Question 4 Student performance

Python for Data Science: Load the 'Student Performance' dataset into one of the data structures (NumPy or Pandas) and perform the following operations.
a. Display header rows and description of the loaded dataset.
b. Remove unnecessary features (E.g. drop unwanted columns) from the dataset such as 'lunch' and 'test preparation course.
c. Convert the attribute 'race/ethnicity' to have 'groupA' to be 'Asian Students', 'groupB' to be 'African Students' , 'groupC' to be 'Afro-Asian Students', 'groupD' to be 'American Students' and 'groupE' to be 'European Students'.
d. Perform the following visualizations on the loaded dataset:
• Tally of the Number of Male & Female students who took up the 'test preparation course' and those who did not.
• Total Number of Male & Female Students belonging to each student group
• No of students who 'failed'(less than 40), 'second class'(between 40 & 50), 'first class'(between 60 & 75) and 'distinction'(above 75) in 'Maths', 'Reading' and 'Writing'.

Click here to download dataset

In [22]:
```
#numpy - Deals multi-dimensional arrays and matrices
#seaborn - Deals with data visualization
#matplotlib - Plotting; pyplot-interactive plotting
#pandas - data structures and data analysis tools
import pandas as pd
import matplotlib.pyplot as plt
import numpy as np
import seaborn as sns
```

In [23]:
```
#Import csv file into variable (dataframe)
studperf_df = pd.read_csv('StudentsPerformance.csv');
print("INFO")
studperf_df.info();print("\n\n\nINFO(VERBOSE=FALSE)")
#showing info about the data frame
studperf_df.info(verbose=False)#short Summary
print("\n\n\nDESCRIBE()");
print(studperf_df.describe())
studperf_df.head(10)
```

```
INFO
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 1000 entries, 0 to 999
Data columns (total 8 columns):
 #   Column                       Non-Null Count  Dtype
---  ------                       --------------  -----
 0   gender                       1000 non-null   object
 1   race/ethnicity               1000 non-null   object
 2   parental level of education  774 non-null    object
 3   lunch                        1000 non-null   object
 4   test preparation course      1000 non-null   object
 5   mathscore                    1000 non-null   int64
 6   reading score                1000 non-null   int64
 7   writing score                1000 non-null   int64
dtypes: int64(3), object(5)
memory usage: 62.6+ KB



INFO(VERBOSE=FALSE)
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 1000 entries, 0 to 999
Columns: 8 entries, gender to writing score
dtypes: int64(3), object(5)
memory usage: 62.6+ KB



DESCRIBE()
         mathscore  reading score  writing score
count  1000.000000    1000.000000    1000.000000
mean     65.969000      69.169000      68.054000
std      15.310338      14.600192      15.195657
min       0.000000      17.000000      10.000000
25%      56.750000      59.000000      57.750000
50%      66.000000      70.000000      69.000000
75%      77.000000      79.000000      79.000000
max     100.000000     100.000000     100.000000
```

Out[23]:

	gender	race/ethnicity	parental level of education	lunch	test preparation course	mathscore	reading score	writing score
0	female	group B	bachelor's degree	standard	none	72	72	74
1	female	group C	NaN	standard	completed	69	90	88
2	female	group B	master's degree	standard	none	90	95	93
3	male	group A	associate's degree	free/reduced	none	47	57	44
4	male	group C	NaN	standard	none	76	78	75
5	female	group B	associate's degree	standard	none	71	83	78
6	female	group B	NaN	standard	completed	88	95	92
7	male	group B	NaN	free/reduced	none	40	43	39
8	male	group D	high school	free/reduced	completed	64	64	67
9	female	group B	high school	free/reduced	none	38	60	50

In [24]:
```
#dropping lunch column
studperf_df.drop(['lunch'],axis=1,inplace=True)
studperf_df.head(3)
```

Out[24]:

	gender	race/ethnicity	parental level of education	test preparation course	mathscore	reading score	writing score
0	female	group B	bachelor's degree	none	72	72	74
1	female	group C	NaN	completed	69	90	88
2	female	group B	master's degree	none	90	95	93

