```
import pandas as pd
import numpy as np
df=pd.read_csv("train.csv")
df.head()
{"summary":"{\n \"name\": \"df\",\n \"rows\": 891,\n \"fields\": [\
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\"dtype\": \"number\",\n \"std\": 257,\n \"min\": 1,\n
\"max\": 891,\n \"num_unique_values\": 891,\n \"samples\": [\n 710,\n 440,\n 841\n ],\n \"semantic_type\": \"\",\n \"description\": \"\"\n
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                                                          1, n
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\"Kvillner, Mr. Johan Henrik Johannesson\"\n ],\n
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\"dtype\": \"category\",\n \"num_unique_values\": 2,\n \"samples\": [\n \"female\",\n \"male\"\n ]
n \"semantic_type\": \"\",\n \"description\": \"\"\n
      },\n {\n \"column\": \"Age\",\n \"properties\": {\
n \"dtype\": \"number\",\n \"std\": 14.526497332334042,\
n \"min\": 0.42,\n \"max\": 80.0,\n
\"num_unique_values\": 88,\n \"samples\": [\n 0.75,\n
22.0\n ],\n \"semantic_type\": \"\",\n
\"num_unique_values\": 7,\n \"samples\": [\n 0\n ],\n \"semantic_type\": \"\",\n
                                                          1, n
\"num_unique_values\": 7,\n \"samples\": [\n
1\n ],\n \"semantic_type\": \"\",\n
                                                          0, n
```

```
\"num_unique_values\": 681,\n
                                   \"samples\": [\n
\"11774\",\n\\"248740\"\n
                                       ],\n
\"semantic_type\": \"\",\n \"description\": \"\"\n
    },\n {\n \"column\": \"Fare\",\n
                                               \"properties\": {\n
\"dtype\": \"number\",\n \"std\": 49.6934285971809,\n
\"min\": 0.0,\n \"max\": 512.3292,\n
\"num unique values\": 248,\n
                                  \"samples\": [\n
                  51.8625\n
11.2417,\n
                                  ],\n
                                              \"semantic type\":
\"\",\n
              \"description\": \"\"\n
                                         }\n
                                                },\n
                                                        {\n
\"column\": \"Cabin\",\n \"properties\": {\n
                                                      \"dtype\":
\"category\",\n \"num unique values\": 147,\n
                  \"<del>D</del>45\",\n
\"samples\": [\n
                                           \"B49\"\n
                                                           ],\n
\"semantic_type\": \"\",\n
                                \"description\": \"\"\n
                                                           }\
           {\n \"column\": \"Embarked\",\n
                                                   \"properties\":
    },\n
          \"dtype\": \"category\",\n \"num_unique_values\":
{\n
           \"samples\": [\n \"S\",\n
                                                    \<u>"</u>C\"\n
3,\n
           \"semantic type\": \"\",\n
                                           \"description\": \"\"\n
],\n
      }\n ]\n}","type":"dataframe","variable_name":"df"}
}\n
df.dtypes
                int64
PassengerId
Survived
                int64
Pclass
                int64
Name
               object
Sex
               obiect
Age
              float64
SibSp
                int64
Parch
                int64
Ticket
               object
Fare
              float64
Cabin
               obiect
Embarked
               object
dtype: object
categorical_columns=df.select dtypes(include=['object','category']).co
lumns.tolist()
numerical_columns=df.select_dtypes(include=['int64','float64']).column
s.tolist()
print(f"categorical columns:\n (categorical columns)")
print(f"numerical columns:\n (numerical columns)")
categorical columns:
 (categorical columns)
numerical columns:
 (numerical columns)
```

```
columns used
=['PassengerId','Survived','Pclass','Age','SibSp','Parch','Fare']
df1=df.loc[:,columns used]
df1.head()
{"summary":"{\n \"name\": \"df1\",\n \"rows\": 891,\n \"fields\":
[\n {\n \"column\": \"PassengerId\",\n \"properties\": {\
      \"dtype\": \"number\",\n \"std\": 257,\n
\"min\": 1,\n \"max\": 891,\n \"num_unique_values\": 891,\n \710,\n 440,\n
\"samples\":
                                            \"semantic type\":
\"column\": \"Pclass\",\n \"properties\": {\n
                                                   \"dtype\":
\"number\",\n \"std\": 0,\n \"min\": 1,\n \"max\": 3 \n \"num unique values\": 3 \n
\"max\": 3,\n
                  \"num_unique_values\": 3,\n \"samples\":
[\n 3,\n 1\n ],\n \"semantic_ty\"\",\n \"description\": \"\"\n }\n },\n {\n \"column\": \"Age\",\n \"properties\": {\n \"dtype\"
                                            \"semantic_type\":
                                                \"dtvpe\":
\"number\",\n \"std\": 14.526497332334042,\n \"min\":
0.42,\n \"max\": 80.0,\n \"num_unique_values\": 88,\n \"samples\": [\n 0.75,\n 22.0\n ],\n
\"semantic type\": \"\",\n \"description\": \"\"\n
   \"dtype\": \"number\",\n \"std\": 1,\n
                                                       \"min\":
n
       \"max\": 8,\n \"num_unique_values\": 7,\n
0,\n
\"samples\": [\n 1,\n 0\n ],\n \"semantic_type\": \"\",\n \"description\": \"\"\n
