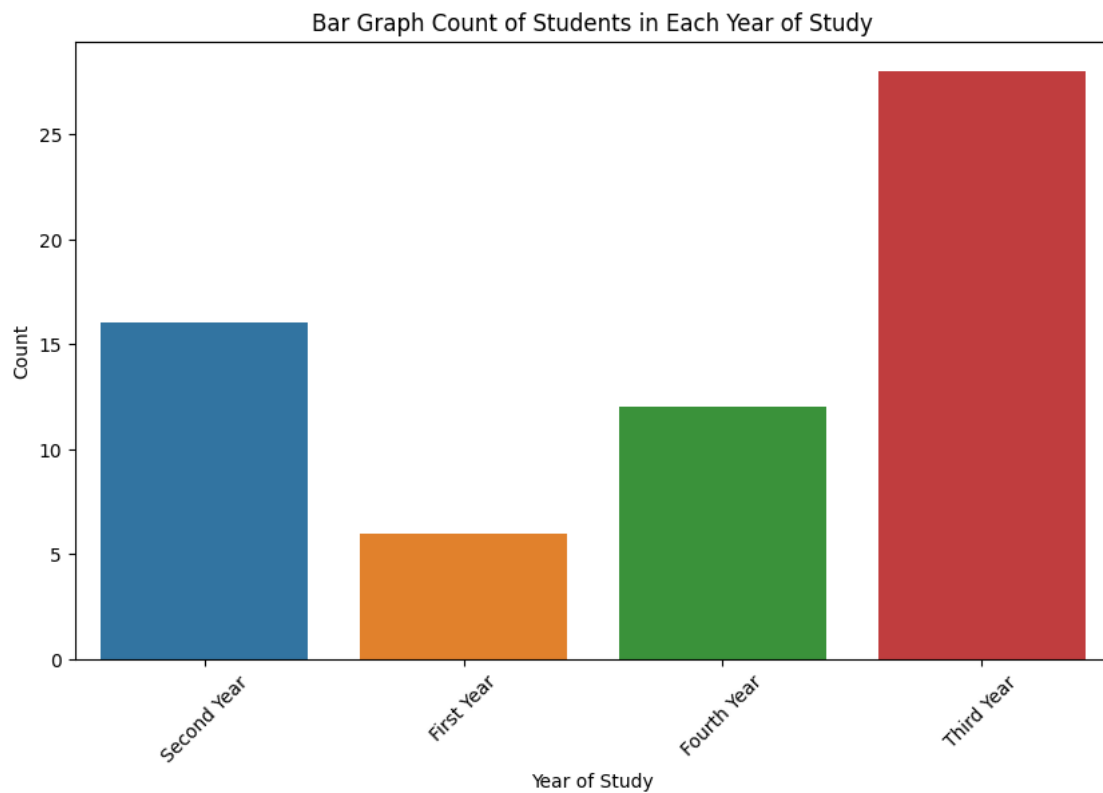
```
C:\Users\Pratham m\AppData\Local\Packages\PythonSoftwareFoundation.Python.3.11_q
bz5n2kfra8p0\LocalCache\local-packages\Python311\site-
packages\seaborn\_oldcore.py:1498: FutureWarning: is_categorical_dtype is
deprecated and will be removed in a future version. Use isinstance(dtype,
CategoricalDtype) instead
```

```
if pd.api.types.is_categorical_dtype(vector):
```

```
C:\Users\Pratham m\AppData\Local\Packages\PythonSoftwareFoundation.Python.3.11_q
```