In [25]:
```
#replacing NaN values in "parental level of education" to "Not applicable"
studperf_df['parental level of education'] = studperf_df['parental level of educati
studperf_df.head()
```

Out[25]:

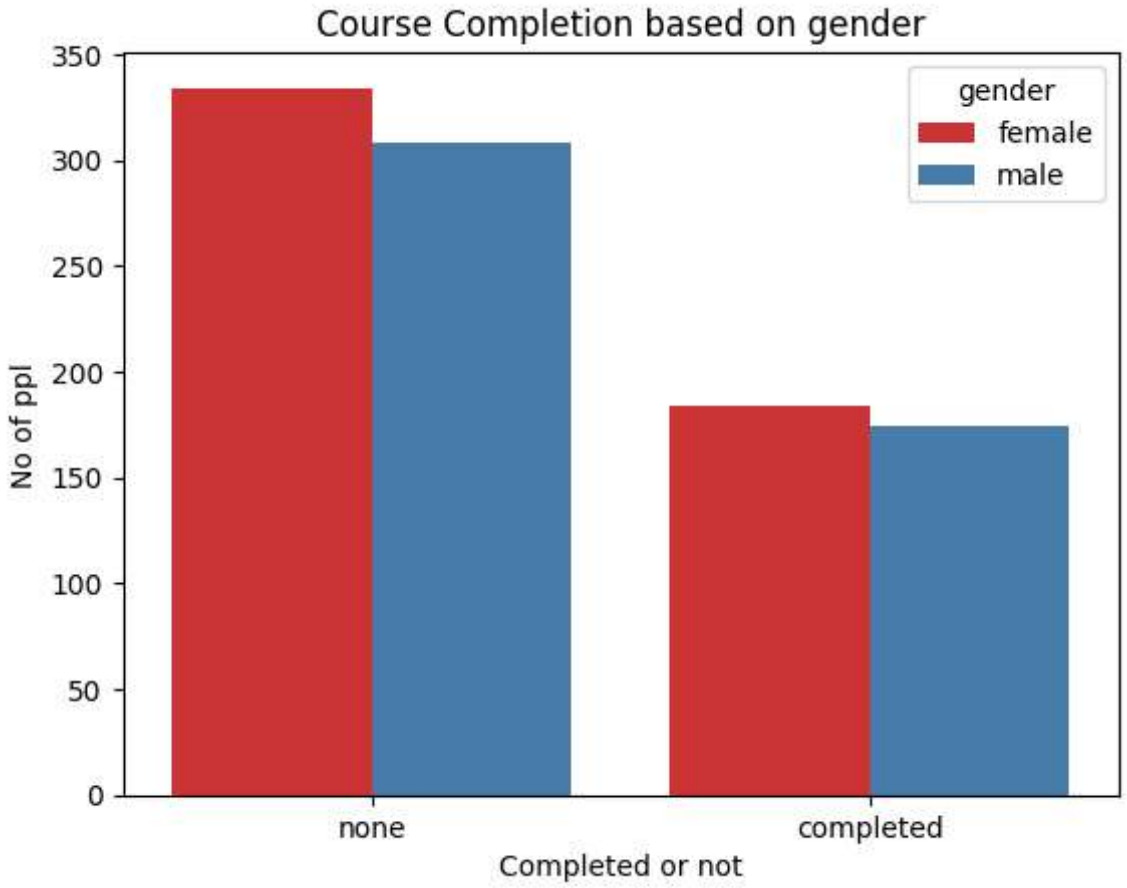
	gender	race/ethnicity	parental level of education	test preparation course	mathscore	reading score	writing score
0	female	group B	bachelor's degree	none	72	72	74
1	female	group C	Not applicable	completed	69	90	88
2	female	group B	master's degree	none	90	95	93
3	male	group A	associate's degree	none	47	57	44
4	male	group C	Not applicable	none	76	78	75

