omkargaikwad23 updates

History

1 contributor

```
1350 lines (1350 sloc) | 65.5 KB
```

In [1]:

```
import numpy as np
import pandas as pd
```

In [3]:

```
data = pd.read_csv("StudentsPerformance.csv")
data.head(10)
```

Out[3]:

	gender	race/ethnicity	parental level of education	lunch	test preparation course	math score	reading score	writing score
0	female	group B	bachelor's degree	standard	none	72	72	74
1	female	group C	some college	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	some college	standard	none	76	78	75
5	female	group B	associate's degree	standard	none	71	83	78
6	female	group B	some college	standard	completed	88	95	92
7	male	group B	some college	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 [8]:

```
data.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  1000 non-null   object
 3   lunch                        1000 non-null   object
 4   test preparation course      1000 non-null   object
 5   math score                   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
```

In [35]:

```
df.describe()
```

Out[35]:

	gender	race/ethnicity	parental level of education	lunch	test preparation course	math score	reading score	
count	984.00000	984.000000	984.000000	984.000000	984.000000	984.000000	984.000000	984
mean	0.48374	1.855691	2.675813	0.347561	0.362805	66.775407	69.795732	68
std	0.49999	1.368706	1.685189	0.476438	0.481054	14.243035	13.831126	14
min	0.00000	0.000000	0.000000	0.000000	0.000000	29.000000	31.000000	33
25%	0.00000	1.000000	1.000000	0.000000	0.000000	57.000000	60.000000	58
50%	0.00000	1.000000	3.000000	0.000000	0.000000	67.000000	70.000000	69
75%	1.00000	3.000000	4.000000	1.000000	1.000000	77.000000	80.000000	79

max	1.00000	4.000000	5.000000	1.000000	1.000000	100.000000	100.000000	100

- No null values are present in the dataset

In [5]:

```
data.isnull().sum()
```

Out[5]:

```
gender                         0
race/ethnicity                 0
parental level of education    0
lunch                          0
test preparation course        0
math score                     0
reading score                  0
writing score                  0
dtype: int64
```

In [9]:

```
data_col = data.columns
for i in data_col[:len(data_col)-3]:
    print("Unique data elements for "+str(i)+" : "+str(data[i].unique()))
```

```
Unique data elements for gender : ['female' 'male']
Unique data elements for race/ethnicity : ['group B' 'group C' 'group A' 'gro
up D' 'group E']
Unique data elements for parental level of education : ["bachelor's degree"
'some college' "master's degree" "associate's degree"
 'high school' 'some high school']
Unique data elements for lunch : ['standard' 'free/reduced']
Unique data elements for test preparation course : ['none' 'completed']
```

In [11]:

```
df = data.copy()
df.head()
```

Out[11]:

	gender	race/ethnicity	parental level of education	lunch	test preparation course	math score	reading score	writing score
0	female	group B	bachelor's degree	standard	none	72	72	74
1	female	group C	some college	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	some college	standard	none	76	78	75

In [12]:

```
df.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  1000 non-null   object
 3   lunch                        1000 non-null   object
 4   test preparation course      1000 non-null   object
 5   math score                   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
```

filling missing values

In [13]:

```
mean_math_score = df['math score'].mean()
df['math score'].fillna(mean_math_score, inplace = True)
```

In [14]:

```
mean_reading_score = df['reading score'].mean()
df['reading score'].fillna(mean_reading_score, inplace = True)
```

In [ ]:

```
mean_writing_score = df['writing score'].mean()
df['writing score'].fillna(mean_writing_score, inplace = True)
```

Catogorical data into numeric data

In [16]:

```
cat_cols = df.select_dtypes(['object']).columns

# output of factorize() is [labels, uniques] and we need labels.
df[cat_cols] = df[cat_cols].apply(lambda x:pd.factorize(x)[0])
```

In [17]:

```
df.head()
```

Out[17]:

	gender	race/ethnicity	parental level of education	lunch	test preparation course	math score	reading score	writing score
0	0	0	0	0	0	72	72	74
1	0	1	1	0	1	69	90	88
2	0	0	2	0	0	90	95	93
3	1	2	3	1	0	47	57	44
4	1	1	1	0	0	76	78	75