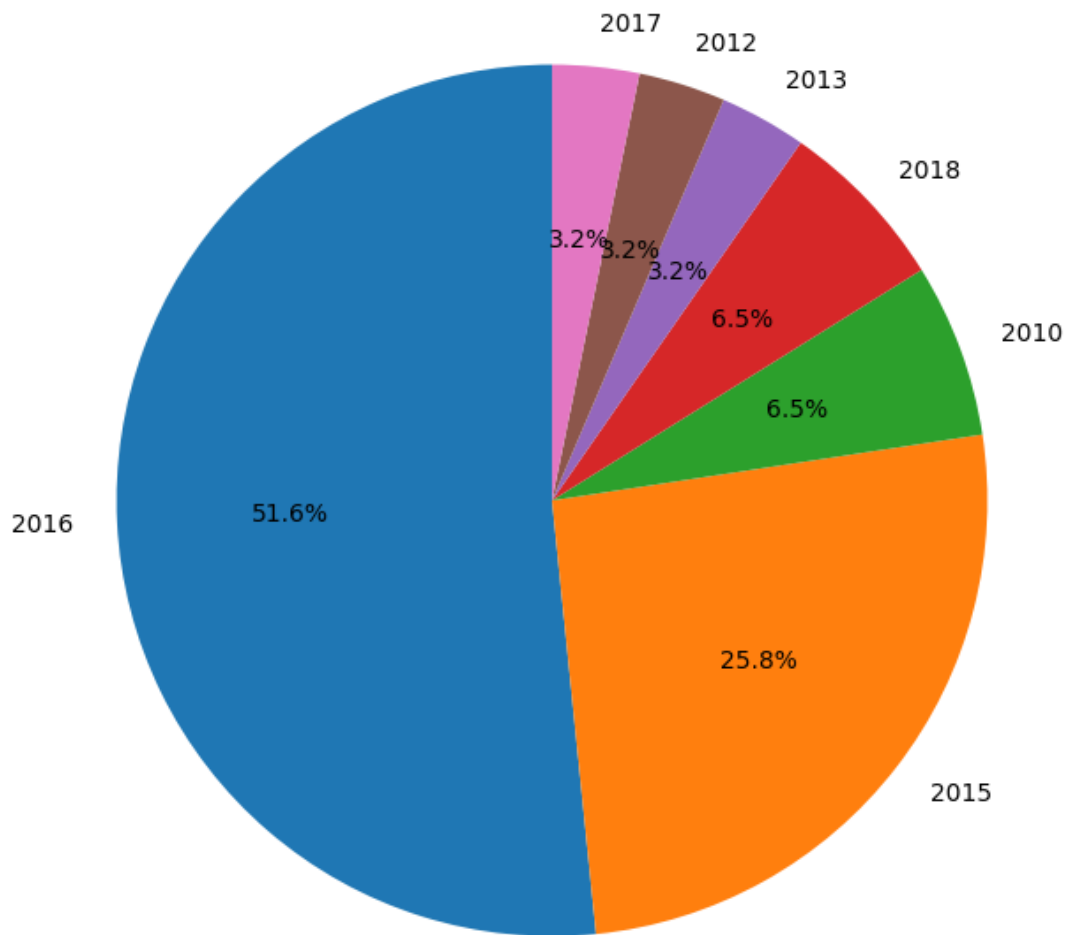
```
bz5n2kfra8p0\LocalCache\local-packages\Python311\site-  
packages\seaborn\_oldcore.py:1498: FutureWarning: is_categorical_dtype is  
deprecated and will be removed in a future version. Use isinstance(dtype,  
CategoricalDtype) instead
```

```
if pd.api.types.is_categorical_dtype(vector):
```



```
[ ]: plt.figure(figsize=(8, 8))  
df["KCSE"].value_counts().plot.pie(autopct="%1.1f%%", startangle=90)  
plt.title(" Pie Chart Distribution of Students by KCSE Grade")  
plt.ylabel("")  
plt.show()
```

Pie Chart Distribution of Students by KCSE Grade



```
[ ]: import seaborn as sns
import matplotlib.pyplot as plt

plt.figure(figsize=(10, 6))
sns.lineplot(
    data=df, x="Yr_JoinCampus", y="Expense_Semester", hue="YearofStudy",
    marker="o"
)
plt.xlabel("Year of Joining Campus")
plt.ylabel("Expense per Semester")
plt.title("Area Plot Expense per Semester Over the Years")
```

```
plt.grid(True)
plt.show()
```

