```
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
import pandas as pd
from sklearn.model_selection import train_test_split , GridSearchCV
from sklearn.metrics import mean_squared_error
from sklearn.preprocessing import StandardScaler
from sklearn.linear_model import LinearRegression


from sklearn import metrics
from IPython.display import HTML
import plotly.express as px

import warnings
warnings.filterwarnings('ignore')


calories = pd.read_csv("/content/calories.csv")
exercise = pd.read_csv("/content/exercise.csv")


calories.head()
```

	User_ID	Calories
0	14733363	231.0
1	14861698	66.0
2	11179863	26.0
3	16180408	71.0
4	17771927	35.0

Next steps: Generate code with calories | View recommended plots | New interactive sheet

```
exercise.head()
```

	User_ID	Gender	Age	Height	Weight	Duration	Heart_Rate	Body_Temp
0	14733363	male	68	190.0	94.0	29.0	105.0	40.8
1	14861698	female	20	166.0	60.0	14.0	94.0	40.3
2	11179863	male	69	179.0	79.0	5.0	88.0	38.7
3	16180408	female	34	179.0	71.0	13.0	100.0	40.5
4	17771927	female	27	154.0	58.0	10.0	81.0	39.8

Next steps: Generate code with exercise | View recommended plots | New interactive sheet

```
exercise_df = exercise.merge(calories , on = "User_ID")
exercise_df.head()
```

	User_ID	Gender	Age	Height	Weight	Duration	Heart_Rate	Body_Temp	Calories
0	14733363	male	68	190.0	94.0	29.0	105.0	40.8	231.0
1	14861698	female	20	166.0	60.0	14.0	94.0	40.3	66.0
2	11179863	male	69	179.0	79.0	5.0	88.0	38.7	26.0
3	16180408	female	34	179.0	71.0	13.0	100.0	40.5	71.0
4	17771927	female	27	154.0	58.0	10.0	81.0	39.8	35.0

Next steps: Generate code with exercise_df | View recommended plots | New interactive sheet

```
print("This dataset has " , exercise_df.shape[0] ," instances and ",  exercise_df.shape[1] , " columns.")
```

```
This dataset has  15000  instances and  9  columns.
```

```
print("Columns : ")
for i , column in zip(range(len(exercise_df.columns)) , exercise_df.columns):
  print("\t" , i + 1 , "." ,  column)
```

```
Columns :
	 1 . User_ID
```

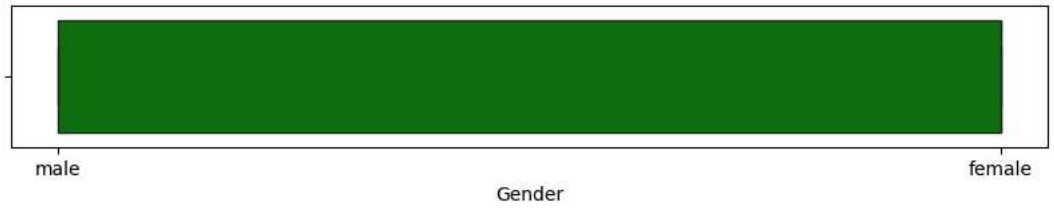
```
2 . Gender
3 . Age
4 . Height
5 . Weight
6 . Duration
7 . Heart_Rate
8 . Body_Temp
9 . Calories
```

