In [15]:

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

Data Collection & Processing

In [16]:

```
calories=pd.read_csv("calories.csv")
# loading the data from csv file to a Pandas DataFrame
```

In [17]:

```
calories.head()
# print the first 5 rows of the dataframe
```

Out[17]:

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

In [18]:

```
exercise_data=pd.read_csv("exercise.csv")
```

In [19]:

```
exercise_data.head()
```

Out[19]:

	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

Combining the two Dataframes

In [20]:

```
calories_data = pd.concat([exercise_data, calories['Calories']], axis=1)
```

In [21]:

```
# Double-click(or enter)to edit
```

In [22]:

```
calories_data.head()
```

Out[22]:

	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

In [23]:

```
# checking the number of rows and columns
calories_data.shape
```

Out[23]:

```
(15000, 9)
```

In [24]:

```
# getting some informations about the data
calories_data.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 15000 entries, 0 to 14999
Data columns (total 9 columns):
 #   Column      Non-Null Count  Dtype  
---  ------      --------------  -----  
 0   User_ID     15000 non-null  int64  
 1   Gender      15000 non-null  object 
 2   Age         15000 non-null  int64  
 3   Height      15000 non-null  float64
 4   Weight      15000 non-null  float64
 5   Duration    15000 non-null  float64
 6   Heart_Rate  15000 non-null  float64
 7   Body_Temp   15000 non-null  float64
 8   Calories    15000 non-null  float64
dtypes: float64(6), int64(2), object(1)
memory usage: 1.0+ MB
```

In [25]:

```
# checking for missing values
calories_data.isnull().sum()
```

Out[25]:

```
User_ID       0
Gender        0
Age           0
Height        0
Weight        0
Duration      0
Heart_Rate    0
Body_Temp     0
Calories      0
dtype: int64
```

Data Analysis

In [26]:

```
# get some statistical measures about the data
calories_data.describe()
```

Out[26]:

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

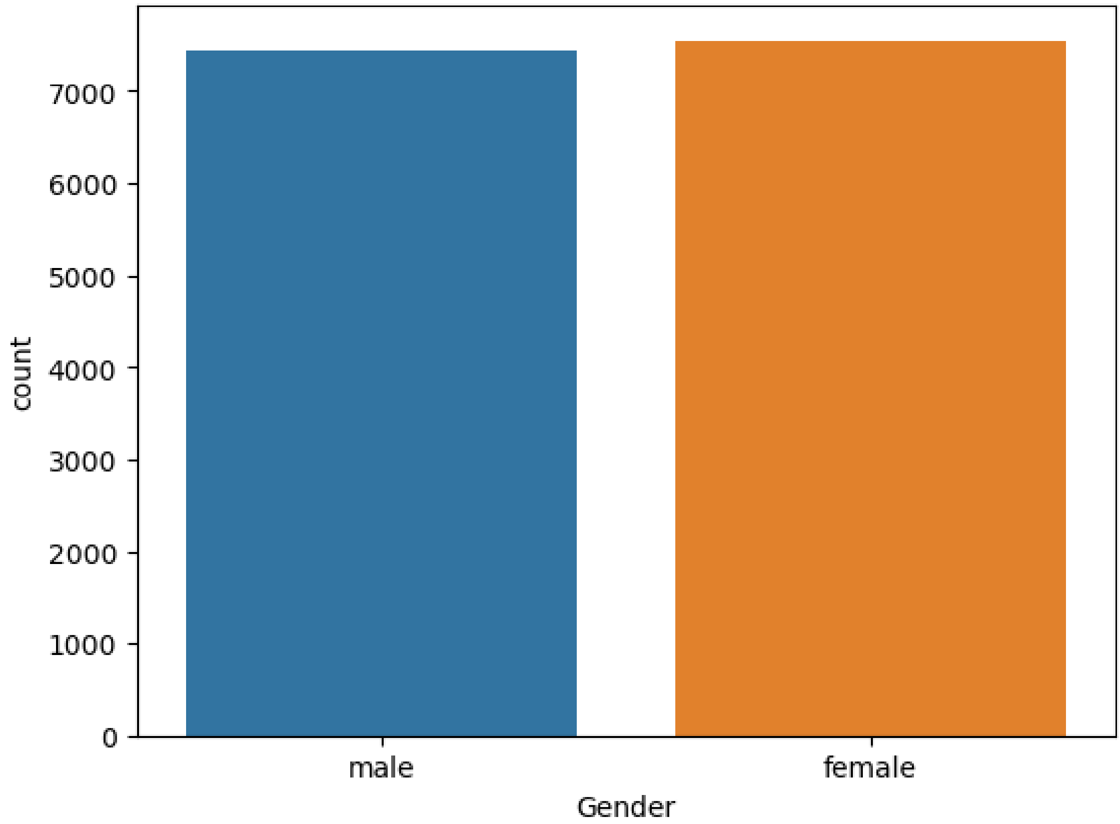
Data Visualization

In [27]:

```
# plotting the gender column in count plot
sns.countplot(calories_data['Gender'])
```