In [26]:
```
#mapping according to question
studperf_df['race/ethnicity']=studperf_df['race/ethnicity'].map({
    "group A":"Asian",
    "group B": 'African',
    "group C":"Afro-American",
    "group D":"American",
    "group E":"European"
})
studperf_df.head()
```

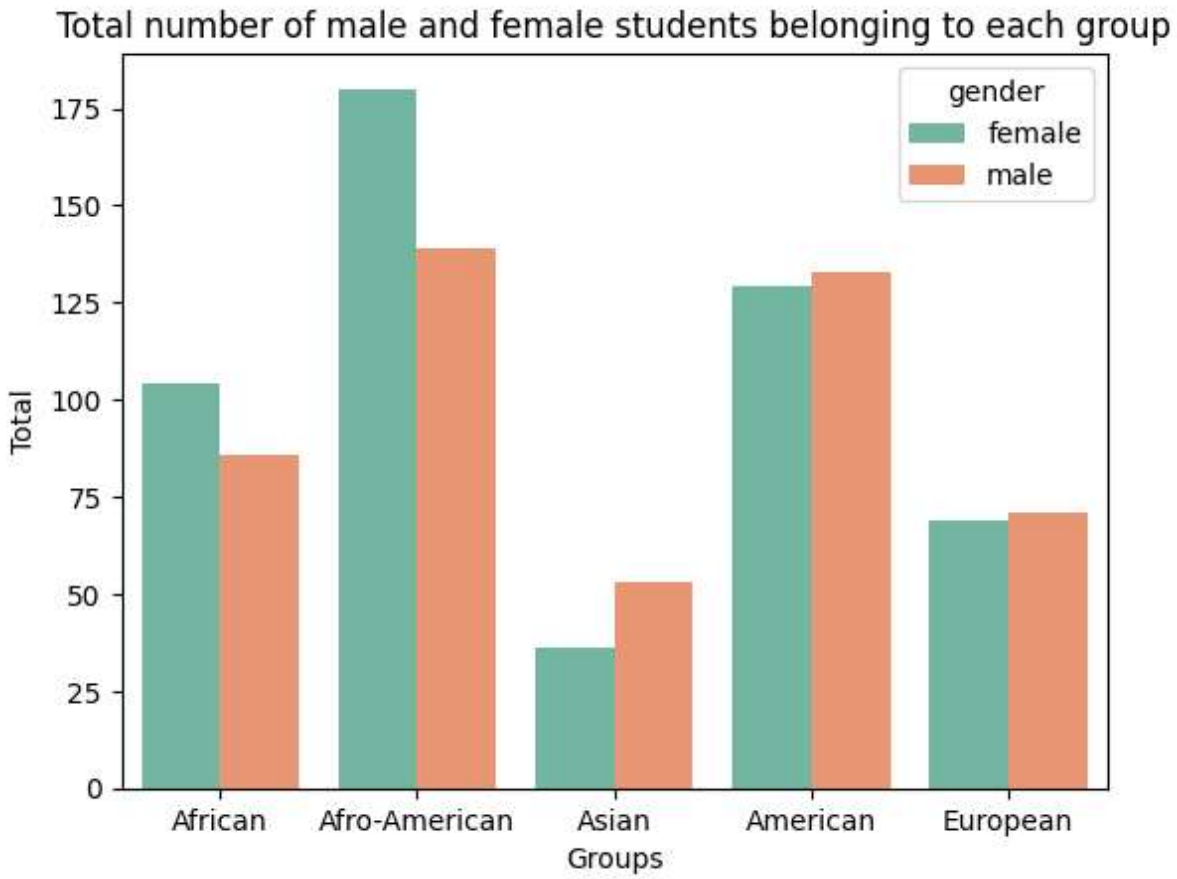
Out[26]:

	gender	race/ethnicity	parental level of education	test preparation course	mathscore	reading score	writing score
0	female	African	bachelor's degree	none	72	72	74
1	female	Afro-American	Not applicable	completed	69	90	88
2	female	African	master's degree	none	90	95	93
3	male	Asian	associate's degree	none	47	57	44
4	male	Afro-American	Not applicable	none	76	78	75