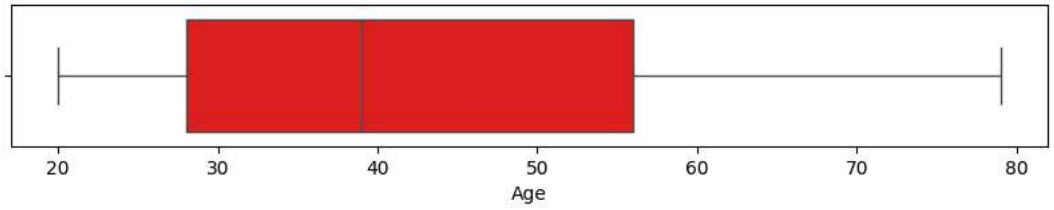
```
exercise_df.describe()
```

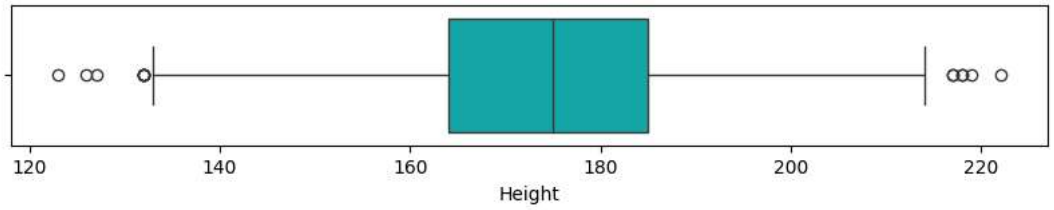
	User_ID	Age	Height	Weight	Duration	Heart_Rate	Body_Temp	Calories
count	1.500000e+04	15000.000000	15000.000000	15000.000000	15000.000000	15000.000000	15000.000000	15000.000000
mean	1.497736e+07	42.789800	174.465133	74.966867	15.530600	95.518533	40.025453	89.539533
std	2.872851e+06	16.980264	14.258114	15.035657	8.319203	9.583328	0.779230	62.456978
min	1.000116e+07	20.000000	123.000000	36.000000	1.000000	67.000000	37.100000	1.000000
25%	1.247419e+07	28.000000	164.000000	63.000000	8.000000	88.000000	39.600000	35.000000
50%	1.499728e+07	39.000000	175.000000	74.000000	16.000000	96.000000	40.200000	79.000000
75%	1.744928e+07	56.000000	185.000000	87.000000	23.000000	103.000000	40.600000	138.000000
max	1.999965e+07	79.000000	222.000000	132.000000	30.000000	128.000000	41.500000	314.000000

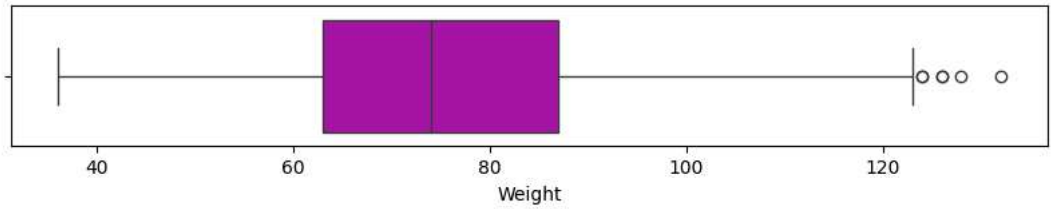
```
c = ['b' , 'g' , 'r' , 'c' , 'm' , 'y' , 'k' , 'w' , 'b']
fig1 , axes = plt.subplots(len(exercise_df.columns) , 1 , figsize = (10 , 20))
plt.subplots_adjust(wspace = 0.3 , hspace = 0.7)
axes = axes.flatten()             #for using axes indeces with one dimention array instead of two dimension
for i , column in zip(range(len(exercise_df.columns)) , exercise_df.columns):
  try:
    sns.boxplot(data = exercise_df , x = column , color = c[i] , ax = axes[i])
  except:
    fig1.delaxes(axes[i])
    continue
```

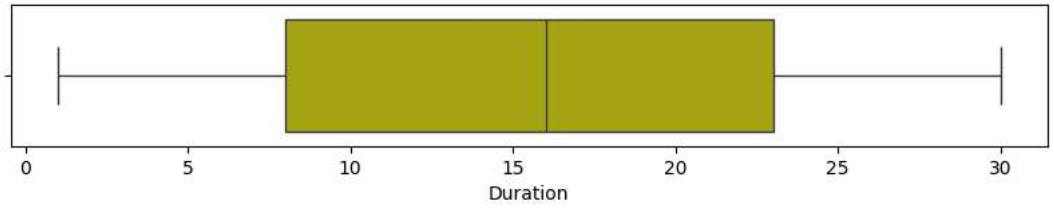

1.0
1.2
1.4
1.6
1.8
2.0
User_ID
1e7

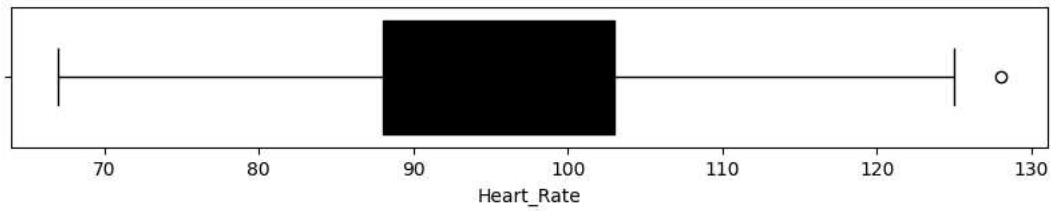

male
female
Gender

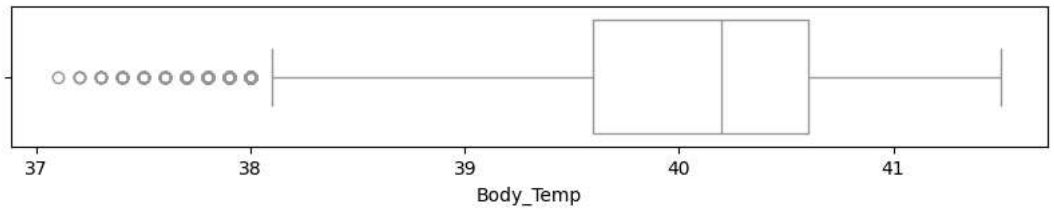

20
30
40
50
60
70
80
Age

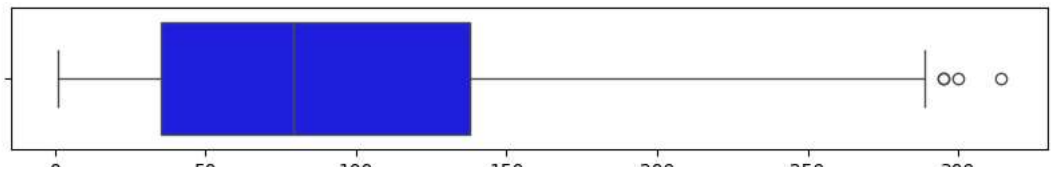

120
140
160
180
200
220
Height


40
60
80
100
120
Weight


0
5
10
15
20
25
30
Duration

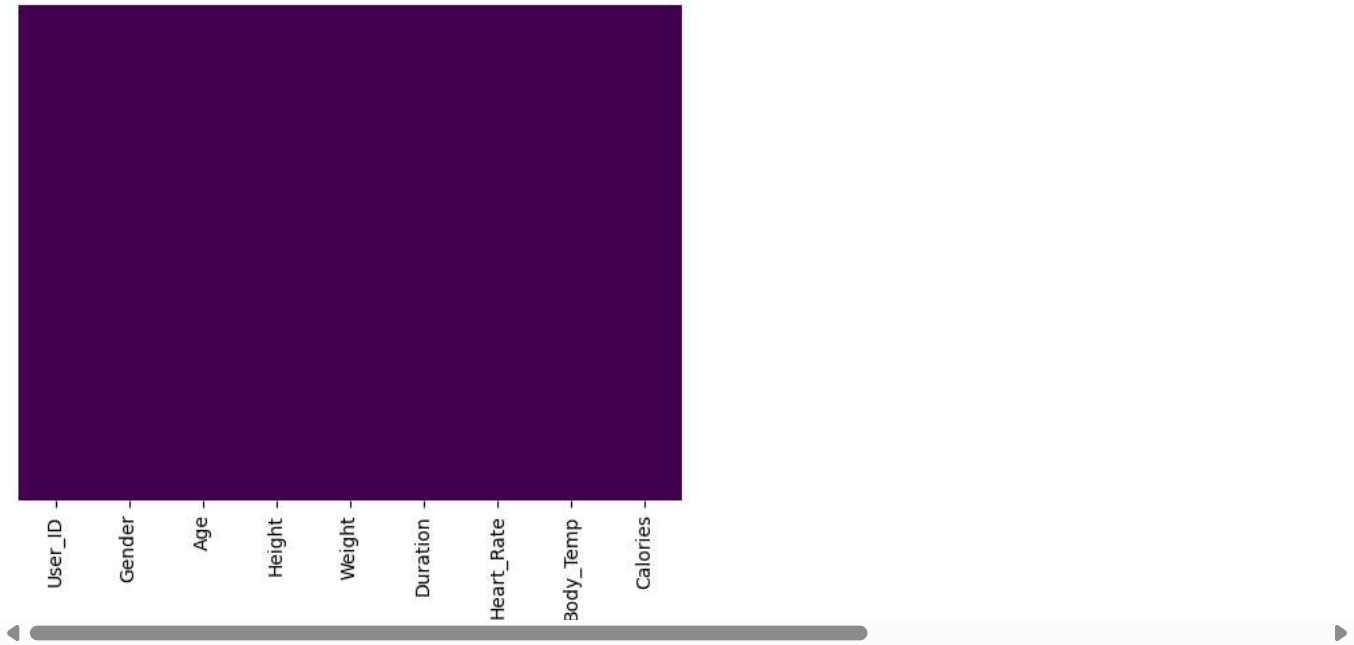

70
80
90
100
110
120
130
Heart_Rate


37
38
39
40
41
Body_Temp




```
sns.heatmap(exercise_df.isnull() , yticklabels = False , cbar = False , cmap = "viridis")
```

```
<Axes: >
```



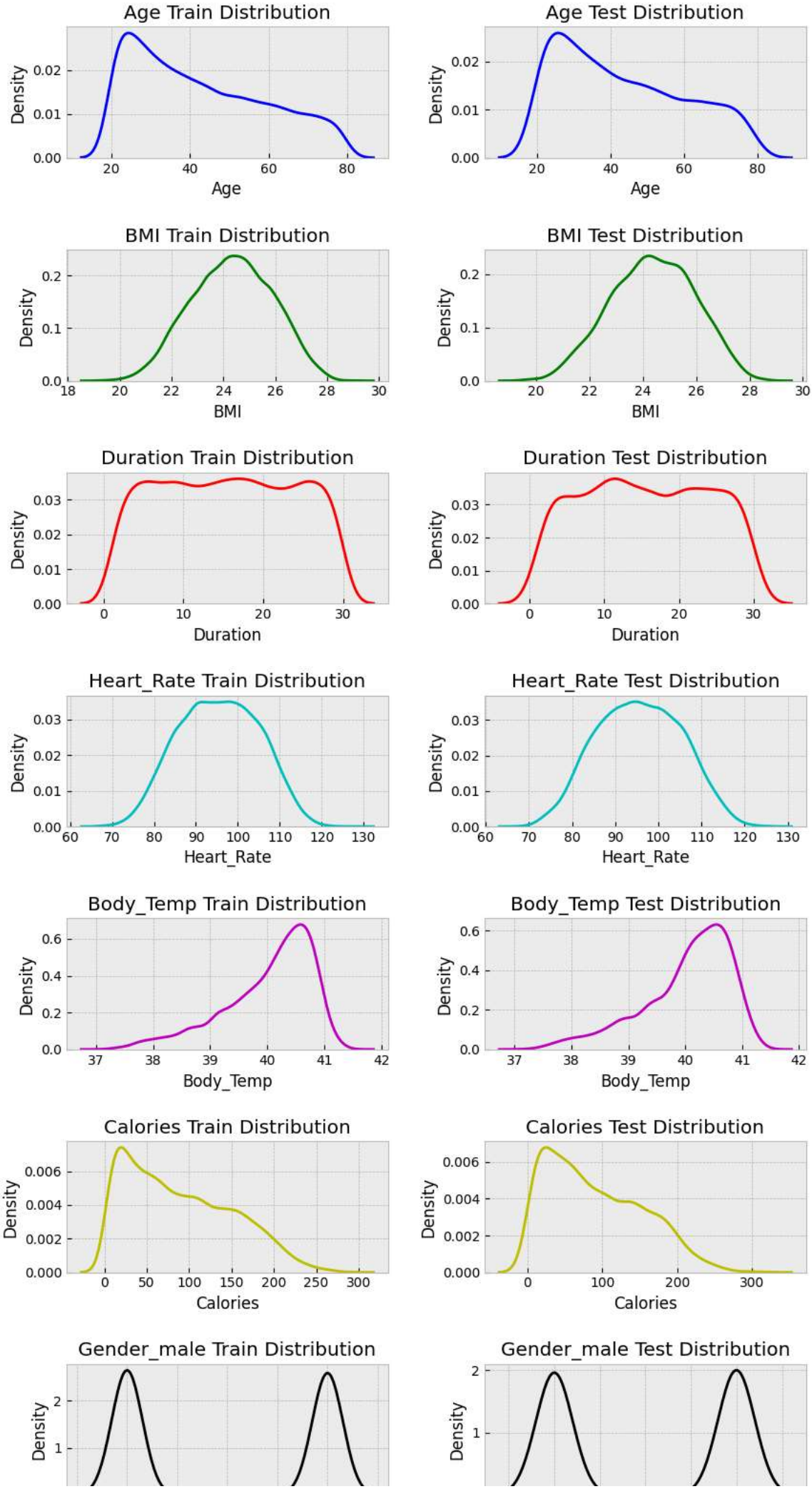

```
print("The shape of dataset before dropping duplicates : " , exercise_df.shape)
exercise_df.drop_duplicates(subset = ['User_ID'], keep='last' , inplace = True)    # Keeping the first example of duplicates in 'User_II
print("The shape of dataset after dropping duplicates : " , exercise_df.shape)
```

```
The shape of dataset before dropping duplicates :  (15000, 9)
The shape of dataset after dropping duplicates :  (15000, 9)
```

```
fig = px.box(exercise_df , x= "Gender" , y = "Heart_Rate")

fig.update_layout(
    width=700,
    height=450,
)

fig.show()
```


```
from matplotlib import style
style.use("bmh")

c = ['b' , 'g' , 'r' , 'c' , 'm' , 'y' , 'k' , 'w' , 'b']
fig1 , axes = plt.subplots(len(exercise_train_data.columns) , 2 , figsize = (10 , 20))
plt.subplots_adjust(wspace = 0.3 , hspace = 0.7)
axes = axes.flatten()             #for using axes indeces with one dimention array instead of two dimension
```

