

Saving data

Ada beberapa tipe data, ketika kita akan menyimpan data

- File workspace dengan ekstensi **.Rdata**
- File Comma separated value (CSV) dengan ekstensi **.csv**
- File script dengan ekstensi **.R**
- Untuk membersihkan layar (console) tekan Ctrl+L
- Objek dapat dipindah/ dihilangkan dengan fungsi **rm**

```
> x<-6
> y<--4
> z<-x+y
> rm(x,y)
> x
Error: object 'x' not found
```

- Fungsi `c` juga dapat ditulis untuk menggabungkan elemen dari dua objek,

```
> z<-c(5,9,1,0)
> x<-c(5,9)
> y<-c(1,0)
> z<-c(x,y)
> z
[1] 5 9 1 0
```

- Fungsi **seq** untuk membentuk barisan,

```
> x
[1] 1 2 3 4 5 6 7 8 9 10

> seq(1,9,by=2)
[1] 1 3 5 7 9

> seq(8,20,length=6)
[1] 8.0 10.4 12.8 15.2 17.6 20.0
```

- Fungsi **rep** untuk replikasi

[illegible]

Membuat Matrik

- Contoh sederhana membuat matrik sederhana dengan *command* cbind atau rbind

```
> x<-c(5,7,9)
> y<-c(6,3,4)
> z<-cbind(x,y)
> z
```

	x	y
[1,]	5	6
[2,]	7	3
[3,]	9	4

- *Command* Dimensi matrik adalah dengan dim

```
> dim(z)
[1] 3 2
```

- Contoh dengan rbind

```
> rbind(z,z)
      x y
[1,] 5 6
[2,] 7 3
[3,] 9 4
[4,] 5 6
[5,] 7 3
[6,] 9 4
```

- Matriks juga dapat dibangun dengan *command* matrix

```
> z<-matrix(c(5,7,9,6,3,4),nrow=3)
> z<-matrix(c(5,7,9,6,3,4),nr=3,byrow=T)
> z
```

	[,1]	[,2]
[1,]	5	7
[2,]	9	6
[3,]	3	4

```
> y<-matrix(c(1,3,0,9,5,-1),nrow=3,byrow=T)
> y
```

	[,1]	[,2]
[1,]	1	3
[2,]	0	9
[3,]	5	-1

```
> y+z
```

	[,1]	[,2]
[1,]	6	10
[2,]	9	15
[3,]	8	3

Modul 2

```
> y*z
      [,1] [,2]
[1,]    5   21
[2,]    0   54
[3,]   15  -4

> x<-matrix(c(3,4,-2,6),nrow=2,byrow=T)
> x
      [,1] [,2]
[1,]    3    4
[2,]   -2    6
```

- *Command* perkalian matrik dengan %**%

```
> y**%*%x
      [,1] [,2]
[1,]   -3   22
[2,]  -18   54
[3,]   17   14
```

- *Command* transpose matriks adalah t

```
> t(z)
      [,1] [,2] [,3]
[1,]    5    9    3
[2,]    7    6    4

> solve(x)
      [,1] [,2]
[1,] 0.23076923 -0.1538462
[2,] 0.07692308  0.1153846
```

Mencari Ukuran Pusat dengan R

- Ukuran pusat dapat ditentukan dengan mencari rata-rata, median atau modusnya. Dalam R dapat digunakan fungsi-fungsi berikut. Mencari trimmed point dengan fungsi trim

```
> x<-c(7.5, 8.2, 3.1, 5.6, 8.2, 9.3, 6.5, 7, 9.3, 1.2, 14.5, 6.2)
> mean(x)
[1] 7.216667
> var(x)
[1] 11.00879
> summary(x)
  Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
 1.200   6.050   7.250   7.217   8.475  14.500
> x[1:6]
[1] 7.5 8.2 3.1 5.6 8.2 9.3
> x[7:12]
[1] 6.5 7.0 9.3 1.2 14.5 6.2
> summary(x[1:6])
  Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
 3.100   6.075   7.850   6.983   8.200   9.300
> summary(x[7:12])
  Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
 1.200   6.275   6.750   7.450   8.725  14.500
> x[c(2,4,9)]
[1] 8.2 5.6 9.3
> x[-(1:6)]
[1] 6.5 7.0 9.3 1.2 14.5 6.2
> median(x)
[1] 7.25
> dataset<-c(x)
> dataset
[1] 7.5 8.2 3.1 5.6 8.2 9.3 6.5 7.0 9.3 1.2 14.5 6.2
> mean(x=dataset,trim=0.1)
[1] 7.09
> mean(x=dataset,trim=0.2)
[1] 7.3125
> mean(x=dataset,trim=0.5)
[1] 7.25
```