C:\Users\Pratham m\AppData\Local\Packages\PythonSoftwareFoundation.Python.3.11_qbz5n2kfra8p0\LocalCache\local-packages\Python311\site-packages\seaborn_oldcore.py:1498: FutureWarning: is_categorical_dtype is deprecated and will be removed in a future version. Use isinstance(dtype, CategoricalDtype) instead

```
if pd.api.types.is_categorical_dtype(vector):
```

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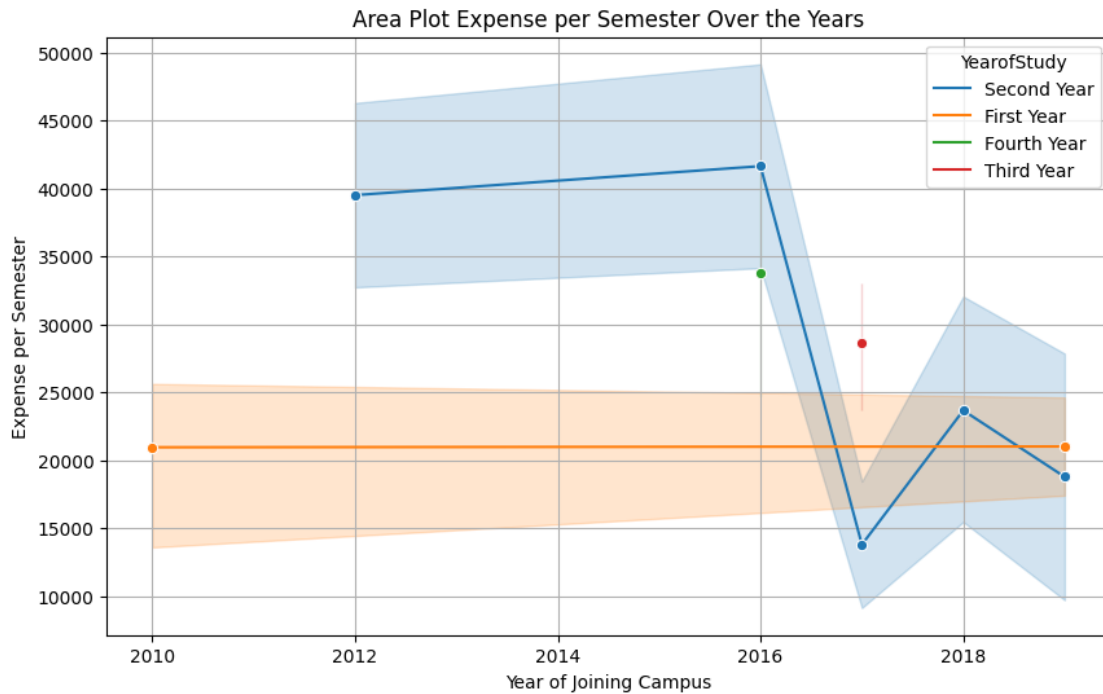
```
if pd.api.types.is_categorical_dtype(vector):
```

C:\Users\Pratham m\AppData\Local\Packages\PythonSoftwareFoundation.Python.3.11_qbz5n2kfra8p0\LocalCache\local-packages\Python311\site-packages\seaborn_oldcore.py:1119: FutureWarning: use_inf_as_na option is deprecated and will be removed in a future version. Convert inf values to NaN before operating instead.

```
with pd.option_context('mode.use_inf_as_na', True):
```

