MACHINE LEARNING LAB

LAB 1

NIKKI EVANA BLESSY.N

2341459

1. a)Create a Dataset (.csv file)for Student Enrollment and Performance

Which contains the following fields.

StudentId(Unique identifier),

Course_Name: Categorical (Math, Science, History, Art).

Gender: (Male, Female, Non-binary).

Age: Integer (10–25).

Enrollment_Date: Random dates from the last 5 years.

Final_Grade: Float (0.0–100.0).

Attendance_Percentage: Float (50–100).

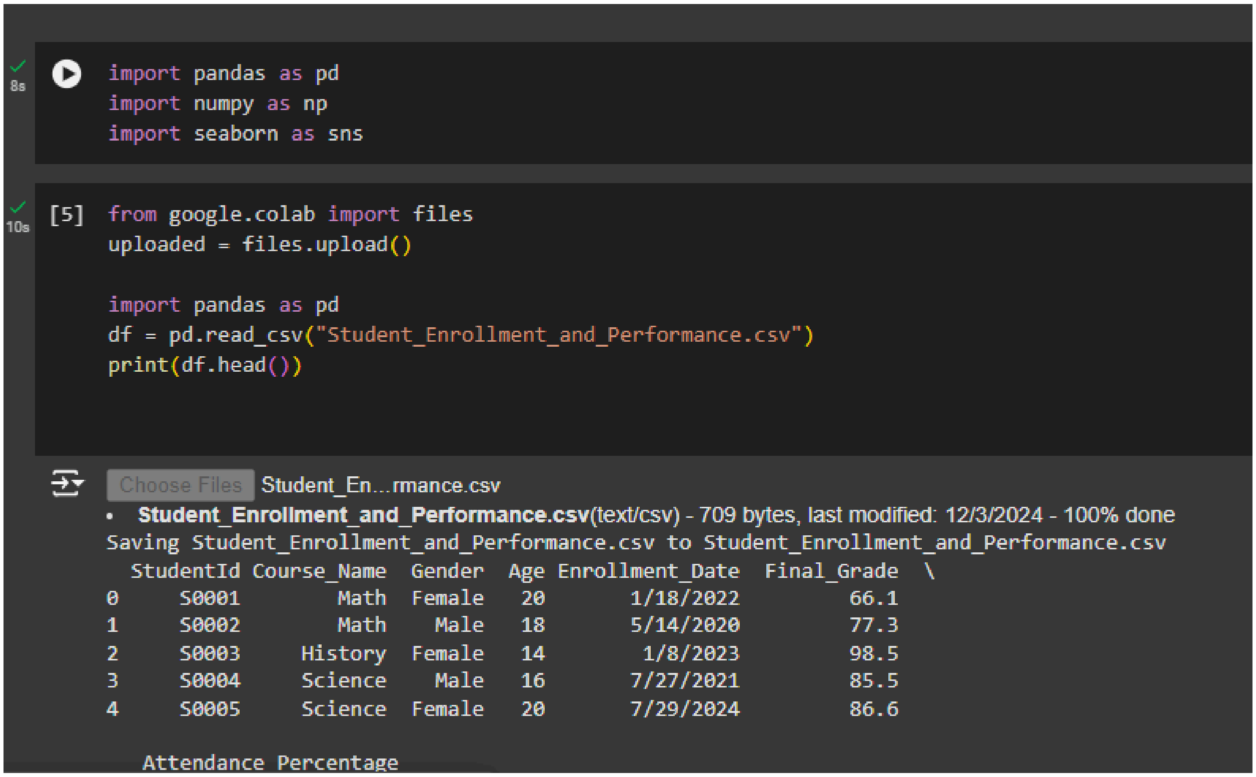
b)Include Null values in the data set.

c)Minimum Fifteen entries(record) in the data set.

StudentId	Course_Name	Gender	Age	Enrollment_Date	Final_Grade	Attendance_Percentage
S0001	Math	Female	20	1/18/2022	66.1	76.7
S0002	Math	Male	18	5/14/2020	77.3	62.2
S0003	History	Female	14	1/8/2023	98.5	73.1
S0004	Science	Male	16	7/27/2021	85.5	63.5
S0005	Science	Female	20	7/29/2024	86.6	96.3
S0006	Science	Female	13	6/14/2023	38	84.4
S0007	Math	Male	12	5/24/2023	64.1	61
S0008	Math	Male	22	11/21/2024	83.4	66.2
S0009	Art	Female	13	10/3/2024	16.3	88.4
S0010	Math	Male	21	12/14/2021	35.5	52.8
S0011	Math	Female	21	3/1/2023	67	92.12
S0012	Art	Male	18	1/1/2021	70.2	90.3
S0013	Science	Male	11	11/16/2023	68.4	70.1
S0014	Science	Female	24	4/25/2020	7.1	53.3

S0015	Math	Female	13	3/7/2020	63.5	95.7

2. Import the above(Q.No1) csv file using Pandas and display the following

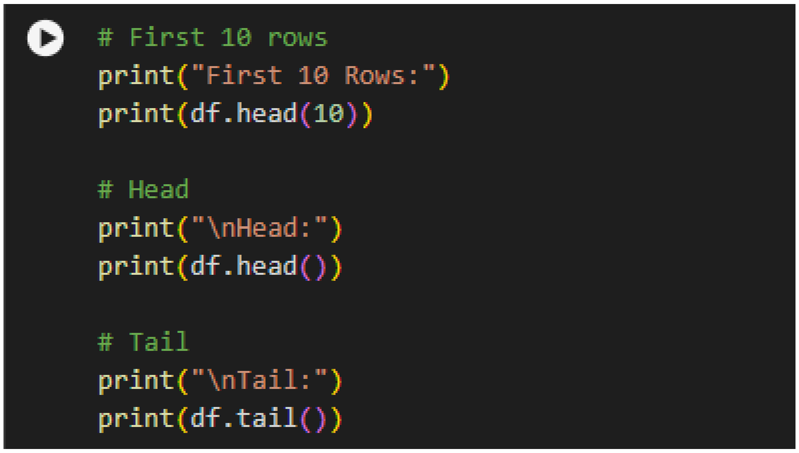


```
import pandas as pd
import numpy as np
import seaborn as sns
```

