

# HW4

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(a)

In the `fat` dataset there are 252 observations and 18 variables.

## Appendix

(a)

```
## Warning: package 'faraway' was built under R version 4.3.3
```

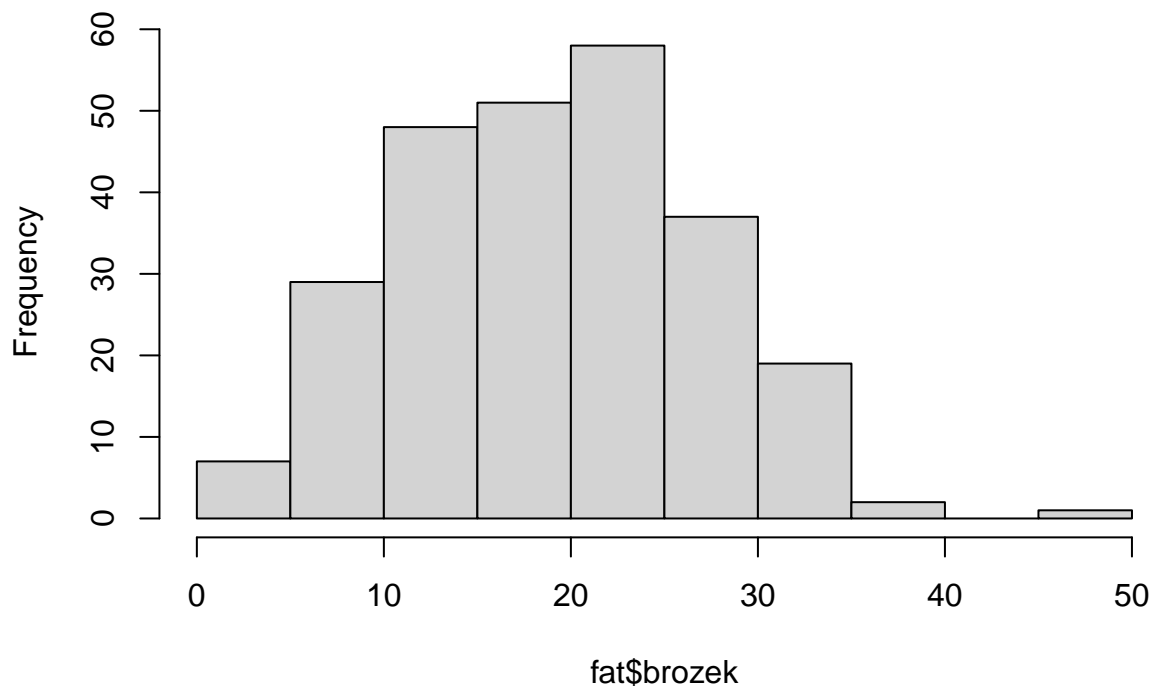
```
##   brozek siri density age weight height adipos free neck chest abdom hip
## 1   12.6 12.3  1.0708  23 154.25  67.75   23.7 134.9 36.2  93.1  85.2  94.5
## 2    6.9  6.1  1.0853  22 173.25  72.25   23.4 161.3 38.5  93.6  83.0  98.7
## 3   24.6 25.3  1.0414  22 154.00  66.25   24.7 116.0 34.0  95.8  87.9  99.2
## 4   10.9 10.4  1.0751  26 184.75  72.25   24.9 164.7 37.4 101.8  86.4 101.2
## 5   27.8 28.7  1.0340  24 184.25  71.25   25.6 133.1 34.4  97.3 100.0 101.9
## 6   20.6 20.9  1.0502  24 210.25  74.75   26.5 167.0 39.0 104.5  94.4 107.8
##   thigh knee ankle biceps forearm wrist
## 1   59.0 37.3  21.9   32.0   27.4  17.1
## 2   58.7 37.3  23.4   30.5   28.9  18.2
## 3   59.6 38.9  24.0   28.8   25.2  16.6
## 4   60.1 37.3  22.8   32.4   29.4  18.2
## 5   63.2 42.2  24.0   32.2   27.7  17.7
## 6   66.0 42.0  25.6   35.7   30.6  18.8
```

```
## [1] 252  18
```

```
##           brozek           siri           density           age
## Min.      : 0.00   Min.      : 0.00   Min.      :0.995   Min.      :22.00
## 1st Qu.:12.80   1st Qu.:12.47   1st Qu.:1.041   1st Qu.:35.75
## Median :19.00   Median :19.20   Median :1.055   Median :43.00
## Mean      :18.94   Mean      :19.15   Mean      :1.056   Mean      :44.88
## 3rd Qu.:24.60   3rd Qu.:25.30   3rd Qu.:1.070   3rd Qu.:54.00
## Max.      :45.10   Max.      :47.50   Max.      :1.109   Max.      :81.00
##           weight           height           adipos           free
## Min.      :118.5   Min.      :29.50   Min.      :18.10   Min.      :105.9
## 1st Qu.:159.0   1st Qu.:68.25   1st Qu.:23.10   1st Qu.:131.3
## Median :176.5   Median :70.00   Median :25.05   Median :141.6
## Mean      :178.9   Mean      :70.15   Mean      :25.44   Mean      :143.7
## 3rd Qu.:197.0   3rd Qu.:72.25   3rd Qu.:27.32   3rd Qu.:153.9
```

