Data structures in R

(STATS240.1: A short course in R)

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Vectors

The simplest data structure is the numeric vector

```
> x<-c(1,2,4,6)
> x*3
> x[2]
> length(x)
```

Naming vector elements

Elements of a vector can have names

```
> x<-1:4
> names(x)<-c("one","two","three","four")
> x
  one   two three  four
    1     2     3     4
>
```

Indexing vectors

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

> x<-1:4
> names(x)<-c("one","two","three","four")
> x
  one   two three  four
    1     2     3     4
> x["three"]
three
    3
```

Arrays and matrices

```
A<-array(c(1:15),c(3,5))
M<-matrix(c(1:10),nrow=2,ncol=5)
```

Indexing arrays and matrices

Requires index to row and column.

Can use logical operators.

```
> A[2,3]      # gives the element in row 2, column 3
> A[2,]       # gives all elements in row 2
> A[A<2]      # gives all elemnets that are less than 2
```

Names of rows and columns

Use the dimnames command to name elements of a vector

Lists

A **list** can contain objects of different types.

```
> places<-c("Washington","Reykjavik","Oslo")
> genders<-c("male","female")
> x<-list(places,genders)
> names(x)<-c("Capitals","Sex")
```

The list can be viewed like other objects:

```
> x
$Capitals
[1] "Washington" "Reykjavik"  "Oslo"

$Sex
[1] "male"   "female"
```

Data frames

A data fram is a matrix-like structure whose columns may be of differing types (it shares many of the properties of matrices and of lists).

There are number of ways to make a data frame:
data.frame(tag.1=value.1,...tag.n=value.n)
as.data.frame()
read.table()