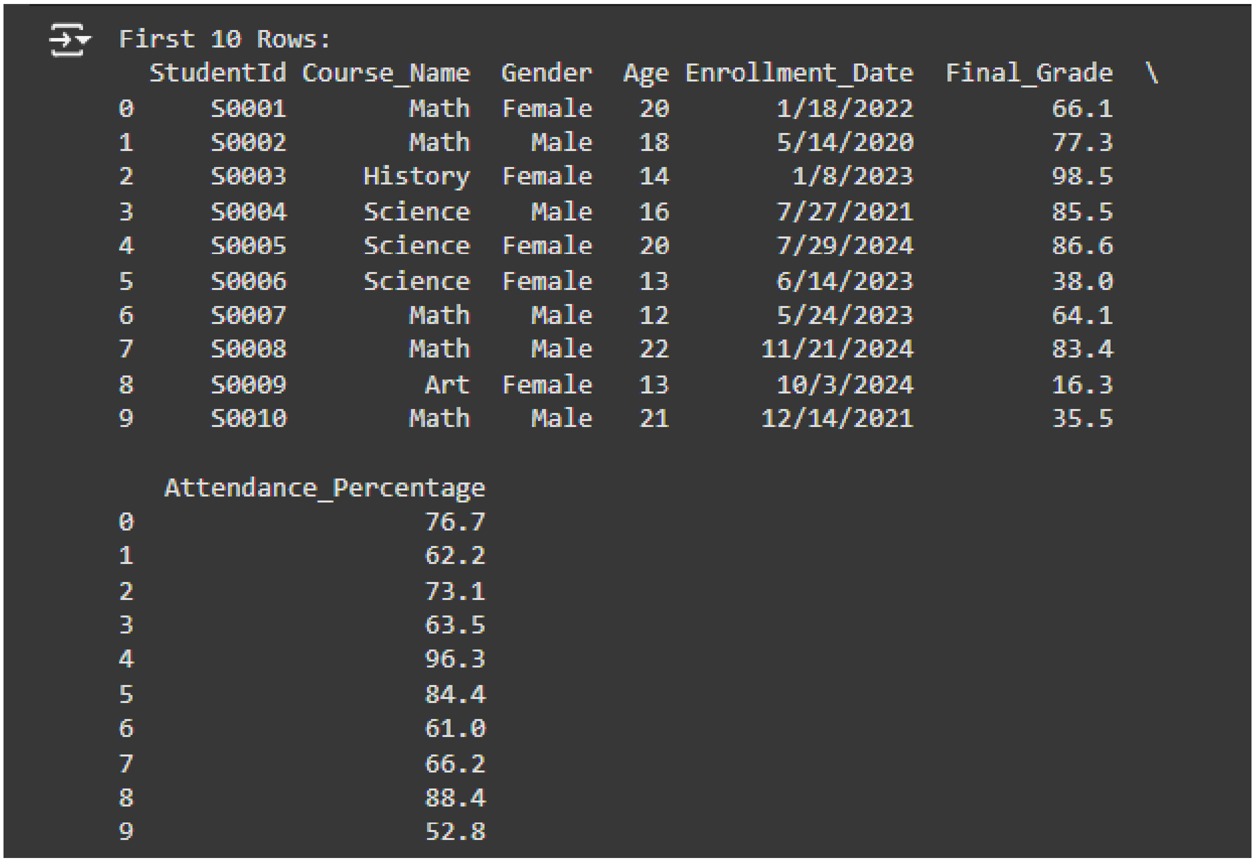
```
[5] from google.colab import files
    uploaded = files.upload()

    import pandas as pd
    df = pd.read_csv("Student_Enrollment_and_Performance.csv")
    print(df.head())
```

```
Student_En...rmance.csv
• Student_Enrollment_and_Performance.csv(text/csv) - 709 bytes, last modified: 12/3/2024 - 100% done
Saving Student_Enrollment_and_Performance.csv to Student_Enrollment_and_Performance.csv
  StudentId Course_Name  Gender  Age Enrollment_Date  Final_Grade  \
0     S0001        Math  Female   20       1/18/2022         66.1
1     S0002        Math    Male   18       5/14/2020         77.3
2     S0003     History  Female   14        1/8/2023         98.5
3     S0004     Science    Male   16       7/27/2021         85.5
4     S0005     Science  Female   20       7/29/2024         86.6

   Attendance_Percentage
```

