## What is R and why does it have such a silly name?

### what the encyclopedia says

### descended from S, developed at Bell Labs (home of C)

### S was developed by John Chambers, described in several books

## R is an implementation of S

**so is S-Plus (a commercial product)**

**the two are very similar**

**we have a site license for S-plus and you could use it identically**

**I'll mention the few differences between R and S-plus as we come to them**

## Why (not) use R

**+very powerful computing environment for data analysis**

**+under active development by enthusiastic volunteers**

**+lots of specialised software packages available**

**+you can distribute your own code**

**+superb graphics capabilities**

**-hard to get started**

**-patchy documentation**

**-aimed at statisticians**

## Why (not) use S+

**+very powerful computing environment for data analysis**

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**+some help in getting started from menus**

**-you can distribute your own code but ithers need S+ to use it**

**-R packages will probably run but need to be ported**

# What are the characteristics of R

## command line interface similar to unix shell (C - like syntax)

- online help in man-page tradition

## programming environment designed for interactive use

## object oriented but function based

## high and low level graphics

# Installation of R

**http://www.r-project.org/**

**http://www.stats.bris.ac.uk/R/**

**\\schalkwykchip\infocourse\2004\rw2000.exe**

# Playing with R: basic arithmetic

**if you type in an expression R will evaluate and print-**

**5*2**

**5^2**

**100%%3**

**100%/%3**

**multiply and divide come before add and subtract**

# Functions

## functions are the main way of making something happen

## easy to define your own

## args may not be required but () are always required

- sum(1,2)
- q() # quit R
- q # print q function

## the basic arithmetic operators are convenience exceptions

## vectorise me!

**variable names start with a letter**

**assign values to variable names with <-**

**basic data structure is the vector**

```
a <- 1:100
b <- c(1,0) # c is a function that combines its arguments
```

**all of the basic functions work on vectors**

```
a + 0.5
a + a
```

## recycling

**operations on vectors of unequal length recycle the shorter one**

```
a <- 1:100

b <- c(1,0)

a + b # add 1 to odd numbered positions only
```

## indexing: index vectors

**a[50] # 50**

**a[-50] # everything but 50**

**a[100:1] # backwards**

**a[c(1:100,100:1)] # count down then up**

**a[1:10*10] # every tenth number**

## indexing: logical vectors

**b <- a%%2==1**

**a[b] # odd only**

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