    \"dtype\": \"number\",\n \"std\": 0,\n
                                                       \"min\":
n
       \"max\": 6,\n \"num_unique_values\": 7,\n
\"samples\": [\n 0,\n 1\n ],\n \"semantic_type\": \"\",\n \"description\": \"\"\n
n },\n {\n \"column\": \"Fare\",\n \"properties\": {\n
\"dtype\": \"number\",\n \"std\": 49.6934285971809,\n
\"min\": 0.0,\n \"max\": 512.3292,\n
\"num_unique_values\": 248,\n \"samples\": [\n 11.2417,\n 51.8625\n ],\n \"sem
11.2417,\n
\"\",\n \"
                                ],\n \"semantic type\":
             \"description\": \"\"\n
                                            }\n ]\
                                       }\n
n}","type":"dataframe","variable name":"df1"}
<google.colab. quickchart helpers.SectionTitle at 0x7e4ecd48ada0>
```

```
from matplotlib import pyplot as plt
df 0['index'].plot(kind='hist', bins=20, title='index')
plt.gca().spines[['top', 'right',]].set_visible(False)
from matplotlib import pyplot as plt
df 1['PassengerId'].plot(kind='hist', bins=20, title='PassengerId')
plt.gca().spines[['top', 'right',]].set_visible(False)
from matplotlib import pyplot as plt
df 2['Survived'].plot(kind='hist', bins=20, title='Survived')
plt.gca().spines[['top', 'right',]].set visible(False)
from matplotlib import pyplot as plt
df 3['Pclass'].plot(kind='hist', bins=20, title='Pclass')
plt.gca().spines[['top', 'right',]].set visible(False)
<google.colab. quickchart helpers.SectionTitle at 0x7e4ecd48be50>
from matplotlib import pyplot as plt
_df_4.plot(kind='scatter', x='index', y='PassengerId', s=32, alpha=.8)
plt.gca().spines[['top', 'right',]].set_visible(False)
from matplotlib import pyplot as plt
df 5.plot(kind='scatter', x='PassengerId', y='Survived', s=32,
alpha=.8)
plt.gca().spines[['top', 'right',]].set visible(False)
from matplotlib import pyplot as plt
_df_6.plot(kind='scatter', x='Survived', y='Pclass', s=32, alpha=.8)
plt.gca().spines[['top', 'right',]].set_visible(False)
from matplotlib import pyplot as plt
_df_7.plot(kind='scatter', x='Pclass', y='Age', s=32, alpha=.8)
plt.gca().spines[['top', 'right',]].set visible(False)
<google.colab. quickchart helpers.SectionTitle at 0x7e4eced313c0>
from matplotlib import pyplot as plt
import seaborn as sns
def plot series(series, series name, series index=0):
  palette = list(sns.palettes.mpl palette('Dark2'))
 xs = series['index']
 ys = series['Survived']
  plt.plot(xs, ys, label=series name, color=palette[series index %
len(palette)])
fig, ax = plt.subplots(figsize=(10, 5.2), layout='constrained')
df sorted = df 8.sort values('index', ascending=True)
plot series(df sorted, '')
sns.despine(fig=fig, ax=ax)
```

```
plt.xlabel('index')
= plt.ylabel('Survived')
from matplotlib import pyplot as plt
import seaborn as sns
def plot series(series, series name, series index=0):
  palette = list(sns.palettes.mpl palette('Dark2'))
 xs = series['index']
 vs = series['Pclass']
  plt.plot(xs, ys, label=series name, color=palette[series index %
len(palette)])
fig, ax = plt.subplots(figsize=(10, 5.2), layout='constrained')
df_sorted = _df_9.sort_values('index', ascending=True)
_plot_series(df sorted, '')
sns.despine(fig=fig, ax=ax)
plt.xlabel('index')
= plt.ylabel('Pclass')
from matplotlib import pyplot as plt
import seaborn as sns
def plot series(series, series name, series index=0):
  palette = list(sns.palettes.mpl palette('Dark2'))
 xs = series['index']
 vs = series['Age']
  plt.plot(xs, ys, label=series name, color=palette[series index %
len(palette)])
fig, ax = plt.subplots(figsize=(10, 5.2), layout='constrained')
df sorted = df 10.sort values('index', ascending=True)
plot series(df sorted, '')
sns.despine(fig=fig, ax=ax)
plt.xlabel('index')
= plt.ylabel('Age')
from matplotlib import pyplot as plt
import seaborn as sns
def plot series(series, series name, series index=0):
  palette = list(sns.palettes.mpl palette('Dark2'))
 xs = series['index']
 ys = series['SibSp']
  plt.plot(xs, ys, label=series name, color=palette[series index %
len(palette)])
fig, ax = plt.subplots(figsize=(10, 5.2), layout='constrained')
df sorted = df 11.sort values('index', ascending=True)
plot series(df sorted, '')
```

```
sns.despine(fig=fig, ax=ax)
plt.xlabel('index')
= plt.ylabel('SibSp')
<google.colab. quickchart helpers.SectionTitle at 0x7e4eced31e40>
from matplotlib import pyplot as plt
_df_12['index'].plot(kind='line', figsize=(8, 4), title='index')
plt.gca().spines[['top', 'right']].set_visible(False)
from matplotlib import pyplot as plt
df 13['PassengerId'].plot(kind='line', figsize=(8, 4),
title='PassengerId')
plt.gca().spines[['top', 'right']].set_visible(False)
from matplotlib import pyplot as plt
df 14['Survived'].plot(kind='line', figsize=(8, 4), title='Survived')
plt.gca().spines[['top', 'right']].set visible(False)
from matplotlib import pyplot as plt
_df_15['Pclass'].plot(kind='line', figsize=(8, 4), title='Pclass')
plt.gca().spines[['top', 'right']].set_visible(False)
# prompt: Using dataframe df1: mean
# Calculate the mean of all numerical columns in the dataframe
df1.mean()
     PassengerId Survived Pclass
                                            SibSp
                                       Age