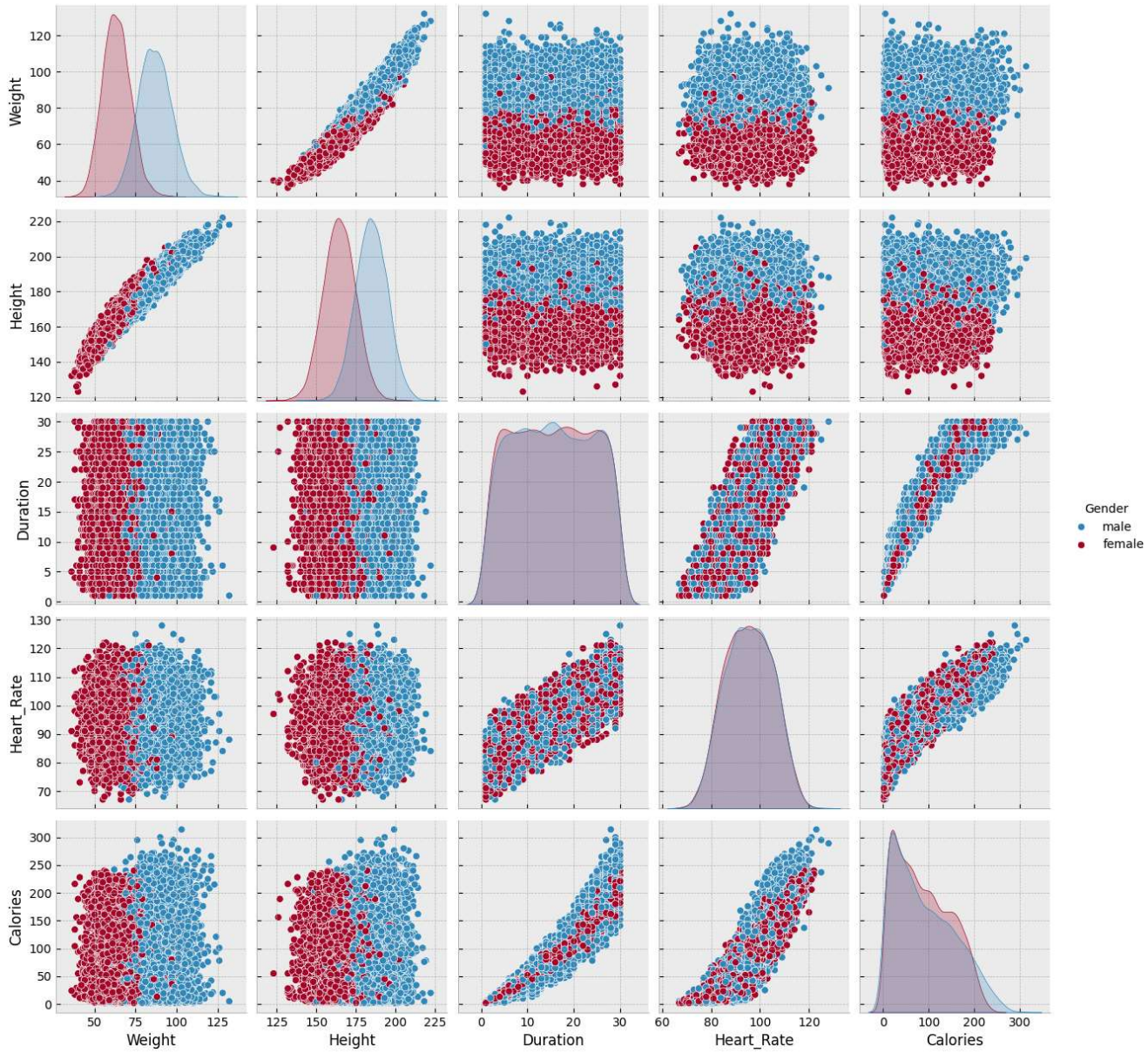
```
for i , column , color in zip(range(0 , len(exercise_train_data.columns) * 2 , 2) , exercise_train_data.columns , c):
  try:
    axes[i].title.set_text(column + " Train Distribution")
    sns.kdeplot(data = exercise_train_data , x = column , ax = axes[i] , color = color)
  except:
    fig1.delaxes(axes[i])
    continue

for i , column , color in zip(range(1 , len(exercise_train_data.columns) * 2 , 2) , exercise_train_data.columns , c):
  try:
    axes[i].title.set_text(column + " Test Distribution")
    sns.kdeplot(data = exercise_test_data , x = column , ax = axes[i] , color = color)
  except:
    fig1.delaxes(axes[i])
    continue
```