- Membuat tabel frekuensi dari suatu data dengan fungsi `table`

```
> table(dataset)
dataset
 1.2 3.1 5.6 6.2 6.5  7 7.5 8.2 9.3 14.5
  1  1  1  1  1  1  1  2  2  1
```

Mencari Ukuran Penyimpangan dengan R

- Menghitung nilai maksimal dan minimal dengan `max`, `min` atau jangkauan dengan `range`

```
> max(dataset)
[1] 14.5
> max(x)
[1] 14.5
> min(dataset)
[1] 1.2
> range(x)
[1] 1.2 14.5
> range(dataset)
[1] 1.2 14.5
```

- Menghitung kuartil dengan fungsi `quantile`

```
> quantile(x, probs=0.5)
50%
7.25
> quantile(x, probs=0.25)
25%
6.05
> quantile(x, probs=0.75)
75%
8.475

> quantile(x, probs=c(0.25, 0.5, 0.75))
      25%    50%    75%
6.050 7.250 8.475

> IQR(x)
[1] 2.425
```

- Menghitung variansi dan standar deviasi dengan fungsi `var` dan `sd`

```
> var(x)
[1] 11.00879

> sd(x)
[1] 3.317949

> mad(x)
[1] 2.00151
```

Contoh lain:

```
> x<-c(7.5,8.2,3.1,5.6,8.2,9.3,6.5,7.0,9.3,1.2,14.5,6.2)
```

Modul 2

```
> mean(x)
[1] 7.216667
> var(x)
[1] 11.00879
> summary(x)
   Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
  1.200  6.050   7.250   7.217   8.475  14.500

> x[1:6]

> x[7:12]

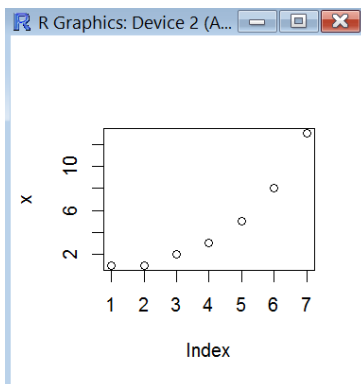
> summary(x[1:6])
   Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
  3.100  6.075   7.850   6.983   8.200   9.300
> summary(x[7:12])
   Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
  1.200  6.275   6.750   7.450   8.725  14.500

> x[c(2,4,9)]
[1] 8.2 5.6 9.3
```

Membuat Visualisasi Data

- Contoh membuat plot sederhana dengan fungsi `plot()`

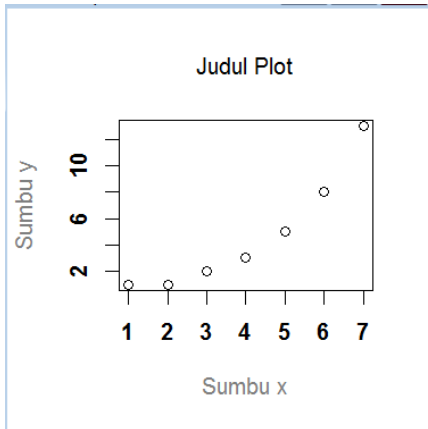
```
> x
[1] 1 1 2 3 5 8 13
> plot(x)
```



Modul 2

Menambahkan keterangan pada plot

```
> plot(x,  
+ main="Judul Plot",  
+ xlab="Sumbu x",  
+ ylab="Sumbu y",  
+ font.main=1, plain text for the title normal size for title  
+ cex.main=1,  
+ font.axis=2, bold text for numbering  
+ col.lab="gray50"  
+ )
```

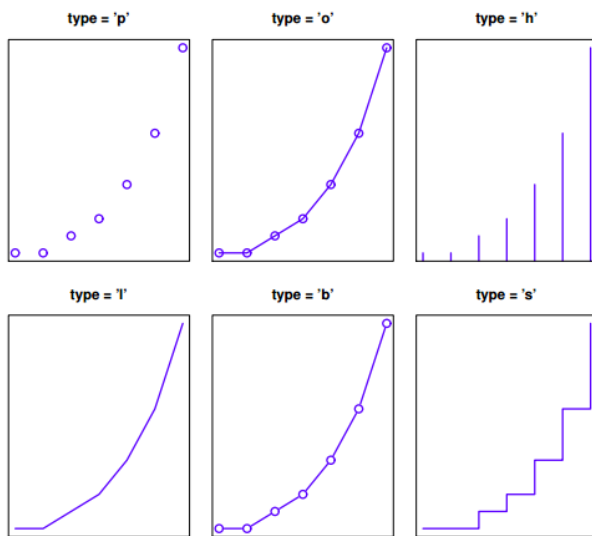


Merubah tipe plot

- `type = "p"`. Draw the **p**oints only.
- `type = "l"`. Draw a line through the points.
- `type = "o"`. Draw the line **o**ver the top of the points.
- `type = "b"`. Draw **b**oth points and lines, but don't overplot.
- `type = "h"`. Draw "histogram-like" vertical bars.
- `type = "s"`. Draw a staircase, going horizontally then vertically.
- `type = "S"`. Draw a Staircase, going vertically then horizontally.
- `type = "c"`. Draw only the connecting lines from the "b" version.
- `type = "n"`. Draw nothing. (Apparently this is useful sometimes?)