C:\Users\Pratham m\AppData\Local\Packages\PythonSoftwareFoundation.Python.3.11_qbz5n2kfra8p0\LocalCache\local-packages\Python311\site-packages\seaborn_oldcore.py:1119: FutureWarning: use_inf_as_na option is deprecated and will be removed in a future version. Convert inf values to NaN before operating instead.

```
with pd.option_context('mode.use_inf_as_na', True):
```



```
[ ]: import seaborn as sns
import matplotlib.pyplot as plt

plt.figure(figsize=(10, 6))
sns.boxplot(data=df, x="YearofStudy", y="Expense_Semester")
plt.xlabel("Year of Study")
plt.ylabel("Expense per Semester")
plt.title(" Box Plot Expense Distribution by Year of Study")
plt.grid(True)
plt.show()
```

C:\Users\Pratham m\AppData\Local\Packages\PythonSoftwareFoundation.Python.3.11_qbz5n2kfra8p0\LocalCache\local-packages\Python311\site-packages\seaborn_oldcore.py:1498: FutureWarning: is_categorical_dtype is deprecated and will be removed in a future version. Use isinstance(dtype, CategoricalDtype) instead

```
if pd.api.types.is_categorical_dtype(vector):
```

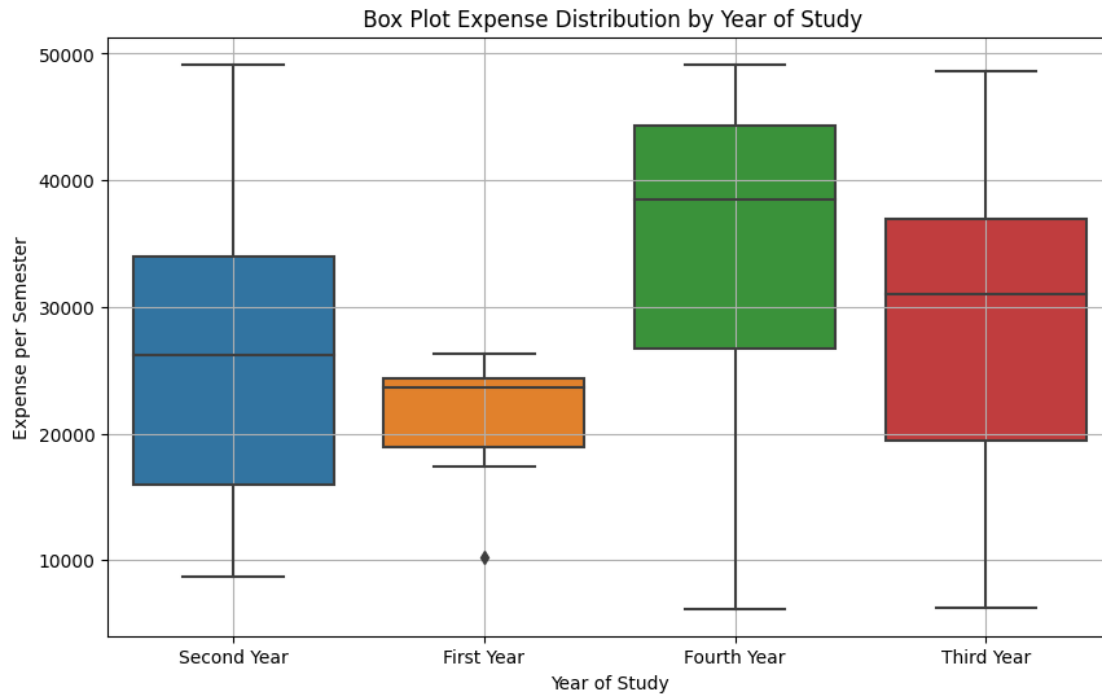
C:\Users\Pratham m\AppData\Local\Packages\PythonSoftwareFoundation.Python.3.11_qbz5n2kfra8p0\LocalCache\local-packages\Python311\site-packages\seaborn_oldcore.py:1498: FutureWarning: is_categorical_dtype is deprecated and will be removed in a future version. Use isinstance(dtype, CategoricalDtype) instead

