

```
setwd("E:/ds_dataset")
data=read.csv(file="protein.csv")
```

data

	Country	RedMeat	WhiteMeat	Eggs	Milk	Fish	Cereals	Starch	Nuts
1	Albania	10.1	1.4	0.5	8.9	0.2	42.3	0.6	5.5
2	Austria	8.9	14.0	4.3	19.9	2.1	28.0	3.6	1.3
3	Belgium	13.5	9.3	4.1	17.5	4.5	26.6	5.7	2.1
4	Bulgaria	7.8	6.0	1.6	8.3	1.2	56.7	1.1	3.7
5	Czechoslovakia	9.7	11.4	2.8	12.5	2.0	34.3	5.0	1.1
6	Denmark	10.6	10.8	3.7	25.0	9.9	21.9	4.8	0.7
7	E Germany	8.4	11.6	3.7	11.1	5.4	24.6	6.5	0.8
8	Finland	9.5	4.9	2.7	33.7	5.8	26.3	5.1	1.0
9	France	18.0	9.9	3.3	19.5	5.7	28.1	4.8	2.4
10	Greece	10.2	3.0	2.8	17.6	5.9	41.7	2.2	7.8
11	Hungary	5.3	12.4	2.9	9.7	0.3	40.1	4.0	5.4
12	Ireland	13.9	10.0	4.7	25.8	2.2	24.0	6.2	1.6
13	Italy	9.0	5.1	2.9	13.7	3.4	36.8	2.1	4.3
14	Netherlands	9.5	13.6	3.6	23.4	2.5	22.4	4.2	1.8
15	Norway	9.4	4.7	2.7	23.3	9.7	23.0	4.6	1.6
16	Poland	6.9	10.2	2.7	19.3	3.0	36.1	5.9	2.0
17	Portugal	6.2	3.7	1.1	4.9	14.2	27.0	5.9	4.7
18	Romania	6.2	6.3	1.5	11.1	1.0	49.6	3.1	5.3
19	Spain	7.1	3.4	3.1	8.6	7.0	29.2	5.7	5.9
20	Sweden	9.9	7.8	3.5	24.7	7.5	19.5	3.7	1.4
21	Switzerland	13.1	10.1	3.1	23.8	2.3	25.6	2.8	2.4
22	UK	17.4	5.7	4.7	20.6	4.3	24.3	4.7	3.4

	Country	RedMeat	WhiteMeat	Eggs	Milk	Fish	Cereals	Starch	Nuts	Fr
1	Albania	10.1	1.4	0.5	8.9	0.2	42.3	0.6	5.5	
2	Austria	8.9	14.0	4.3	19.9	2.1	28.0	3.6	1.3	
3	Belgium	13.5	9.3	4.1	17.5	4.5	26.6	5.7	2.1	
4	Bulgaria	7.8	6.0	1.6	8.3	1.2	56.7	1.1	3.7	
5	Czechoslovakia	9.7	11.4	2.8	12.5	2.0	34.3	5.0	1.1	
6	Denmark	10.6	10.8	3.7	25.0	9.9	21.9	4.8	0.7	

Data

data	25 obs. of 10 variables
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```
data=read.table(file="protein.csv",header=TRUE,sep=";",row.names=1)
```

View(data)

	RedMeat	WhiteMeat	Eggs	Milk	Fish	Cereals	Starch	Nuts	Fr.Veg
Albania	10.1	1.4	0.5	8.9	0.2	42.3	0.6	5.5	1
Austria	8.9	14.0	4.3	19.9	2.1	28.0	3.6	1.3	4
Belgium	13.5	9.3	4.1	17.5	4.5	26.6	5.7	2.1	4
Bulgaria	7.8	6.0	1.6	8.3	1.2	56.7	1.1	3.7	4
Czechoslovakia	9.7	11.4	2.8	12.5	2.0	34.3	5.0	1.1	4
Denmark	10.6	10.8	3.7	25.0	9.9	21.9	4.8	0.7	2

data	25 obs. of 9 variables
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```
colSums(is.na(data))
```

```

RedMeat whiteMeat      Eggs      Milk      Fish  Cereals  Starch
      0           0           0           0           0           0
Nuts      Fr.Veg
      0           0

```

```
scaled_data=scale(data)
```

```
view(scaled_data)
```

scaled_data	num [1:25, 1:9] 0.0813 -0.2773 1.0971 -0.6059 -0.0382 ...
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	RedMeat	WhiteMeat	Eggs	Milk	Fish	Cereals	Starch	Nuts
Albania	0.08126490	-1.75848885	-2.17963852	-1.15573814	-1.200282130	0.9159176	-2.24957717	1.222
Austria	-0.27725673	1.65237315	1.22045441	0.39237676	-0.641874675	-0.3870690	-0.41368721	-0.892
Belgium	1.09707621	0.38006748	1.04150215	0.05460623	0.063482111	-0.5146342	0.87143577	-0.489
Bulgaria	-0.60590157	-0.51325352	-1.19540109	-1.24018077	-0.906383469	2.2280161	-1.94359551	0.316
Czechoslovakia	-0.03824231	0.94854448	-0.12168754	-0.64908235	-0.671264541	0.1869740	0.44306145	-0.993
Denmark	0.23064892	0.78612248	0.68359763	1.11013912	1.650534878	-0.9428885	0.32066878	-1.194

