```
import random as rn

height=[]
weight=[]
heightInM=[]
bmi=[]
bmiStatus=[]

numIndividuals=int(input("Please enter the number of individuals
involved in the study:"))

for i in range(numIndividuals):
    h=round(rn.uniform(5,7),2)
    height.append(h)

for i in range(numIndividuals):
    w=round(rn.uniform((15*height[i])-10,(15*height[i])+10),2)
    weight.append(w)

for i in range(numIndividuals):
    hm=0.3048*height[i]
    heightInM.append(hm)

for i in range(numIndividuals):
    a=weight[i]/(hm*hm)
    bmi.append(a)

for i in range(numIndividuals):
    if(bmi[i]<=19):
        bmis="underweight"
    elif(19<bmi[i]<=22.5):
        bmis="normal"
    elif(22.5<bmi[i]<26.5):
        bmis="overweight"
    else:
        bmis="obese"

    bmiStatus.append(bmis)

#print(height,weight,heightInM,bmi,bmiStatus)
```

```
Please enter the number of individuals involved in the study:50
```

Lower case omega represents a particular event . In this case it will be given by {height,weight,heightInM,bmi,bmiStatus}

Capital omega is the sample set of the experiment

F is the powerset of capital omega. It consists of null set, all subsets of capital omega and and capital omega itself

P is the probability of an event. It ranges from 0 to 1

The probabilty function is mapped from F to P

Example: Calculating the probability of a person whose height is more than 6 feet being overweight or obese

```
x=0
for i in range (numIndividuals):
    if (height[i]>6):
        if(bmi[i]>22.5):
            x=x+1

p=x/numIndividuals

print("The probability of a person whose height is more than 6 feet being overweight or obese is",p)
```

```
The probability of a person whose height is more than 6 feet being overweight or obese is 0.48
```

Bmi calculation can be useful in predicting certain health conditions and the probability will help take proper precautions and treatments in a society

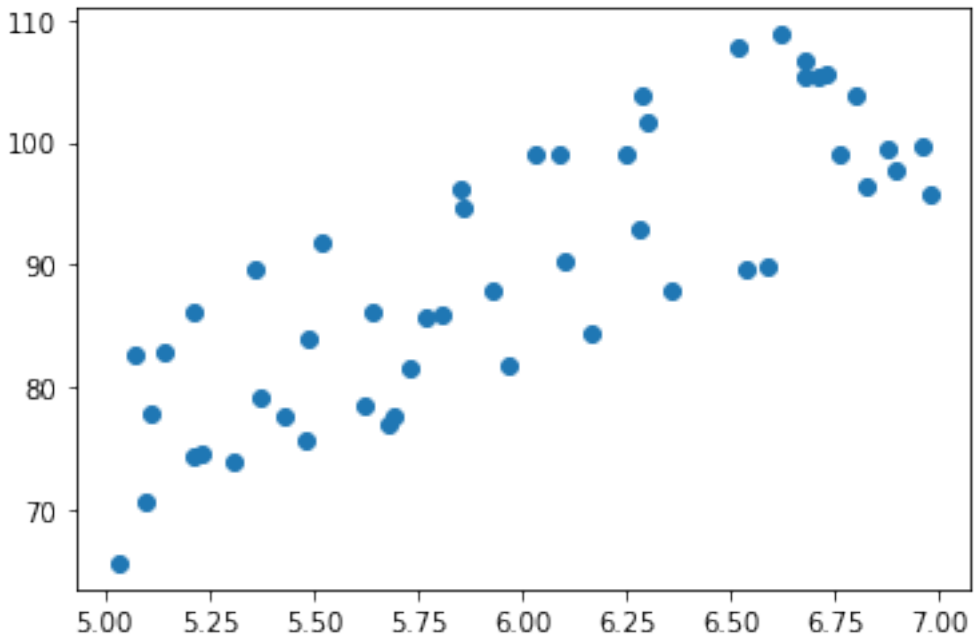
Examples of independent events is a person being more than 6 feet tall and being obese and a person being more than 6 feet tall and being underweight.

scatterplot for the given data

```
import matplotlib.pyplot as plt

plt.scatter(height,weight)
plt.show
```

```
<function matplotlib.pyplot.show(close=None, block=None)>
```



a 3d visualisation of a new experiment

Lets consider age also in this experiment

```
age=[]
for i in range(numIndividuals):
    y=rn.randint(25,40)
    age.append(y)
```

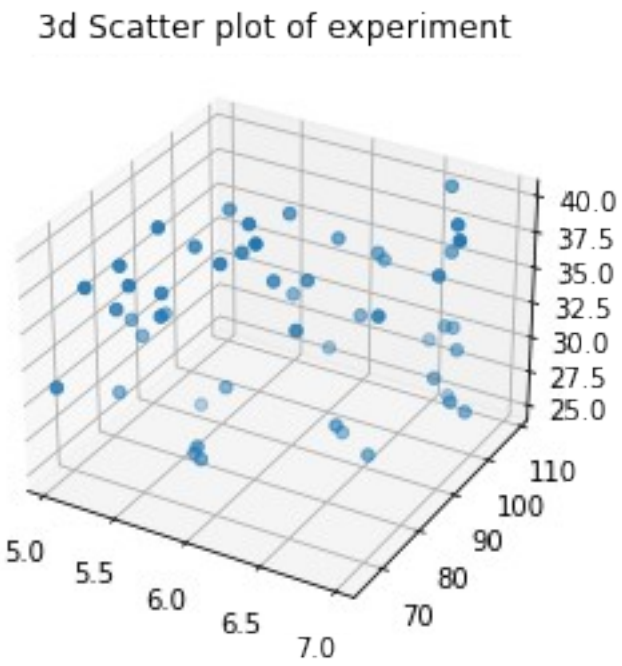
```
from mpl_toolkits import mplot3d
import numpy as np
import matplotlib.pyplot as plt

fig = plt.figure()


ax = plt.axes(projection ='3d')

ax.scatter(height, weight, age)


ax.set_title('3d Scatter plot of experiment')
plt.show()
```



When we consider the third parameter in this case age, we can define new events and look at how this third parameter effects our earlier result

Example: Calculating the probability of a person whose height is more than 6 feet and age less than 33 being overweight or obese

```
x=0
for i in range (numIndividuals):
    if (height[i]>6):
        if(bmi[i]>22.5):
            if(age[i]<33):
                x=x+1


p=x/numIndividuals

print("The probability of a person whose height is more than 6 feet
and age less than 33 being overweight or obese is",p)
```