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```
if pd.api.types.is_categorical_dtype(vector):
```



```
[ ]: import seaborn as sns
```

```
sns.pairplot(df[["Age", "ApproxHeight", "ApproxWeight", "KCSE",  
↪ "Expense_Semester"]])  
plt.suptitle(" Pair plot Pair Plot of Numerical Variables", y=1.02)  
plt.show()
```

C:\Users\Pratham m\AppData\Local\Packages\PythonSoftwareFoundation.Python.3.11_qbz5n2kfra8p0\LocalCache\local-packages\Python311\site-packages\seaborn_oldcore.py:1498: FutureWarning: is_categorical_dtype is deprecated and will be removed in a future version. Use isinstance(dtype, CategoricalDtype) instead

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```

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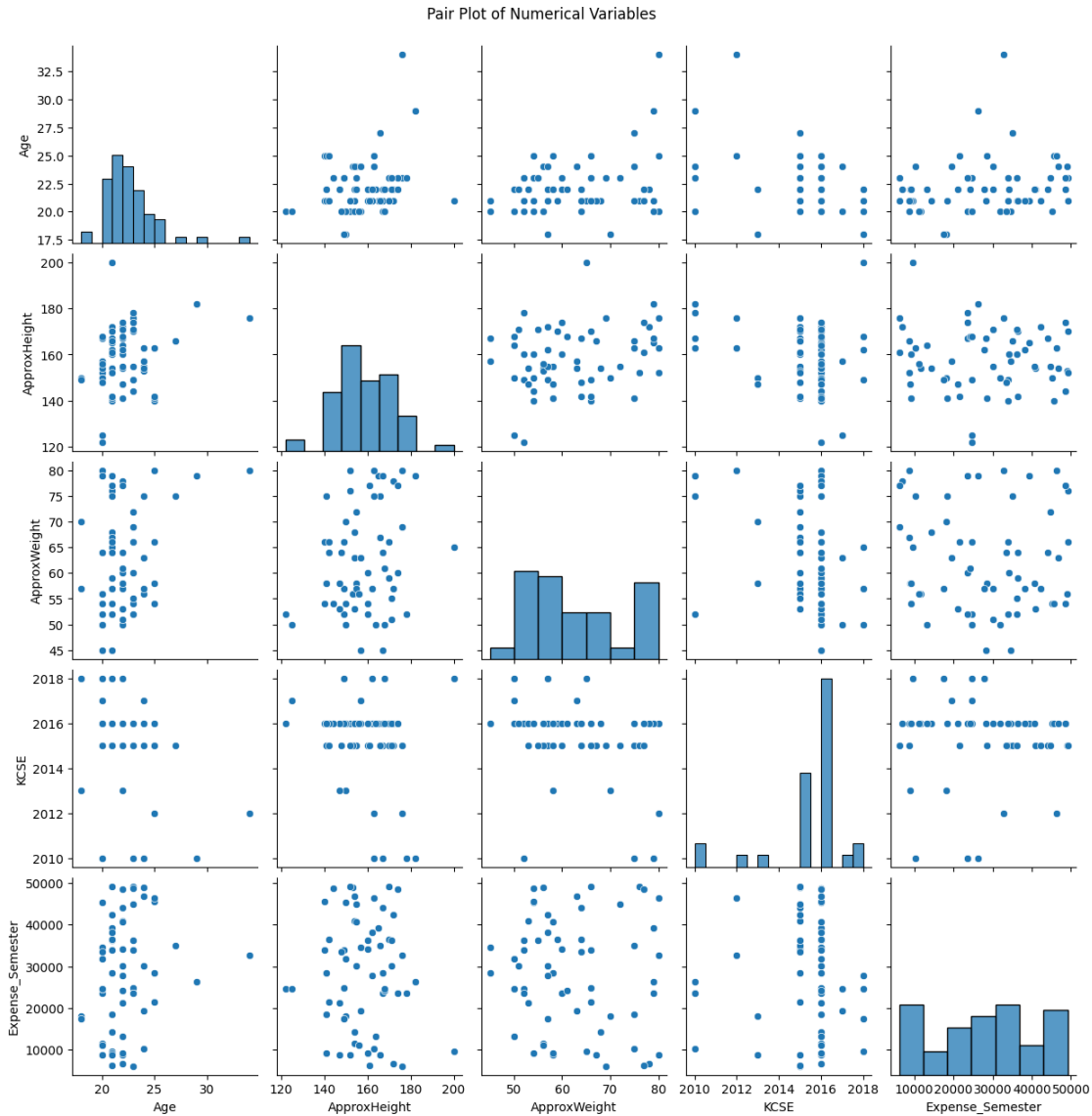
```