Age Train Distribution
Density
Age
Age Test Distribution
Density
Age
BMI Train Distribution
Density
BMI
BMI Test Distribution
Density
BMI
Duration Train Distribution
Density
Duration
Duration Test Distribution
Density
Duration
Heart_Rate Train Distribution
Density
Heart_Rate
Heart_Rate Test Distribution
Density
Heart_Rate
Body_Temp Train Distribution
Density
Body_Temp
Body_Temp Test Distribution
Density
Body_Temp
Calories Train Distribution
Density
Calories
Calories Test Distribution
Density
Calories
Gender_male Train Distribution
Density
Gender_male Test Distribution
Density

Start coding or generate with AI.

```
sns.pairplot(exercise_df[["Weight" , "Height" , "Duration" , "Heart_Rate" , "Calories" , "Gender"]] , hue = "Gender")
```

```
<seaborn.axisgrid.PairGrid at 0x7ff6ab9bee10>
```




```
exercise_train_data.columns
```

```
Index(['Age', 'BMI', 'Duration', 'Heart_Rate', 'Body_Temp', 'Calories',
       'Gender_male'],
      dtype='object')
```

```
for data in [exercise_df , exercise_df]:         # adding BMI column to both training and test sets
  data["BMI"] = data["Weight"] / ((data["Height"] / 100) ** 2)
  data["BMI"] = round(data["BMI"] , 2)
```

```
bmi_category = ["Very severely underweight" , "Severely underweight" ,
                "Underweight" , "Normal" ,
                "Overweight" , "Obese Class I" ,
                "Obese Class II" , "Obese Class III"]
```

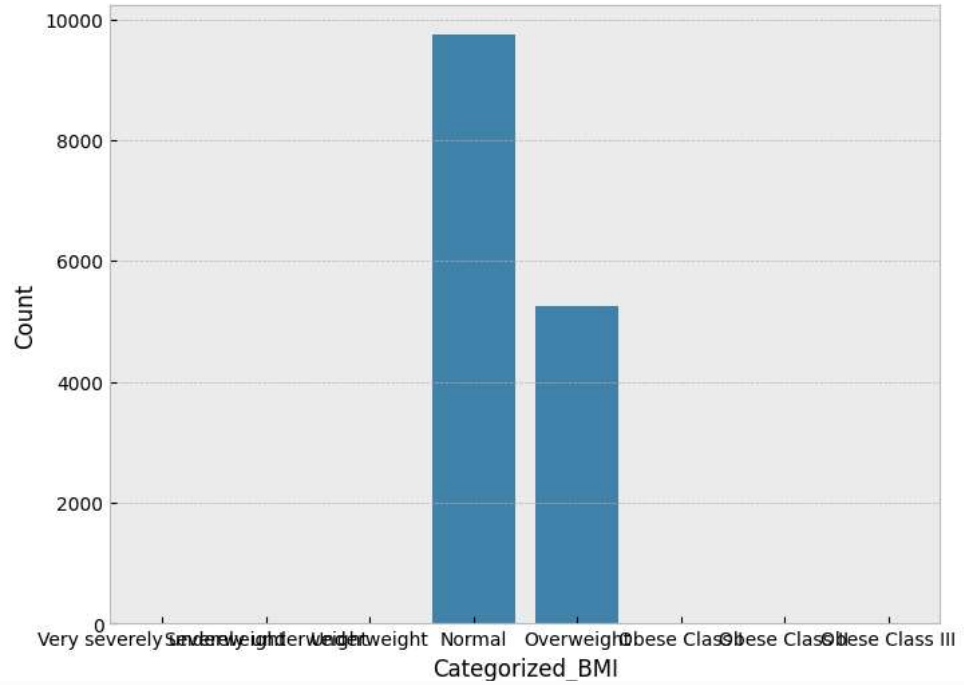
```
exercise_df["Categorized_BMI"] = pd.cut(exercise_df["BMI"] , bins = [0 , 15 , 16 , 18.5 , 25 , 30 , 35 , 40 , 50]
                                        , right = False , labels = bmi_category)


ds = exercise_df["Categorized_BMI"].value_counts().reset_index()
ds.columns = ["Categorized_BMI" , "Count"]
ds
```

	Categorized_BMI	Count
0	Normal	9741
1	Overweight	5259
2	Severely underweight	0
3	Very severely underweight	0
4	Underweight	0
5	Obese Class I	0
6	Obese Class II	0
7	Obese Class III	0

Next steps: Generate code with ds | View recommended plots | New interactive sheet

```
ds = ds[(ds["Categorized_BMI"] == "Normal") | (ds["Categorized_BMI"] == "Overweight")]
#ds["Categorized_BMI"] = ds["Categorized_BMI"].astype("object")

plt.rcParams["figure.figsize"] = 8 , 6
sns.barplot(data = ds , x = "Categorized_BMI" , y = "Count")
```

```
<Axes: xlabel='Categorized_BMI', ylabel='Count'>
```




```
plt.rcParams["figure.figsize"] = 8 , 6
corr = exercise_df.corr(numeric_only = True)
sns.heatmap(corr , annot = True , square = True , linewidth = .5 , vmin = 0 , vmax = 1 , cmap = 'Blues')
```