```
#importing the libraries
import pandas as pd
import numpy as np
import seaborn as sns
import matplotlib.pyplot as plt
from sklearn.model_selection import train_test_split
from sklearn.linear_model import LinearRegression
from sklearn import metrics
from matplotlib import style
```

```
#loading the csv data into pandas data frame
insurance_data = pd.read_csv('/content/insurance.csv')
```

```
#Basic information of the given data
insurance_data.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 1338 entries, 0 to 1337
Data columns (total 7 columns):
 #   Column    Non-Null Count  Dtype  
---  ------    --------------  -----  
 0   age       1338 non-null   int64  
 1   sex       1338 non-null   object 
 2   bmi       1338 non-null   float64
 3   children  1338 non-null   int64  
 4   smoker    1338 non-null   object 
 5   region    1338 non-null   object 
 6   charges   1338 non-null   float64
dtypes: float64(2), int64(2), object(3)
memory usage: 73.3+ KB
```

```
#loading the first five rows from the given data set
insurance_data.head()
```

	age	sex	bmi	children	smoker	region	charges
0	19	female	27.900	0	yes	southwest	16884.92400
1	18	male	33.770	1	no	southeast	1725.55230
2	28	male	33.000	3	no	southeast	4449.46200
3	33	male	22.705	0	no	northwest	21984.47061
4	32	male	28.880	0	no	northwest	3866.85520

```
#loading the last five rows from the given data set
insurance_data.tail()
```

	age	sex	bmi	children	smoker	region	charges
1333	50	male	30.97	3	no	northwest	10600.5483
1334	18	female	31.92	0	no	northeast	2205.9808

```
#checking the total rows and columns from the given data set
insurance_data.shape
```

```
(1338, 7)
```

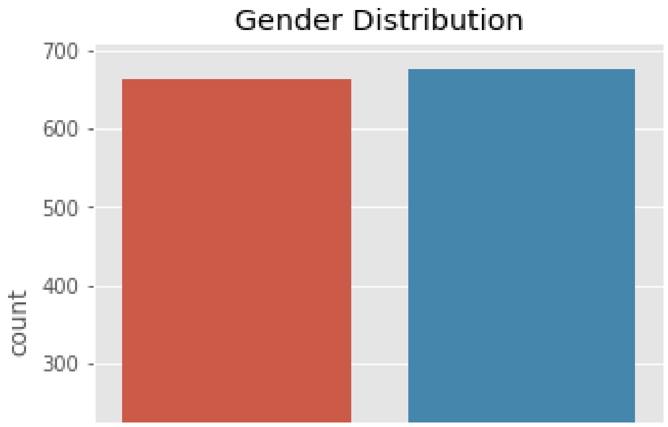
```
#statistical measure of the given data set
insurance_data.describe()
```

	age	bmi	children	charges
count	1338.000000	1338.000000	1338.000000	1338.000000
mean	39.207025	30.663397	1.094918	13270.422265
std	14.049960	6.098187	1.205493	12110.011237
min	18.000000	15.960000	0.000000	1121.873900
25%	27.000000	26.296250	0.000000	4740.287150
50%	39.000000	30.400000	1.000000	9382.033000
75%	51.000000	34.693750	2.000000	16639.912515
max	64.000000	53.130000	5.000000	63770.428010

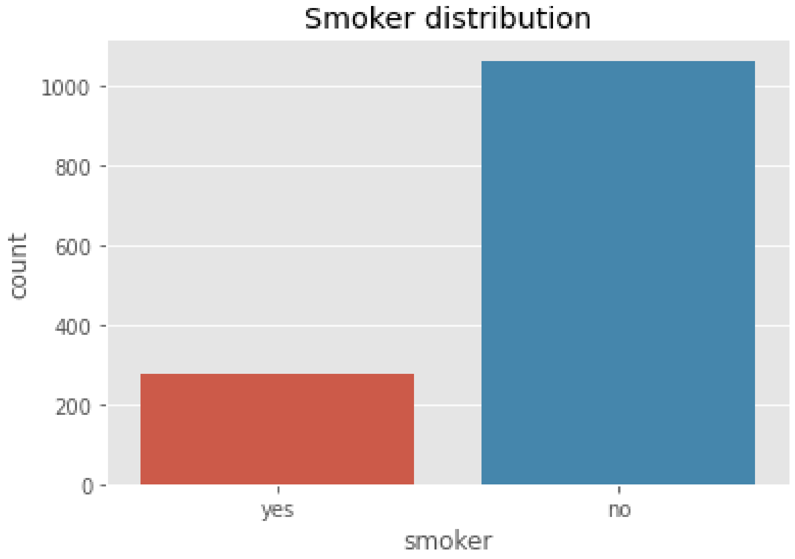
```
#Finding the sum of the missing values of the given data set
insurance_data.isnull().sum()
```

```
age         0
sex         0
bmi         0
children    0
smoker      0
region      0
charges     0
dtype: int64
```