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```

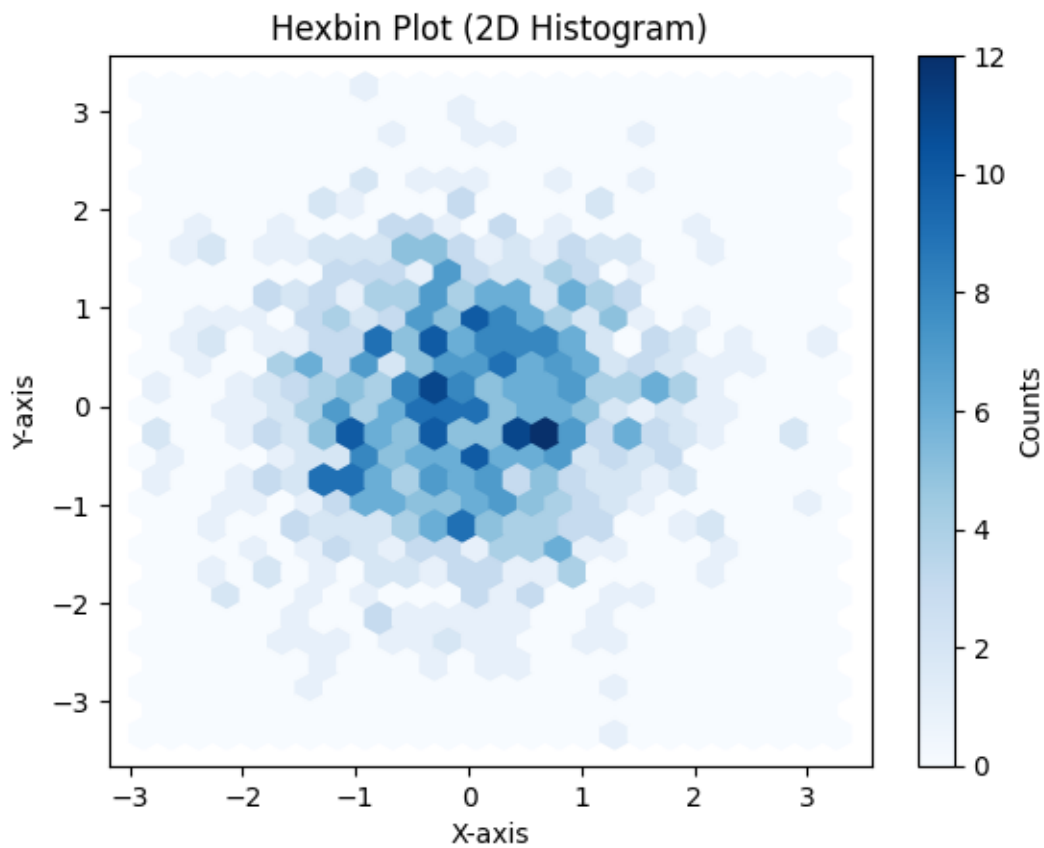



```
[ ]: import numpy as np
import matplotlib.pyplot as plt

# Generate random data
x = np.random.randn(1000)
y = np.random.randn(1000)

# Create a hexbin plot
plt.hexbin(x, y, gridsize=25, cmap="Blues")
plt.colorbar(label="Counts")
plt.xlabel("X-axis")
plt.ylabel("Y-axis")
```

```
plt.title("Hexbin Plot (2D Histogram)")
plt.show()
```



```
[ ]: import matplotlib.pyplot as plt
