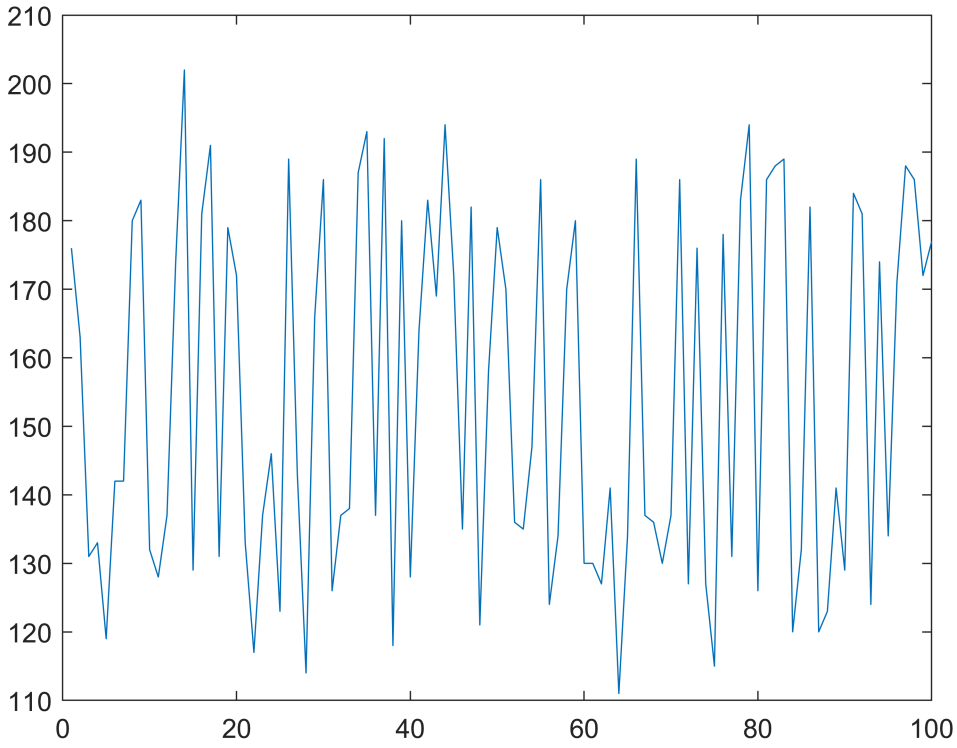
# Lab #03

Load simulated hospital data

```
clear
clc

load hospital.mat
```

Firstly, lets plot weight data

```
weightsAll=hospital.Weight;
plot(weightsAll);
```




When we analyze this plot we obtain no usefull information

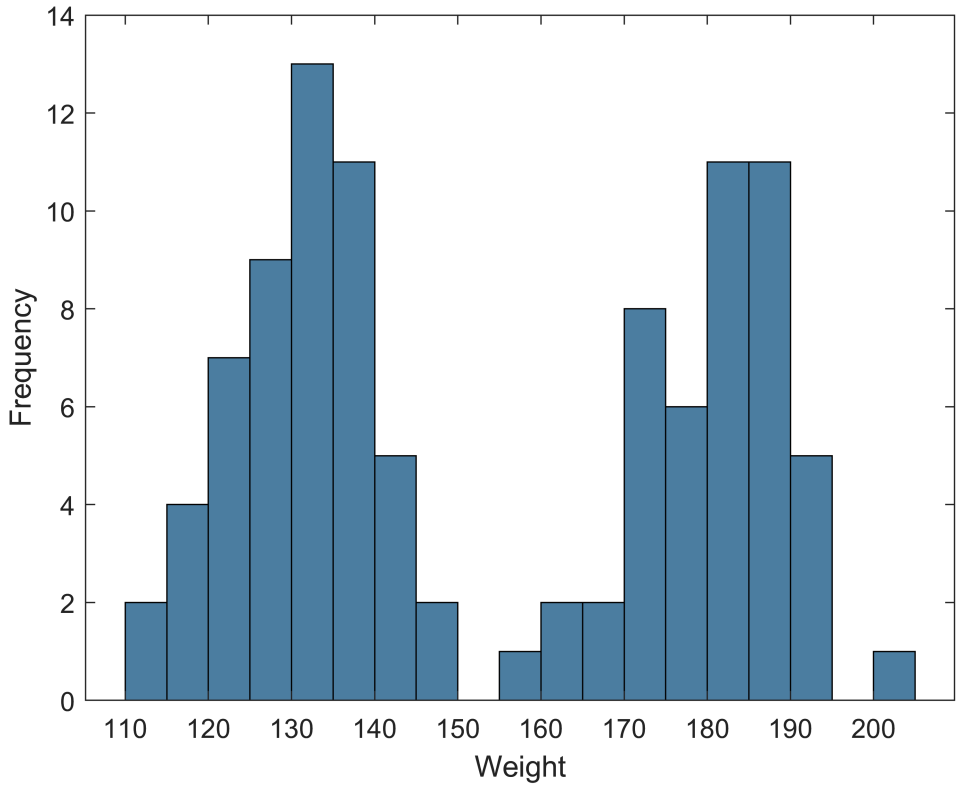
Now, let's see the histogram

```
h1=histogram(weightsAll,'BinWidth',5)
```

```
h1 =
  Histogram with properties:

            Data: [100×1 double]
          Values: [2 4 7 9 13 11 5 2 0 1 2 2 8 6 11 11 5 0 1]
         NumBins: 19
        BinEdges: [110 115 120 125 130 135 140 145 150 155 160 165 170 175 180 185 190 195 200 205]
        BinWidth: 5
```

```
        BinLimits: [110 205]
    Normalization: 'count'
        FaceColor: 'auto'
        EdgeColor: [0 0 0]

  Show all properties
```

```
xlabel('Weight')
ylabel('Frequency')
```