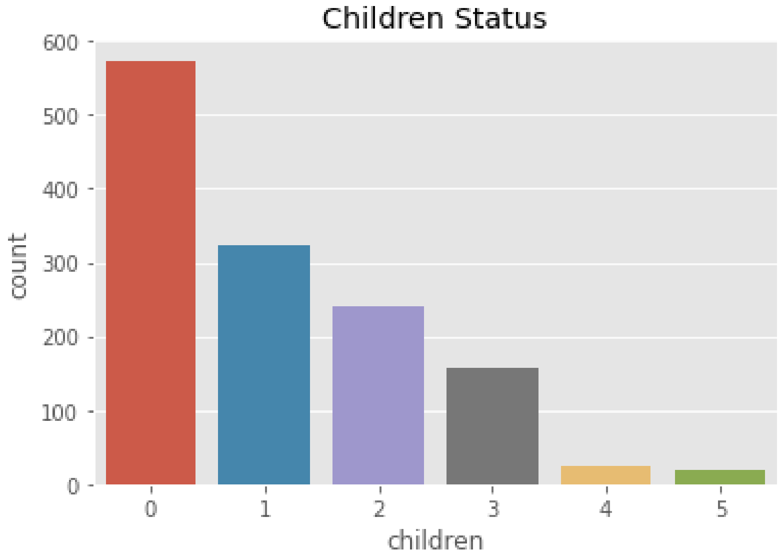
```
#setting the figure size
plt.figure(figsize=(5,5))
style.use('ggplot')
sns.countplot(x='sex',data=insurance_data)
plt.title("Gender Distribution")
plt.show()
```



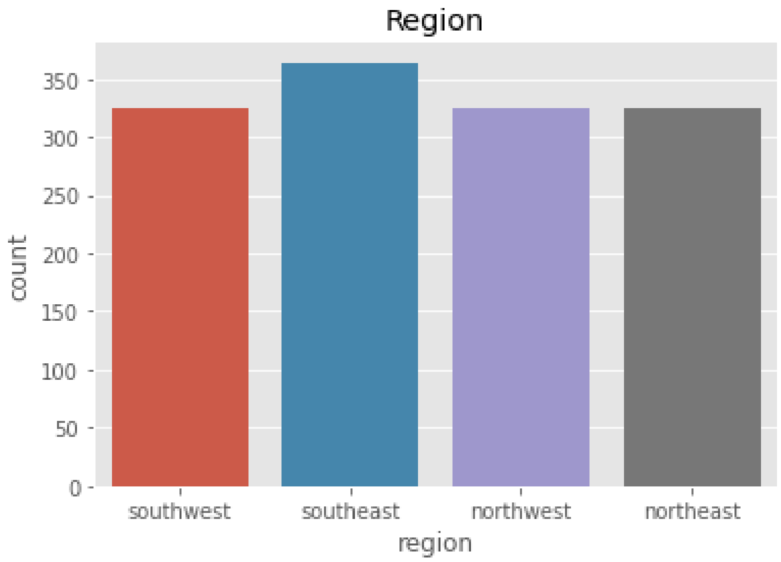
```
sns.countplot(x='smoker',data=insurance_data)
plt.title('Smoker distribution')
plt.show()
```