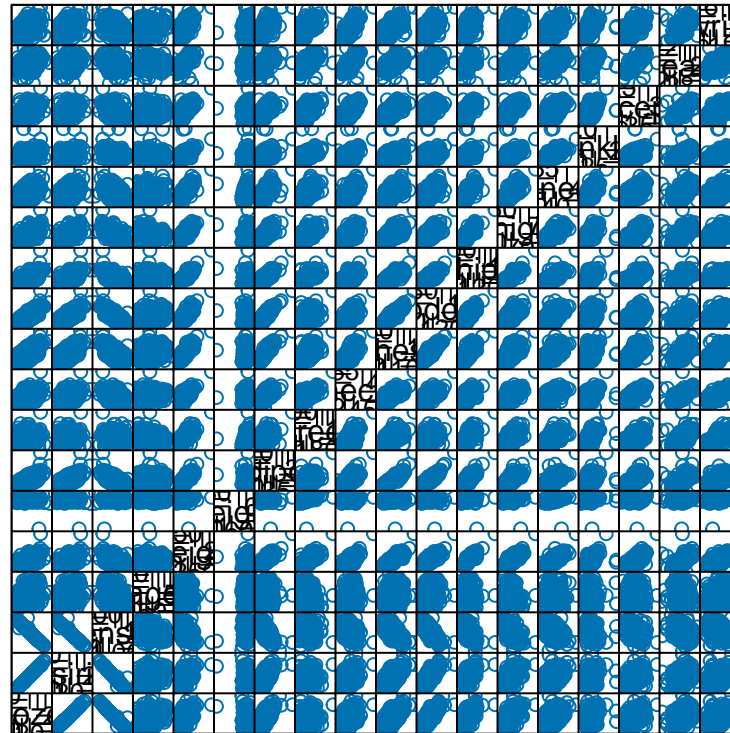
```
## Max. :363.1 Max. :77.75 Max. :48.90 Max. :240.5
## neck chest abdom hip
## Min. :31.10 Min. : 79.30 Min. : 69.40 Min. : 85.0
## 1st Qu.:36.40 1st Qu.: 94.35 1st Qu.: 84.58 1st Qu.: 95.5
## Median :38.00 Median : 99.65 Median : 90.95 Median : 99.3
## Mean :37.99 Mean :100.82 Mean : 92.56 Mean : 99.9
## 3rd Qu.:39.42 3rd Qu.:105.38 3rd Qu.: 99.33 3rd Qu.:103.5
## Max. :51.20 Max. :136.20 Max. :148.10 Max. :147.7
## thigh knee ankle biceps forearm
## Min. :47.20 Min. :33.00 Min. :19.1 Min. :24.80 Min. :21.00
## 1st Qu.:56.00 1st Qu.:36.98 1st Qu.:22.0 1st Qu.:30.20 1st Qu.:27.30
## Median :59.00 Median :38.50 Median :22.8 Median :32.05 Median :28.70
## Mean :59.41 Mean :38.59 Mean :23.1 Mean :32.27 Mean :28.66
## 3rd Qu.:62.35 3rd Qu.:39.92 3rd Qu.:24.0 3rd Qu.:34.33 3rd Qu.:30.00
## Max. :87.30 Max. :49.10 Max. :33.9 Max. :45.00 Max. :34.90
## wrist
## Min. :15.80
## 1st Qu.:17.60
## Median :18.30
## Mean :18.23
## 3rd Qu.:18.80
## Max. :21.40
```