Clearly we have two group of data.

We can assume that gender makes difference in the data.

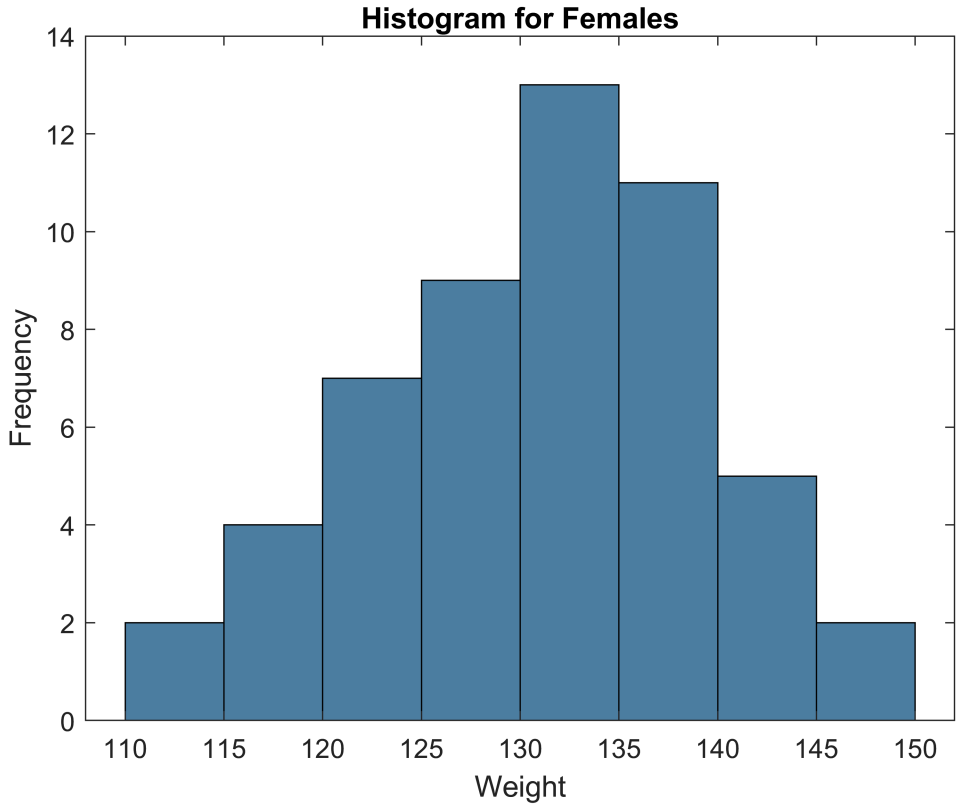
So split this data by gender. Then plot the histograms for each gender.

```
weightsFemale=hospital.Weight(hospital.Sex=='Female');
h2=histogram(weightsFemale,'BinWidth',5)
```

```
h2 =
  Histogram with properties:

            Data: [53×1 double]
          Values: [2 4 7 9 13 11 5 2]
         NumBins: 8
        BinEdges: [110 115 120 125 130 135 140 145 150]
        BinWidth: 5
       BinLimits: [110 150]
    Normalization: 'count'
        FaceColor: 'auto'
        EdgeColor: [0 0 0]
```