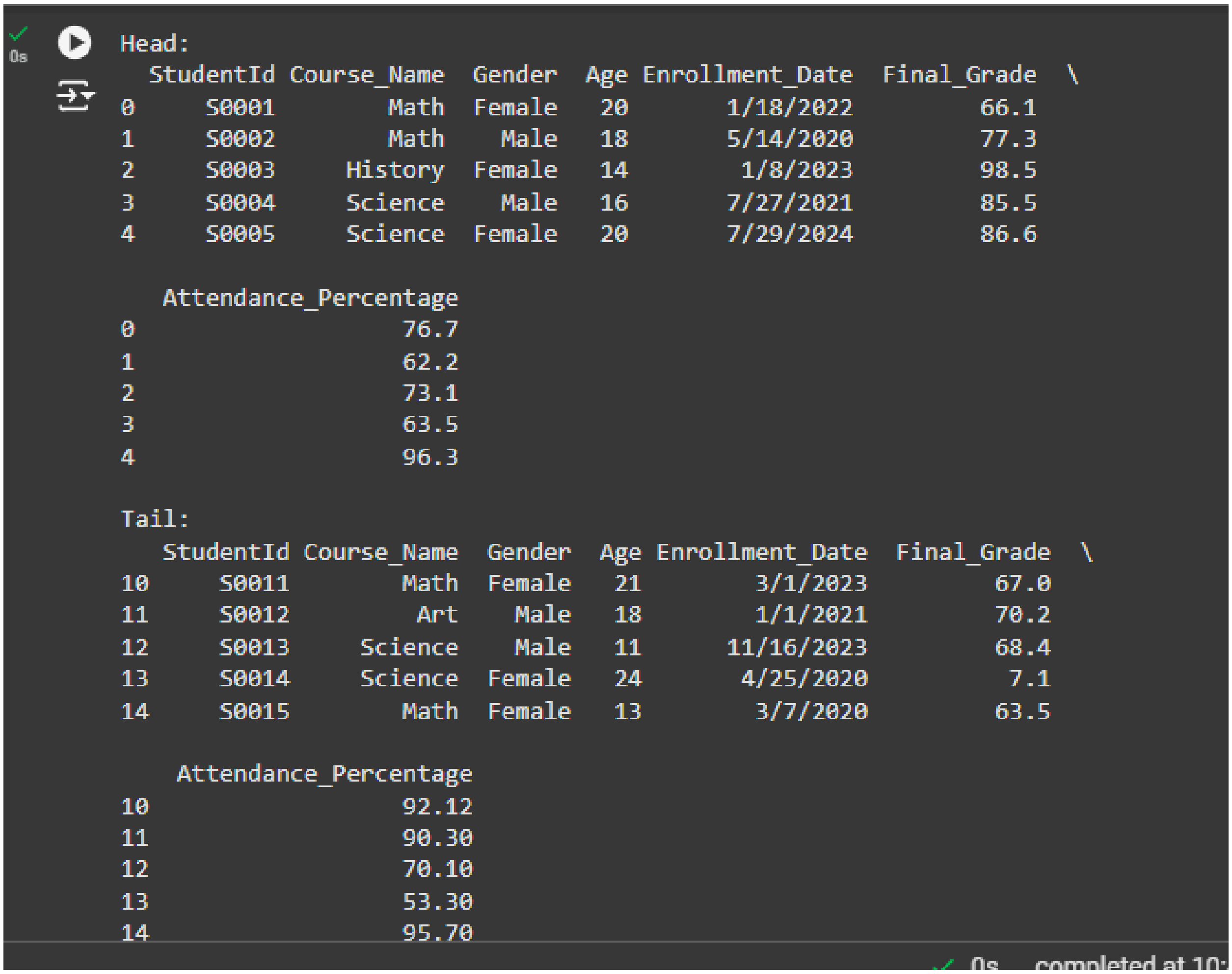
a)Display the first 10 rows,Head,Tail.



```
# First 10 rows
print("First 10 Rows:")
print(df.head(10))

# Head
print("\nHead:")
print(df.head())

# Tail
print("\nTail:")
print(df.tail())
```

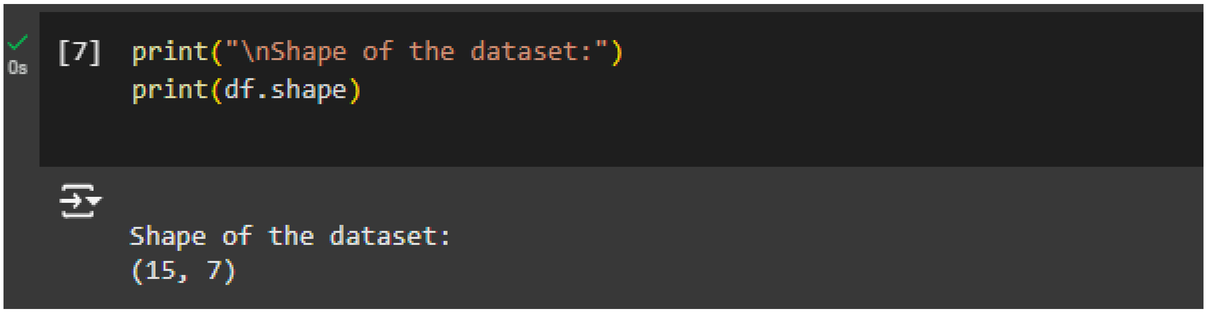


```
First 10 Rows:
  StudentId Course_Name  Gender  Age Enrollment_Date  Final_Grade  \
0     S0001        Math  Female   20       1/18/2022         66.1   
1     S0002        Math    Male   18       5/14/2020         77.3   
2     S0003     History  Female   14        1/8/2023         98.5   
3     S0004     Science    Male   16       7/27/2021         85.5   
4     S0005     Science  Female   20       7/29/2024         86.6   
5     S0006     Science  Female   13       6/14/2023         38.0   
6     S0007        Math    Male   12       5/24/2023         64.1   
7     S0008        Math    Male   22      11/21/2024         83.4   
8     S0009         Art  Female   13       10/3/2024         16.3   
9     S0010        Math    Male   21      12/14/2021         35.5   

   Attendance_Percentage  
0                   76.7  
1                   62.2  
2                   73.1  
3                   63.5  
4                   96.3  
5                   84.4  
6                   61.0  
7                   66.2  
8                   88.4  
9                   52.8  
```



```
Head:
  StudentId Course_Name  Gender  Age Enrollment_Date  Final_Grade  \
0     S0001        Math  Female   20       1/18/2022         66.1
1     S0002        Math    Male   18       5/14/2020         77.3
2     S0003     History  Female   14        1/8/2023         98.5
3     S0004     Science    Male   16       7/27/2021         85.5
4     S0005     Science  Female   20       7/29/2024         86.6

   Attendance_Percentage
0                   76.7
1                   62.2
2                   73.1
3                   63.5
4                   96.3

Tail:
   StudentId Course_Name  Gender  Age Enrollment_Date  Final_Grade  \
10     S0011        Math  Female   21        3/1/2023         67.0
11     S0012         Art    Male   18        1/1/2021         70.2
12     S0013     Science    Male   11      11/16/2023         68.4
13     S0014     Science  Female   24       4/25/2020          7.1
14     S0015        Math  Female   13        3/7/2020         63.5

    Attendance_Percentage
10                  92.12
11                  90.30
12                  70.10
13                  53.30
14                  95.70
```