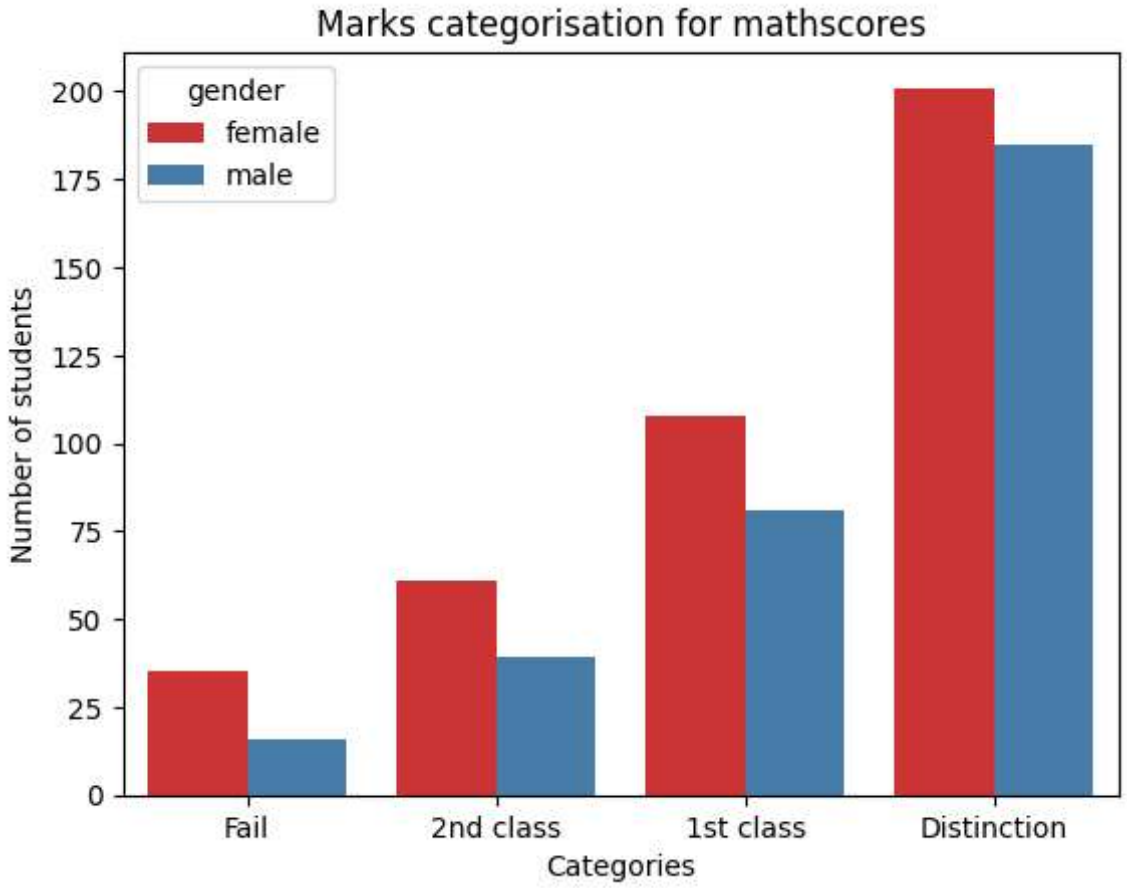
In [27]:
```
#Tally of the Number of Male & Female students who took up the ‘test preparation co
ax=sns.countplot(data=studperf_df,x="test preparation course",hue='gender',palette=
ax.set(title='Course Completion based on gender',xlabel='Completed or not',ylabel='
plt.show()
```