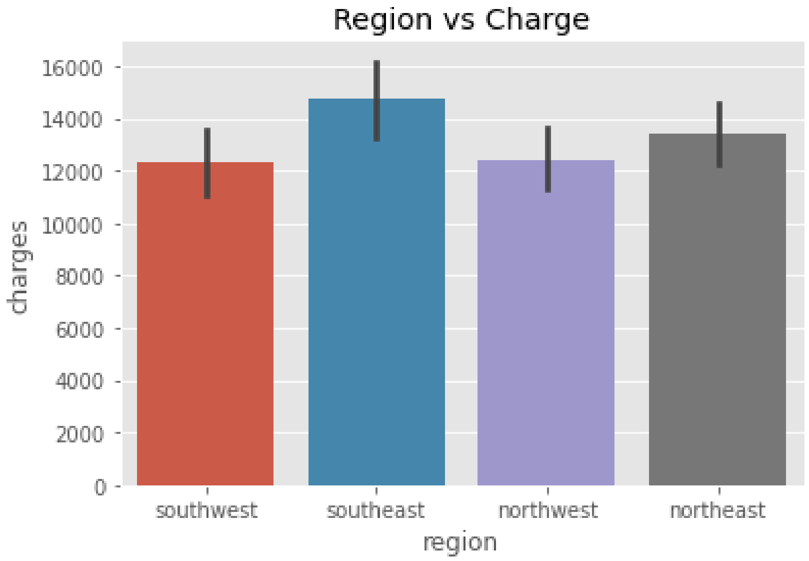
```
sns.countplot(x='children',data=insurance_data)
plt.title("Children Status")
plt.show()
```



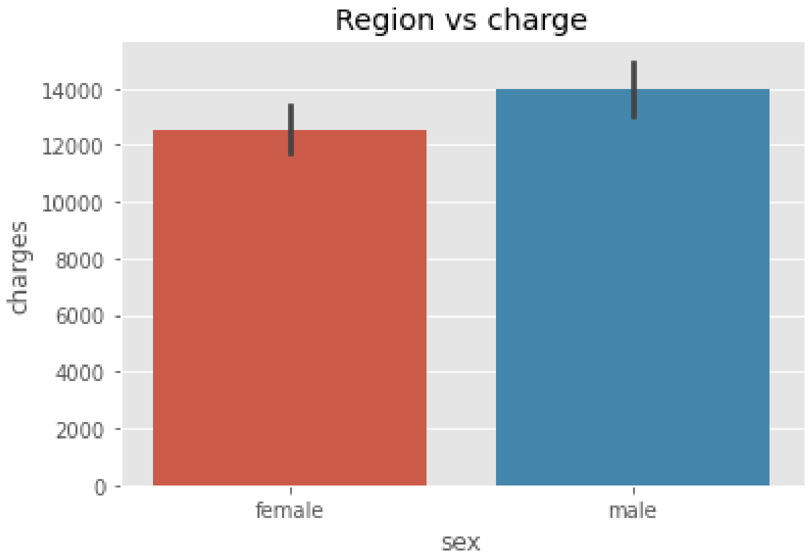
```
sns.countplot(x='region',data=insurance_data)
plt.title('Region')
plt.show()
```



```
#checking the price range
sns.barplot(x='region',y='charges',data=insurance_data)
plt.title("Region vs Charge")
plt.show()
```

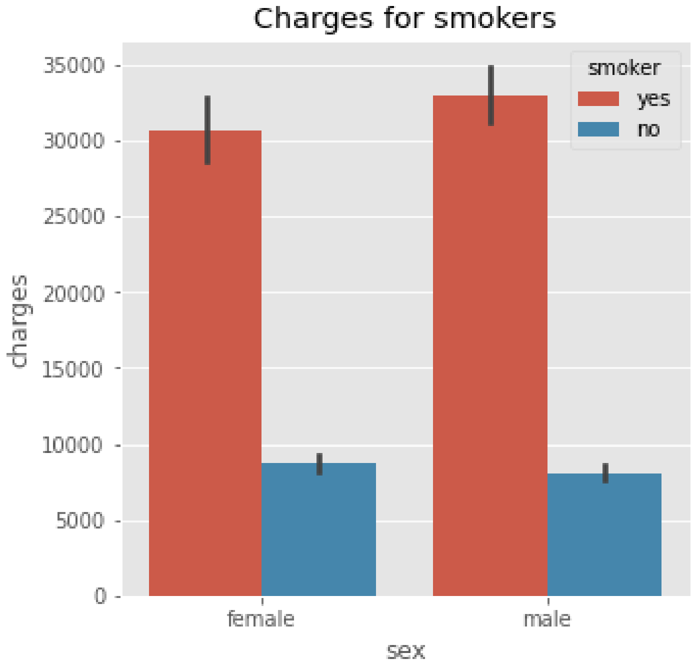


```
sns.barplot(x='sex',y='charges',data=insurance_data)
plt.title(' vs charge')
plt.show()
```