Out[27]:

```
<AxesSubplot:xlabel='Gender', ylabel='count'>
```

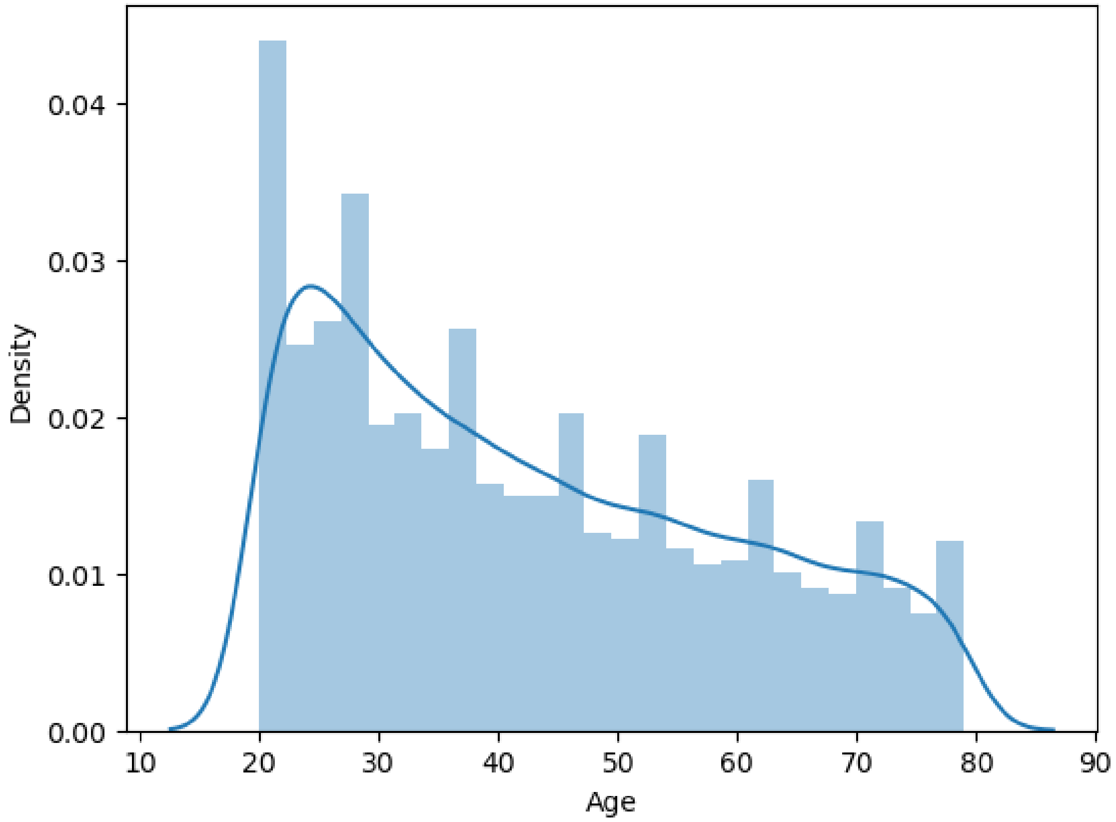


In [28]:

```
# finding the distribution of "Age" column
sns.distplot(calories_data['Age'])
```

Out[28]:

<AxesSubplot:xlabel='Age', ylabel='Density'>

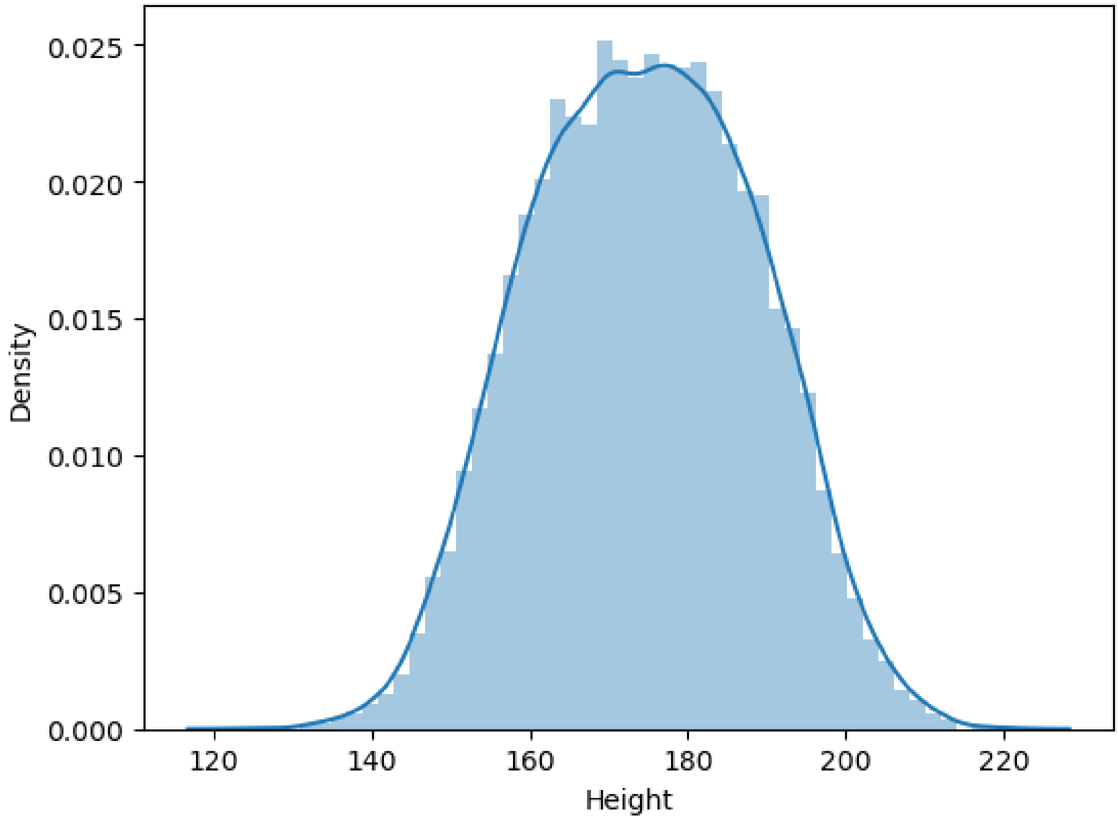


In [29]:

```
# finding the distribution of "Height" column
sns.distplot(calories_data['Height'])
```