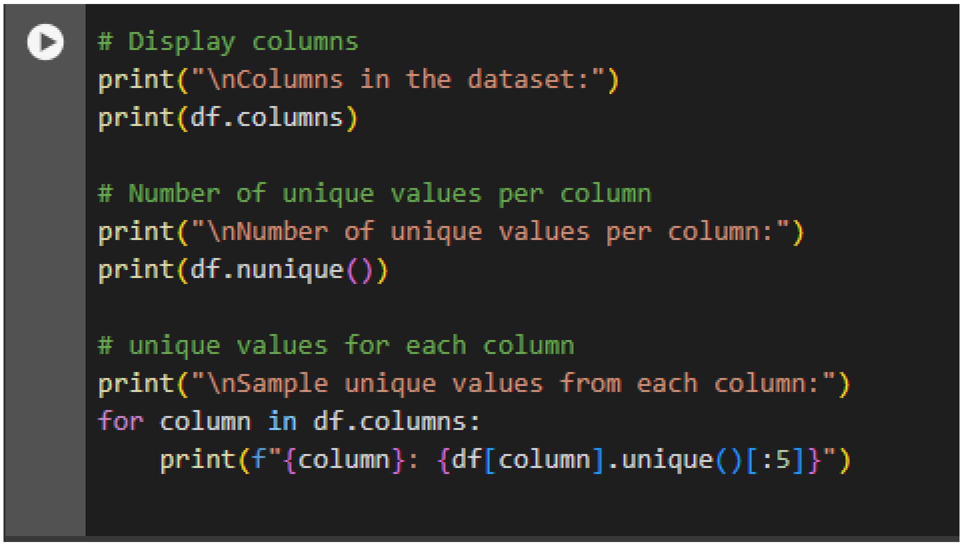
b)Display the shape of the data.



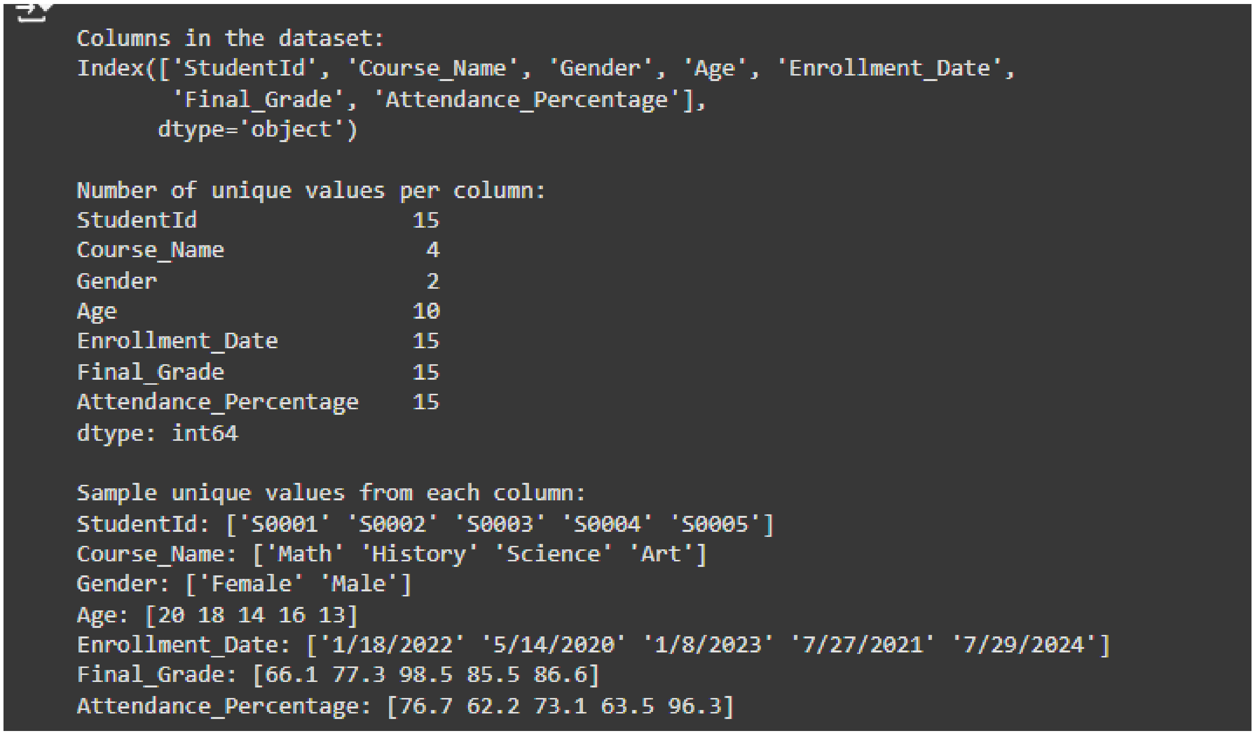
```
print("\nShape of the dataset:")
print(df.shape)
```

```

Shape of the dataset:
(15, 7)
```

c)Display the columns,Number unique columns and the data available in any of the unique columns.

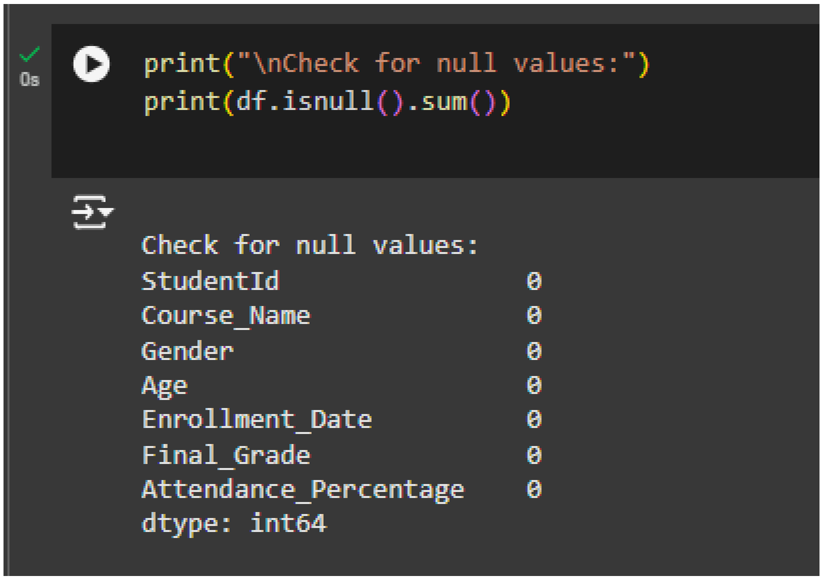


```python
# Display columns
print("\nColumns in the dataset:")
print(df.columns)

# Number of unique values per column
print("\nNumber of unique values per column:")
print(df.nunique())

# unique values for each column
print("\nSample unique values from each column:")
for column in df.columns:
    print(f"{column}: {df[column].unique()[:5]}")
```



```
Columns in the dataset:
Index(['StudentId', 'Course_Name', 'Gender', 'Age', 'Enrollment_Date',
       'Final_Grade', 'Attendance_Percentage'],
      dtype='object')

Number of unique values per column:
StudentId                15
Course_Name               4
Gender                    2
Age                      10
Enrollment_Date          15
Final_Grade              15
Attendance_Percentage    15
dtype: int64

Sample unique values from each column:
StudentId: ['S0001' 'S0002' 'S0003' 'S0004' 'S0005']
Course_Name: ['Math' 'History' 'Science' 'Art']
Gender: ['Female' 'Male']
Age: [20 18 14 16 13]
Enrollment_Date: ['1/18/2022' '5/14/2020' '1/8/2023' '7/27/2021' '7/29/2024']
Final_Grade: [66.1 77.3 98.5 85.5 86.6]
Attendance_Percentage: [76.7 62.2 73.1 63.5 96.3]
```

