

# Introduction to R Software

## Swayam Prabha

### Lecture 8

## R as Calculator, Built-in Functions and Assignments

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Slides can be downloaded from  
<http://home.iitk.ac.in/~shalab/sp>

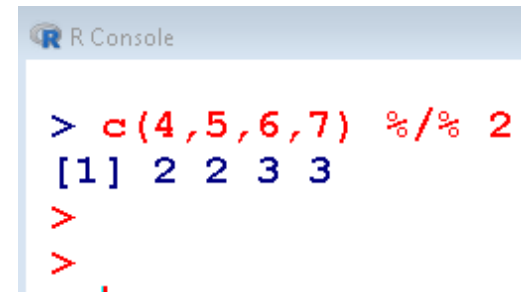


# Integer Division %/%

**Integer Division:** Division in which the fractional part (remainder) is discarded

```
> c(4,5,6,7) %/% 2  
[1] 2 2 3 3
```

**4%/%2, 5%/%2, 6%/%2, 7%/%2**

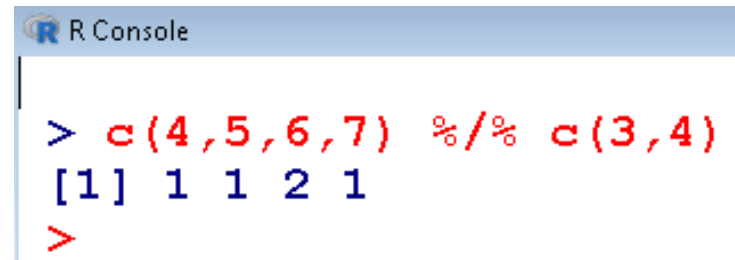


```
R Console  
> c(4,5,6,7) %/% 2  
[1] 2 2 3 3  
>  
>
```

# Integer Division %/%

**Integer Division:** Division in which the fractional part (remainder) is discarded

```
> c(4,5,6,7) %/% c(3,4)
[1] 1 1 2 1
```



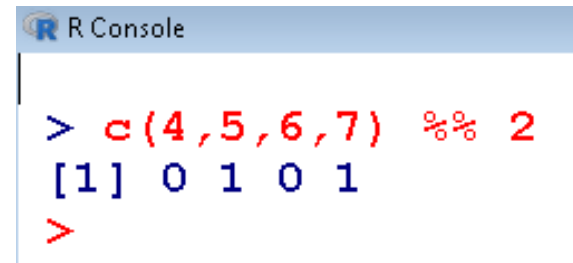
```
R Console
> c(4,5,6,7) %/% c(3,4)
[1] 1 1 2 1
>
```

**4%/%3, 5%/%4, 6%/%3, 7%/%4**

# Modulo Division (x mod y) %%:

x mod y : modulo operation finds the remainder after division of one number by another

```
> c(4,5,6,7) %% 2  
[1] 0 1 0 1
```



```
R Console  
> c(4,5,6,7) %% 2  
[1] 0 1 0 1  
>
```

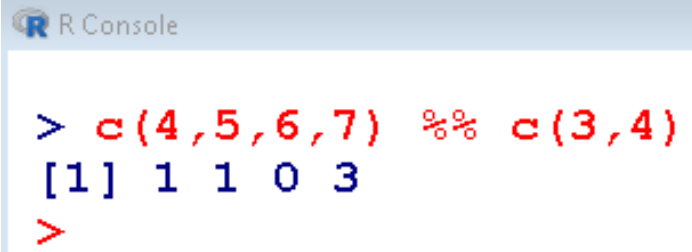
**4%%2, 5%%2, 6%%2, 7%%2**

# Modulo Division (x mod y) : %%

x mod y : modulo operation finds the remainder after division  
of one number by another

```
> c(4,5,6,7) %% c(3,4)
[1] 1 1 0 3
```

**4%%3, 5%%4, 6%%3, 7%%4**



```
R Console
> c(4,5,6,7) %% c(3,4)
[1] 1 1 0 3
>
```

# Maximum: max

```
> max(2.6, 4.3, -6.9)
```

```
[1] 4.3
```

```
> max( c(2.6, 4.3, -6.9) )
```

```
[1] 4.3
```

```
R Console
> max(2.6, 4.3, -6.9)
[1] 4.3
>
> max( c(2.6, 4.3, -6.9) )
[1] 4.3
>
```

# Minimum : min

```
> min(2.6, 4.3, -6.9)
```

```
[1] -6.9
```

```
> min(c(2.6, 4.3, -6.9) )
```

```
[1] -6.9
```

```
R Console
> min(2.6, 4.3, -6.9)
[1] -6.9
>
> min(c(2.6, 4.3, -6.9) )
[1] -6.9
>
```

# Overview Over Further Functions

<code>abs()</code>	<b>Absolute value</b>
<code>sqrt()</code>	<b>Square root</b>
<code>round()</code> , <code>floor()</code> , <code>ceiling()</code>	<b>Rounding, up and down</b>
<code>sum()</code> , <code>prod()</code>	<b>Sum and product</b>
<code>log()</code> , <code>log10()</code> , <code>log2()</code>	<b>Logarithms</b>
<code>exp()</code>	<b>Exponential function</b>
<code>sin()</code> , <code>cos()</code> , <code>tan()</code> , <code>asin()</code> , <code>acos()</code> , <code>atan()</code>	<b>Trigonometric functions</b>
<code>sinh()</code> , <code>cosh()</code> , <code>tanh()</code> , <code>asinh()</code> , <code>acosh()</code> , <code>atanh()</code>	<b>Hyperbolic functions</b>



