# Student Result Analysis

In [12]:
```
# importing the required libraries

import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
import warnings
warnings.filterwarnings("ignore")
```

In [13]:
```
# call csv file and convert it to dataframe using Pandas function

df = pd.read_csv(r"C:\Users\kalpak\OneDrive\Desktop\Excel projects\student_scores.csv")
print(df.head())
```

```
   Unnamed: 0  Gender EthnicGroup          ParentEduc     LunchType TestPrep  \
0           0  female         NaN   bachelor's degree      standard     none
1           1  female     group C        some college      standard      NaN
2           2  female     group B     master's degree      standard     none
3           3    male     group A  associate's degree  free/reduced     none
4           4    male     group C        some college      standard     none

  ParentMaritalStatus PracticeSport IsFirstChild  NrSiblings TransportMeans  \
0             married     regularly          yes         3.0     school_bus
1             married     sometimes          yes         0.0            NaN
2              single     sometimes          yes         4.0     school_bus
3             married         never           no         1.0            NaN
4             married     sometimes          yes         0.0     school_bus

  WklyStudyHours  MathScore  ReadingScore  WritingScore
0            < 5         71            71            74
1        5 - 10         69            90            88
2            < 5         87            93            91
3        5 - 10         45            56            42
4        5 - 10         76            78            75
```

In [14]:
```
# get overall statistics about the dataset

df.describe()
```

Out[14]:

| | Unnamed: 0 | NrSiblings | MathScore | ReadingScore | WritingScore |
|---|---|---|---|---|---|
| **count** | 30641.000000 | 29069.000000 | 30641.000000 | 30641.000000 | 30641.000000 |
| **mean** | 499.556607 | 2.145894 | 66.558402 | 69.377533 | 68.418622 |
| **std** | 288.747894 | 1.458242 | 15.361616 | 14.758952 | 15.443525 |
| **min** | 0.000000 | 0.000000 | 0.000000 | 10.000000 | 4.000000 |
| **25%** | 249.000000 | 1.000000 | 56.000000 | 59.000000 | 58.000000 |
| **50%** | 500.000000 | 2.000000 | 67.000000 | 70.000000 | 69.000000 |
| **75%** | 750.000000 | 3.000000 | 78.000000 | 80.000000 | 79.000000 |
| **max** | 999.000000 | 7.000000 | 100.000000 | 100.000000 | 100.000000 |

In [15]:
```
# .info() will give basic info about the dataset

df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 30641 entries, 0 to 30640
Data columns (total 15 columns):
 #   Column               Non-Null Count  Dtype  
---  ------               --------------  -----  
 0   Unnamed: 0           30641 non-null  int64  
 1   Gender               30641 non-null  object 
 2   EthnicGroup          28801 non-null  object 
 3   ParentEduc           28796 non-null  object 
 4   LunchType            30641 non-null  object 
 5   TestPrep             28811 non-null  object 
 6   ParentMaritalStatus  29451 non-null  object 
 7   PracticeSport        30010 non-null  object 
 8   IsFirstChild         29737 non-null  object 
 9   NrSiblings           29069 non-null  float64
 10  TransportMeans       27507 non-null  object 
 11  WklyStudyHours       29686 non-null  object 
 12  MathScore            30641 non-null  int64  
 13  ReadingScore         30641 non-null  int64  
 14  WritingScore         30641 non-null  int64  
dtypes: float64(1), int64(4), object(10)
memory usage: 3.5+ MB
```

In [16]:
```
# isnull().sum() gives the count of null values present in each column

df.isnull().sum()
```

Out[16]:
```
Unnamed: 0               0
Gender                   0
EthnicGroup           1840
ParentEduc            1845
LunchType                0
TestPrep              1830
ParentMaritalStatus   1190
PracticeSport          631
IsFirstChild           904
NrSiblings            1572
TransportMeans        3134
WklyStudyHours         955
MathScore                0
ReadingScore             0
WritingScore             0
dtype: int64
```

In [17]:
```
# shape will give number of rows and number of columns respectively

df.shape
```

