```
Clear["Global`*"]
```

1 - 10 Data representations

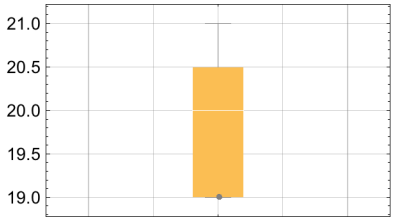
Represent the data by a stem-and-leaf plot, a histogram, and a boxplot:

1. Length of nails [mm] 19, 21, 19, 20, 19, 20, 21, 20

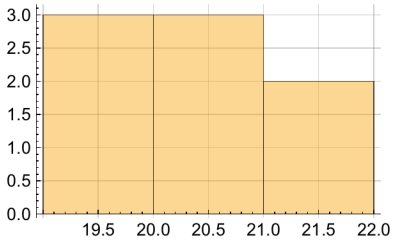
```
ln = {19, 21, 19, 20, 19, 20, 21, 20}
```

```
{19, 21, 19, 20, 19, 20, 21, 20}
```

```
bwc = BoxWhiskerChart[{ln}, FrameLabel → Automatic,
  GridLines → Automatic, ImageSize → 200]
```




```
his = Histogram[{ln}, FrameLabel → Automatic,
  GridLines → Automatic, ImageSize → 200]
```




```
Needs["StatisticalPlots`"]
```

```
StemLeafPlot[ln]
```

Stem	Leaves
1	999
2	00011

```
Stem units: 10
```

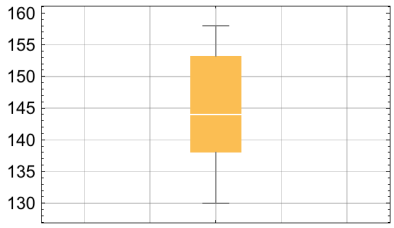
3. Systolic blood pressure of 15 female patients of ages 20-22

156, 158, 154, 133, 141, 130, 144, 137, 151, 146, 156, 138, 138, 149, 139

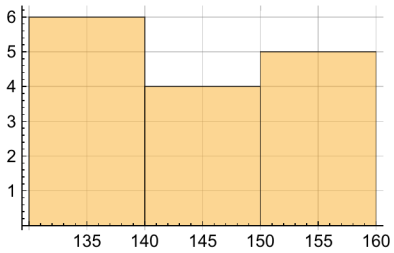
```
sbp = {156, 158, 154, 133, 141, 130,
  144, 137, 151, 146, 156, 138, 138, 149, 139}
```

```
{156, 158, 154, 133, 141, 130, 144, 137, 151, 146, 156, 138, 138, 149, 139}
```

```
bwc = BoxWhiskerChart[{sbp}, FrameLabel → Automatic,
  GridLines → Automatic, ImageSize → 200]
```




```
his = Histogram[{sbp}, FrameLabel → Automatic,
  GridLines → Automatic, ImageSize → 200]
```




```
StemLeafPlot[sbp]
```

Stem	Leaves
1	334444445555666

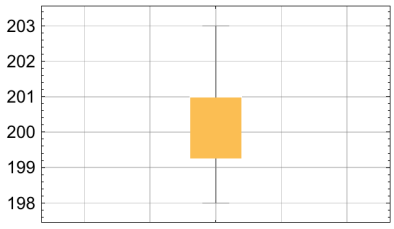
Stem units: 100

5. Weight of filled bags [g] in an automatic filling
203, 199, 198, 201, 200, 201, 201

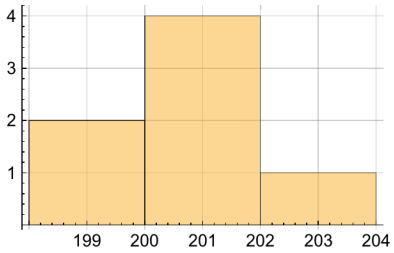
```
wb = {203, 199, 198, 201, 200, 201, 201}
```

```
{203, 199, 198, 201, 200, 201, 201}
```

```
bwc = BoxWhiskerChart[{wb}, FrameLabel → Automatic,
  GridLines → Automatic, ImageSize → 200]
```



```
his = Histogram[{wb}, FrameLabel → Automatic,
  GridLines → Automatic, ImageSize → 200]
```




```
StemLeafPlot[wb]
```

Stem	Leaves
2	0000000

```
Stem units: 100
```

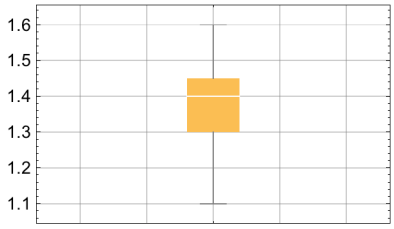
7. Release time [sec] of a relay

1.3, 1.2, 1.4, 1.5, 1.3, 1.3, 1.4, 1.1, 1.5, 1.4, 1.6, 1.3, 1.5, 1.1, 1.4, 1.2, 1.3, 1.5, 1.4, 1.4