# Examples

```
> abs(-6)
```

```
[1] 6
```

```
> abs(c(-2-3,-4,5,6))
```

```
[1] 5 4 5 6
```

```
R Console  
  
> abs(-6)  
[1] 6  
>  
>  
> abs(c(-2-3,-4,5,6))  
[1] 5 4 5 6
```

# Examples

```
> sqrt(9)
```

```
[1] 3
```

```
> sqrt(c(16,25,36,49))
```

```
[1] 4 5 6 7
```

```
R Console  
  
> sqrt(9)  
[1] 3  
>  
> sqrt(c(16,25,36,49))  
[1] 4 5 6 7  
>
```

# Examples

```
> sum(c(3,4,5,6))
```

```
[1] 18
```

```
> prod(c(3,4,5,6))
```

```
[1] 360
```

R Console

```
> sum(c(3,4,5,6))  
[1] 18
```

R Console

```
> prod(c(3,4,5,6))  
[1] 360
```

# Examples

```
> round(3.42)
```

```
[1] 3
```

```
> round(2.68)
```

```
[1] 3
```

```
R Console  
> round(3.42)  
[1] 3
```

```
R Console  
> round(2.68)  
[1] 3  
,
```

# Assignments

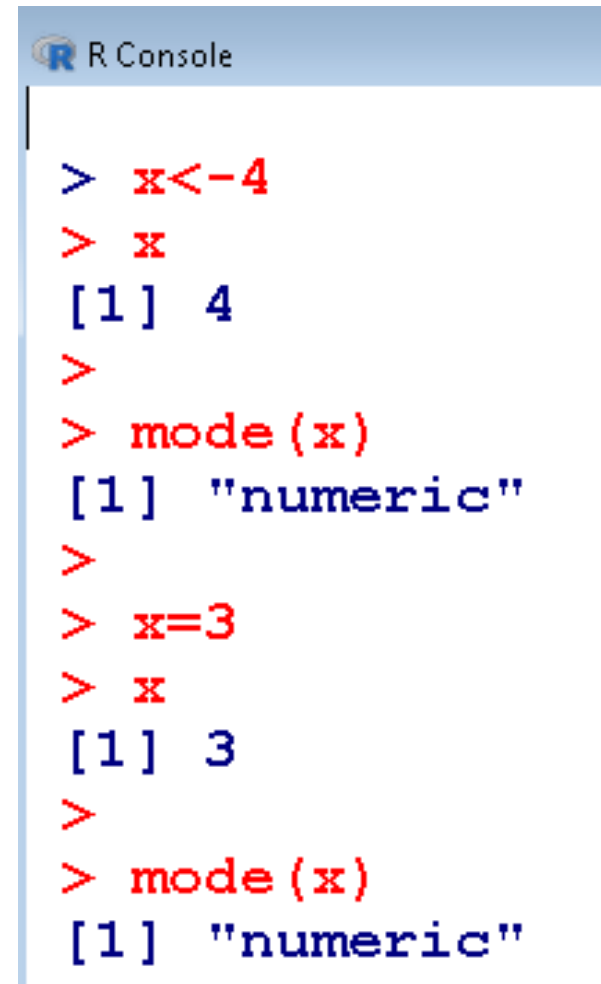
Assignments can be made in two ways:

```
> x<-4
> x
[1] 4

> mode(x)
[1] "numeric"

> x=3
> x
[1] 3

> mode(x)
[1] "numeric"
```



```
R Console
> x<-4
> x
[1] 4
>
> mode(x)
[1] "numeric"
>
> x=3
> x
[1] 3
>
> mode(x)
[1] "numeric"
```

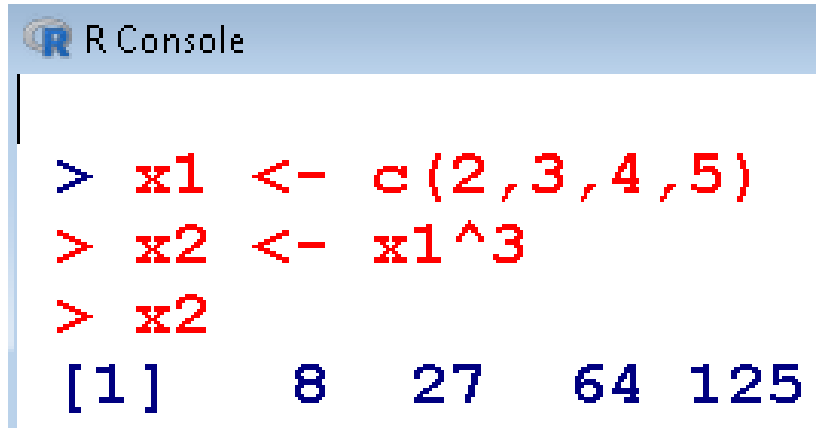
# Assignments

An assignment can also be used to save values in variables:

```
> x1 <- c(2,3,4,5)
```

```
> x2 <- x1^3
```

```
> x2  
[1] 8 27 64 125
```



```
R Console  
> x1 <- c(2,3,4,5)  
> x2 <- x1^3  
> x2  
[1] 8 27 64 125
```

**ATTENTION: R is case sensitive (X is not the same as x)**