**Histogram of fat\$brozek**



```
##
## Attaching package: 'lattice'
```

```
## The following object is masked from 'package:faraway':
##
##      melanoma
```



Scatter Plot Matrix

```
##      brozek  siri density  age weight height adipos  free  neck chest abdom
## brozek    1.00  1.00   -0.99  0.29  0.61  -0.09  0.73  0.02  0.49  0.70  0.81
## siri      1.00  1.00   -0.99  0.29  0.61  -0.09  0.73  0.02  0.49  0.70  0.81
## density  -0.99 -0.99    1.00 -0.28 -0.59  0.10  -0.71 -0.01 -0.47 -0.68 -0.80
## age       0.29  0.29   -0.28  1.00 -0.01 -0.17  0.12 -0.24  0.11  0.18  0.23
## weight    0.61  0.61   -0.59 -0.01  1.00  0.31  0.89  0.79  0.83  0.89  0.89
## height   -0.09 -0.09    0.10 -0.17  0.31  1.00  -0.02  0.49  0.25  0.13  0.09
## adipos    0.73  0.73   -0.71  0.12  0.89  -0.02  1.00  0.55  0.78  0.91  0.92
## free      0.02  0.02   -0.01 -0.24  0.79  0.49  0.55  1.00  0.68  0.59  0.50
## neck      0.49  0.49   -0.47  0.11  0.83  0.25  0.78  0.68  1.00  0.78  0.75
## chest     0.70  0.70   -0.68  0.18  0.89  0.13  0.91  0.59  0.78  1.00  0.92
## abdom     0.81  0.81   -0.80  0.23  0.89  0.09  0.92  0.50  0.75  0.92  1.00
## hip       0.63  0.63   -0.61 -0.05  0.94  0.17  0.88  0.70  0.73  0.83  0.87
## thigh     0.56  0.56   -0.55 -0.20  0.87  0.15  0.81  0.68  0.70  0.73  0.77
## knee      0.51  0.51   -0.50  0.02  0.85  0.29  0.71  0.70  0.67  0.72  0.74
## ankle     0.27  0.27   -0.26 -0.11  0.61  0.26  0.50  0.58  0.48  0.48  0.45
## biceps    0.49  0.49   -0.49 -0.04  0.80  0.21  0.75  0.65  0.73  0.73  0.68
## forearm   0.36  0.36   -0.35 -0.09  0.63  0.23  0.56  0.55  0.62  0.58  0.50
## wrist     0.35  0.35   -0.33  0.21  0.73  0.32  0.63  0.67  0.74  0.66  0.62
##      hip thigh  knee ankle biceps forearm wrist
## brozek  0.63  0.56  0.51  0.27  0.49  0.36  0.35
## siri    0.63  0.56  0.51  0.27  0.49  0.36  0.35
```

## density	-0.61	-0.55	-0.50	-0.26	-0.49	-0.35	-0.33
## age	-0.05	-0.20	0.02	-0.11	-0.04	-0.09	0.21
## weight	0.94	0.87	0.85	0.61	0.80	0.63	0.73
## height	0.17	0.15	0.29	0.26	0.21	0.23	0.32
## adipos	0.88	0.81	0.71	0.50	0.75	0.56	0.63
## free	0.70	0.68	0.70	0.58	0.65	0.55	0.67
## neck	0.73	0.70	0.67	0.48	0.73	0.62	0.74
## chest	0.83	0.73	0.72	0.48	0.73	0.58	0.66
## abdom	0.87	0.77	0.74	0.45	0.68	0.50	0.62
## hip	1.00	0.90	0.82	0.56	0.74	0.55	0.63
## thigh	0.90	1.00	0.80	0.54	0.76	0.57	0.56
## knee	0.82	0.80	1.00	0.61	0.68	0.56	0.66
## ankle	0.56	0.54	0.61	1.00	0.48	0.42	0.57
## biceps	0.74	0.76	0.68	0.48	1.00	0.68	0.63
## forearm	0.55	0.57	0.56	0.42	0.68	1.00	0.59
## wrist	0.63	0.56	0.66	0.57	0.63	0.59	1.00