Show all properties

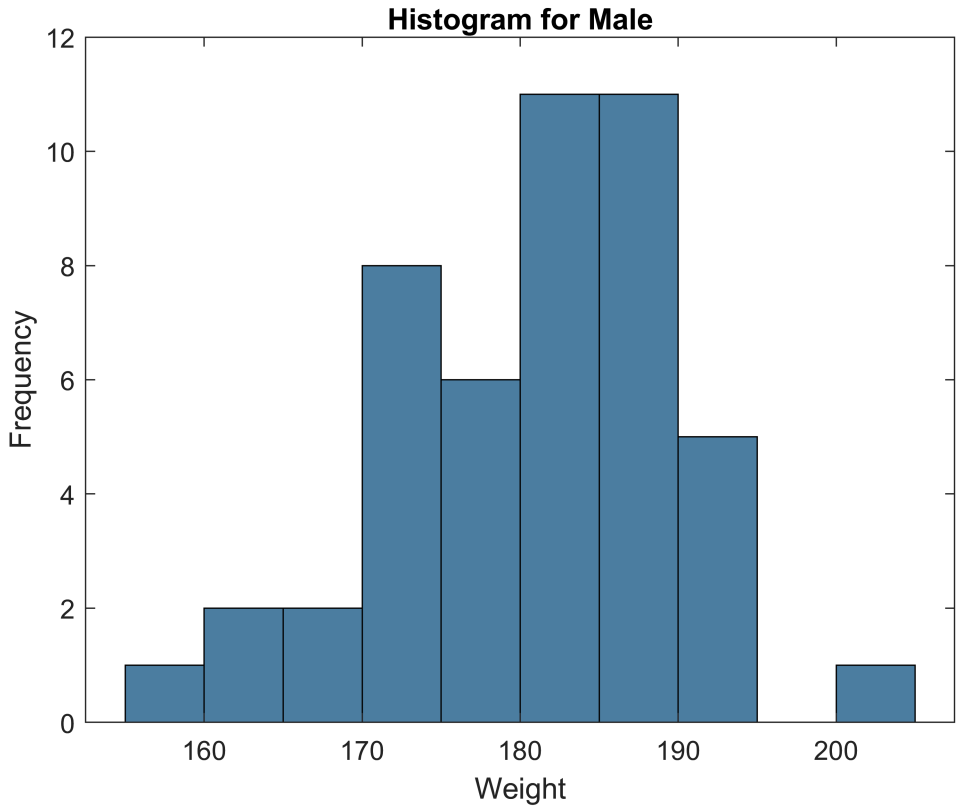
```
xlabel('Weight')
ylabel('Frequency')
title('Histogram for Females')
```




```
weightsMale=hospital.Weight(hospital.Sex=='Male');
h3=histogram(weightsMale,'BinWidth',5)
```

```
h3 =
  Histogram with properties:

            Data: [47×1 double]
          Values: [1 2 2 8 6 11 11 5 0 1]
         NumBins: 10
        BinEdges: [155 160 165 170 175 180 185 190 195 200 205]
        BinWidth: 5
       BinLimits: [155 205]
   Normalization: 'count'
       FaceColor: 'auto'
       EdgeColor: [0 0 0]

  Show all properties
```

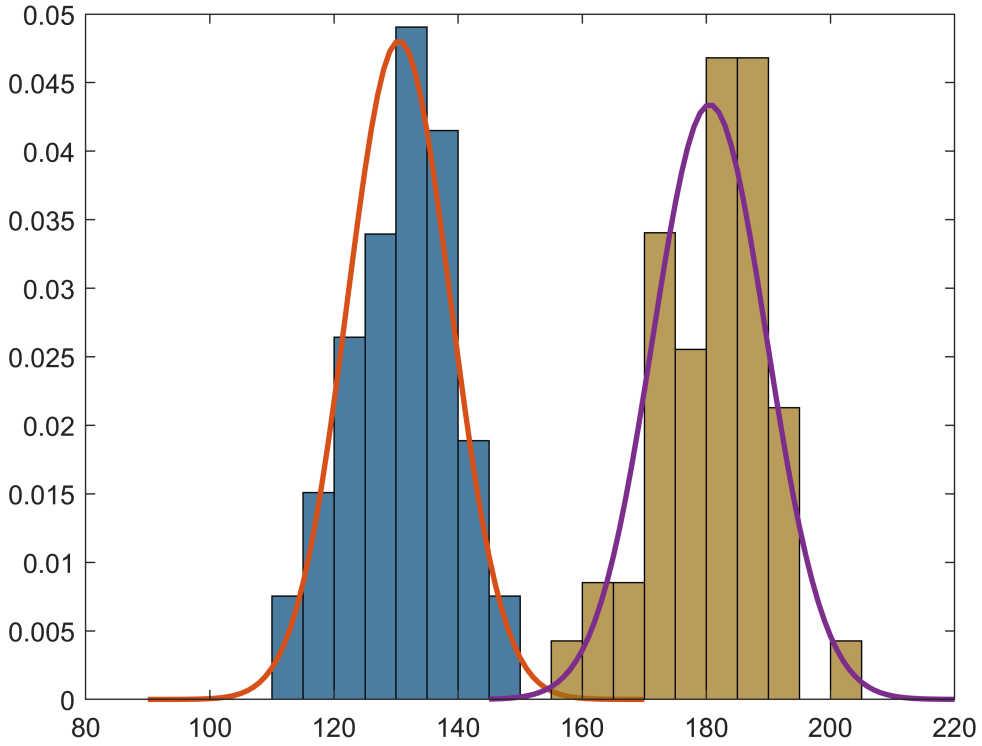
```
xlabel('Weight')
ylabel('Frequency')
title('Histogram for Male')
```




Now calculate standard deviation, mean and pdf.