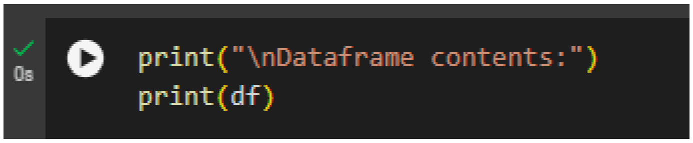
d)Check the Null values in the dataset.



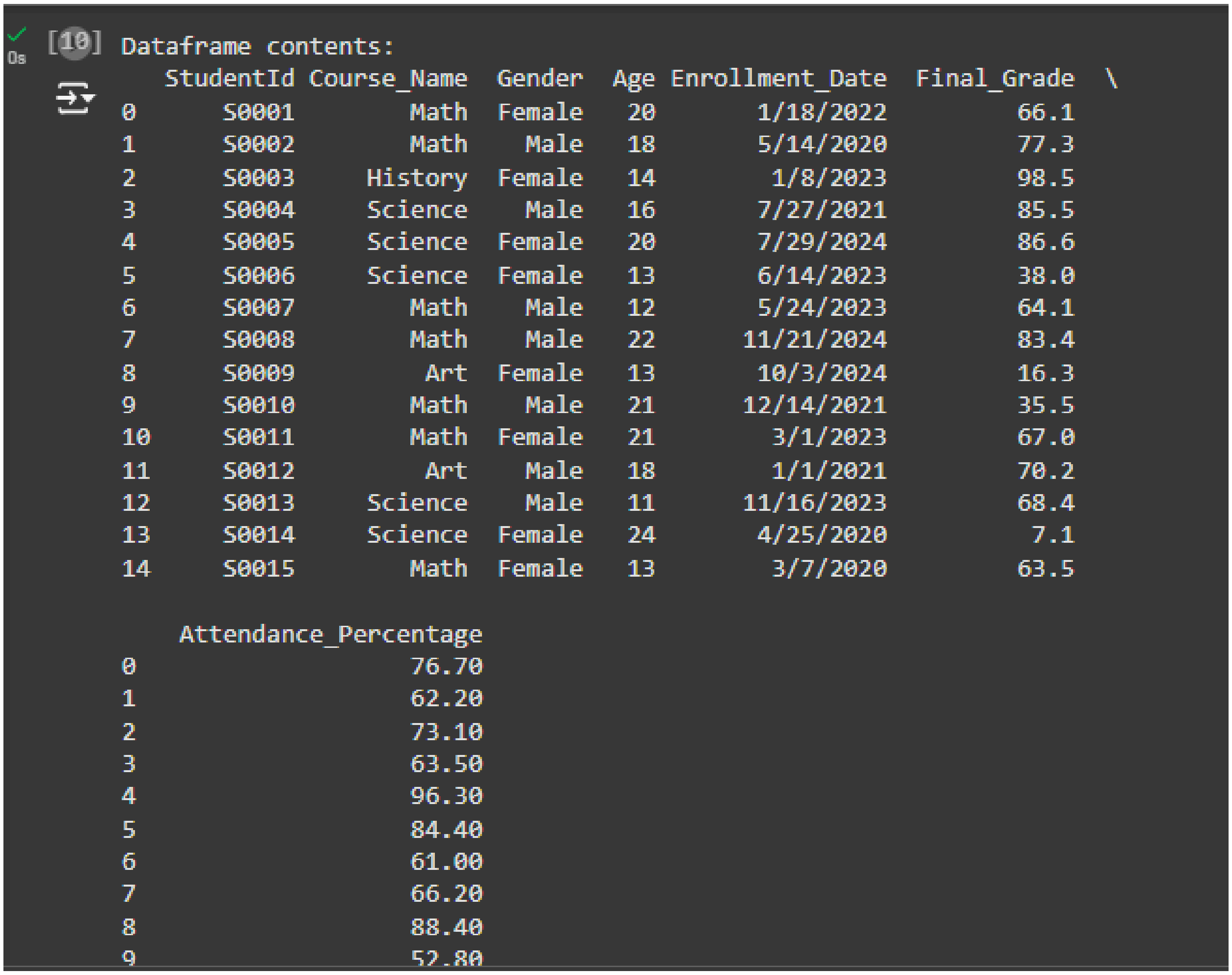
```
print("\nCheck for null values:")
print(df.isnull().sum())
```

```
Check for null values:
StudentId                0
Course_Name              0
Gender                   0
Age                      0
Enrollment_Date          0
Final_Grade              0
Attendance_Percentage    0
dtype: int64
```

e)Store the data in data frame and display

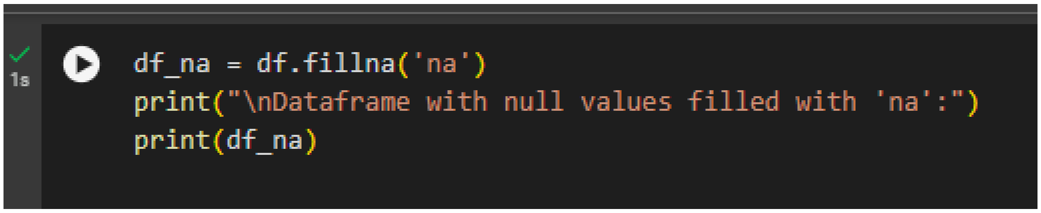


```
print("\nDataframe contents:")
print(df)
```

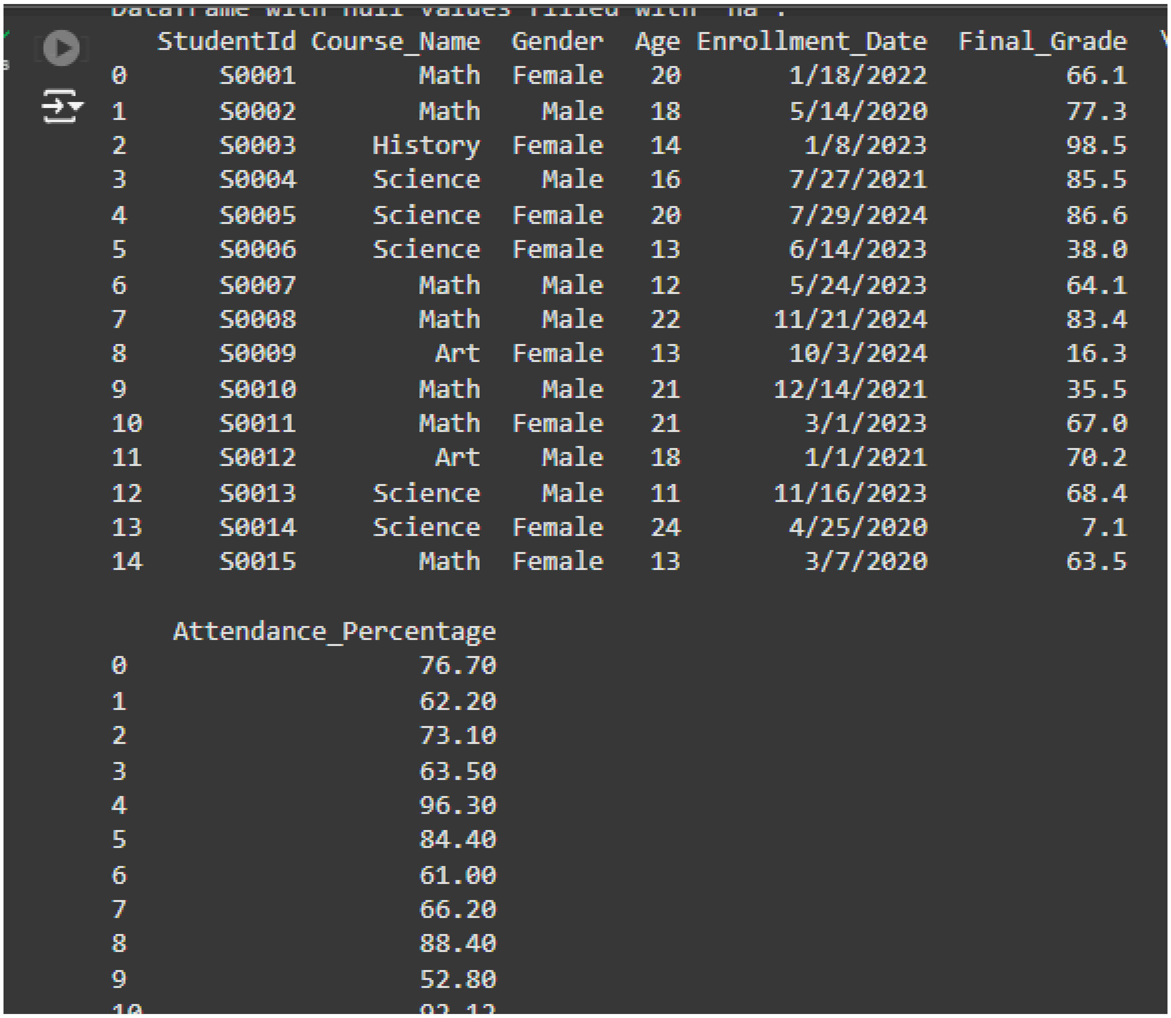


```
Dataframe contents:
   StudentId Course_Name  Gender  Age Enrollment_Date  Final_Grade  \
0      S0001        Math  Female   20       1/18/2022         66.1
1      S0002        Math    Male   18       5/14/2020         77.3
2      S0003     History  Female   14        1/8/2023         98.5
3      S0004     Science    Male   16       7/27/2021         85.5
4      S0005     Science  Female   20       7/29/2024         86.6
5      S0006     Science  Female   13       6/14/2023         38.0
6      S0007        Math    Male   12       5/24/2023         64.1
7      S0008        Math    Male   22      11/21/2024         83.4
8      S0009         Art  Female   13       10/3/2024         16.3
9      S0010        Math    Male   21      12/14/2021         35.5
10     S0011        Math  Female   21        3/1/2023         67.0
11     S0012         Art    Male   18        1/1/2021         70.2
12     S0013     Science    Male   11      11/16/2023         68.4
13     S0014     Science  Female   24       4/25/2020          7.1
14     S0015        Math  Female   13        3/7/2020         63.5

    Attendance_Percentage
0                   76.70
1                   62.20
2                   73.10
3                   63.50
4                   96.30
5                   84.40
6                   61.00
7                   66.20
8                   88.40
9                   52.80
```

e)Fill the null values with ‘na’ and display

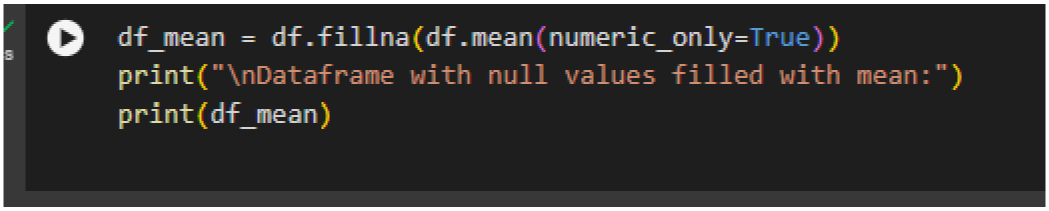


```
df_na = df.fillna('na')
print("\nDataframe with null values filled with 'na':")
print(df_na)
```