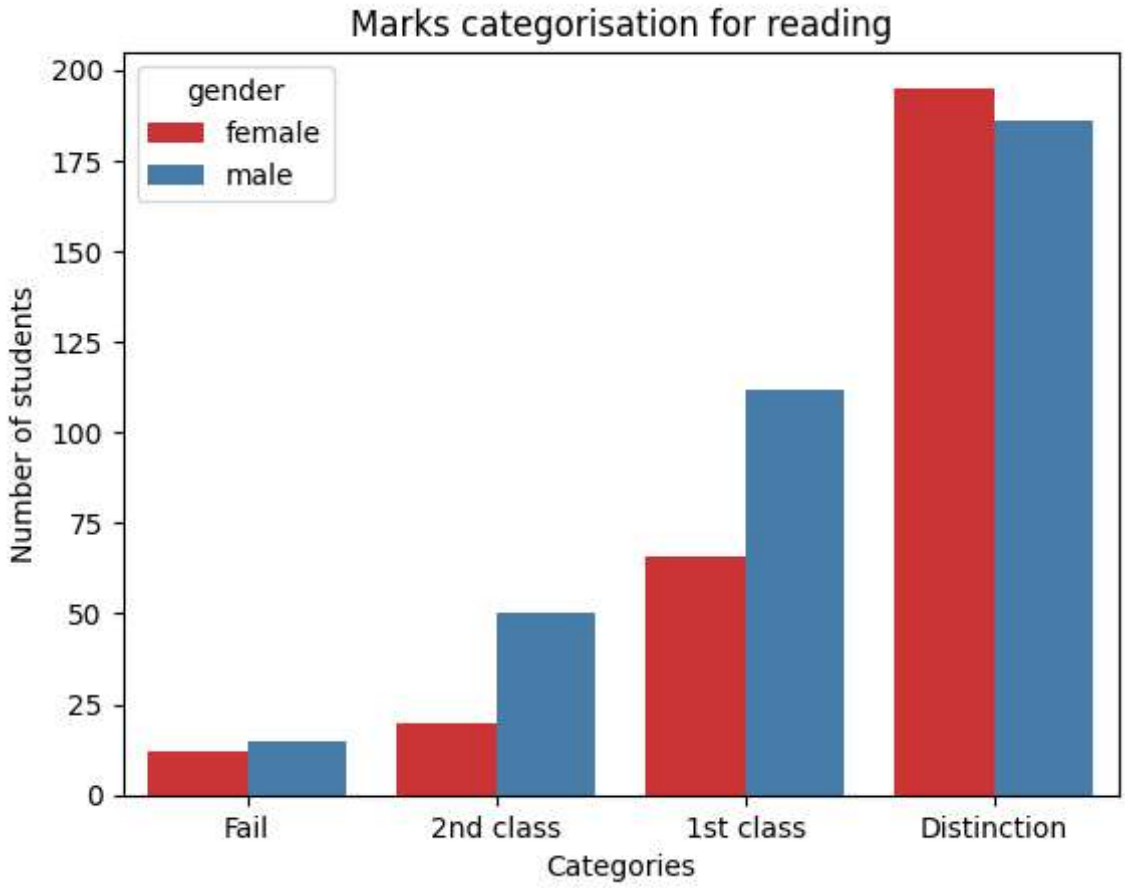
In [28]:
```
#Total Number of Male & Female Students belonging to each student group
ax = sns.countplot(x="race/ethnicity",hue="gender",palette="Set2",data=studperf_df)
ax.set(title="Total number of male and female students belonging to each group", xl
plt.show()
```