Then, plot histogram (Normalization->pdf) and pdf

```
stdWeightFemale=std(weightsFemale);
meanWeightFemale=mean(weightsFemale);

stdWeightMale=std(weightsMale);
meanWeightMale=mean(weightsMale);

x1 = 90:1:170;
f1 = exp(-(x1-meanWeightFemale).^2./(2*stdWeightFemale^2))./(stdWeightFemale*sqrt(2*pi));

x2 = 145:1:220;
f2 = exp(-(x2-meanWeightMale).^2./(2*stdWeightMale^2))./(stdWeightMale*sqrt(2*pi));

histogram(weightsFemale,'Normalization',"pdf","BinWidth",5)
hold on
plot(x1,f1,'LineWidth',2)

histogram(weightsMale,'Normalization',"pdf","BinWidth",5)
plot(x2,f2,'LineWidth',2)
hold off
```




Alternatively, instead of using a long formula for calculating f (pdf),

we can use matlab's functions **makedist** and **pdf**

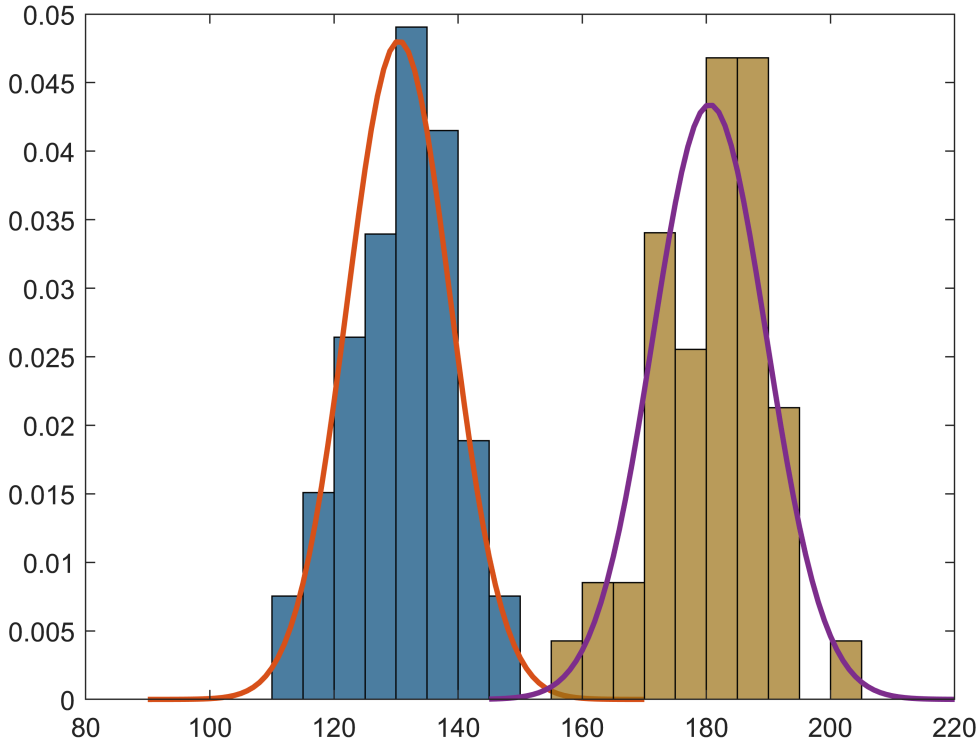
```
pd1 = makedist('Normal','mu',meanWeightFemale,'sigma',stdWeightFemale);
F1 = pdf(pd1,x1)
```

```
F1 = 1×81
    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000 ···
```

```
pd2 = makedist('Normal','mu',meanWeightMale,'sigma',stdWeightMale);
F2 = pdf(pd2,x2)
```

```
F2 = 1×76
    0.0000    0.0000    0.0001    0.0001    0.0001    0.0002    0.0002    0.0004 ···
```

```
histogram(weightsFemale,'Normalization',"pdf","BinWidth",5)
hold on
plot(x1,F1,'LineWidth',2)

histogram(weightsMale,'Normalization',"pdf","BinWidth",5)
plot(x2,F2,'LineWidth',2)
hold off
```


0.05
0.045
0.04
0.035
0.03
0.025
0.02
0.015
0.01
0.005
0
80
100
120
140
160
180
200
220