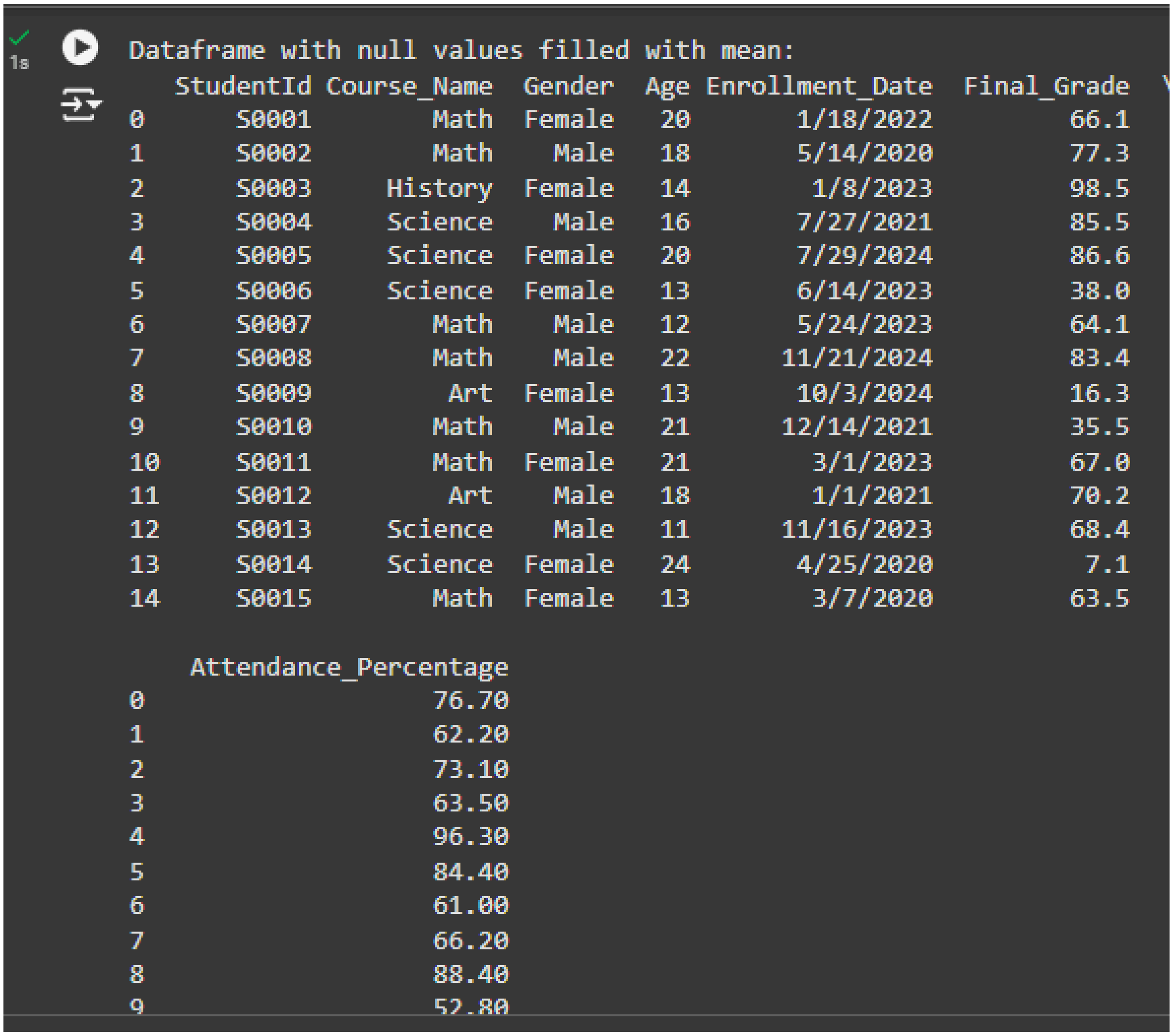


```
Dataframe with null values filled with 'na':
   StudentId Course_Name  Gender  Age Enrollment_Date  Final_Grade  V
0      S0001        Math  Female   20       1/18/2022         66.1
1      S0002        Math    Male   18       5/14/2020         77.3
2      S0003     History  Female   14        1/8/2023         98.5
3      S0004     Science    Male   16       7/27/2021         85.5
4      S0005     Science  Female   20       7/29/2024         86.6
5      S0006     Science  Female   13       6/14/2023         38.0
6      S0007        Math    Male   12       5/24/2023         64.1
7      S0008        Math    Male   22      11/21/2024         83.4
8      S0009         Art  Female   13       10/3/2024         16.3
9      S0010        Math    Male   21      12/14/2021         35.5
10     S0011        Math  Female   21        3/1/2023         67.0
11     S0012         Art    Male   18        1/1/2021         70.2
12     S0013     Science    Male   11      11/16/2023         68.4
13     S0014     Science  Female   24       4/25/2020          7.1
14     S0015        Math  Female   13        3/7/2020         63.5

    Attendance_Percentage
0                   76.70
1                   62.20
2                   73.10
3                   63.50
4                   96.30
5                   84.40
6                   61.00
7                   66.20
8                   88.40
9                   52.80
10                  92.12
```

f)Fill the null values with 'mean' and display

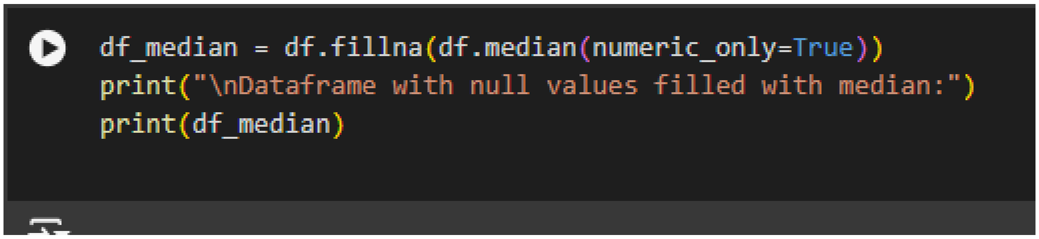


```python
df_mean = df.fillna(df.mean(numeric_only=True))
print("\nDataframe with null values filled with mean:")
print(df_mean)
```