from matplotlib.sankey import Sankey

fig, ax = plt.subplots()
ax.set_xlim(-0.5, 3)
ax.set_ylim(-0.5, 0.5)

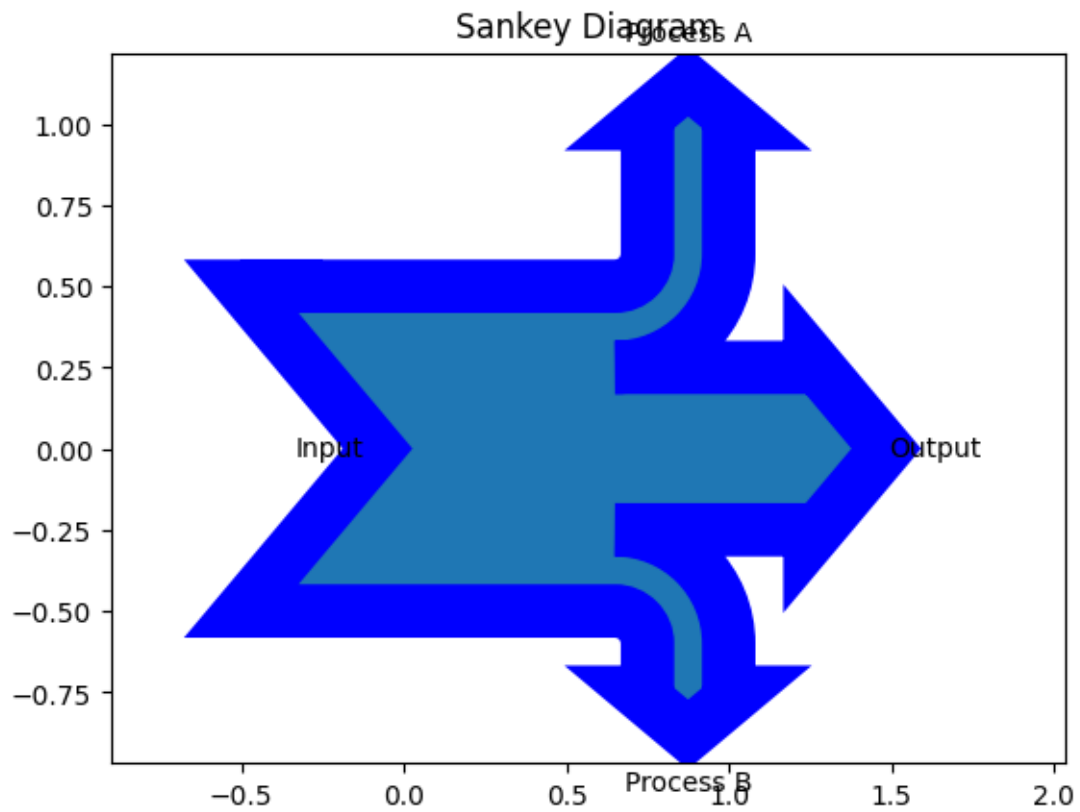
sankey = Sankey(ax=ax, unit=None)
sankey.add(
    flows=[1, -0.25, -0.25, -0.5],
    labels=["Input", "Process A", "Process B", "Output"],
    orientations=[0, 1, -1, 0],
    pathlengths=[0, 0.5, 0.25, 0.25],
    trunklength=1.5,
    linewidth=20,
    color="blue",
```

```

)
sankey.finish()

plt.title("Sankey Diagram")
plt.show()

```



[]: