```python
# pip install pandas openpyxl matplotlib seaborn numpy

import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns



# Load the CSV file
csv_file_path = 'Ignite_Program_Cohort_2 (1).csv'  # Replace with the actual path to your CSV file
csv_data = pd.read_csv(csv_file_path)

# Display the first few rows of the CSV file
print(csv_data.head())
```

```
     Surname        First Name              Email Address  THEORY-
9/11/2024  \
0     Points               NaN                        NaN
30.0
1        NaN              76ix     phemelo1307@gmail.com
NaN
2  ABDULLAHI          ABUBAKAR    siddeeqtech1@gmail.com
NaN
3        NaN   Abson T Muzvuru  abson99muzvuru@gmail.com
NaN
4     Muyobo  Adam Musakabantu      muyoboadam@gmail.com
26.0

   ASSIGNMENT_2-9/12/2024  PRACTICAL-9/14/2024  PRACTICAL-9/15/2024  \
0                    30.0                 20.0                 50.0
1                     NaN                  1.0                  NaN
2                     NaN                  1.0                  NaN
3                     NaN                  NaN                  NaN
4                     NaN                 20.0                 30.0

   practical-9/29/2024  ASSIGNMENT_3-9/30/2024  practical-10/6/2024  \
0                 20.0                    30.0                 50.0
1                  NaN                     NaN                  NaN
2                  NaN                     NaN                  NaN
3                  NaN                     NaN                  NaN
4                 20.0                     NaN                 30.0

   practical-10/12/2024  practical-10/13/2024
0                 100.0                  50.0
1                   NaN                   NaN
2                   NaN                   NaN
3                   NaN                   NaN
4                   NaN                   NaN
```

analyze Marks of students.

```
# Create a DataFrame
df = pd.DataFrame(csv_data)

# Output the DataFrame
print(df)
```

```
       Surname                    First Name                    Email
Address  \
0       Points                           NaN
NaN
1          NaN                          76ix
phemelo1307@gmail.com
2    ABDULLAHI                      ABUBAKAR
siddeeqtech1@gmail.com
3          NaN               Abson T Muzvuru
abson99muzvuru@gmail.com
4       Muyobo              Adam Musakabantu
muyoboadam@gmail.com
..         ...                           ...                           .
..
111    umutoni  mariette imana irahari pee
umumaridid i@gmail.com
112  musinguzi                         oscar
oscarmusinguzi2001@gmail.com
113     mwangi                          tony
tonymwangz@gmail.com
114     jokhun                        vikram
vjokhun1@gmail.com
115   tafadzwa                        walter
wchapera@gmail.com

     THEORY-9/11/2024  ASSIGNMENT_2-9/12/2024  PRACTICAL-9/14/2024  \
0                30.0                    30.0                 20.0
1                 NaN                     NaN                  1.0
2                 NaN                     NaN                  1.0
3                 NaN                     NaN                  NaN
4                26.0                     NaN                 20.0
..                ...                     ...                  ...
111               NaN                     NaN                 13.0
112              23.0                     NaN                  1.0
113               NaN                     NaN                  1.0
114               NaN                     NaN                  1.0
115               NaN                     NaN                 13.0

     PRACTICAL-9/15/2024  practical-9/29/2024  ASSIGNMENT_3-9/30/2024
\
0                   50.0                 20.0                    30.0
```

```
1                      NaN                    NaN                    NaN

2                      NaN                    NaN                    NaN

3                      NaN                    NaN                    NaN

4                     30.0                   20.0                    NaN

..                     ...                    ...                    ...

111                    NaN                    NaN                    NaN

112                    NaN                    NaN                    NaN

113                    NaN                    NaN                    NaN

114                    NaN                    NaN                    NaN

115                    NaN                    NaN                    NaN


     practical-10/6/2024  practical-10/12/2024  practical-10/13/2024
0                   50.0                 100.0                  50.0
1                    NaN                   NaN                   NaN
2                    NaN                   NaN                   NaN
3                    NaN                   NaN                   NaN
4                   30.0                   NaN                   NaN
..                   ...                   ...                   ...
111                  NaN                   NaN                   NaN
112                 40.0                   NaN                   NaN
113                  NaN                   NaN                   NaN
114                  NaN                   NaN                   NaN
115                  NaN                   NaN                   NaN

[116 rows x 12 columns]
```

```python
# Exclude these columns from replacing NaN values
columns_to_exclude = ['Surname', 'First Name', 'Email Address']

# Replace NaN values with 0 for all columns except the excluded ones
df.loc[:, ~df.columns.isin(columns_to_exclude)] = df.loc[:,
~df.columns.isin(columns_to_exclude)].fillna(0)

# Convert numeric columns to float
numeric_columns = df.columns.drop(columns_to_exclude)
df[numeric_columns] = df[numeric_columns].astype(float)

# Calculate percentage for each column
for column in numeric_columns:
    max_value = df.iloc[0][column]
    df[column] = (df[column] / max_value) * 100
```

```
df['Average Score'] = df[numeric_columns].mean(axis=1)

print(df.head(20))
```

```
      Surname        First Name                    Email Address  \
0      Points               NaN                              NaN
1         NaN              76ix           phemelo1307@gmail.com
2   ABDULLAHI          ABUBAKAR          siddeeqtech1@gmail.com
3         NaN   Abson T Muzvuru         abson99muzvuru@gmail.com
4      Muyobo  Adam Musakabantu            muyoboadam@gmail.com
5      Situma             Agnes           aggiesituma@gmail.com
6        Akum               Ann            annakum510@gmail.com
7         NaN       Anti Social    forthepeopleonly01@gmail.com
8    Kampamba            Benson      bensonkampamba66@gmail.com
9       Dondi            Brivia           briviadondi@gmail.com
10    Thierry            Buliro       thierrysiscob13@gmail.com
11      NGUGI          CAROLINE        wcarolinengugi@gmail.com
12  Sendawula            Calvin    calvinsendawula188@gmail.com
13    Tusiime         Catherine               ctcathyt@gmail.com
14      Okisa         Celestine         celeineokisah@gmail.com
15    Wangara           Charles         charliewangara@gmail.com
16    Sinyani             Chozi         chozin.sinyani@gmail.com
17      Makai            Daniel          danielmakai92@gmail.com
18      Wambi            Daniel  wambidanielcollins256@gmail.com
19     Kadagi             Dante           dantekadagi3@gmail.com

    THEORY-9/11/2024  ASSIGNMENT_2-9/12/2024  PRACTICAL-9/14/2024  \
0          100.000000                   100.0                100.0
1            0.000000                     0.0                  5.0
2            0.000000                     0.0                  5.0
3            0.000000                     0.0                  0.0
4           86.666667                     0.0                100.0
5            0.000000                     0.0                  5.0
6           93.333333                     0.0                 50.0
7           90.000000                     0.0                 50.0
8           96.666667                     0.0                 75.0
9            0.000000                     0.0                  5.0
10          93.333333                     0.0                  5.0
11           0.000000                     0.0                  5.0
12          90.000000                     0.0                  5.0
13           0.000000                     0.0                  5.0
14          90.000000                     0.0                100.0
15           0.000000                     0.0                 65.0
16          96.666667                     0.0                 90.0
17           0.000000                     0.0                  5.0
18           0.000000                     0.0                  5.0
19          93.333333                     0.0                  5.0

    PRACTICAL-9/15/2024  practical-9/29/2024  ASSIGNMENT_3-
9/30/2024  \
```

0	100.0	100.0	100.0
1	0.0	0.0	0.0
2	0.0	0.0	0.0
3	0.0	0.0	0.0
4	60.0	100.0	0.0
5	0.0	0.0	0.0
6	90.0	100.0	0.0
7	100.0	0.0	0.0
8	0.0	25.0	0.0
9	0.0	0.0	0.0
10	0.0	0.0	0.0
11	0.0	0.0	0.0
12	0.0	0.0	0.0
13	0.0	0.0	0.0
14	90.0	0.0	0.0
15	0.0	0.0	0.0
16	0.0	0.0	0.0
17	0.0	0.0	0.0
18	0.0	0.0	0.0
19	0.0	0.0	0.0

	practical-10/6/2024	practical-10/12/2024	practical-10/13/2024	\
0	100.0	100.0	100.0	
1	0.0	0.0	0.0	
2	0.0	0.0	0.0	
3	0.0	0.0	0.0	
4	60.0	0.0	0.0	
5	0.0	0.0	0.0	
6	0.0	0.0	0.0	
7	0.0	0.0	0.0	
8	60.0	0.0	0.0	

```
9                   0.0                   0.0                   0.0
10                  0.0                   0.0                   0.0
11                  0.0                   0.0                   0.0
12                  0.0                   0.0                   0.0
13                  0.0                   0.0                   0.0
14                  0.0                   0.0                   0.0
15                  0.0                   0.0                   0.0
16                  0.0                   0.0                   0.0
17                  0.0                   0.0                   0.0
18                  0.0                   0.0                   0.0
19                  0.0                   0.0                   0.0
```

```
    Average Score
0      100.000000
1        0.555556
2        0.555556
3        0.000000
4       45.185185
5        0.555556
6       37.037037
7       26.666667
8       28.518519
9        0.555556
10      10.925926
11       0.555556
12      10.555556
13       0.555556
14      31.111111
15       7.222222
16      20.740741
17       0.555556
18       0.555556
19      10.925926
```

```
# Remove the first row (which contained the max values)
df = df.iloc[1:].reset_index(drop=True)
print(df.head(20))
```

```
      Surname        First Name                    Email Address  \
0         NaN              76ix           phemelo1307@gmail.com
1   ABDULLAHI          ABUBAKAR          siddeeqtech1@gmail.com
2         NaN   Abson T Muzvuru        abson99muzvuru@gmail.com
3      Muyobo  Adam Musakabantu            muyoboadam@gmail.com
4      Situma             Agnes           aggiesituma@gmail.com
5        Akum               Ann            annakum510@gmail.com
6         NaN       Anti Social    forthepeopleonly01@gmail.com
7    Kampamba            Benson      bensonkampamba66@gmail.com
8       Dondi            Brivia           briviadondi@gmail.com
9     Thierry            Buliro       thierrysiscob13@gmail.com
10      NGUGI          CAROLINE        wcarolinengugi@gmail.com
```

```
11  Sendawula            Calvin     calvinsendawula188@gmail.com
12    Tusiime         Catherine               ctcathyt@gmail.com
13      Okisa         Celestine          celeineokisah@gmail.com
14    Wangara           Charles         charliewangara@gmail.com
15    Sinyani             Chozi         chozin.sinyani@gmail.com
16      Makai            Daniel          danielmakai92@gmail.com
17      Wambi            Daniel  wambidanielcollins256@gmail.com
18     Kadagi             Dante           dantekadagi3@gmail.com
19     Otwori           Daphine          daphineotwori@gmail.com

    THEORY-9/11/2024  ASSIGNMENT_2-9/12/2024  PRACTICAL-9/14/2024  \
0           0.000000                     0.0                  5.0
1           0.000000                     0.0                  5.0
2           0.000000                     0.0                  0.0
3          86.666667                     0.0                100.0
4           0.000000                     0.0                  5.0
5          93.333333                     0.0                 50.0
6          90.000000                     0.0                 50.0
7          96.666667                     0.0                 75.0
8           0.000000                     0.0                  5.0
9          93.333333                     0.0                  5.0
10          0.000000                     0.0                  5.0
11         90.000000                     0.0                  5.0
12          0.000000                     0.0                  5.0
13         90.000000                     0.0                100.0
14          0.000000                     0.0                 65.0
15         96.666667                     0.0                 90.0
16          0.000000                     0.0                  5.0
17          0.000000                     0.0                  5.0
18         93.333333                     0.0                  5.0
19         96.666667                     0.0                  5.0

    PRACTICAL-9/15/2024  practical-9/29/2024  ASSIGNMENT_3-
9/30/2024  \
0                   0.0                  0.0                     0.0

1                   0.0                  0.0                     0.0

2                   0.0                  0.0                     0.0

3                  60.0                100.0                     0.0

4                   0.0                  0.0                     0.0

5                  90.0                100.0                     0.0

6                 100.0                  0.0                     0.0

7                   0.0                 25.0                     0.0
```

```
8                     0.0                     0.0                     0.0

9                     0.0                     0.0                     0.0

10                    0.0                     0.0                     0.0

11                    0.0                     0.0                     0.0

12                    0.0                     0.0                     0.0

13                   90.0                     0.0                     0.0

14                    0.0                     0.0                     0.0

15                    0.0                     0.0                     0.0

16                    0.0                     0.0                     0.0

17                    0.0                     0.0                     0.0

18                    0.0                     0.0                     0.0

19                    0.0                     0.0                     0.0


    practical-10/6/2024  practical-10/12/2024  practical-10/13/2024  \
0                   0.0                   0.0                   0.0
1                   0.0                   0.0                   0.0
2                   0.0                   0.0                   0.0
3                  60.0                   0.0                   0.0
4                   0.0                   0.0                   0.0
5                   0.0                   0.0                   0.0
6                   0.0                   0.0                   0.0
7                  60.0                   0.0                   0.0
8                   0.0                   0.0                   0.0
9                   0.0                   0.0                   0.0
10                  0.0                   0.0                   0.0
11                  0.0                   0.0                   0.0
12                  0.0                   0.0                   0.0
13                  0.0                   0.0                   0.0
14                  0.0                   0.0                   0.0
15                  0.0                   0.0                   0.0
16                  0.0                   0.0                   0.0
17                  0.0                   0.0                   0.0
18                  0.0                   0.0                   0.0
19                  0.0                   0.0                   0.0

    Average Score
0        0.555556
1        0.555556
2        0.000000
```

```
3       45.185185
4        0.555556
5       37.037037
6       26.666667
7       28.518519
8        0.555556
9       10.925926
10       0.555556
11      10.555556
12       0.555556
13      31.111111
14       7.222222
15      20.740741
16       0.555556
17       0.555556
18      10.925926
19      11.296296
```

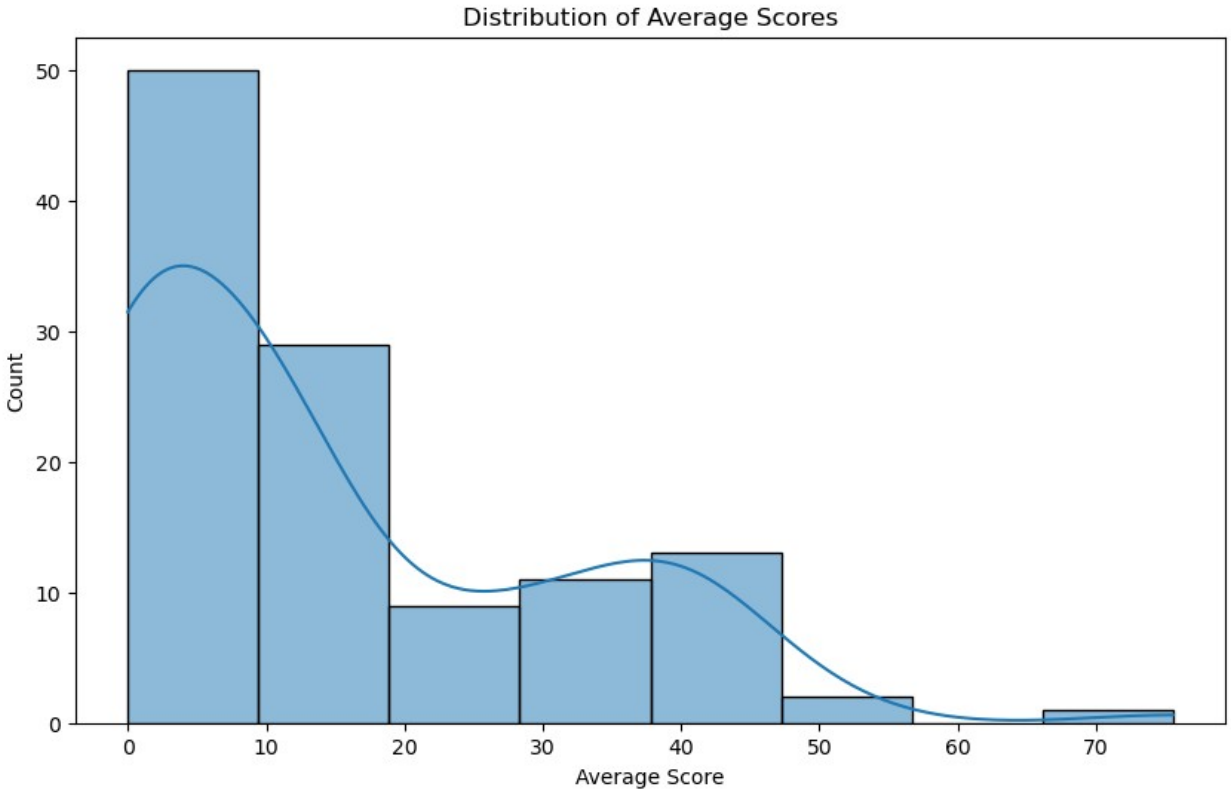
```
def plot_distribution(data, title, xlabel, ylabel):
    plt.figure(figsize=(10, 6))
    sns.histplot(data, kde=True)
    plt.title(title)
    plt.xlabel(xlabel)
    plt.ylabel(ylabel)
    plt.show()

# Analyze overall performance
df['Average Score'] = df[numeric_columns].mean(axis=1)
print("Overall Performance Statistics:")
print(df['Average Score'].describe())
```

```
Overall Performance Statistics:
count    115.000000
mean      14.786473
std       16.059471
min        0.000000
25%        0.555556
50%       10.555556
75%       27.333333
max       75.555556
Name: Average Score, dtype: float64
```

```
# Plot overall score distribution
plot_distribution(df['Average Score'], 'Distribution of Average
Scores', 'Average Score', 'Count')
```

```
C:\Users\Administrator\anaconda3\Lib\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\Administrator\anaconda3\Lib\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):
```




```
# Top 10 performers
print("\nTop 10 Performers:")
print(df.nlargest(10, 'Average Score')[['Surname', 'First Name',
'Average Score']])
```

```
Top 10 Performers:
         Surname        First Name  Average Score
34         Kaddu          Innocent      75.555556
98           NaN          Victoria      50.555556
29       Oletile              Fela      48.000000
3         Muyobo  Adam Musakabantu      45.185185
68      Emmanuel           Nsubuga      44.444444
52           NaN      Legooramotho      43.259259
36  Martin frank          Isingoma      42.592593
51     Chepkemoi             Laura      41.481481
41         Laker             Jessy      40.185185
22       Fadhili             Denis      40.111111
```

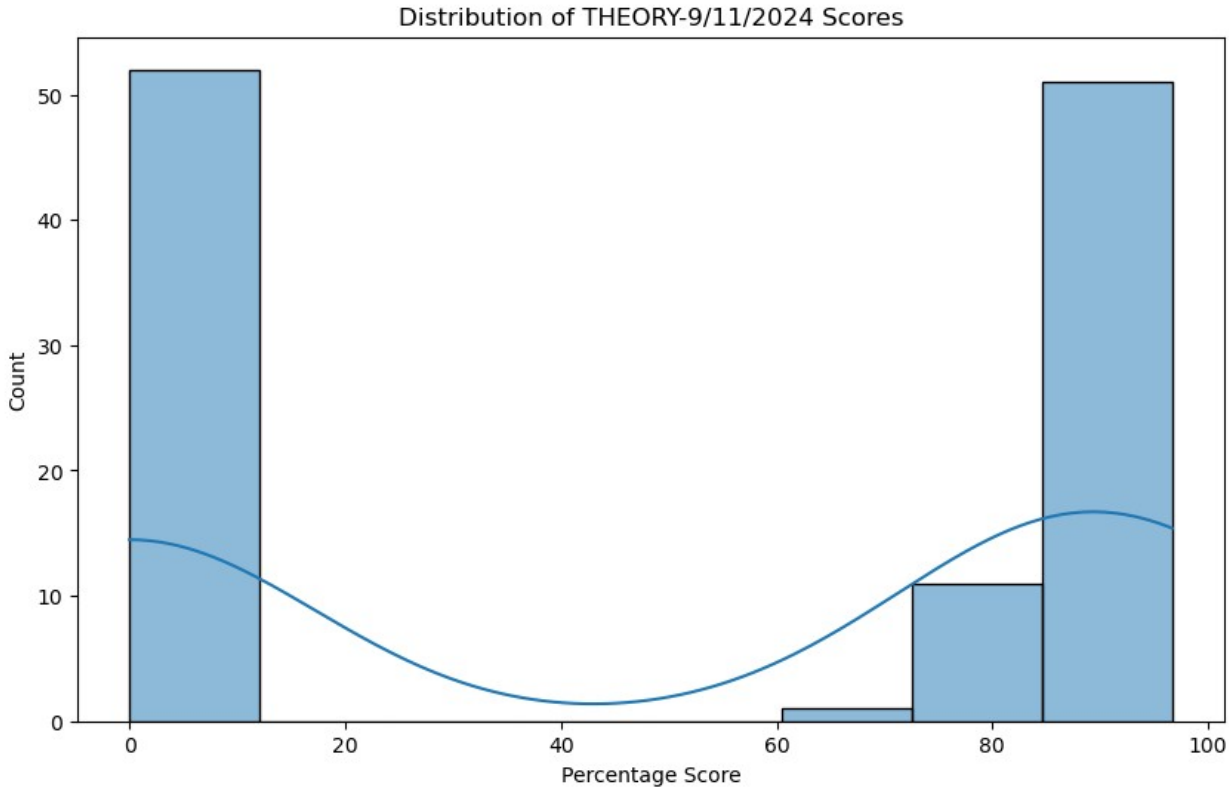
```python
# Bottom 10 performers
print("\nBottom 10 Performers:")
print(df.nsmallest(10, 'Average Score')[['Surname', 'First Name',
'Average Score']])
```

```
Bottom 10 Performers:
      Surname       First Name  Average Score
2         NaN  Abson T Muzvuru       0.000000
20      Muniu             Dave       0.000000
28   Katwamba           Edward       0.000000
73    Ayebale          Paphras       0.000000
74    Ayebale          Paphras       0.000000
82    Wachera             Rose       0.000000
84      Siywa             Ryan       0.000000
94      Muema            Tonny       0.000000
0         NaN             76ix       0.555556
1   ABDULLAHI         ABUBAKAR       0.555556
```

```python
# Analyze performance by assessment
for column in numeric_columns:
    print(f"\n{column} Performance Statistics:")
    print(df[column].describe())
    plot_distribution(df[column], f'Distribution of {column} Scores',
'Percentage Score', 'Count')
```

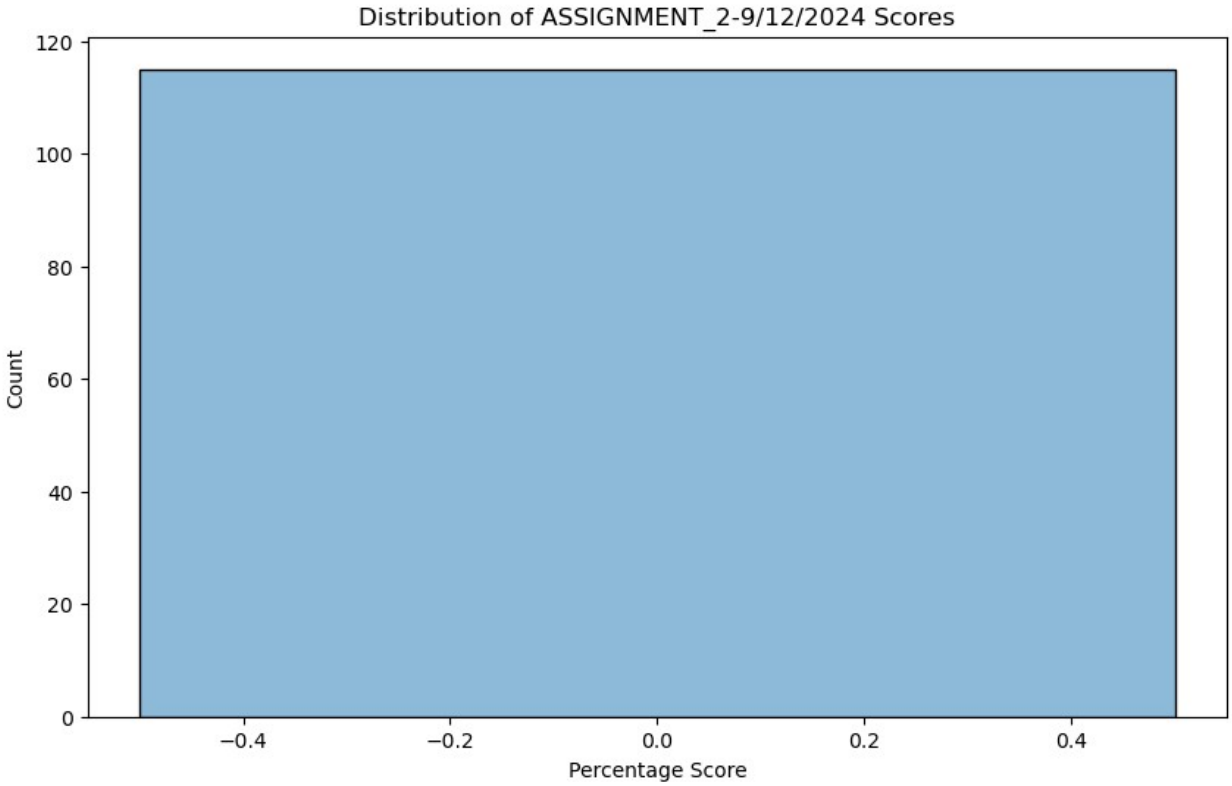
```
THEORY-9/11/2024 Performance Statistics:
count    115.000000
mean      48.782609
std       44.711182
min        0.000000
25%        0.000000
50%       80.000000
75%       90.000000
max       96.666667
Name: THEORY-9/11/2024, dtype: float64

C:\Users\Administrator\anaconda3\Lib\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\Administrator\anaconda3\Lib\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):
```



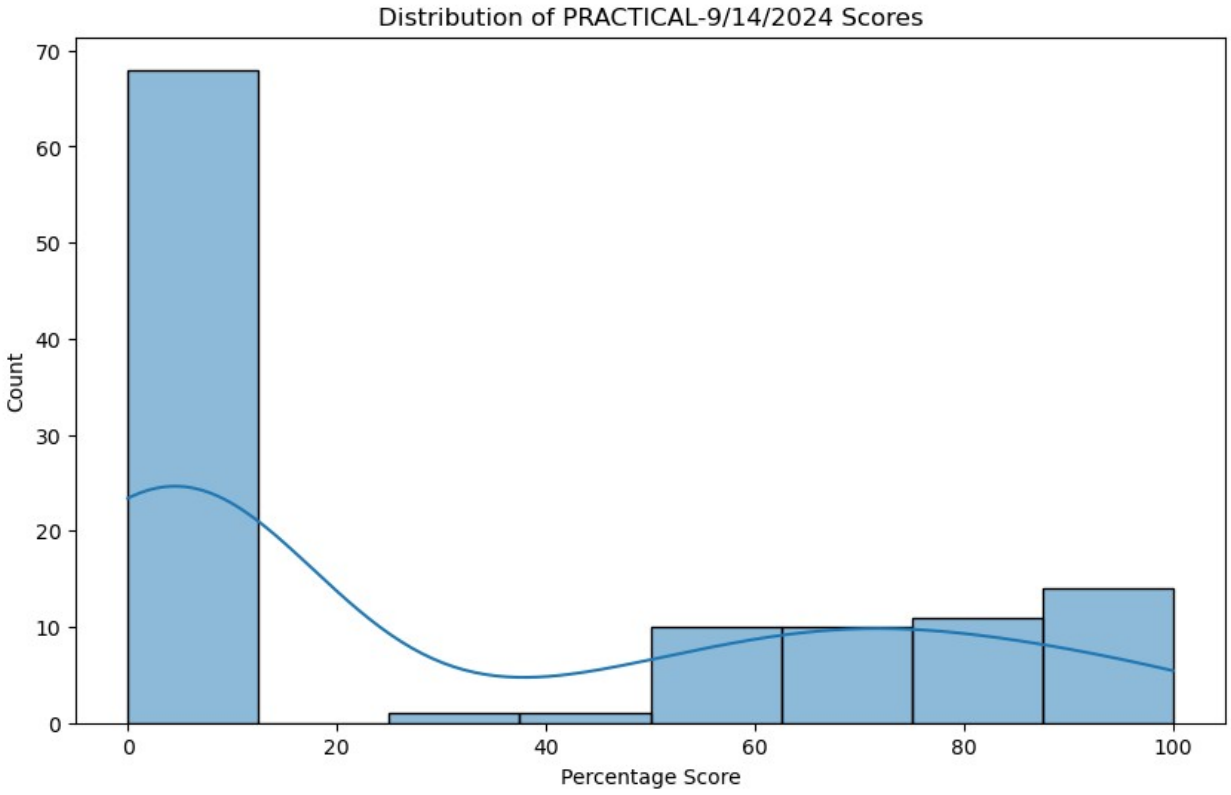

```
ASSIGNMENT_2-9/12/2024 Performance Statistics:
count    115.0
mean       0.0
std        0.0
min        0.0
25%        0.0
50%        0.0
75%        0.0
max        0.0
Name: ASSIGNMENT_2-9/12/2024, dtype: float64

C:\Users\Administrator\anaconda3\Lib\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\Administrator\anaconda3\Lib\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):
```



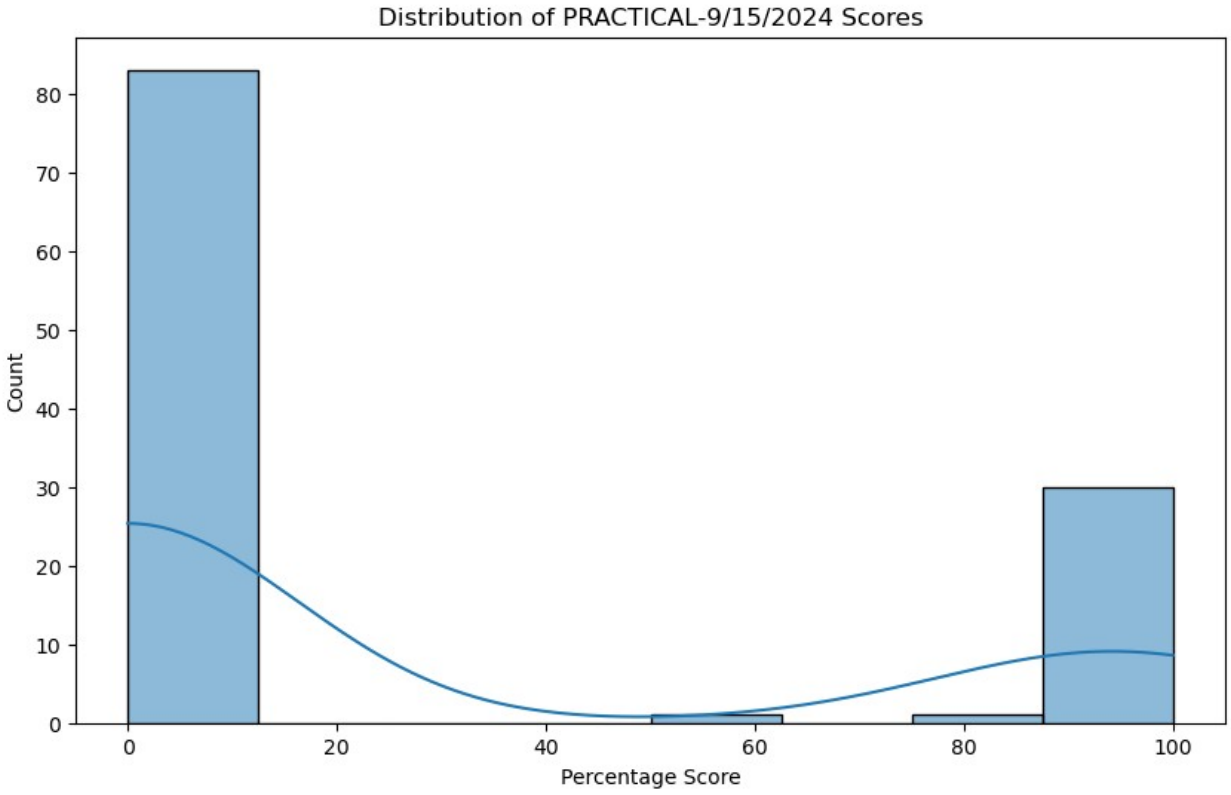

```
PRACTICAL-9/14/2024 Performance Statistics:
count    115.000000
mean      32.043478
std       35.490891
min        0.000000
25%        5.000000
50%        5.000000
75%       65.000000
max      100.000000
Name: PRACTICAL-9/14/2024, dtype: float64

C:\Users\Administrator\anaconda3\Lib\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\Administrator\anaconda3\Lib\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):
```



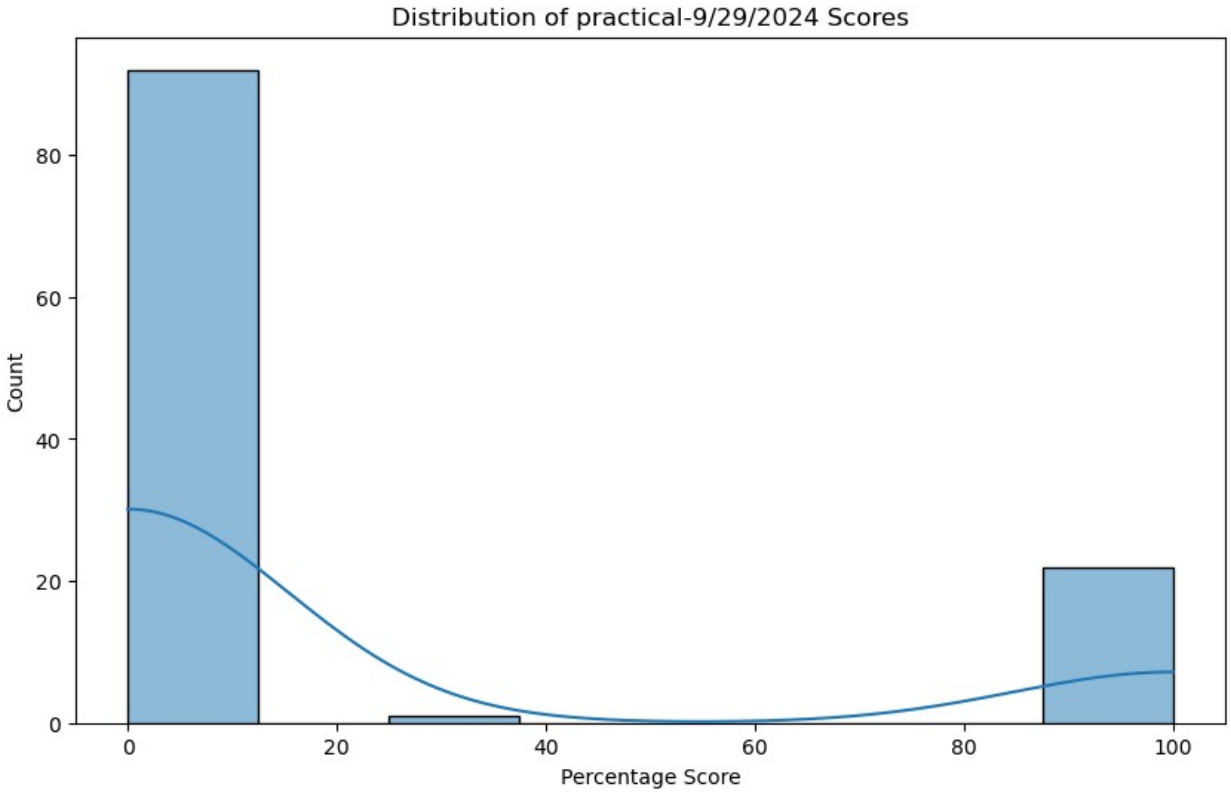

```
PRACTICAL-9/15/2024 Performance Statistics:
count    115.000000
mean      25.947826
std       42.167969
min        0.000000
25%        0.000000
50%        0.000000
75%       90.000000
max      100.000000
Name: PRACTICAL-9/15/2024, dtype: float64

C:\Users\Administrator\anaconda3\Lib\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\Administrator\anaconda3\Lib\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):
```




```
practical-9/29/2024 Performance Statistics:
count    115.000000
mean      19.347826
std       39.467518
min        0.000000
25%        0.000000
50%        0.000000
75%        0.000000
max      100.000000
Name: practical-9/29/2024, dtype: float64

C:\Users\Administrator\anaconda3\Lib\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\Administrator\anaconda3\Lib\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):
```




```
ASSIGNMENT_3-9/30/2024 Performance Statistics:
count    115.0
mean       0.0
std        0.0
min        0.0
25%        0.0
50%        0.0
75%        0.0
max        0.0
Name: ASSIGNMENT_3-9/30/2024, dtype: float64

C:\Users\Administrator\anaconda3\Lib\site-packages\seaborn\
_oldcore.py:1498: FutureWarning: is_categorical_dtype is deprecated
and will be removed in a future version. Use isinstance(dtype,
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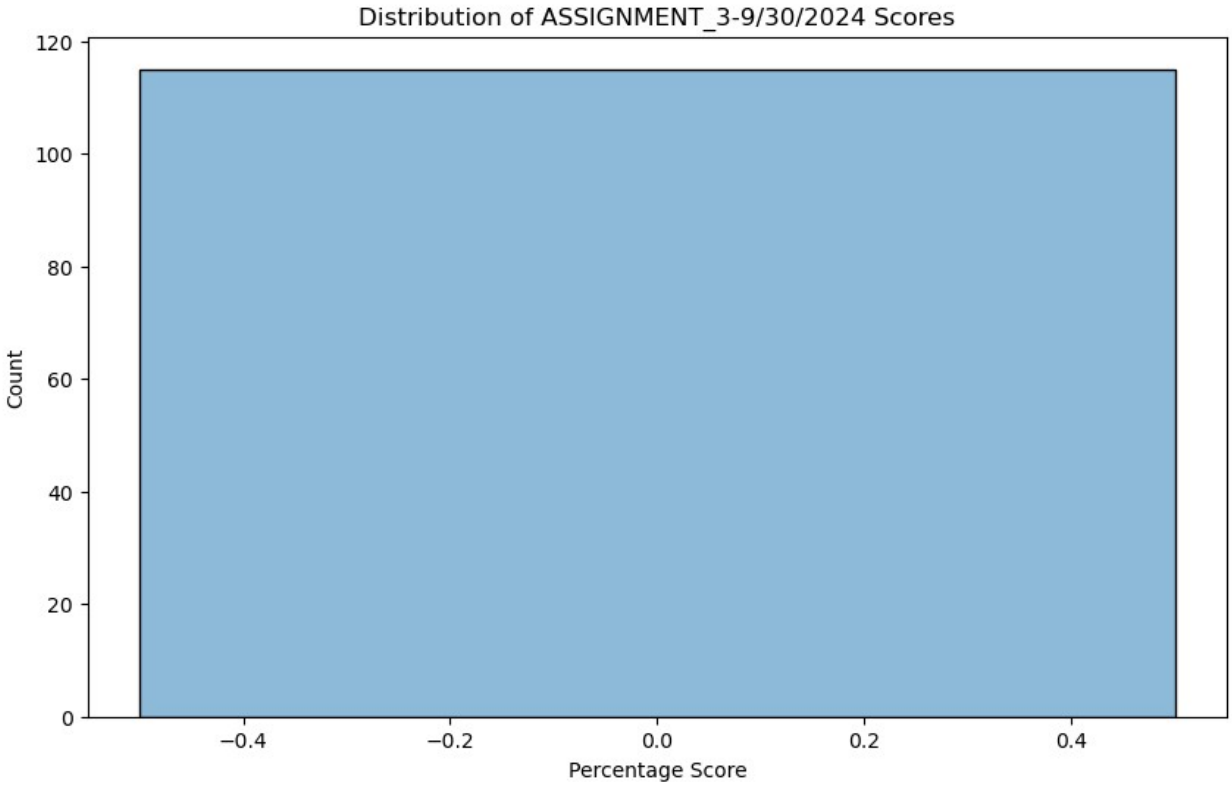
```




```
practical-10/6/2024 Performance Statistics:
count    115.000000
mean       5.217391
std       19.971375
min        0.000000
25%        0.000000
50%        0.000000
75%        0.000000
max      100.000000
Name: practical-10/6/2024, dtype: float64

C:\Users\Administrator\anaconda3\Lib\site-packages\seaborn\
_oldcore.py:1498: FutureWarning: is_categorical_dtype is deprecated
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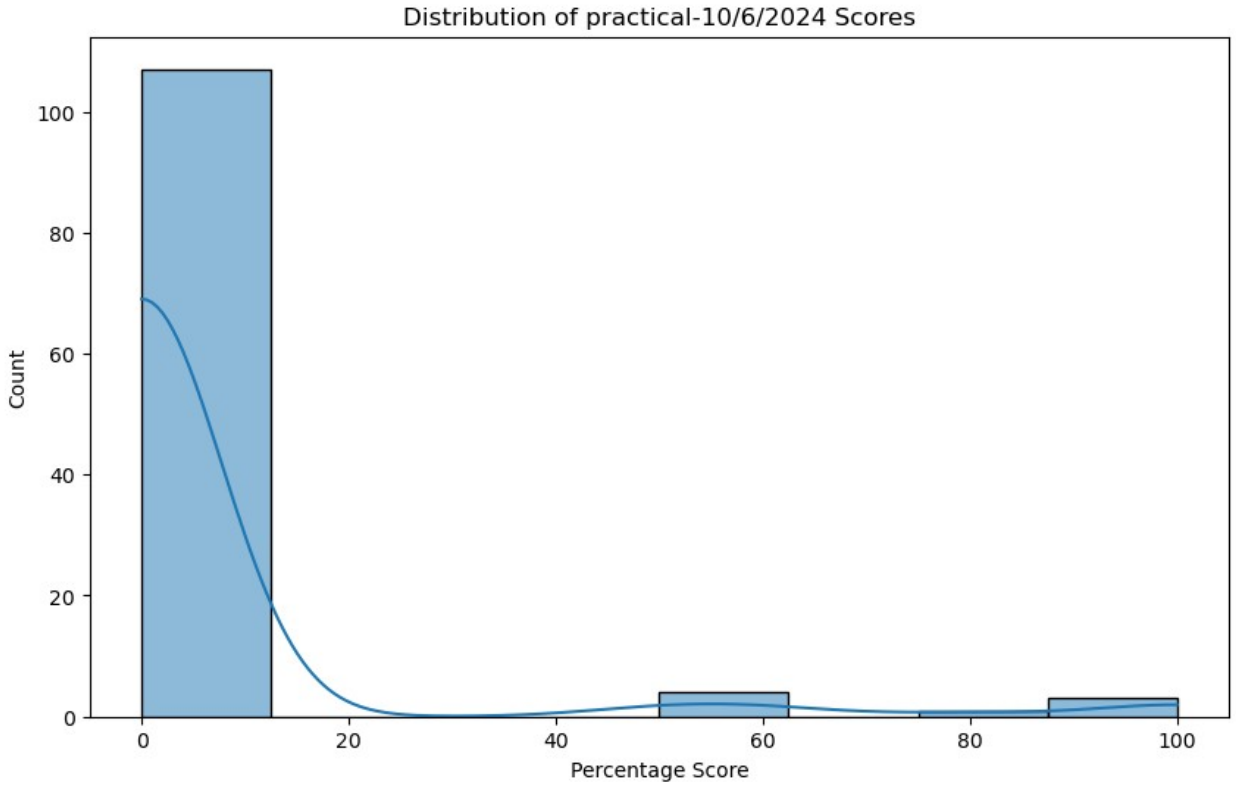


```
practical-10/12/2024 Performance Statistics:
count    115.000000
mean       0.869565
std        9.325048
min        0.000000
25%        0.000000
50%        0.000000
75%        0.000000
max      100.000000
Name: practical-10/12/2024, dtype: float64

C:\Users\Administrator\anaconda3\Lib\site-packages\seaborn\
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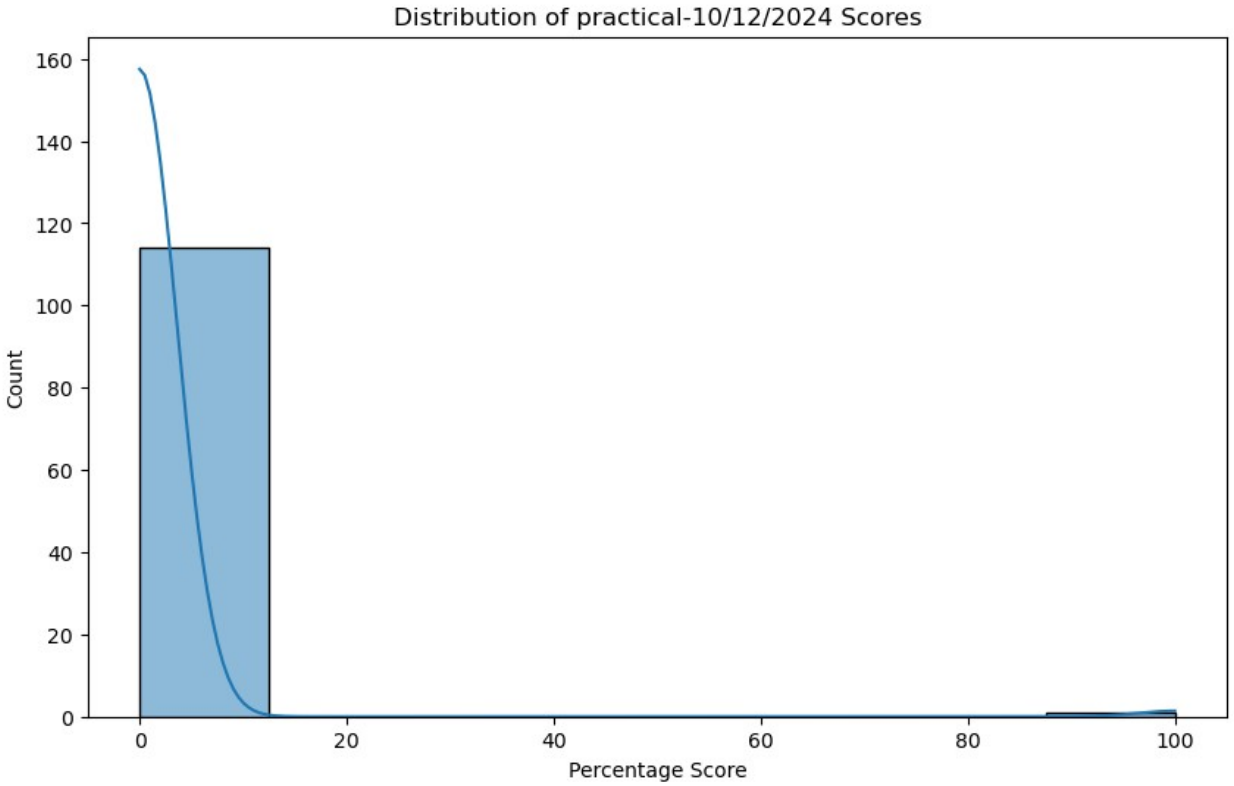


```
practical-10/13/2024 Performance Statistics:
count    115.000000
mean       0.869565
std        9.325048
min        0.000000
25%        0.000000
50%        0.000000
75%        0.000000
max      100.000000
Name: practical-10/13/2024, dtype: float64

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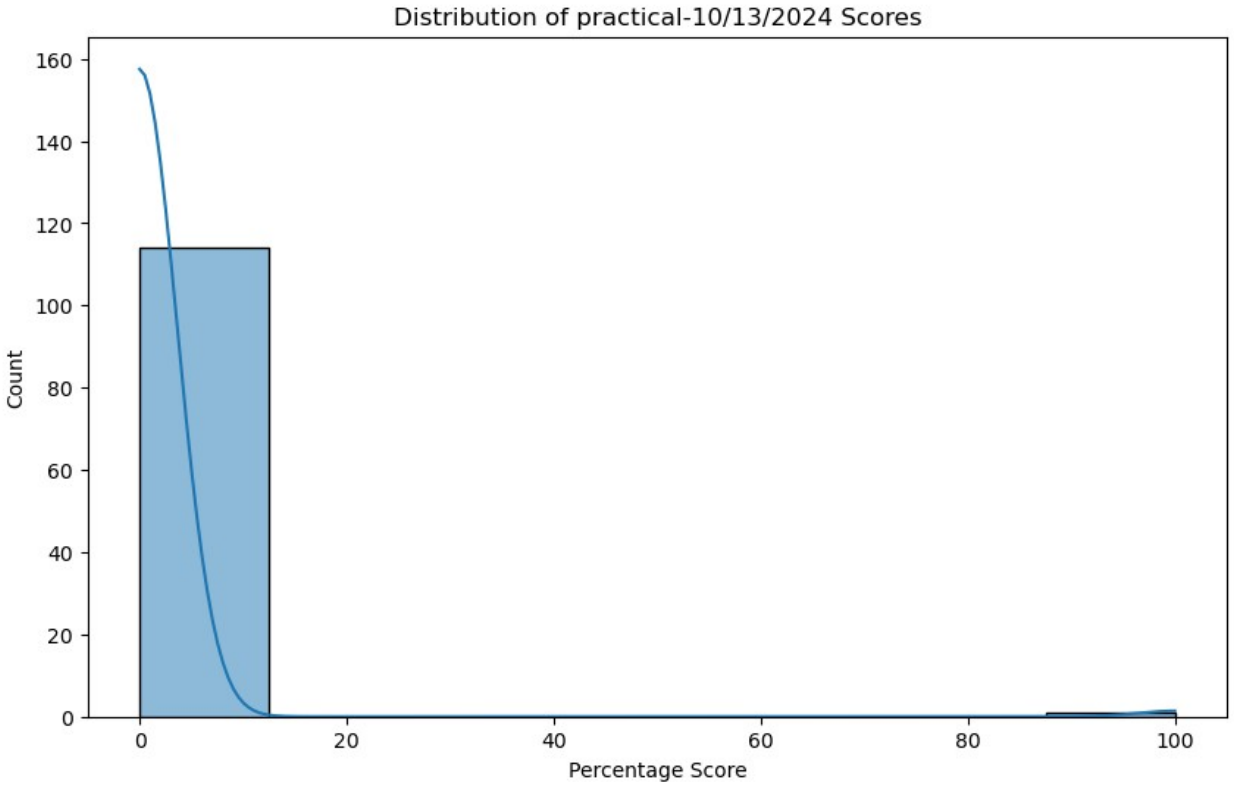
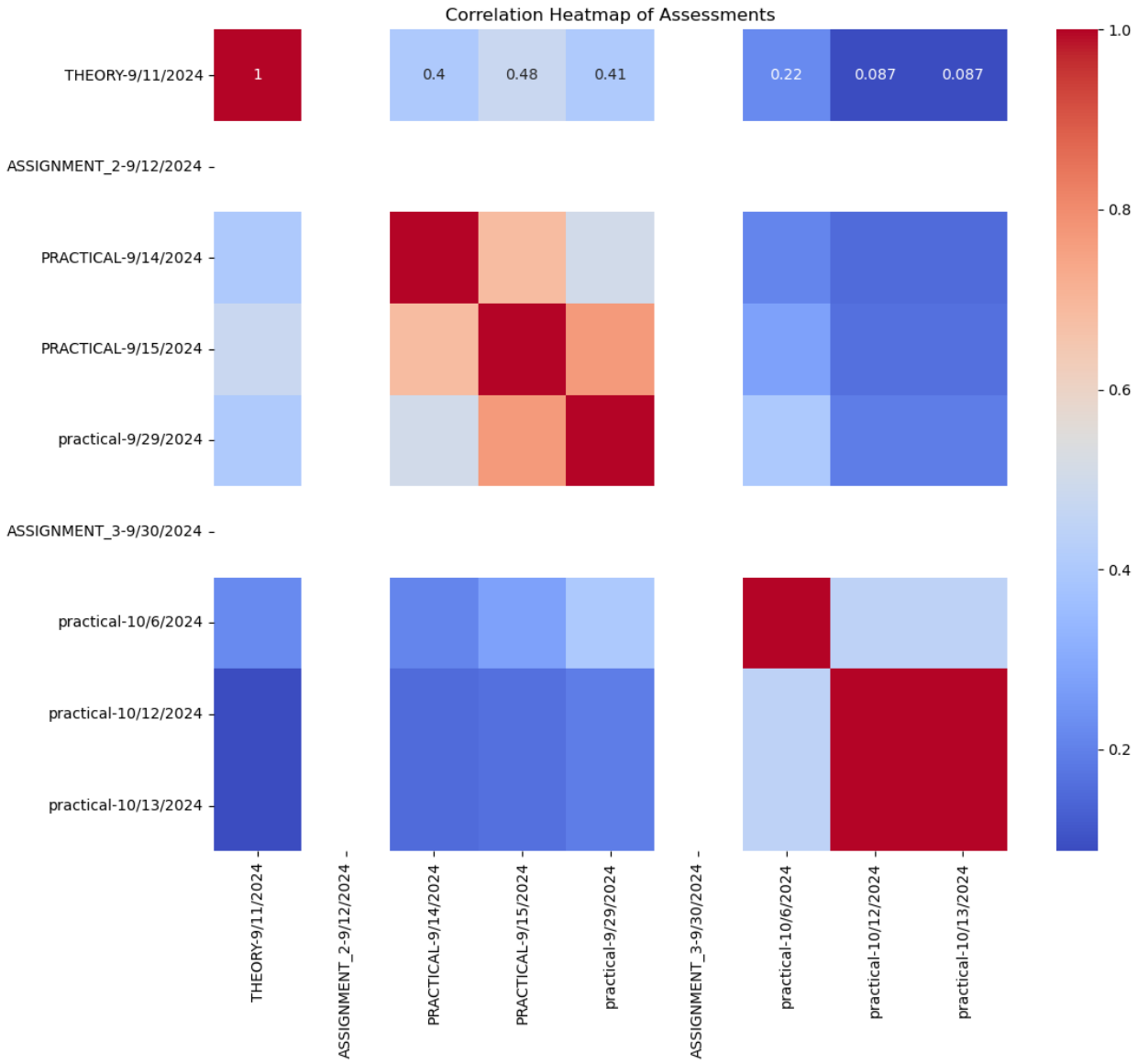



```
# Correlation heatmap of assessments
plt.figure(figsize=(12, 10))
sns.heatmap(df[numeric_columns].corr(), annot=True, cmap='coolwarm')
plt.title('Correlation Heatmap of Assessments')
plt.show()
```

```
C:\Users\Administrator\anaconda3\Lib\site-packages\seaborn\
matrix.py:260: FutureWarning: Format strings passed to MaskedConstant
are ignored, but in future may error or produce different behavior
  annotation = ("{:" + self.fmt + "}").format(val)
```




```
# Scatter plot matrix
sns.pairplot(df[list(numeric_columns) + ['Average Score']], height=2)
plt.suptitle('Scatter Plot Matrix of Assessments', y=1.02)
plt.show()
```

```
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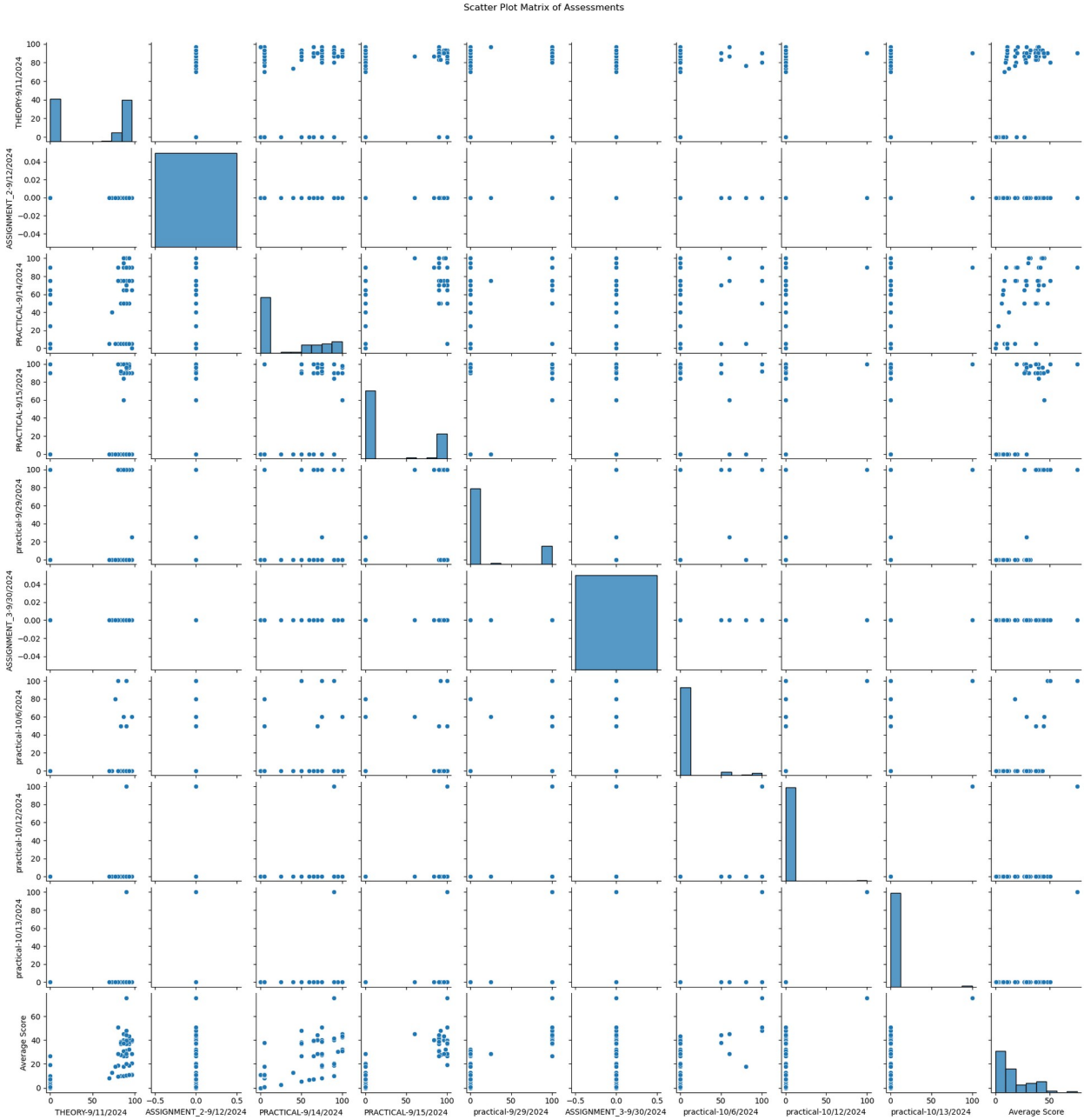
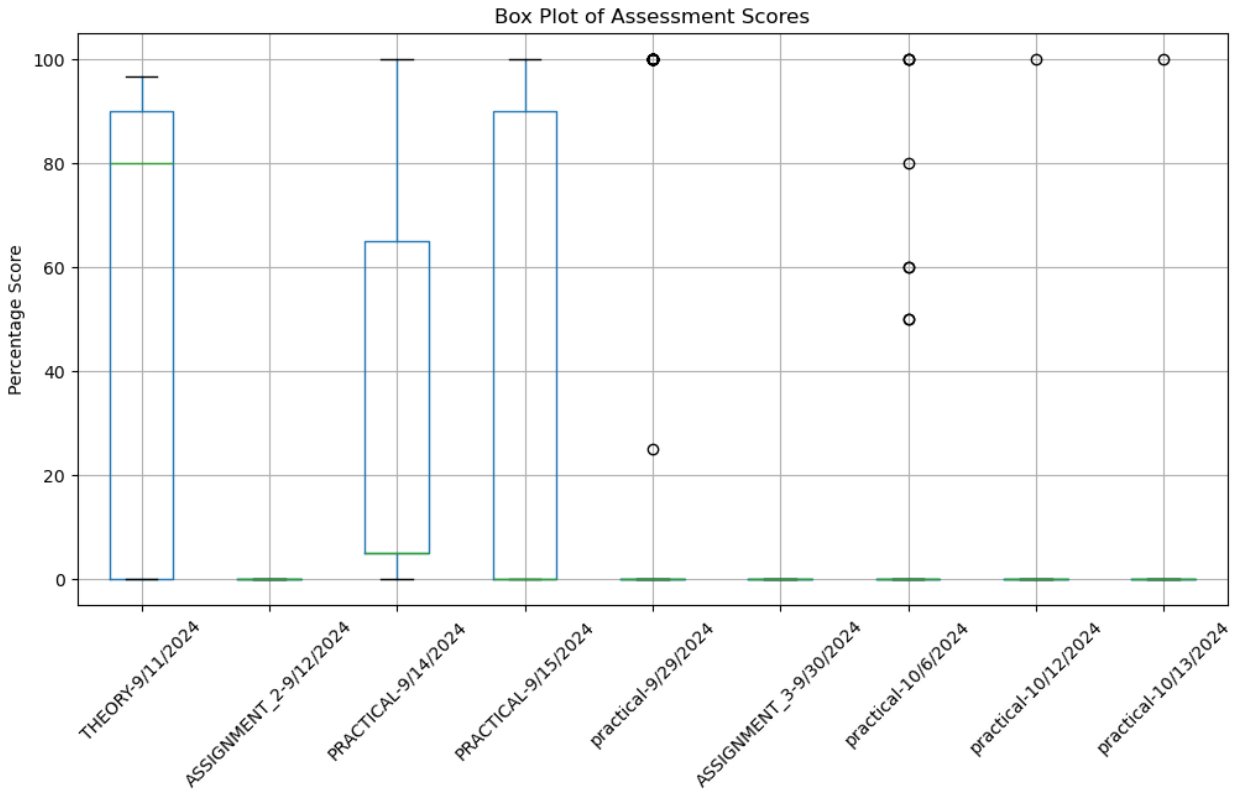
```



```
# Box plot of assessment scores
plt.figure(figsize=(12, 6))
df[numeric_columns].boxplot()
plt.title('Box Plot of Assessment Scores')
plt.ylabel('Percentage Score')
plt.xticks(rotation=45)
plt.show()
```



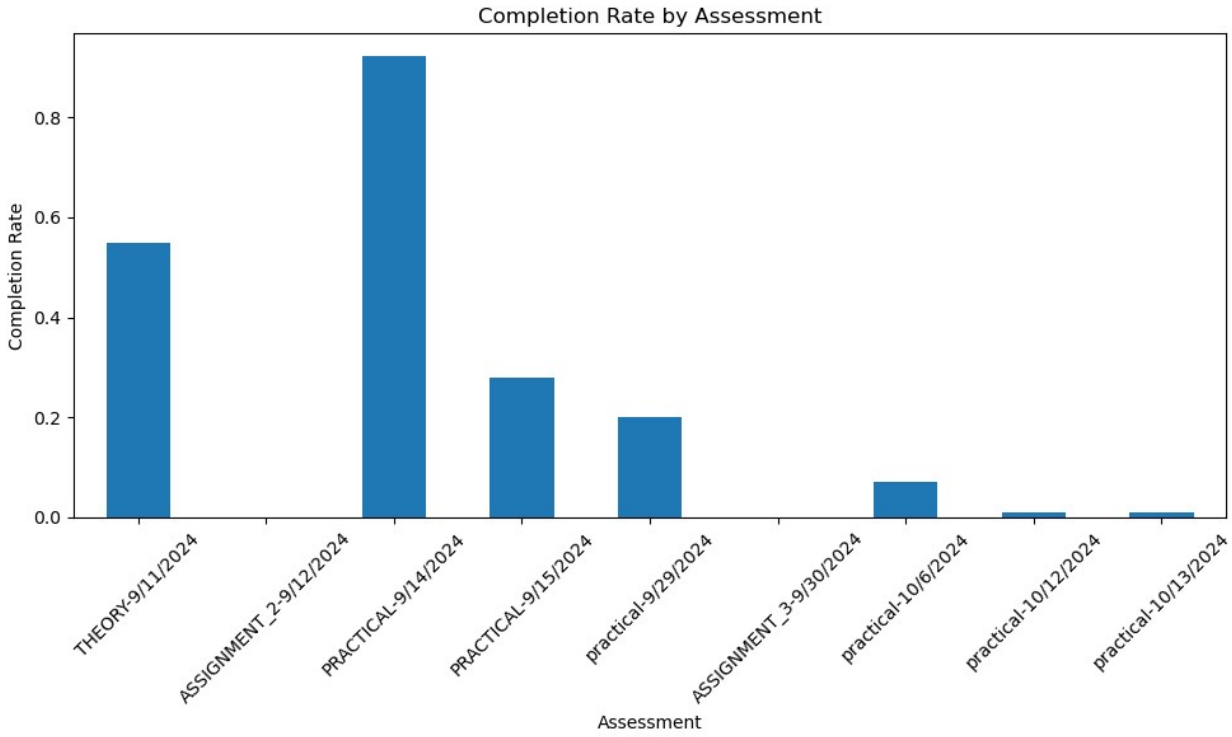

```
# Identify students with missing scores (0% after conversion)
missing_scores = (df[numeric_columns] == 0).sum()
print("\nNumber of students with missing scores for each assessment:")
print(missing_scores)
```

```
Number of students with missing scores for each assessment:
THEORY-9/11/2024           52
ASSIGNMENT_2-9/12/2024    115
PRACTICAL-9/14/2024         9
PRACTICAL-9/15/2024        83
practical-9/29/2024        92
ASSIGNMENT_3-9/30/2024    115
practical-10/6/2024       107
practical-10/12/2024      114
practical-10/13/2024      114
dtype: int64
```

```python
# Calculate and display completion rate for each assessment
completion_rate = 1 - (missing_scores / len(df))
print("\nCompletion rate for each assessment:")
print(completion_rate)
```

```
Completion rate for each assessment:
THEORY-9/11/2024          0.547826
ASSIGNMENT_2-9/12/2024    0.000000
PRACTICAL-9/14/2024       0.921739
PRACTICAL-9/15/2024       0.278261
practical-9/29/2024       0.200000
ASSIGNMENT_3-9/30/2024    0.000000
practical-10/6/2024       0.069565
practical-10/12/2024      0.008696
practical-10/13/2024      0.008696
dtype: float64
```

```python
# Plot completion rate
plt.figure(figsize=(10, 6))
completion_rate.plot(kind='bar')
plt.title('Completion Rate by Assessment')
plt.xlabel('Assessment')
plt.ylabel('Completion Rate')
plt.xticks(rotation=45)
plt.tight_layout()
plt.show()
```



```
# Sort the dataframe by Average Score in descending order
df_sorted = df.sort_values('Average Score', ascending=False)

# Reset the index of the sorted dataframe
df_sorted = df_sorted.reset_index(drop=True)

# Rearrange columns to put Average Score after Email Address
columns_order = columns_to_exclude + ['Average Score'] +
list(numeric_columns)
df_sorted = df_sorted[columns_order]

# Export the sorted dataframe to a CSV file
output_file = 'student_performance_sorted.csv'
df_sorted.to_csv(output_file, index=False)

print(f"Data has been sorted by Average Score and exported to
{output_file}")
```

```
Data has been sorted by Average Score and exported to
student_performance_sorted.csv
```

```
pip install seaborn
```

```
Requirement already satisfied: seaborn in c:\users\administrator\
anaconda3\lib\site-packages (0.12.2)Note: you may need to restart the
kernel to use updated packages.

Requirement already satisfied: numpy!=1.24.0,>=1.17 in c:\users\
administrator\anaconda3\lib\site-packages (from seaborn) (1.26.0)
Requirement already satisfied: pandas>=0.25 in c:\users\administrator\
anaconda3\lib\site-packages (from seaborn) (2.1.0)
Requirement already satisfied: matplotlib!=3.6.1,>=3.1 in c:\users\
administrator\anaconda3\lib\site-packages (from seaborn) (3.8.0)
Requirement already satisfied: contourpy>=1.0.1 in c:\users\
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=3.6.1,>=3.1->seaborn) (1.1.1)
Requirement already satisfied: cycler>=0.10 in c:\users\administrator\
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(0.11.0)
Requirement already satisfied: fonttools>=4.22.0 in c:\users\
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=3.6.1,>=3.1->seaborn) (4.42.1)
Requirement already satisfied: kiwisolver>=1.0.1 in c:\users\
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=3.6.1,>=3.1->seaborn) (23.1)
Requirement already satisfied: pillow>=6.2.0 in c:\users\
administrator\anaconda3\lib\site-packages (from matplotlib!
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=3.6.1,>=3.1->seaborn) (10.0.1)
Requirement already satisfied: pyparsing>=2.3.1 in c:\users\
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Requirement already satisfied: python-dateutil>=2.7 in c:\users\
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Requirement already satisfied: pytz>=2020.1 in c:\users\administrator\
anaconda3\lib\site-packages (from pandas>=0.25->seaborn)
(2023.3.post1)
Requirement already satisfied: tzdata>=2022.1 in c:\users\
administrator\anaconda3\lib\site-packages (from pandas>=0.25->seaborn)
(2023.3)
Requirement already satisfied: six>=1.5 in c:\users\administrator\
anaconda3\lib\site-packages (from python-dateutil>=2.7->matplotlib!
=3.6.1,>=3.1->seaborn) (1.16.0)
```

analyze now class attendance

```
import matplotlib.pyplot as plt
sns.set()



# Load the Excel file
excel_file_path = 'AI CLASS ATTENDANCE.xlsx'  # Replace with the
actual path to your Excel file
excel_data = pd.ExcelFile(excel_file_path)

# View the sheet names
sheet_names = excel_data.sheet_names
print("Available sheets:", sheet_names)
```

```
Available sheets: ['29AUGUST2024', '31SEPTEMBER2024',
'5SEPTEMBER2024', '12SEPTEMBER2024', '14SEPTEMBER2024',
'19SEPTEMBER2024', '21SEPTEMBER2024', '26SEPTEMBER2024',
'28SEPTEMBER2024']
```

```
# Load the data from a specific sheet
sheet_name = '29AUGUST2024'  # Replace with the name of the sheet you
want to view
sheet_data = pd.read_excel(excel_file_path, sheet_name=sheet_name)

# Display the first few rows of the sheet
print(sheet_data.head())
```

```
          name  Email  duration(minutes)(id-82753475504) Guest
0    max-time    NaN                                 199   NaN
1  kedi James    NaN                                 125   Yes
```

```
2      Walter    NaN                                    127   Yes
3        Kemo    NaN                                     48   Yes
4  Theo Mmuru    NaN                                     75   Yes
```

```
def process_attendance_data(sheet_names, file_path):
    # Initialize an empty list to store dataframes
    dfs = []

    for sheet in sheet_names:
        # Read each sheet
        df = pd.read_excel(file_path, sheet_name=sheet)

        # Print column names to verify the structure
        print(f"Columns in sheet '{sheet}':", df.columns.tolist())

        # Extract the max_time from the row with 'max-time'
        max_time_row = df[df.iloc[:, 0].str.contains('max-time',
case=False, na=False)]

        # If a max-time row is found, get its value and drop that row
for calculations
        if not max_time_row.empty:
            max_time = float(max_time_row.iloc[0, 2])  # Assuming the
max-time is in the third column
            df = df[df.iloc[:, 0] != max_time_row.iloc[0, 0]]  # Drop
the max-time row for further processing

        # Check and extract duration columns
        duration_cols = [col for col in df.columns if 'duration' in
col.lower()]
        if not duration_cols:
            raise KeyError(f"No duration columns found in sheet
'{sheet}'")

        # Rename each "duration" column by prepending the sheet name
        renamed_duration_cols = {col: f"{sheet}_{col}" for col in
duration_cols}
        df.rename(columns=renamed_duration_cols, inplace=True)

        # Print the DataFrame after renaming columns for debugging
        print(f"DataFrame after renaming columns in sheet '{sheet}':")
        print(df.head())

        # Calculate attendance percentage for each renamed duration
column
        for new_col in renamed_duration_cols.values():
            df[new_col] = (df[new_col] / max_time) * 100  # Calculate
percentage
            df[new_col] = df[new_col].clip(upper=100)  # Cap at 100%
```

```
        # Select necessary columns: 'name' and the renamed duration
columns
        df = df[['name'] + list(renamed_duration_cols.values())]
        dfs.append(df)

    # Merge all dataframes on the 'name' column
    combined_df = dfs[0]
    for df in dfs[1:]:
        combined_df = pd.merge(combined_df, df, on="name",
how="outer")

    # Lowercase all names
    combined_df["name"] = combined_df["name"].str.lower()

    # Replace NaN with 0 in all attendance percentage columns
    combined_df.fillna(0, inplace=True)

    # Calculate the overall average attendance percentage
    # First, get all columns that start with any sheet name (the new
duration columns)
    duration_cols = [col for col in combined_df.columns if any(sheet
in col for sheet in sheet_names)]

    # Sum attendance values and calculate the average
    combined_df["overall_average_attendance"] =
combined_df[duration_cols].replace(0, pd.NA).sum(axis=1) /
len(sheet_names)

    # Sort the data by overall average attendance in descending order
    combined_df =
combined_df.sort_values("overall_average_attendance", ascending=False)

    return combined_df
processed_df = process_attendance_data(sheet_names, excel_file_path)

Columns in sheet '29AUGUST2024': ['name', 'Email', 'duration(minutes)
(id-82753475504)', 'Guest']
DataFrame after renaming columns in sheet '29AUGUST2024':
           name  Email  29AUGUST2024_duration(minutes)(id-82753475504)
Guest
1    kedi James    NaN                                             125
Yes
2        Walter    NaN                                             127
Yes
3          Kemo    NaN                                              48
Yes
4    Theo Mmuru    NaN                                              75
Yes
5  Daniel Wambi    NaN                                              74
Yes
```

```
Columns in sheet '31SEPTEMBER2024': ['name', 'Email',
'duration(minutes)(id-82753475504)', 'Guest']
DataFrame after renaming columns in sheet '31SEPTEMBER2024':
              name  Email  31SEPTEMBER2024_duration(minutes)(id-
82753475504)  \
1          Anthony    NaN
63
2     Fela Oletile    NaN
63
3  Laura Chepkemoi    NaN
63
4      Rose Mwangi    NaN
124
5       kedi James    NaN
63

  Guest
1   Yes
2   Yes
3   Yes
4   Yes
5   Yes
Columns in sheet '5SEPTEMBER2024': ['name', 'Email',
'duration(minutes)(id-82753475504)', 'Guest']
DataFrame after renaming columns in sheet '5SEPTEMBER2024':
                                      name  Email  \
1                           Dennis Nkandu    NaN
2                                   chozi    NaN
3                             Rose Mwangi    NaN
4  https://st1.zoom.us/web_client/mhk4ubj    NaN
5                    Julius Momanyi Kanani    NaN

   5SEPTEMBER2024_duration(minutes)(id-82753475504) Guest
1                                                59   Yes
2                                                27   Yes
3                                               161   Yes
4                                                 3   Yes
5                                                 1   Yes
Columns in sheet '12SEPTEMBER2024': ['name', 'Email',
'duration(minutes)(id-82753475504)', 'Guest']
DataFrame after renaming columns in sheet '12SEPTEMBER2024':
                  name  Email  \
1          NKUSI DIANE    NaN
2         Martin Abuya    NaN
3                 USER    NaN
4           kedi James    NaN
5  munjwok james alala    NaN

   12SEPTEMBER2024_duration(minutes)(id-82753475504) Guest
1                                                56   Yes
```

```
2                                                    98   Yes
3                                                     2   Yes
4                                                    85   Yes
5                                                    13   Yes
Columns in sheet '14SEPTEMBER2024': ['name', 'Email',
'duration(minutes)(id-82753475504)', 'Guest']
DataFrame after renaming columns in sheet '14SEPTEMBER2024':
             name  Email  14SEPTEMBER2024_duration(minutes)(id-
82753475504)  \
1      kedi James    NaN
79
2    Erick Okello    NaN
69
3  Laura Gachanja    NaN
42
4     Rose Mwangi    NaN
66
5    Fela Oletile    NaN
64

  Guest
1   Yes
2   Yes
3   Yes
4   Yes
5   Yes
Columns in sheet '19SEPTEMBER2024': ['name', 'Email',
'duration(minutes)(id-82753475504)', 'Guest']
DataFrame after renaming columns in sheet '19SEPTEMBER2024':
                    name  Email  \
1       Nicholas Gitonga    NaN
2        Oscar Musinguzi    NaN
3  Dradiku Owen Harrison    NaN
4                 Gibson    NaN
5         Asiimwe Doreen    NaN

   19SEPTEMBER2024_duration(minutes)(id-82753475504) Guest
1                                                    74   Yes
2                                                    58   Yes
3                                                    85   Yes
4                                                    85   Yes
5                                                    56   Yes
Columns in sheet '21SEPTEMBER2024': ['name', 'Email',
'duration(minutes)(id-82753475504)', 'Guest']
DataFrame after renaming columns in sheet '21SEPTEMBER2024':
                       name  Email  \
1                kedi James    NaN
2           Oscar Musinguzi    NaN
3                    Jerome    NaN
```

```
4          Nicholas Gitonga    NaN
5  Tshaka Vaughn Jesse Meya    NaN

   21SEPTEMBER2024_duration(minutes)(id-82753475504) Guest
1                                                  66   Yes
2                                                  61   Yes
3                                                  61   Yes
4                                                  59   Yes
5                                                  48   Yes
Columns in sheet '26SEPTEMBER2024': ['name', 'Email',
'duration(minutes)(id-82753475504)', 'Guest']
DataFrame after renaming columns in sheet '26SEPTEMBER2024':
         name  Email  26SEPTEMBER2024_duration(minutes)(id-
82753475504) Guest
1       Jessy    NaN
116   Yes
2         Elvis    NaN
142   Yes
3  kedi James    NaN
29   Yes
4       Jerome    NaN
117   Yes
5          Inno    NaN
117   Yes
Columns in sheet '28SEPTEMBER2024': ['name', 'Email',
'duration(minutes)(id-82753475504)', 'Guest']
DataFrame after renaming columns in sheet '28SEPTEMBER2024':
                 name  Email  \
1          kedi James    NaN
2  Celestine Sabatian    NaN
3     Oscar Musinguzi    NaN
4        Denise Mutoni    NaN
5         Daniel Wambi    NaN

   28SEPTEMBER2024_duration(minutes)(id-82753475504) Guest
1                                                  65   Yes
2                                                  61   Yes
3                                                  58   Yes
4                                                  17   Yes
5                                                  47   Yes

processed_df = process_attendance_data(sheet_names, excel_file_path)

Columns in sheet '29AUGUST2024': ['name', 'Email', 'duration(minutes)
(id-82753475504)', 'Guest']
DataFrame after renaming columns in sheet '29AUGUST2024':
          name  Email  29AUGUST2024_duration(minutes)(id-82753475504)
Guest
1    kedi James    NaN                                                125
Yes
```

```
2        Walter    NaN                                                  127
Yes
3          Kemo    NaN                                                   48
Yes
4    Theo Mmuru    NaN                                                   75
Yes
5  Daniel Wambi    NaN                                                   74
Yes
Columns in sheet '31SEPTEMBER2024': ['name', 'Email',
'duration(minutes)(id-82753475504)', 'Guest']
DataFrame after renaming columns in sheet '31SEPTEMBER2024':
              name  Email  31SEPTEMBER2024_duration(minutes)(id-
82753475504)  \
1          Anthony    NaN
63
2     Fela Oletile    NaN
63
3  Laura Chepkemoi    NaN
63
4      Rose Mwangi    NaN
124
5       kedi James    NaN
63

  Guest
1   Yes
2   Yes
3   Yes
4   Yes
5   Yes
Columns in sheet '5SEPTEMBER2024': ['name', 'Email',
'duration(minutes)(id-82753475504)', 'Guest']
DataFrame after renaming columns in sheet '5SEPTEMBER2024':
                                    name  Email  \
1                          Dennis Nkandu    NaN
2                                  chozi    NaN
3                            Rose Mwangi    NaN
4  https://st1.zoom.us/web_client/mhk4ubj    NaN
5                  Julius Momanyi Kanani    NaN

   5SEPTEMBER2024_duration(minutes)(id-82753475504) Guest
1                                                59   Yes
2                                                27   Yes
3                                               161   Yes
4                                                 3   Yes
5                                                 1   Yes
Columns in sheet '12SEPTEMBER2024': ['name', 'Email',
'duration(minutes)(id-82753475504)', 'Guest']
DataFrame after renaming columns in sheet '12SEPTEMBER2024':
```

```
                   name  Email  \
1          NKUSI DIANE    NaN
2         Martin Abuya    NaN
3                 USER    NaN
4           kedi James    NaN
5  munjwok james alala    NaN

   12SEPTEMBER2024_duration(minutes)(id-82753475504) Guest
1                                                  56   Yes
2                                                  98   Yes
3                                                   2   Yes
4                                                  85   Yes
5                                                  13   Yes
Columns in sheet '14SEPTEMBER2024': ['name', 'Email',
'duration(minutes)(id-82753475504)', 'Guest']
DataFrame after renaming columns in sheet '14SEPTEMBER2024':
             name  Email  14SEPTEMBER2024_duration(minutes)(id-
82753475504)  \
1      kedi James    NaN
79
2    Erick Okello    NaN
69
3  Laura Gachanja    NaN
42
4     Rose Mwangi    NaN
66
5    Fela Oletile    NaN
64

  Guest
1   Yes
2   Yes
3   Yes
4   Yes
5   Yes
Columns in sheet '19SEPTEMBER2024': ['name', 'Email',
'duration(minutes)(id-82753475504)', 'Guest']
DataFrame after renaming columns in sheet '19SEPTEMBER2024':
                    name  Email  \
1       Nicholas Gitonga    NaN
2        Oscar Musinguzi    NaN
3  Dradiku Owen Harrison    NaN
4                 Gibson    NaN
5         Asiimwe Doreen    NaN

   19SEPTEMBER2024_duration(minutes)(id-82753475504) Guest
1                                                  74   Yes
2                                                  58   Yes
3                                                  85   Yes
4                                                  85   Yes
```

```
5                                                    56   Yes
Columns in sheet '21SEPTEMBER2024': ['name', 'Email',
'duration(minutes)(id-82753475504)', 'Guest']
DataFrame after renaming columns in sheet '21SEPTEMBER2024':
                      name  Email  \
1                kedi James    NaN
2           Oscar Musinguzi    NaN
3                    Jerome    NaN
4          Nicholas Gitonga    NaN
5  Tshaka Vaughn Jesse Meya    NaN

   21SEPTEMBER2024_duration(minutes)(id-82753475504) Guest
1                                                    66   Yes
2                                                    61   Yes
3                                                    61   Yes
4                                                    59   Yes
5                                                    48   Yes
Columns in sheet '26SEPTEMBER2024': ['name', 'Email',
'duration(minutes)(id-82753475504)', 'Guest']
DataFrame after renaming columns in sheet '26SEPTEMBER2024':
         name  Email  26SEPTEMBER2024_duration(minutes)(id-
82753475504) Guest
1       Jessy    NaN
116   Yes
2       Elvis    NaN
142   Yes
3  kedi James    NaN
29   Yes
4      Jerome    NaN
117   Yes
5        Inno    NaN
117   Yes
Columns in sheet '28SEPTEMBER2024': ['name', 'Email',
'duration(minutes)(id-82753475504)', 'Guest']
DataFrame after renaming columns in sheet '28SEPTEMBER2024':
                 name  Email  \
1          kedi James    NaN
2  Celestine Sabatian    NaN
3     Oscar Musinguzi    NaN
4       Denise Mutoni    NaN
5        Daniel Wambi    NaN

   28SEPTEMBER2024_duration(minutes)(id-82753475504) Guest
1                                                    65   Yes
2                                                    61   Yes
3                                                    58   Yes
4                                                    17   Yes
5                                                    47   Yes

print(processed_df.head())
```

```
                name  29AUGUST2024_duration(minutes)(id-
82753475504)  \
7        rose mwangi                                        92.462312

6        rose mwangi                                        92.462312

9   nicholas gitonga                                        65.829146

0         kedi james                                        62.814070

64      fela oletile                                        52.763819


    31SEPTEMBER2024_duration(minutes)(id-82753475504)  \
7                                           100.000000
6                                           100.000000
9                                            76.923077
0                                            96.923077
64                                           96.923077

    5SEPTEMBER2024_duration(minutes)(id-82753475504)  \
7                                           96.987952
6                                           96.987952
9                                           69.879518
0                                           81.325301
64                                          53.614458

    12SEPTEMBER2024_duration(minutes)(id-82753475504)  \
7                                            99.236641
6                                            99.236641
9                                            73.282443
0                                            64.885496
64                                           77.099237

    14SEPTEMBER2024_duration(minutes)(id-82753475504)  \
7                                           88.607595
6                                           83.544304
9                                           75.949367
0                                          100.000000
64                                          81.012658

    19SEPTEMBER2024_duration(minutes)(id-82753475504)  \
7                                           53.030303
6                                           53.030303
9                                           56.060606
0                                            0.000000
64                                          49.242424

    21SEPTEMBER2024_duration(minutes)(id-82753475504)  \
7                                           90.909091
6                                           90.909091
```

```
9                                                  76.623377
0                                                  85.714286
64                                                 70.129870

    26SEPTEMBER2024_duration(minutes)(id-82753475504)  \
7                                                  98.837209
6                                                  98.837209
9                                                  67.441860
0                                                  16.860465
64                                                  0.000000

    28SEPTEMBER2024_duration(minutes)(id-82753475504)  \
7                                                  81.690141
6                                                  81.690141
9                                                  59.154930
0                                                  91.549296
64                                                 92.957746

   overall_average_attendance
7                   89.084583
6                   88.521995
9                   69.016036
0                   66.674666
64                  63.749254
```

```
# Overall statistics
overall_stats = processed_df["overall_average_attendance"].describe()
print("Overall Attendance Statistics:")
print(overall_stats)
```

```
Overall Attendance Statistics:
count     162.000000
unique    154.000000
top         0.200803
freq        3.000000
Name: overall_average_attendance, dtype: float64
```

```
# Top 10 attendees
print("\nTop 5 Attendees:")
print(processed_df[["name", "overall_average_attendance"]].head(10))
```

```
Top 5 Attendees:
                     name overall_average_attendance
7              rose mwangi                  89.084583
6              rose mwangi                  88.521995
9         nicholas gitonga                  69.016036
0               kedi james                  66.674666
64            fela oletile                  63.749254
38     celestine sabatian                   60.322855
13        oscar musinguzi                   52.619852
```

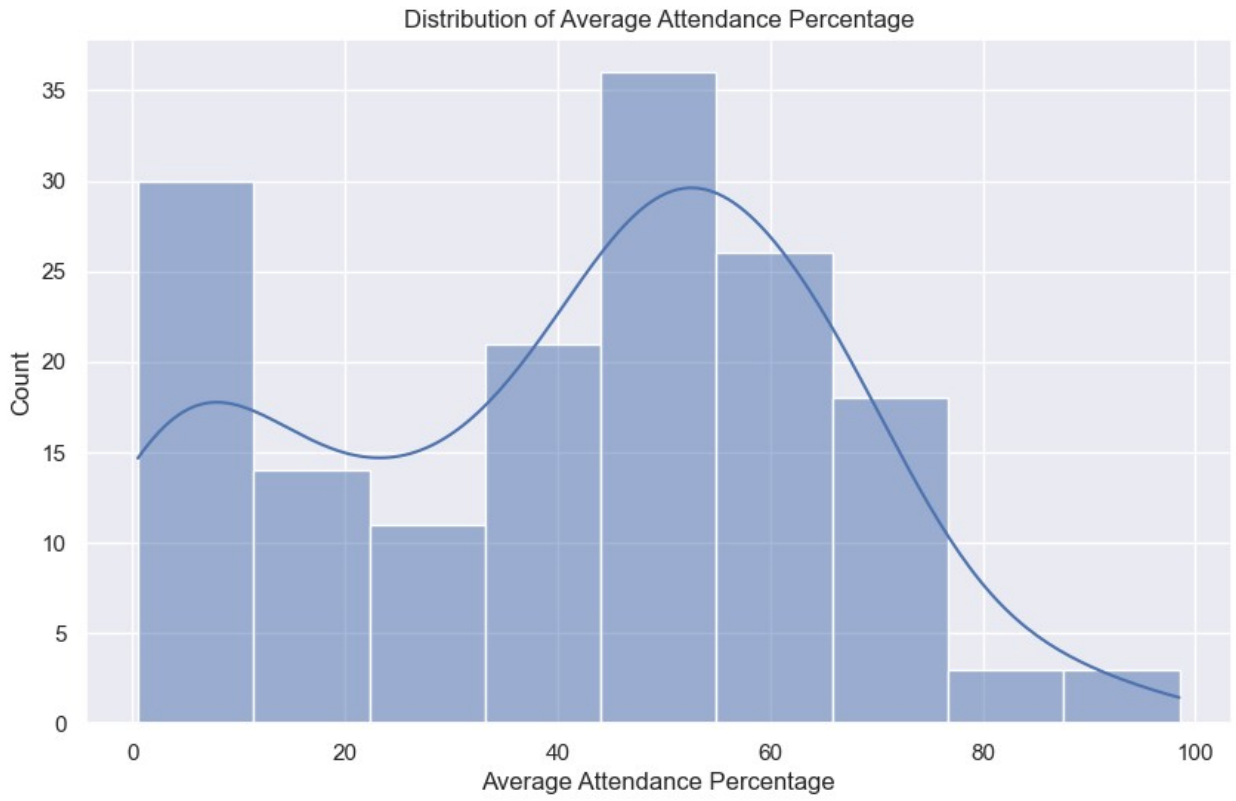
```
14           martin abuya                   49.583192
10           erick okello                   48.632682
74  isingoma martin frank                   47.870748
```

```
# Bottom 5 attendees
print("\nBottom 5 Attendees:")
print(processed_df[["name", "overall_average_attendance"]].tail())
```

```
Bottom 5 Attendees:
                           name overall_average_attendance
77               william kanani                   0.111669
62             kenneth williams                   0.111669
125             taremwa danison                   0.066934
72                   hannington                   0.055835
22   167075 kyalo laureen ndanu                   0.055835
```

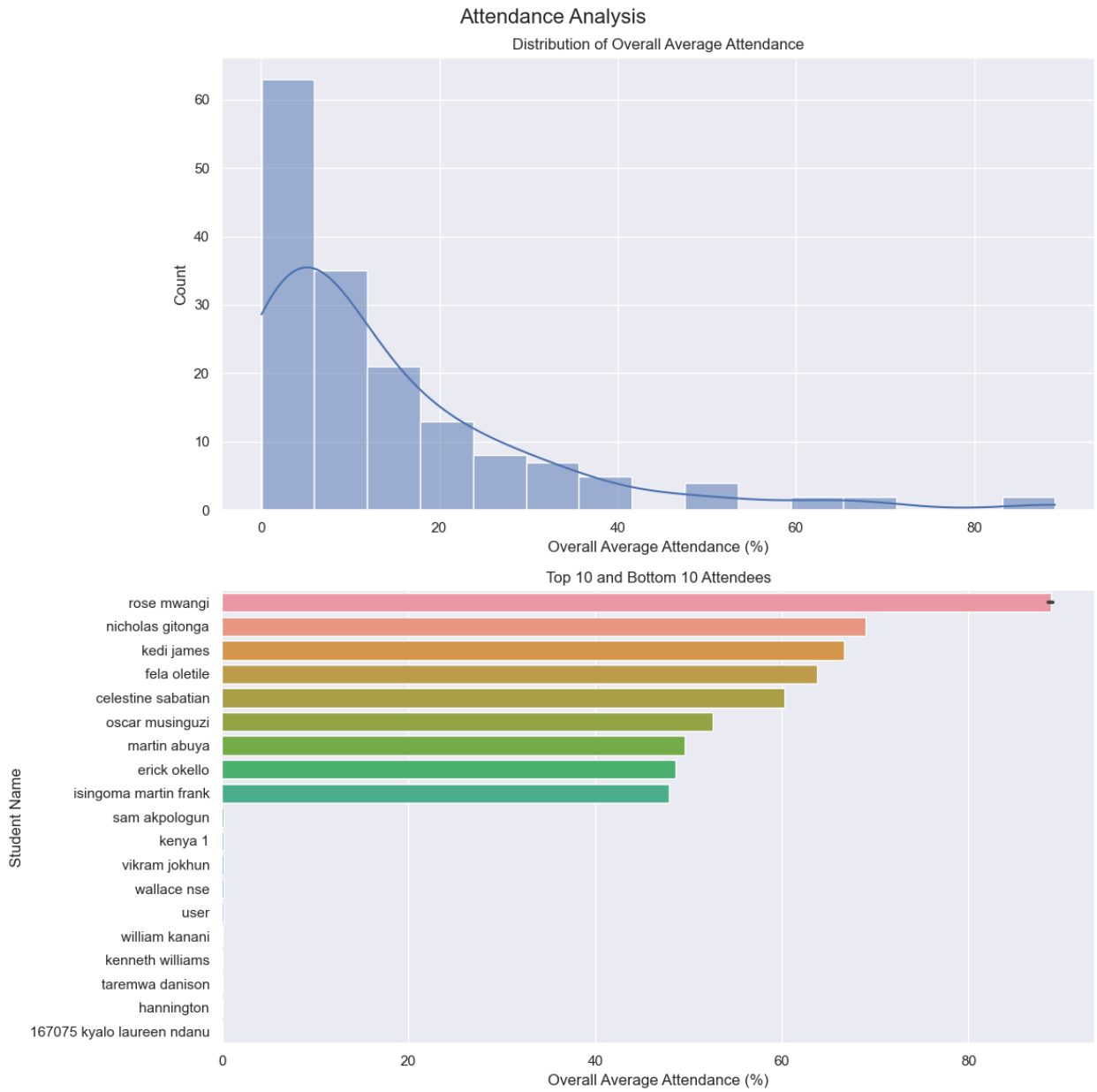
```
# Attendance distribution
plt.figure(figsize=(10, 6))
sns.histplot(processed_df["overall_average_attendance"], kde=True)
plt.title("Distribution of Average Attendance Percentage")
plt.xlabel("Average Attendance Percentage")
plt.ylabel("Count")
plt.show()
```

```
C:\Users\Administrator\anaconda3\Lib\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\Administrator\anaconda3\Lib\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):
```




```
# Set up the plotting area
fig, (ax1, ax2) = plt.subplots(2, 1, figsize=(12, 12))
fig.suptitle("Attendance Analysis", fontsize=16)

# 1. Distribution of Overall Average Attendance
sns.histplot(processed_df["overall_average_attendance"], kde=True,
ax=ax1)
ax1.set_title("Distribution of Overall Average Attendance")
ax1.set_xlabel("Overall Average Attendance (%)")
ax1.set_ylabel("Count")

# 2. Top and Bottom 10 Attendees
top_bottom_df = pd.concat([processed_df.head(10),
processed_df.tail(10)])
sns.barplot(x="overall_average_attendance", y="name",
data=top_bottom_df, ax=ax2)
ax2.set_title("Top 10 and Bottom 10 Attendees")
ax2.set_xlabel("Overall Average Attendance (%)")
ax2.set_ylabel("Student Name")

plt.tight_layout()
plt.show()

# Optional: Save the figure
#plt.savefig("attendance_analysis.png", dpi=300, bbox_inches="tight")
```

```
C:\Users\Administrator\anaconda3\Lib\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\Administrator\anaconda3\Lib\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\Administrator\anaconda3\Lib\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\Administrator\anaconda3\Lib\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\Administrator\anaconda3\Lib\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):
```




```
# Save processed data to CSV
processed_df.to_csv("processed_attendance_data.csv", index=False)
print("Processed data has been saved to
'processed_attendance_data.csv'")
```

```
Processed data has been saved to 'processed_attendance_data.csv'
```