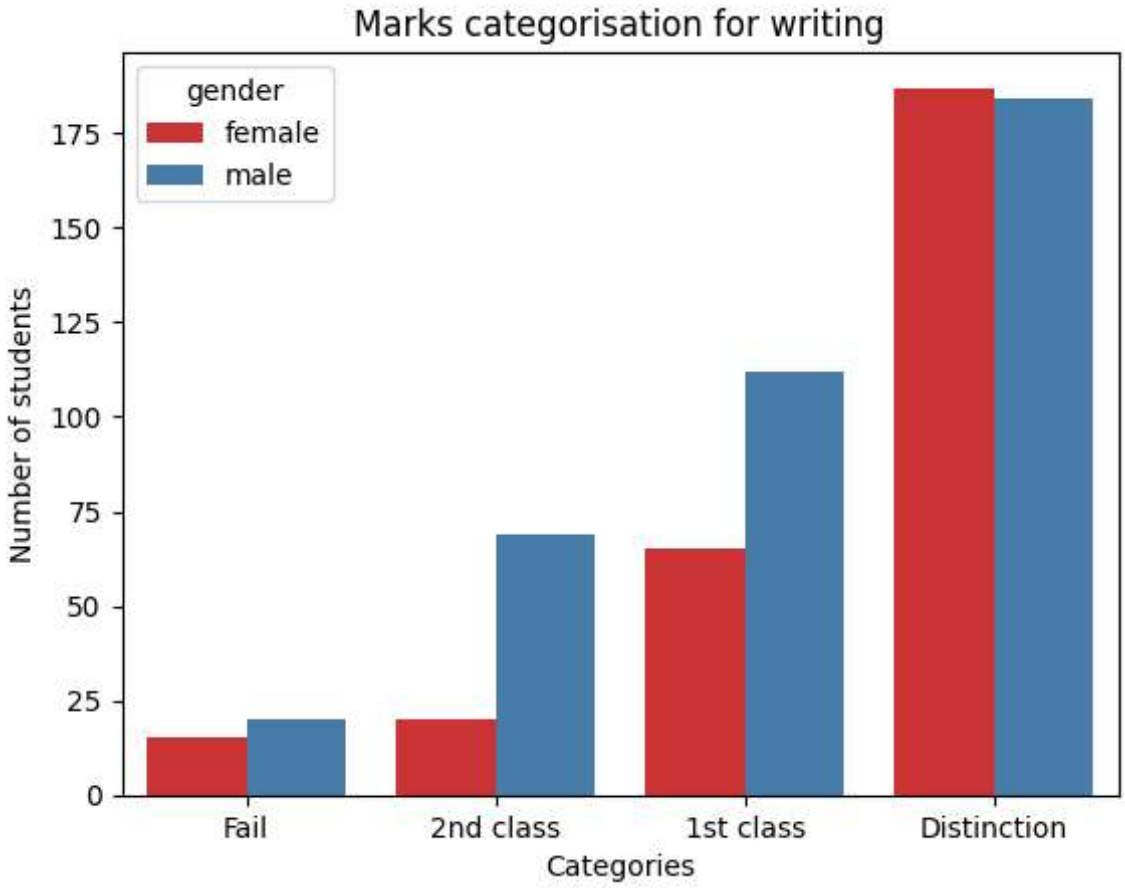
In [29]:
```
#making intervals of marks  from mathscore according to question
interval=(0,40,50,60,75)
categories = ["Fail", "2nd class","1st class","Distinction"]
studperf_df["Marks_cats"]=pd.cut(studperf_df.mathscore,interval,labels=categories)
ax=sns.countplot(x="Marks_cats",hue="gender",palette="Set1",data=studperf_df)
ax.set(title="Marks categorisation for mathscores",xlabel="Categories",ylabel="Numb
plt.show()
```



In [30]:
```
#Marks categorisation for reading
studperf_df["Marks_Cats"]=pd.cut(studperf_df["reading score"],interval,labels=categ
ax=sns.countplot(x="Marks_Cats",hue="gender",palette="Set1",data=studperf_df)
ax.set(title="Marks categorisation for reading",xlabel="Categories",ylabel="Number
plt.show()
```



In [31]:
```
#Marks categorisation for writing
studperf_df["Marks_Cats"]=pd.cut(studperf_df["writing score"],interval,labels=categ
ax=sns.countplot(x="Marks_Cats",hue="gender",palette="Set1",data=studperf_df)
ax.set(title="Marks categorisation for writing",xlabel="Categories",ylabel="Number
plt.show()
```


Marks categorisation for writing
gender
female
male
Number of students
0
25
50
75
100
125
150
175
Fail
2nd class
1st class
Distinction
Categories