                                                   Parch
                                                           Fare
0
                        0.0
                                3.0
                                      24.0
                                              0.0
                                                     0.0
                                                           8.05
               1
1
               2
                        NaN
                                       NaN
                                              NaN
                                                     NaN
                                                            NaN
                                NaN
2
               3
                        NaN
                                NaN
                                       NaN
                                              NaN
                                                     NaN
                                                            NaN
3
               4
                        NaN
                                NaN
                                       NaN
                                              NaN
                                                     NaN
                                                            NaN
4
               5
                                       NaN
                                                     NaN
                        NaN
                                NaN
                                              NaN
                                                            NaN
                                 . . .
                                       . . .
                                              . . .
                                                      . . .
                                                            . . .
886
             887
                        NaN
                                NaN
                                       NaN
                                              NaN
                                                     NaN
                                                            NaN
887
             888
                        NaN
                                NaN
                                       NaN
                                              NaN
                                                     NaN
                                                            NaN
888
             889
                                NaN
                                       NaN
                                              NaN
                                                     NaN
                                                            NaN
                        NaN
889
             890
                        NaN
                                NaN
                                       NaN
                                              NaN
                                                     NaN
                                                            NaN
890
             891
                        NaN
                                NaN
                                       NaN
                                              NaN
                                                     NaN
                                                            NaN
[891 rows x 7 columns]
df1.std()
PassengerId
               257.353842
Survived
                  0.486592
Pclass
                  0.836071
                 14.526497
Age
SibSp
                  1.102743
Parch
                  0.806057
```

```
Fare
              49.693429
dtype: float64
modes = df1.mode()
# Print the modes
print(modes)
    PassengerId Survived Pclass
                                 Age
                                      SibSp Parch
                                                   Fare
0
             1
                     0.0
                            3.0
                                 24.0
                                        0.0
                                              0.0
                                                   8.05
1
             2
                     NaN
                            NaN
                                 NaN
                                              NaN
                                        NaN
                                                    NaN
2
             3
                     NaN
                            NaN
                                 NaN
                                        NaN
                                              NaN
                                                    NaN
3
             4
                                        NaN
                                              NaN
                                                    NaN
                     NaN
                            NaN
                                 NaN
4
             5
                     NaN
                            NaN
                                 NaN
                                        NaN
                                              NaN
                                                    NaN
                     . . .
                            . . .
                                  . . .
                                        . . .
                                              . . .
                                                    . . .
886
            887
                     NaN
                            NaN
                                 NaN
                                        NaN
                                              NaN
                                                    NaN
887
            888
                     NaN
                            NaN
                                 NaN
                                        NaN
                                              NaN
                                                    NaN
888
            889
                            NaN
                                 NaN
                                        NaN
                                              NaN
                                                    NaN
                     NaN
889
            890
                     NaN
                            NaN
                                 NaN
                                        NaN
                                              NaN
                                                    NaN
890
            891
                            NaN
                                 NaN
                                              NaN
                                                    NaN
                     NaN
                                        NaN
[891 rows x 7 columns]
df1.median()
PassengerId
             446.0000
Survived
               0.0000
Pclass
               3.0000
              28.0000
Age
SibSp
               0.0000
               0.0000
Parch
Fare
              14.4542
dtype: float64
df1.describe()
{"summary":"{\n \"name\": \"df1\",\n \"rows\": 8,\n \"fields\": [\n
{\n \"column\": \"PassengerId\",\n \"properties\": {\n
\"dtype\": \"number\",\n \"std\": 320.8159711429855,\n
\"min\": 1.0,\n \"max\": 891.0,\n \"num_unique_values\":
          \"samples\": [\n 891.0,\n
6,\n
                                                  446.0,\n
\"Survived\",\n \"properties\": {\n \"dtype\": \"number\",\n \"std\": 314.8713661874558,\n
0.0,\n \"max\": 891.0,\n \"num_unique_values\": 5,\n
\"std\": 314.2523437079694,\n \"min\": 0.836071240977049,\n
```

```
714.0,\n \"num_unique_values\": 8,\n \"samples\": [\n 29.69911764705882,\n 28.0,\n 714.0\n ],\n \"semantic_type\": \"\",\n \"description\": \"\"\n }\
n },\n {\n \"column\": \"SibSp\",\n \"properties\": {\
n \"dtype\": \"number\",\n \"std\": 314.4908277465442,\n
\"min\": 0.0,\n \"max\": 891.0,\n \"num_unique_values\":
6,\n \"samples\": [\n 891.0,\n 0.5230078563411896,\n 8.0\n ],\n \"semantic_type\": \"\",\n \"description\": \"\"\n }\\n }\\n \\"column\": \"Parch\",\n \"properties\": {\
n \"dtype\": \"number\",\n \"std\": 314.65971717879,\n
\"min\": 0.0,\n \"max\": 891.0,\n \"num_unique_values\":
5,\n \"samples\": [\n 0.38159371492704824,\n 6.0,\n 0.8060572211299483\n ],\n
\"semantic_type\": \"\",\n \"description\": \"\"\n }\
n },\n {\n \"column\": \"Fare\",\n \"properties\": {\n \"dtype\": \"number\",\n \"std\": 330.6256632228578,\n \"min\": 0.0,\n \"max\": 891.0,\n \"num_unique_values\": 8,\n \"samples\": [\n 32.204207968574636,\n 14.4542,\n 891.0\n ],\n \"semantic_type\": \"\",\n \"description\": \"\"\n }\n ]\"
n}","type":"dataframe"}
df.head(2)
{"summary":"{\n \"name\": \"df\",\n \"rows\": 891,\n \"fields\": [\
n {\n \"column\": \"PassengerId\",\n \"properties\": {\n
\"dtype\": \"number\",\n \"std\": 257,\n \"min\": 1,\n
\"max\": 891,\n \"num_unique_values\": 891,\n \"samples\": [\n 710,\n 440,\n 841\n ],\n \"semantic_type\": \"\",\n \"description\": \"\"\n
0\n ],\n \"semantic_type\": \"\",\n
\"num_unique_values\": 3,\n \"samples\": [\n
1\n ],\n \"semantic_type\": \"\",\n
                                                                        3,\n
```

```
\"Moubarek, Master. Halim Gonios (\\\"William George\\\")\",\n
\"Kvillner, Mr. Johan Henrik Johannesson\"\n ],\n
\"semantic_type\": \"\",\n \"description\": \"\"\n }\
n },\n {\n \"column\": \"Sex\",\n \"properties\": {\n
\"dtype\": \"category\",\n \"num_unique_values\": 2,\n \"samples\": [\n \"female\",\n \"male\"\n \"semantic_type\": \"\",\n \"description\": \"\"\n
      },\n {\n \"column\": \"Age\",\n \"properties\": {\
}\n
n \"dtype\": \"number\",\n \"std\": 14.526497332334042,\\
n \"min\": 0.42,\n \"max\": 80.0,\n \\"num_unique_values\": 88,\n \"samples\": [\n 0.75,\n
\"semantic_type\": \"\",\n \"description\": \"\"\n
n },\n {\n \"column\": \"Fare\",\n \"properties\": {\n \"dtype\": \"number\",\n \"std\": 49.6934285971809,\n
\"min\": 0.0,\n \"max\": 512.3292,\n
\"column\": \"Cabin\",\n \"properties\": {\n \"dtype\":
\"category\",\n \"num_unique_values\": 147,\n \"samples\": [\n \"D45\",\n \"B49\"\n
                                                              ],\n
\"semantic_type\": \"\",\n \"description\": \"\"\n }\

n },\n {\n \"column\": \"Embarked\",\n \"properties\":
{\n \"dtype\": \"category\",\n \"num_unique_values\":
3,\n \"samples\": [\n \"S\",\n \"C\"\n
],\n \"semantic_type\": \"\",\n \"description\": \"\"\n
df['Sex'].unique()
array(['male', 'female'], dtype=object)
df[['Sex','Age']].groupby('Sex').mean()
```

```
{"summary":"{\n \"name\": \"df[['Sex','Age']]\",\n \"rows\": 2,\n
\"fields\": [\n \\"column\\": \\"Sex\\\",\n
\"properties\": {\n
                       \"dtype\": \"string\",\n
\"num unique values\": 2,\n
                                \"samples\": [\n
\"male\",\n \"female\"\n
                                    ],\n
\"semantic_type\": \"\",\n
                               \"description\": \"\"\n
    },\n {\n \"column\": \"Age\",\n \"properties\": {\n
\"dtype\": \"number\",\n
                             \"std\": 1.9876317510589439,\n
\"min\": 27.915708812260537,\n
                                   \"max\": 30.72664459161148,\n
\"num unique values\": 2,\n
                                \"samples\": [\n
                           27.915708812260537\n
30.72664459161148,\n
\"semantic type\": \"\",\n
                              \"description\": \"\"\n }\
    }\n ]\n}","type":"dataframe"}
df['Survived'].unique()
array([0, 1])
df[['Survived','Age']].groupby('Survived').mean()
{"summary":"{\n \"name\": \"df[['Survived','Age']]\",\n \"rows\":
2,\n \"fields\": [\n \"column\": \"Survived\",\n
                     \"dtype\": \"number\",\n
\"properties\": {\n
                                                 \"std\":
          \"min\": 0,\n
                           \"max\": 1,\n
0,\n
                              \"samples\": [\n
\"num_unique_values\": 2,\n
                                                        1, n
0\n ],\n \"semantic type\": \"\",\n
\"description\": \"\"\n
                               },\n
                                       {\n
                                                \"column\":
                          }\n
                                       \"dtype\": \"number\",\n
\"Age\",\n \"properties\": {\n
\"std\": 1.6139638671549115,\n
                                   \"min\": 28.343689655172415,\n
\"max\": 30.62617924528302,\n
                                 \"num unique values\": 2,\n
\"samples\": [\n
                       28.343689655172415,\n
30.62617924528302\n
                        ],\n
                                  \"semantic type\": \"\",\n
\"description\": \"\"\n
                                 }\n ]\n}","type":"dataframe"}
                          }\n
```