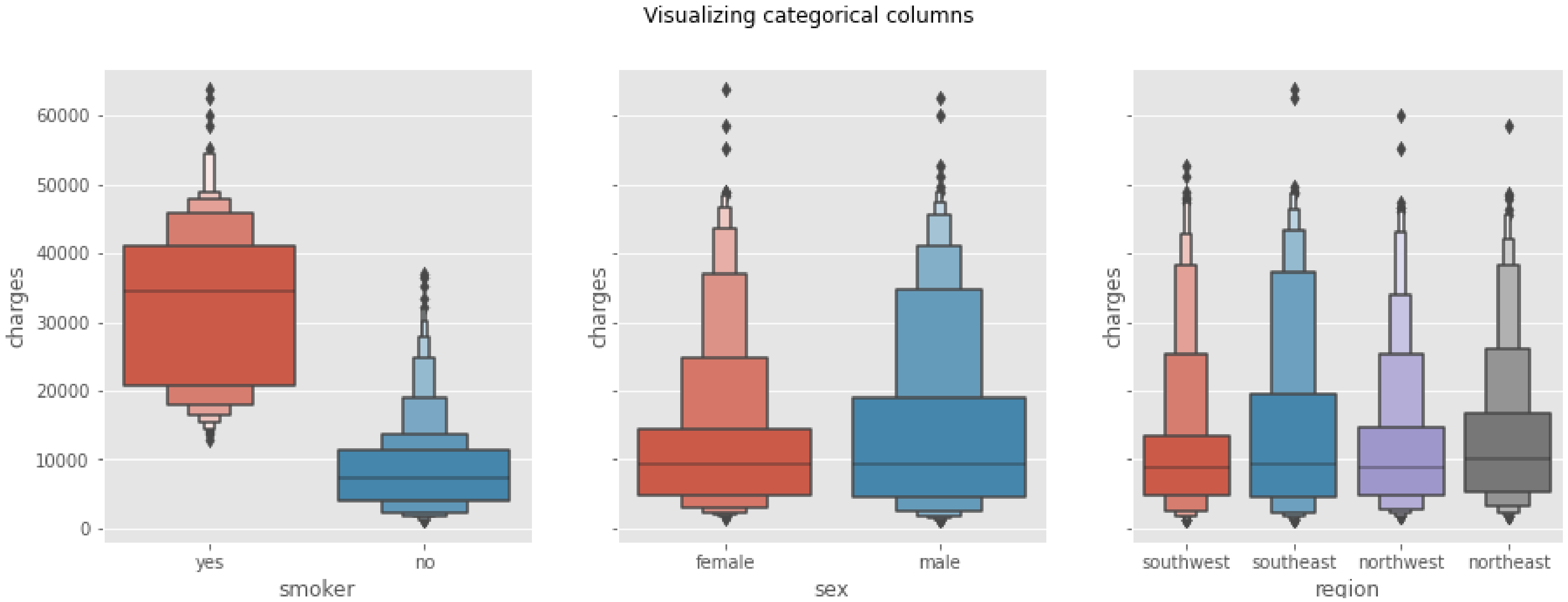
```
plt.figure(figsize=(5,5))
sns.barplot(x='sex', y='charges',hue='smoker', data=insurance_data)
plt.title('Charges for smokers')
```

```
    Text(0.5, 1.0, 'Charges for smokers')
```