Modul 2

Contoh seperti gambar di bawah ini



Colour of the plot: `col`

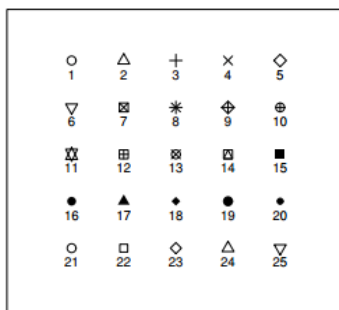
Character used to plot points: `pch`

Plot size: `cex`

Line type: `lty`

Line width: `lwd`

pch (i.e., plot character) values



lty (i.e., line type) values



Membuat Grafik

Misal ada 25 mhs yang menyukai olahraga 1) sepakbola, 2) bola voli, 3) basket, 4) lainnya (data dari Anom Yudistira) dengan data sebagai berikut: 3 4 1 1 3 4 3 3 1 3 2 1 2 1 2 3 2 3 1 1 1 1 4 3 1

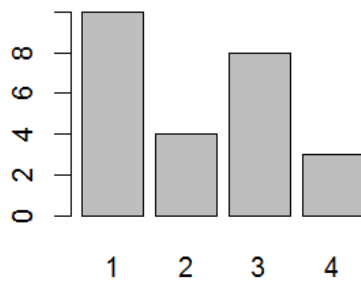
Masukan data dengan menggunakan fungsi `scan()`

```
> data<-scan()  
1: 3 4 1 1 3 4 3 3 1 3 2 1 2 1 2 3 2 3 1 1 1 1 4 3 1  
26:  
Read 25 items
```


Modul 2

- Diagram batang dengan `barplot()`

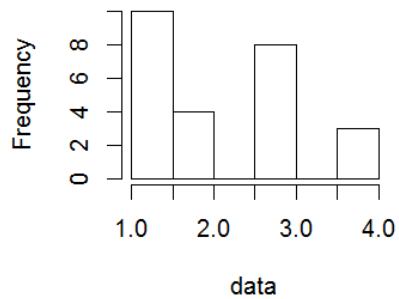
```
> barplot(table(data))
```



- Histogram dengan fungsi `hist()`

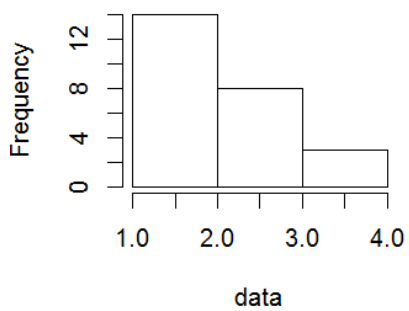
```
> hist(data)
```

Histogram of data



```
> hist(data,breaks=3)
```

Histogram of data



Modul 2

- Diagram batang daun dengan `stem()`

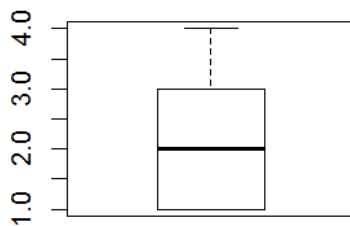
```
> stem(data)
```

```
The decimal point is at the |
```

```
1 | 0000000000
2 | 0000
3 | 00000000
4 | 000
```

- Membuat boxplot dengan fungsi `boxplot()`

```
> boxplot(data)
```

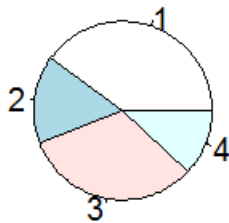


- Mendeteksi outlier

```
> outlier<-data>3
> which(outlier)
[1] 2 6 23
```

- Membuat diagram pie dengan `pie()`

```
> pie(table(data))
```



Referensi:

1. Learning statistics with R:
A tutorial for psychology students and other beginners
(e-Book), Daniel Navarro, University of Adelaide
2. Pengenalan Bahasa R untuk Analisis Data dan Grafik
I.G.A Anom Yudistira (Modul Pembelajaran)