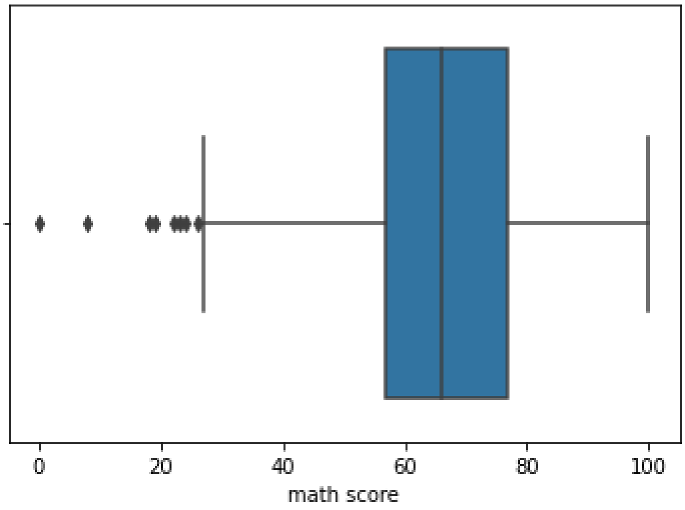
Check for outliers

In [18]:

```
import seaborn as sns
sns.boxplot(x=df['math score'])
```

Out[18]:

```
<AxesSubplot:xlabel='math score'>
```



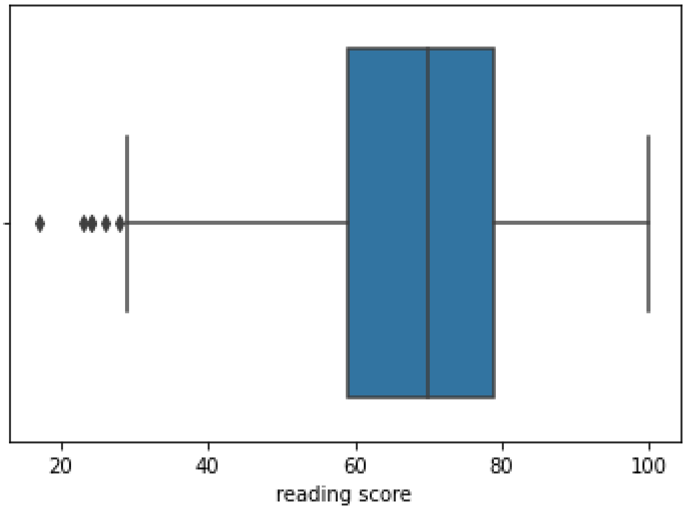
In [19]:

```
import seaborn as sns
```

```
sns.boxplot(x=df['reading score'])
```

Out[19]:

```
<AxesSubplot:xlabel='reading score'>
```

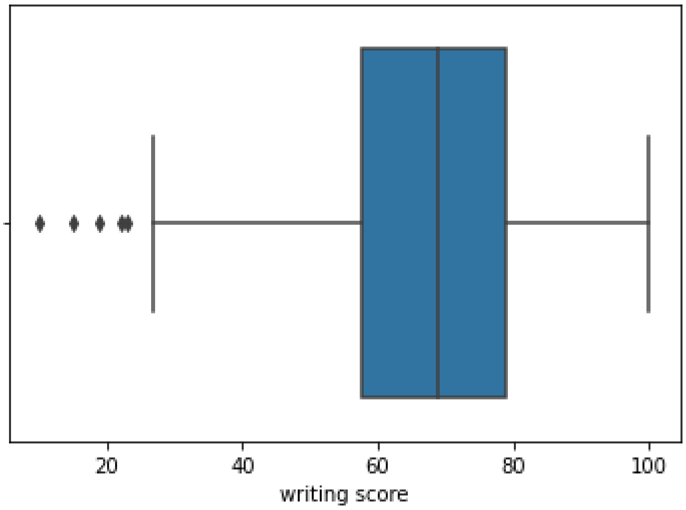


In [20]:

```
import seaborn as sns
sns.boxplot(x=df['writing score'])
```

Out[20]:

```
<AxesSubplot:xlabel='writing score'>
```



In [25]:

```
def outlierDetection (i,df):
    Q1 = np.percentile(df[i], 25)
    Q3 = np.percentile(df[i], 75)
    IQR = Q3 - Q1
    # Upper bound
    upper = np.where(df[i] >= (Q3+1.5*IQR))
    # Lower bound
    lower = np.where(df[i] <= (Q1-1.5*IQR))

    ''' Removing the Outliers '''
    df.drop(upper[0], axis=0, inplace = True)
    df.drop(lower[0], axis=0, inplace = True)
```

In [26]:

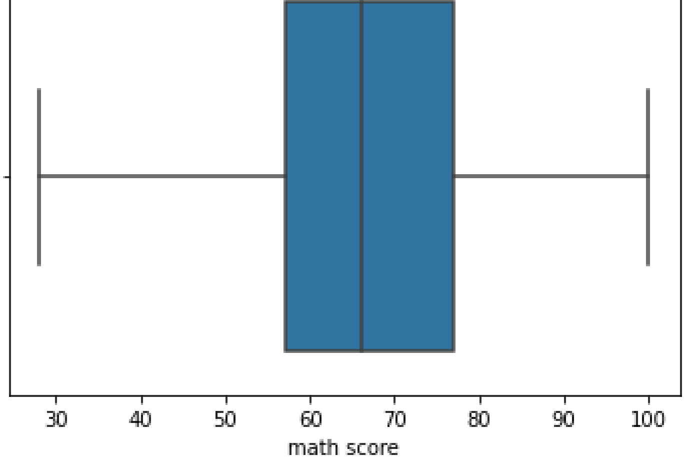
```
outlierDetection('math score',df)
df = df.reset_index(drop=True)
```