Out[17]:
```
(30641, 15)
```

## Drop unnamed column

In [18]:
```
df=df.drop("Unnamed: 0",axis=1)
print(df.head())
```

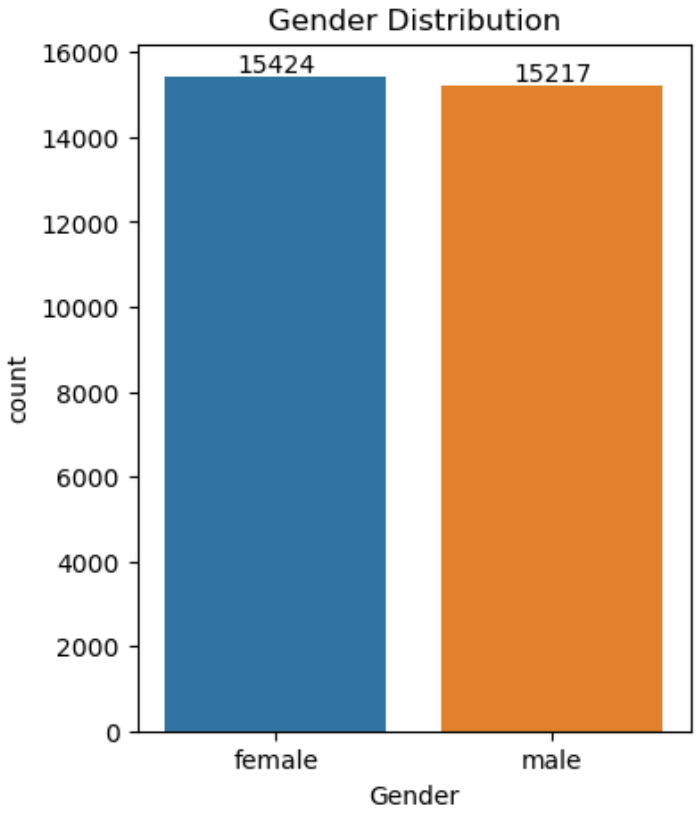
```
   Gender EthnicGroup          ParentEduc     LunchType TestPrep  \
0  female         NaN   bachelor's degree      standard     none
1  female     group C        some college      standard      NaN
2  female     group B     master's degree      standard     none
3    male     group A  associate's degree  free/reduced     none
4    male     group C        some college      standard     none

  ParentMaritalStatus PracticeSport IsFirstChild  NrSiblings TransportMeans  \
0             married     regularly          yes         3.0     school_bus
1             married     sometimes          yes         0.0            NaN
2              single     sometimes          yes         4.0     school_bus
3             married         never           no         1.0            NaN
4             married     sometimes          yes         0.0     school_bus

  WklyStudyHours  MathScore  ReadingScore  WritingScore
0            < 5         71            71            74
1        5 - 10         69            90            88
2            < 5         87            93            91
3        5 - 10         45            56            42
4        5 - 10         76            78            75
```

## Gender distribution

In [34]:
```
plt.figure(figsize=(4,5))
ax=sns.countplot(data=df,x="Gender")
ax.bar_label(ax.containers[0])
plt.title("Gender Distribution")
plt.show()
```