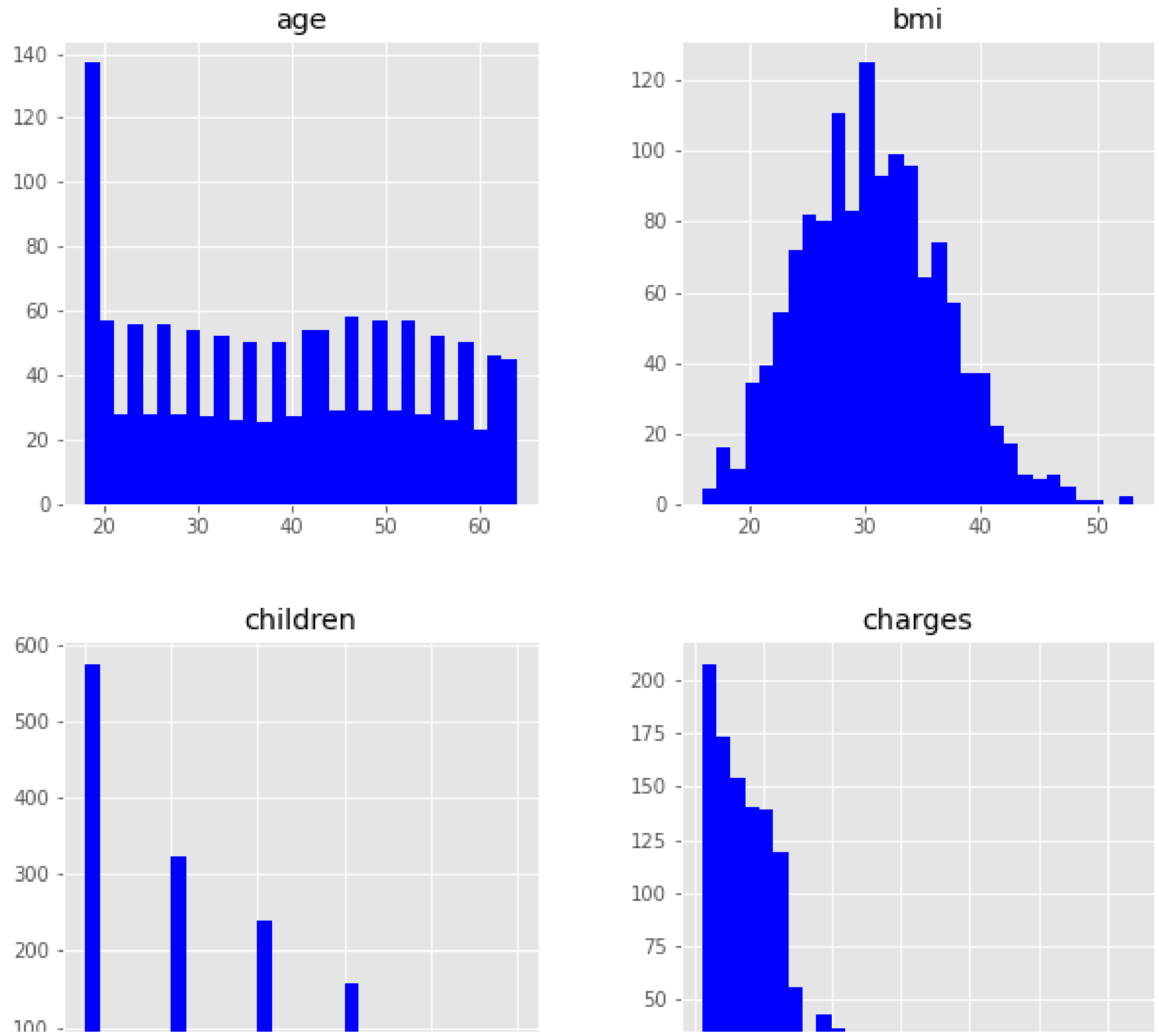


```
fig, axes = plt.subplots(1,3, figsize=(15,5), sharey=True)
fig.suptitle('Visualizing categorical columns')
sns.boxenplot(x='smoker', y= 'charges', data=insurance_data, ax=axes[0])
sns.boxenplot(x='sex', y= 'charges', data=insurance_data, ax=axes[1])
sns.boxenplot(x='region', y= 'charges', data=insurance_data, ax=axes[2])
```