Out[29]:

```
<AxesSubplot:xlabel='Height', ylabel='Density'>
```

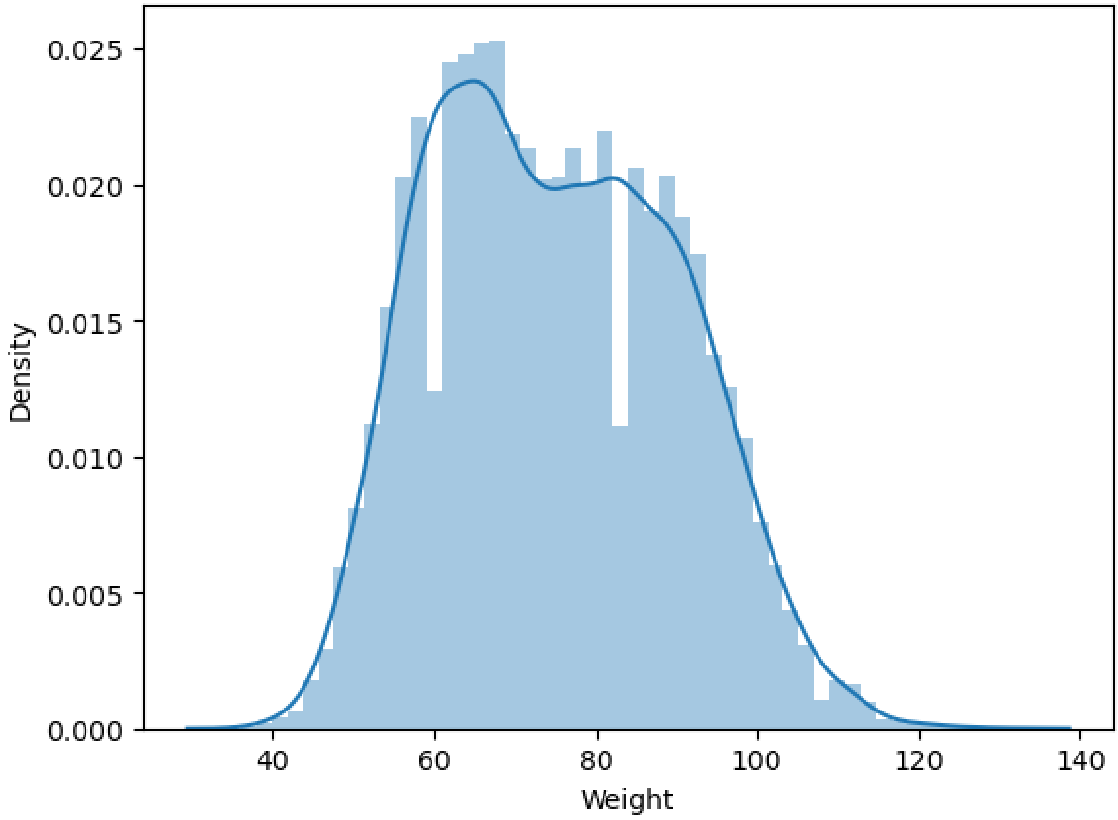


In [30]:

```
# finding the distribution of "Weight" column
sns.distplot(calories_data['Weight'])
```

Out[30]:

```
<AxesSubplot:xlabel='Weight', ylabel='Density'>
```



Finding the Correlation in the dataset

1. Positive Correlation
2. Negative Correlation

In [31]:

```
correlation = calories_data.corr()
```

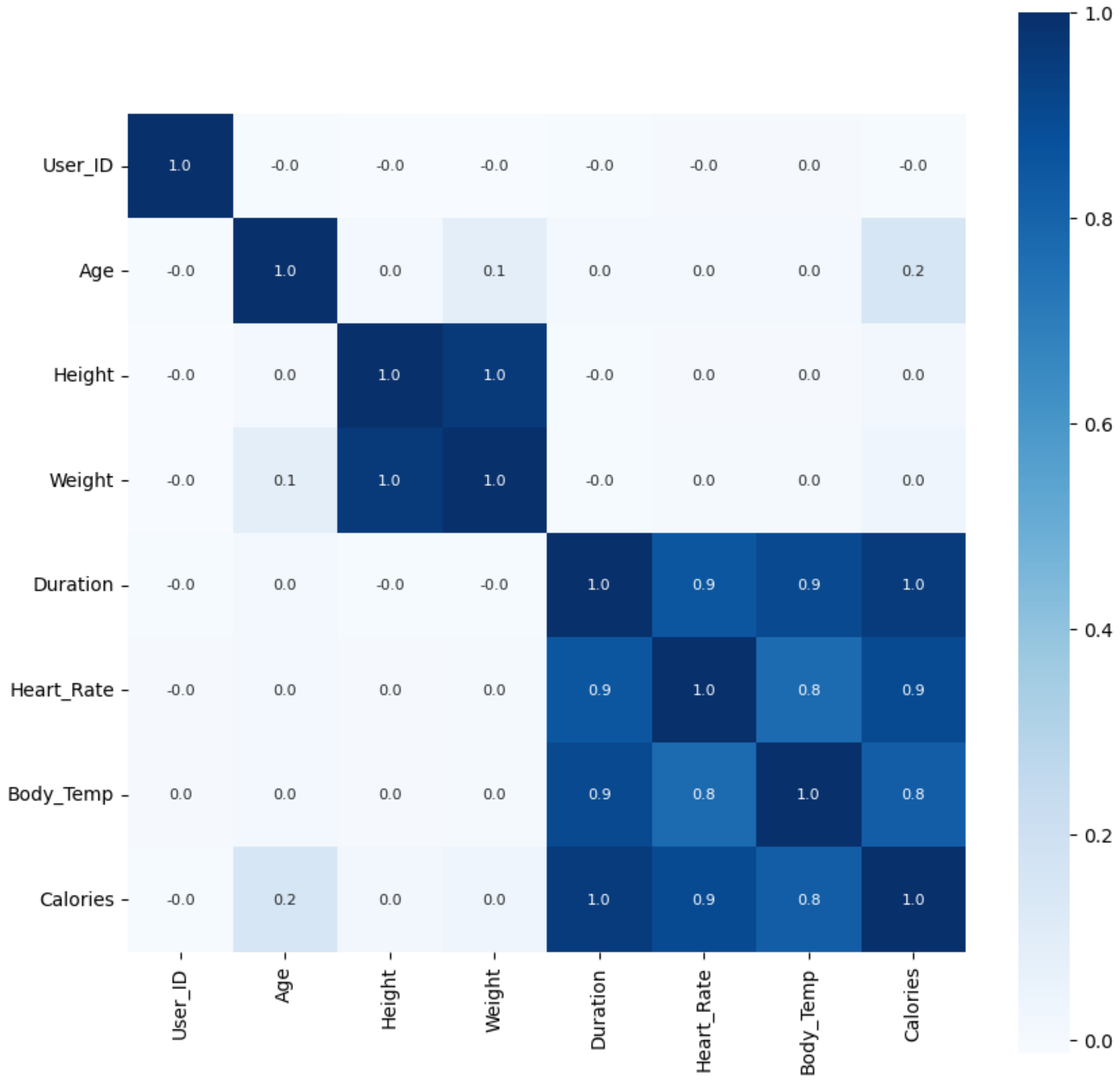
In [32]:

```
# constructing a heatmap to understand the correlation

plt.figure(figsize=(10,10))
sns.heatmap(correlation, cbar=True, square=True, fmt='.1f', annot=True, annot_kws={'size
```