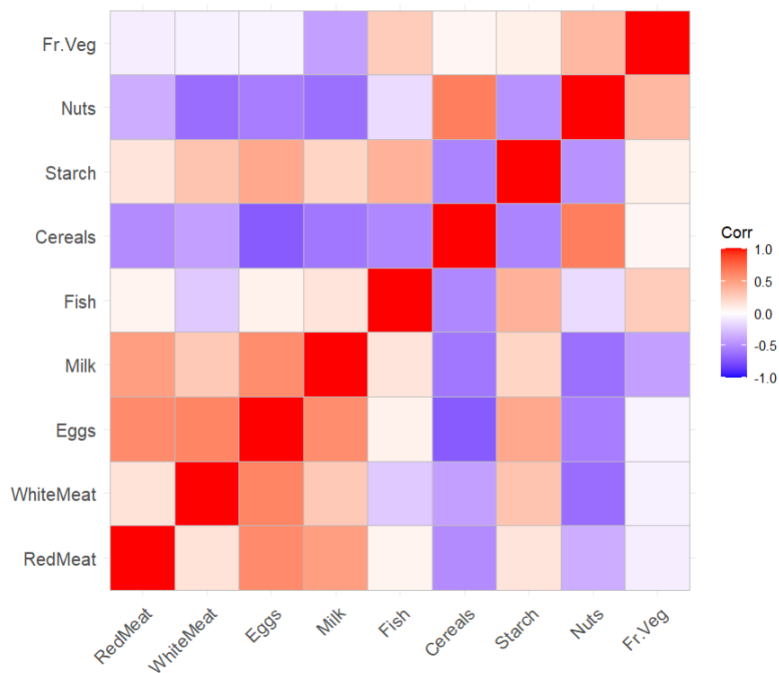
```
library(factoextra)
```

```
library(FactoMineR)
```

```
library(ggcorrplot)
```

```
cor_mat=cor(scaled_data)
```

```
ggcorrplot(cor_mat)
```



```
data.pca=princomp(cor_mat)
```

```
summary(data.pca)
```

Importance of components:

	Comp.1	Comp.2	Comp.3	Comp.4	Comp.5
Standard deviation	1.2785390	0.5187769	0.37155811	0.2854996	0.15175548
Proportion of Variance	0.7550709	0.1243143	0.06376953	0.0376505	0.01063772
Cumulative Proportion	0.7550709	0.8793852	0.94315474	0.9808052	0.99144296

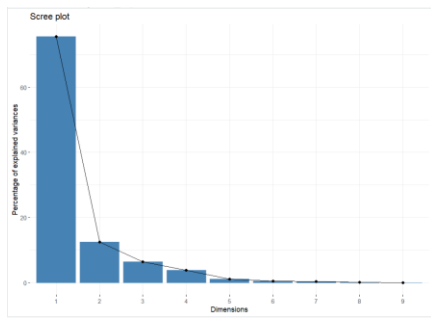
	Comp.6	Comp.7	Comp.8	Comp.9
Standard deviation	0.100089157	0.084613737	0.0367140593	7.958511e-09
Proportion of Variance	0.004627366	0.003307056	0.0006226222	2.925657e-17
Cumulative Proportion	0.996070322	0.999377378	1.0000000000	1.000000e+00

```
data.pca$loadings[,1:2]
```

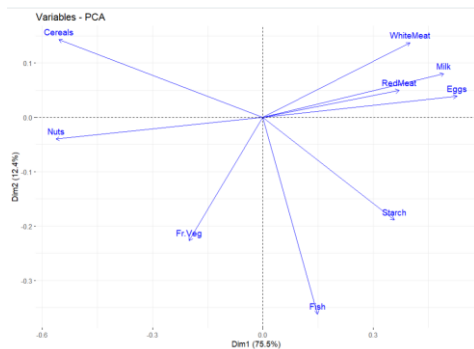
	Comp.1	Comp.2
RedMeat	0.2902937	0.09510150
WhiteMeat	0.3131864	0.26392299
Eggs	0.4131713	0.07419838
Milk	0.3852342	0.15393922
Fish	0.1165053	-0.69780771
Cereals	-0.4342505	0.27531862
Starch	0.2796041	-0.36379635
Nuts	-0.4400339	-0.07686551
Fr.Veg	-0.1567571	-0.43715631

```
library("factoextra")
```

```
fviz_eig(data.pca,addLabels="TRUE")
```



```
fviz_pca_var(data.pca,col.var="blue")
```



```
fviz_cos2(data.pca,choice="var",axes=1:2)
```