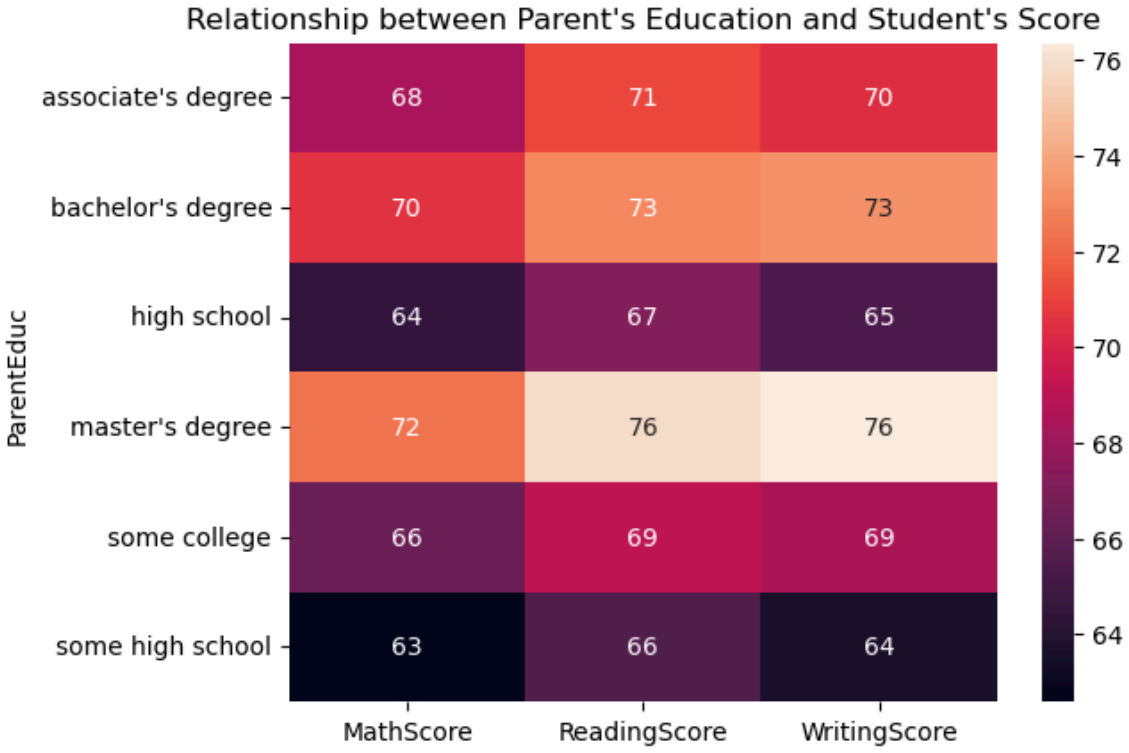


In [23]:
```
# from the above chart we have analysed that:
# the number of females in the data is more than the number of males
```

In [26]:
```
gb = df.groupby("ParentEduc").agg({"MathScore":'mean',"ReadingScore":'mean',"WritingScore
print(gb)
```

```
                    MathScore  ReadingScore  WritingScore
ParentEduc
associate's degree  68.365586     71.124324     70.299099
bachelor's degree   70.466627     73.062020     73.331069
high school         64.435731     67.213997     65.421136
master's degree     72.336134     75.832921     76.356896
some college        66.390472     69.179708     68.501432
some high school    62.584013     65.510785     63.632409
```

In [36]:
```
sns.heatmap(gb,annot=True)
plt.title("Relationship between Parent's Education and Student's Score")
plt.show()
```

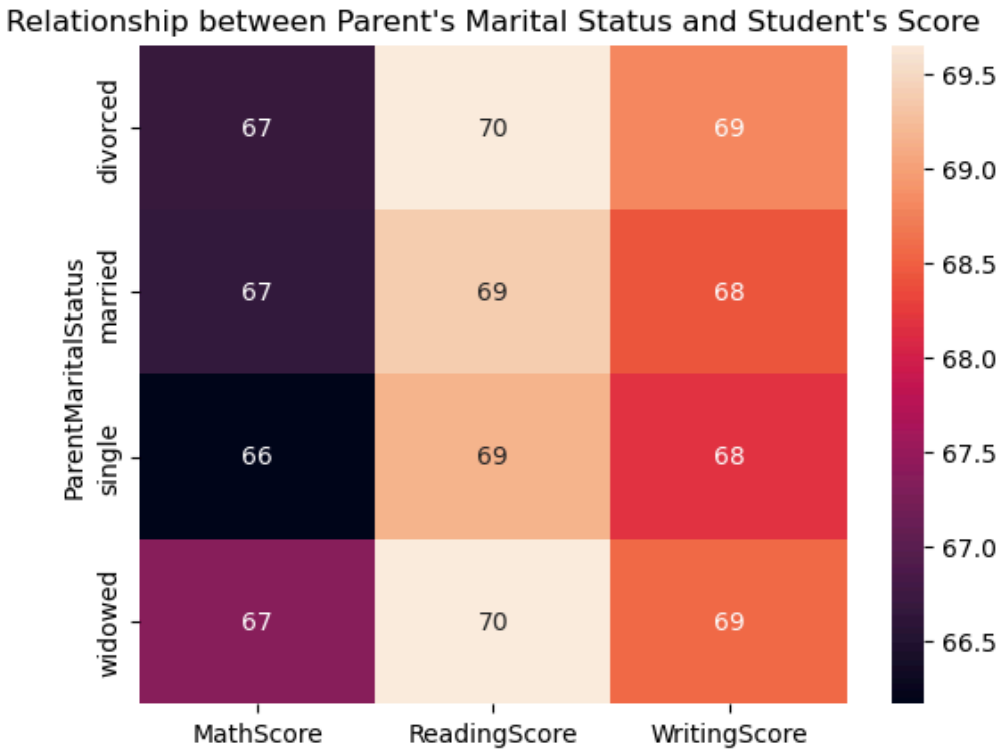



In [29]:
```
# from the above chart we have concluded that:
# the education of the parents have a good impact on their scores
```