Out[32]:

```
<AxesSubplot:>
```



Converting the text data to numerical values

In [33]:

```
calories_data.replace({"Gender":{'male':0,'female':1}}, inplace=True)
```

In [34]:

```
calories_data.head()
```

Out[34]:

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

Separating features and Target

In [35]:

```
X = calories_data.drop(columns=['User_ID','Calories'], axis=1)
Y = calories_data['Calories']
```

In [36]:

```
print(X)
```

```
       Gender  Age  Height  Weight  Duration  Heart_Rate  Body_Temp
0           0   68   190.0    94.0      29.0       105.0       40.8
1           1   20   166.0    60.0      14.0        94.0       40.3
2           0   69   179.0    79.0       5.0        88.0       38.7
3           1   34   179.0    71.0      13.0       100.0       40.5
4           1   27   154.0    58.0      10.0        81.0       39.8
...       ...  ...     ...     ...       ...         ...        ...
14995       1   20   193.0    86.0      11.0        92.0       40.4
14996       1   27   165.0    65.0       6.0        85.0       39.2
14997       1   43   159.0    58.0      16.0        90.0       40.1
14998       0   78   193.0    97.0       2.0        84.0       38.3
14999       0   63   173.0    79.0      18.0        92.0       40.5

[15000 rows x 7 columns]
```

In [37]:

```
print(Y)
```

```
0        231.0
1         66.0
2         26.0
3         71.0
4         35.0
         ...  
14995     45.0
14996     23.0
14997     75.0
14998     11.0
14999     98.0
Name: Calories, Length: 15000, dtype: float64
```

Splitting the data into training data and Test data

In [38]:

```
from sklearn.model_selection import train_test_split
```

In [39]:

```
X_train, X_test, Y_train, Y_test = train_test_split(X, Y, test_size=0.2, random_state=2)
```

In [40]:

```
print(X.shape, X_train.shape, X_test.shape)
```

```
(15000, 7) (12000, 7) (3000, 7)
```

Model Training

XGBoost Regressor

In [41]:

```
from xgboost import XGBRegressor
```

In [42]:

```
# loading the model
model = XGBRegressor()
```

In [43]:

```
# training the model with X_train
model.fit(X_train, Y_train)
```

Out[43]:

```
XGBRegressor(base_score=None, booster=None, callbacks=None,
             colsample_bylevel=None, colsample_bynode=None,
             colsample_bytree=None, early_stopping_rounds=None,
             enable_categorical=False, eval_metric=None, feature_types=Non
e,
             gamma=None, gpu_id=None, grow_policy=None, importance_type=No
ne,
             interaction_constraints=None, learning_rate=None, max_bin=Non
e,
             max_cat_threshold=None, max_cat_to_onehot=None,
             max_delta_step=None, max_depth=None, max_leaves=None,
             min_child_weight=None, missing=nan, monotone_constraints=Non
e,
             n_estimators=100, n_jobs=None, num_parallel_tree=None,
             predictor=None, random_state=None, ...)
```

Evaluation

Prediction on Test Data

In [44]:

```
test_data_prediction = model.predict(X_test)
```

In [45]:

```
print(test_data_prediction)
```

```
[127.823784 226.00154   38.66253  ... 144.3636    22.767195  89.87375 ]
```

Mean Absolute Error

In [46]:

```
from sklearn import metrics
```

In [47]:

```
mae = metrics.mean_absolute_error(Y_test, test_data_prediction)
```

In [48]:

```
print("Mean Absolute Error = ", mae)
```

```
Mean Absolute Error =  1.4807048829992613
```

In [ ]:

```

```