In [27]:

```
sns.boxplot(x=df['math score'])
```

Out[27]:

```
<AxesSubplot:xlabel='math score'>
```



In [28]:

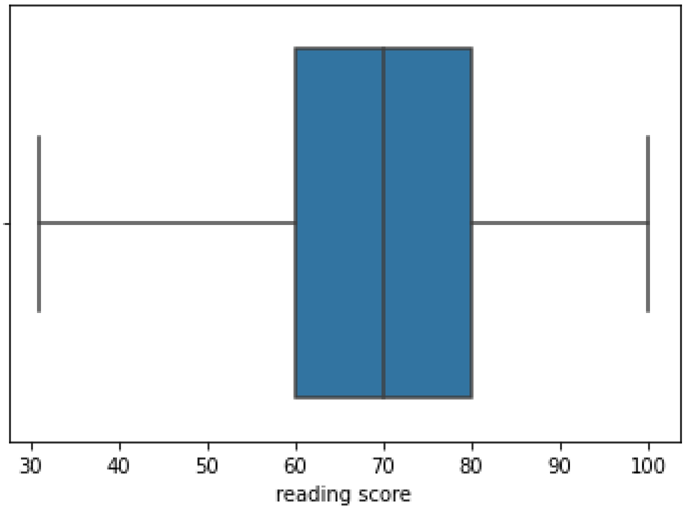
```
outlierDetection('reading score', df)
df = df.reset_index(drop=True)
```

In [31]:

```
sns.boxplot(x=df['reading score'])
```

Out[31]:

```
<AxesSubplot:xlabel='reading score'>
```



In [32]:

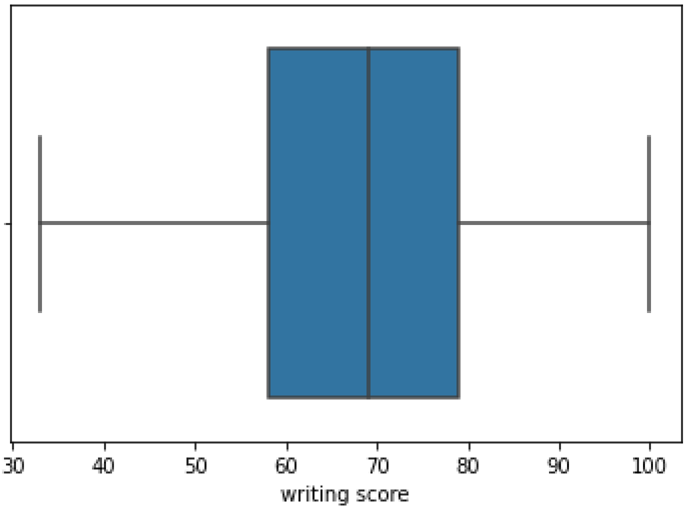
```
outlierDetection('writing score', df)
df = df.reset_index(drop=True)
```

In [33]:

```
sns.boxplot(x=df['writing score'])
```

Out[33]:

```
<AxesSubplot:xlabel='writing score'>
```



Reemoved outliers using boxplot

- Reomoved outliers using boxplot

Using MinMaxScaler to scale data from range 0 to 10

In [21]:
```
df_scaled = df.copy()
```

In [22]:
```
col_names = ['math score', 'reading score', 'writing score']

features= df_scaled[col_names]
```

In [23]:
```
from sklearn.preprocessing import MinMaxScaler
# scaled = (x-min)/(max-min)

scaler = MinMaxScaler(feature_range=(0,10))
df_scaled[col_names] = scaler.fit_transform(features.values)
```

In [24]:
```
df_scaled.head()
```

Out[24]:

	gender	race/ethnicity	parental level of education	lunch	test preparation course	math score	reading score	writing score
0	0	0	0	0	0	7.2	6.626506	7.111111
1	0	1	1	0	1	6.9	8.795181	8.666667
2	0	0	2	0	0	9.0	9.397590	9.222222
3	1	2	3	1	0	4.7	4.819277	3.777778
4	1	1	1	0	0	7.6	7.349398	7.222222

- Data is scaled in 0 - 10

In [40]:
```
from sklearn import preprocessing
df1 = df
```

In [41]:
```
Standardisation = preprocessing.StandardScaler()
```

In [43]:
```
x_after_Standardisation = Standardisation.fit_transform(df1)
```

Standardisation = (x - mean(x)) / standard_deviation

In [44]:
```
print ("\nAfter Standardisation : \n", x_after_Standardisation)
```

```
After Standardisation :
 [[-0.96799167 -1.3564894  -1.58864892 ...  0.36700396  0.15945117
   0.3680697 ]
 [-0.96799167 -0.62550059 -0.99494192 ...  0.15626759  1.46152545
   1.34373415]
 [-0.96799167 -1.3564894  -0.40123492 ...  1.63142218  1.82321276
   1.69218573]
 ...
```