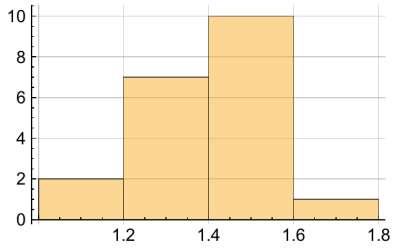
```
rt = {1.3, 1.2, 1.4, 1.5, 1.3, 1.3, 1.4, 1.1, 1.5,
  1.4, 1.6, 1.3, 1.5, 1.1, 1.4, 1.2, 1.3, 1.5, 1.4, 1.4}
```

```
{1.3, 1.2, 1.4, 1.5, 1.3, 1.3, 1.4, 1.1, 1.5,
 1.4, 1.6, 1.3, 1.5, 1.1, 1.4, 1.2, 1.3, 1.5, 1.4, 1.4}
```

```
bwc = BoxWhiskerChart[{rt}, FrameLabel → Automatic,
  GridLines → Automatic, ImageSize → 200]
```




```
his = Histogram[{rt}, FrameLabel → Automatic,
  GridLines → Automatic, ImageSize → 200]
```



```
StemLeafPlot[rt]
```

Stem	Leaves
1	11223333444444555 6

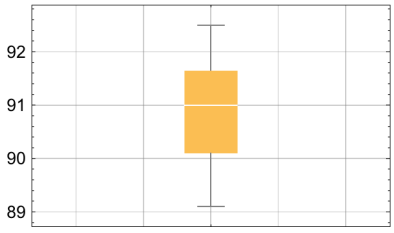
Stem units: 1

9. Efficiency [%] of seven Voith Francis turbines of runner diameter 2.3 m under a head range of 185 m
91.8, 89.1, 89.9, 92.5, 90.7, 91.2, 91.0

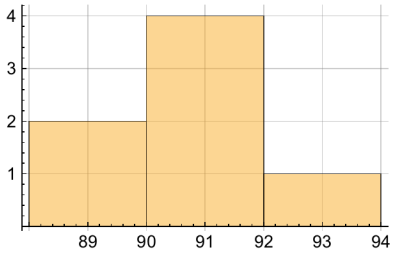
```
eff = {91.8, 89.1, 89.9, 92.5, 90.7, 91.2, 91.0}
```

```
{91.8, 89.1, 89.9, 92.5, 90.7, 91.2, 91.}
```

```
bwc = BoxWhiskerChart[{eff}, FrameLabel → Automatic,
  GridLines → Automatic, ImageSize → 200]
```




```
his = Histogram[{eff}, FrameLabel → Automatic,
  GridLines → Automatic, ImageSize → 200]
```




```
StemLeafPlot[eff]
```

Stem	Leaves
8	9
9	011122

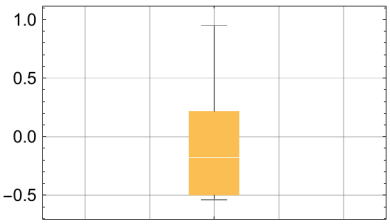
Stem units: 10

10. -0.51, 0.12, -0.47, 0.95, 0.25, -0.18, -0.54

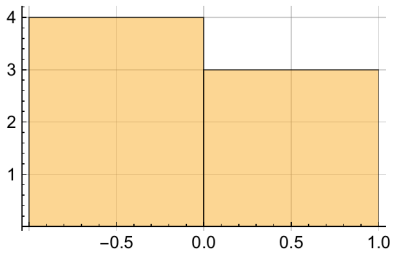
```
nn = {-0.51, 0.12, -0.47, 0.95, 0.25, -0.18, -0.54}
```

```
{-0.51, 0.12, -0.47, 0.95, 0.25, -0.18, -0.54}
```

```
bwc = BoxWhiskerChart[{nn}, FrameLabel → Automatic,
   GridLines → Automatic, ImageSize → 200]
```




```
his = Histogram[{nn}, FrameLabel → Automatic,
   GridLines → Automatic, ImageSize → 200]
```




```
StemLeafPlot[nn]
```

Stem	Leaves
-5	41
-4	7
-1	8
1	2
2	5
9	5

Stem units: $\frac{1}{10}$

11 - 16 Average and spread

Find the mean and compare it with the median. Find the standard deviation and compare it with the interquartile range.

11. For the data in problem 1.

```
Grid[N[{{"Mean", "Median", "Standard Deviation", "Interquartile Range"},
    {Mean[ln], Median[ln], StandardDeviation[ln],
     InterquartileRange[ln]}}], Frame → All]
```

Mean	Median	Standard Deviation	Interquartile Range
19.875	20.	0.834523	1.5

13. For the medical data in problem 3.

```
Grid[N[{{"Mean", "Median", "Standard Deviation", "Interquartile Range"},
    {Mean[sbp], Median[sbp], StandardDeviation[sbp],
     InterquartileRange[sbp]}}], Frame → All]
```

Mean	Median	Standard Deviation	Interquartile Range
144.667	144.	8.97351	15.25

15. For the release times in problem 7.

```
Grid[N[{{"Mean", "Median", "Standard Deviation", "Interquartile Range"},
    {Mean[rt], Median[rt], StandardDeviation[rt],
     InterquartileRange[rt]}}], Frame → All]
```

Mean	Median	Standard Deviation	Interquartile Range
1.355	1.4	0.135627	0.15

17. Outlier, reduced data. Calculate s for the data 4, 1, 3, 10, 2. Then reduce the data by deleting the outlier and calculate s. Comment.

```
Grid[N[{{"Standard Deviation", "Stand Dev w/o Outlier"},
    {StandardDeviation[{4, 1, 3, 10, 2}],
     StandardDeviation[{4, 1, 3, 2}]}}], Frame → All]
```

Standard Deviation	Stand Dev w/o Outlier
3.53553	1.29099