In [30]:
```
gb1 = df.groupby("ParentMaritalStatus").agg({"MathScore":'mean',"ReadingScore":'mean',"Wr
print(gb1)
```

```
                     MathScore  ReadingScore  WritingScore
ParentMaritalStatus
divorced             66.691197     69.655011     68.799146
married              66.657326     69.389575     68.420981
single               66.165704     69.157250     68.174440
widowed              67.368866     69.651438     68.563452
```

In [37]:
```
sns.heatmap(gb1,annot=True)
plt.title("Relationship between Parent's Marital Status and Student's Score")
plt.show()
```

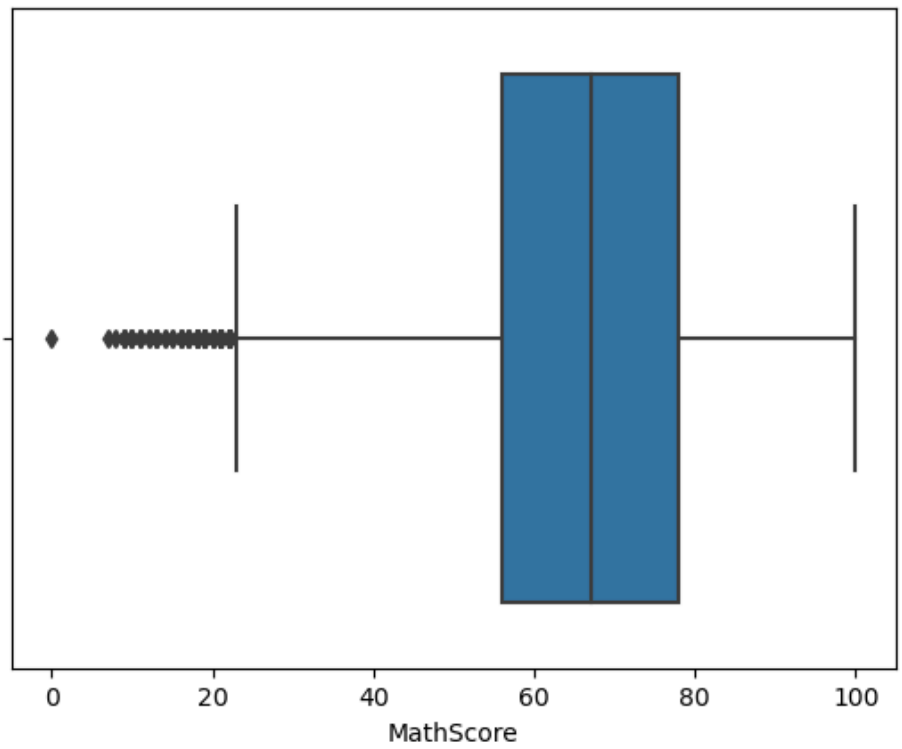



In [33]:
```
# from the above chart we have concluded that:
# there is no/negligible impact on the student scores due to their parent's marital statu
```

In [ ]:
```
gb1 = df.groupby("ParentMaritalStatus").agg({"MathScore":'mean',"ReadingScore":'mean',"Wr
print(gb1)
```

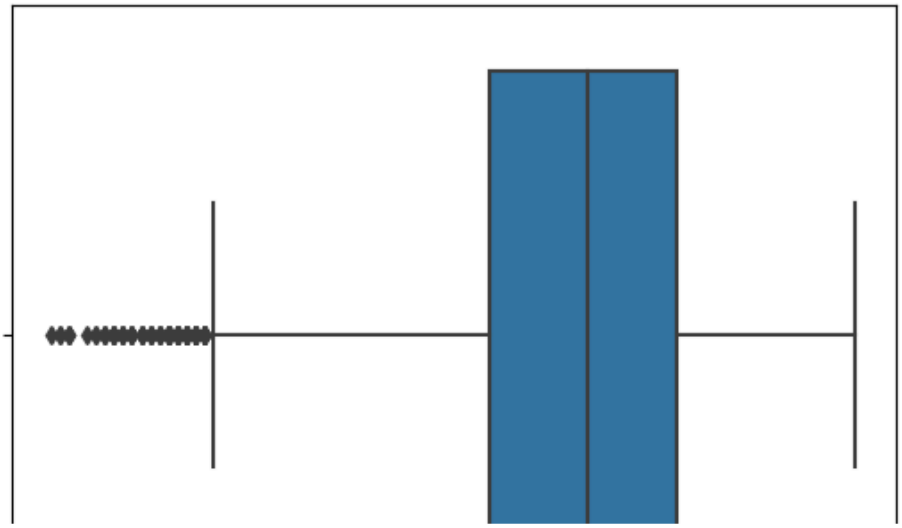
In [43]:
```
sns.boxplot(data=df,x="MathScore")
```

Out[43]: <AxesSubplot:xlabel='MathScore'>



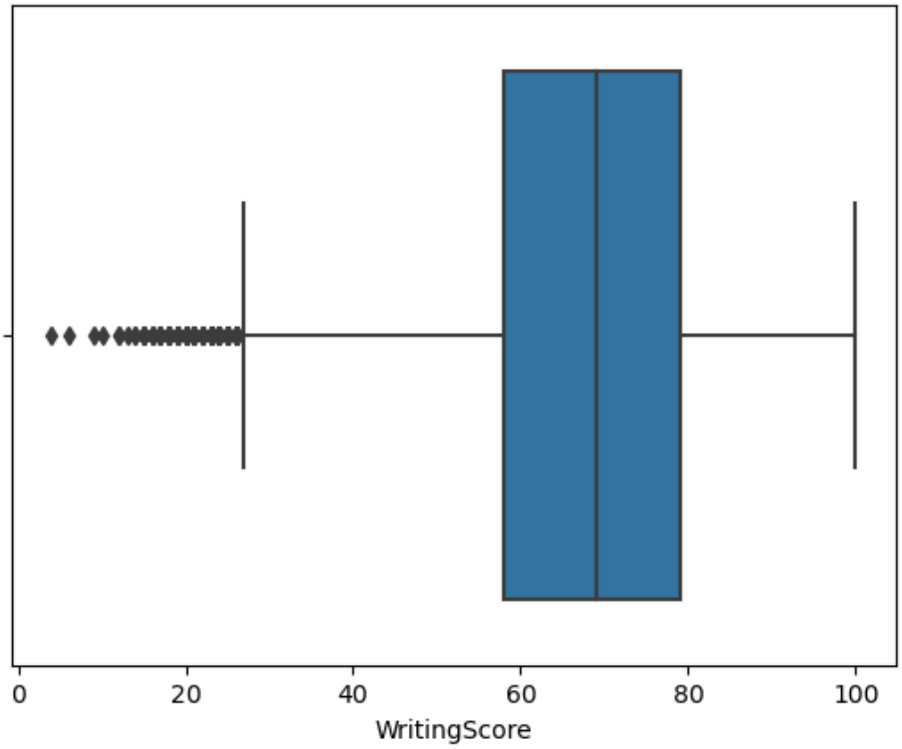
In [41]:
```
sns.boxplot(data=df,x="ReadingScore")
```

Out[41]: <AxesSubplot:xlabel='ReadingScore'>



In [42]:
```
sns.boxplot(data=df,x="WritingScore")
```

Out[42]: <AxesSubplot:xlabel='WritingScore'>




In [45]:
```
# from the above charts we have concluded that:
# Maths is comparatively the tough subject for the students to score good marks
```

In [47]:
```
print(df["EthnicGroup"].unique())
```

```
[nan 'group C' 'group B' 'group A' 'group D' 'group E']
```

## Distribution of Ethnic Groups

In [57]:
```
groupA = df.loc[(df["EthnicGroup"]=="group A")].count()
groupB = df.loc[(df["EthnicGroup"]=="group B")].count()
groupC = df.loc[(df["EthnicGroup"]=="group C")].count()
groupD = df.loc[(df["EthnicGroup"]=="group D")].count()
groupE = df.loc[(df["EthnicGroup"]=="group E")].count()

l=["groupA","groupB","groupC","groupD","groupE"]
mlist = [groupA["EthnicGroup"],groupB["EthnicGroup"],groupC["EthnicGroup"],groupD["Ethnic
plt.pie(mlist,labels=l ,autopct= "%1.2f%%")
plt.title("Distribution of Ethnic Groups")
print(mlist)
plt.show()
```

```
[2219, 5826, 9212, 7503, 4041]
```