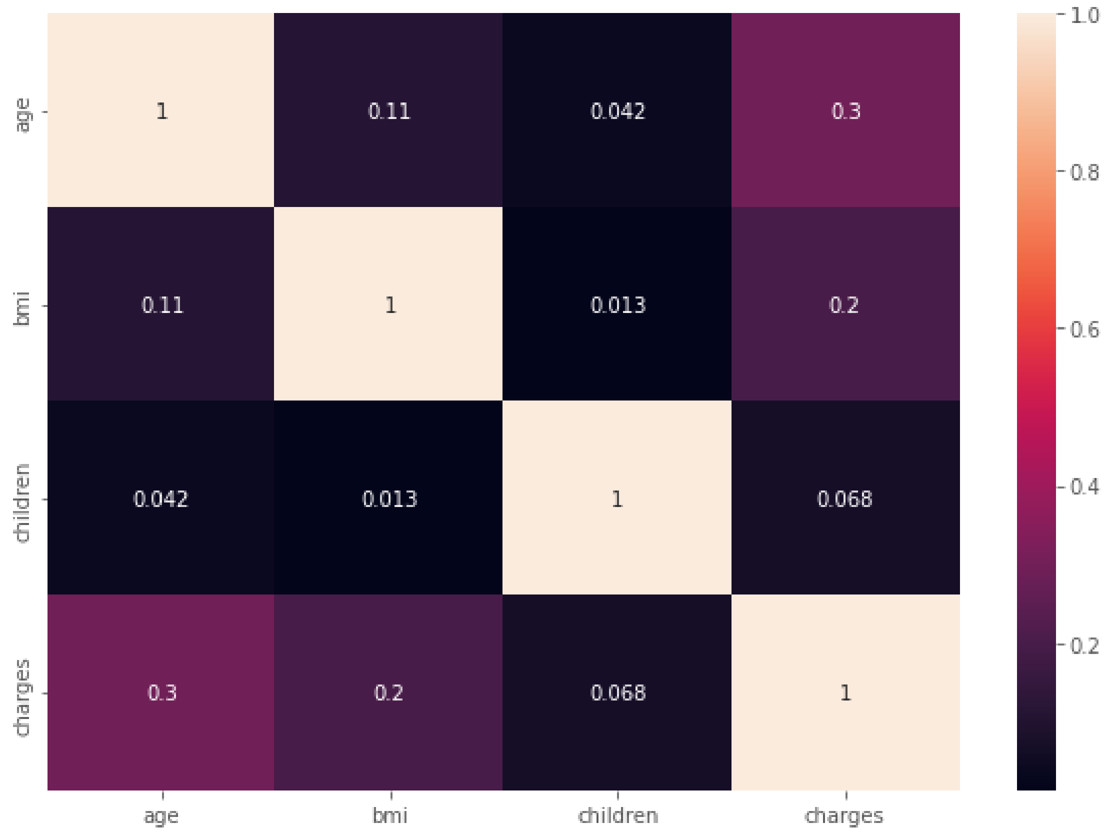
```
    <matplotlib.axes._subplots.AxesSubplot at 0x7fae1f9d4410>
```



```
insurance_data[['age','bmi','children','charges']].hist(bins=30, figsize=(10,10), color='blue')
plt.show()
```



```
plt.figure(figsize=(10,7))
sns.heatmap(insurance_data.corr(), annot = True)
plt.show()
```



```
insurance_data['sex'] = insurance_data['sex'].apply({'male':0, 'female':1}.get)
```

```
insurance_data['smoker'] = insurance_data['smoker'].apply({'yes':1, 'no':0}.get)
insurance_data['region'] = insurance_data['region'].apply({'southwest':1, 'southeast':2, 'northwest':3, 'northeast':4}.get)

X = insurance_data.drop(['charges', 'sex'], axis=1)
y = insurance_data.charges
```

```
#splitting the data into train and test
X_train, X_test, y_train, y_test = train_test_split(X,y, test_size=0.3, random_state=42)
print("X_train shape: ", X_train.shape)
print("X_test shape: ", X_test.shape)
print("y_train shpae: ", y_train.shape)
print("y_test shape: ", y_test.shape)
```

```
X_train shape:  (936, 5)
X_test shape:  (402, 5)
y_train shpae:  (936,)
y_test shape:  (402,)
```

```
#Using Linear Regression
linreg = LinearRegression()
```

```
data = {'age':50, 'bmi':25, 'children':2, 'smoker':1, 'region':2}
index = [0]
cust_insurance_data = pd.DataFrame(data, index)
cust_insurance_data
```

	age	bmi	children	smoker	region
0	50	25	2	1	2

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