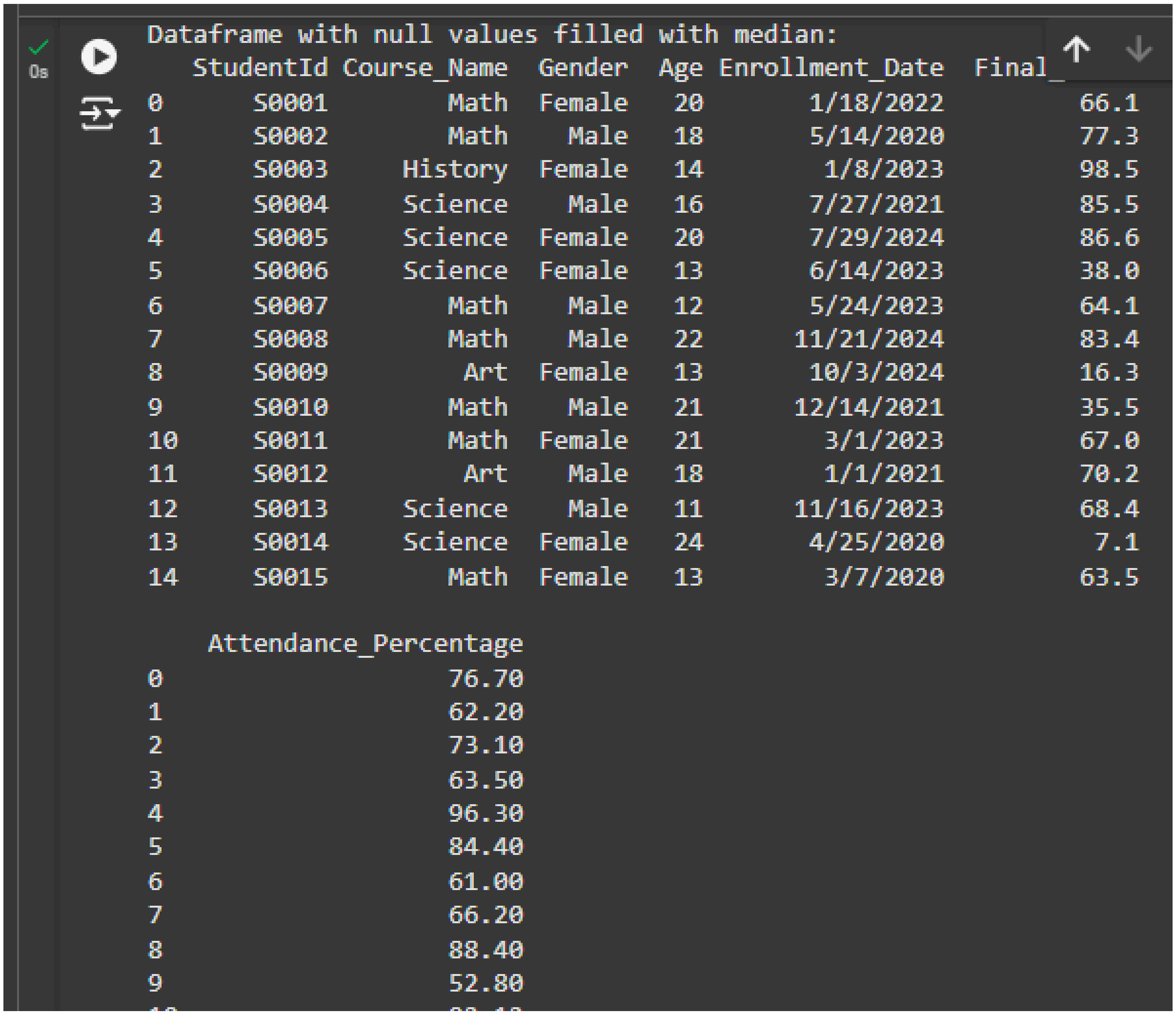


```
Dataframe with null values filled with mean:
   StudentId Course_Name  Gender  Age Enrollment_Date  Final_Grade  \
0      S0001        Math  Female   20       1/18/2022         66.1
1      S0002        Math    Male   18       5/14/2020         77.3
2      S0003     History  Female   14        1/8/2023         98.5
3      S0004     Science    Male   16       7/27/2021         85.5
4      S0005     Science  Female   20       7/29/2024         86.6
5      S0006     Science  Female   13       6/14/2023         38.0
6      S0007        Math    Male   12       5/24/2023         64.1
7      S0008        Math    Male   22      11/21/2024         83.4
8      S0009         Art  Female   13       10/3/2024         16.3
9      S0010        Math    Male   21      12/14/2021         35.5
10     S0011        Math  Female   21        3/1/2023         67.0
11     S0012         Art    Male   18        1/1/2021         70.2
12     S0013     Science    Male   11      11/16/2023         68.4
13     S0014     Science  Female   24       4/25/2020          7.1
14     S0015        Math  Female   13        3/7/2020         63.5

    Attendance_Percentage
0                   76.70
1                   62.20
2                   73.10
3                   63.50
4                   96.30
5                   84.40
6                   61.00
7                   66.20
8                   88.40
9                   52.80
```

g)Fill the null values with ‘median’ and display



```
df_median = df.fillna(df.median(numeric_only=True))
print("\nDataframe with null values filled with median:")
print(df_median)
```



```
Dataframe with null values filled with median:
   StudentId Course_Name  Gender  Age Enrollment_Date  Final_
0      S0001        Math  Female   20       1/18/2022    66.1
1      S0002        Math    Male   18       5/14/2020    77.3
2      S0003     History  Female   14        1/8/2023    98.5
3      S0004     Science    Male   16       7/27/2021    85.5
4      S0005     Science  Female   20       7/29/2024    86.6
5      S0006     Science  Female   13       6/14/2023    38.0
6      S0007        Math    Male   12       5/24/2023    64.1
7      S0008        Math    Male   22      11/21/2024    83.4
8      S0009         Art  Female   13       10/3/2024    16.3
9      S0010        Math    Male   21      12/14/2021    35.5
10     S0011        Math  Female   21        3/1/2023    67.0
11     S0012         Art    Male   18        1/1/2021    70.2
12     S0013     Science    Male   11      11/16/2023    68.4
13     S0014     Science  Female   24       4/25/2020     7.1
14     S0015        Math  Female   13        3/7/2020    63.5

    Attendance_Percentage
0                   76.70
1                   62.20
2                   73.10
3                   63.50
4                   96.30
5                   84.40
6                   61.00
7                   66.20
8                   88.40
9                   52.80
```