R – Variables and Operators

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Outline

Variables :
convention & environment

Operators :
arithmetic & logical

Vectorized operation :
making R a powerful language

Variable

- Placeholders to hold any object

```
x <- 10
```

- Case sensitive variable names

```
x is different from X
```

Naming Convention

- **Syntactically valid names**
  - Consist of letters , numbers, dots or underline characters
  - Either start with a letter
  - Or start with dot character & not followed by a number

empNames

Emp_Names

Emp.Names

.EmpNames

.2EmpNames

Naming Convention

- **Do not use RESERVE keywords**

if	for	TRUE	NA
else	in	FALSE	NA_integer
repeat	next	NULL	NA_real
while	break	Inf	NA_complex
function		NaN	NA_character

Variable Naming Guide

- Google R style guide
  - http://bit.ly/googleRguide
- Use lowercase letters
- Separate words using dot(.)
- Do not use underscores (_) or hyphens (-)

student_Marks Bad

studentMarks OK

student.marks Good

Assign Variable

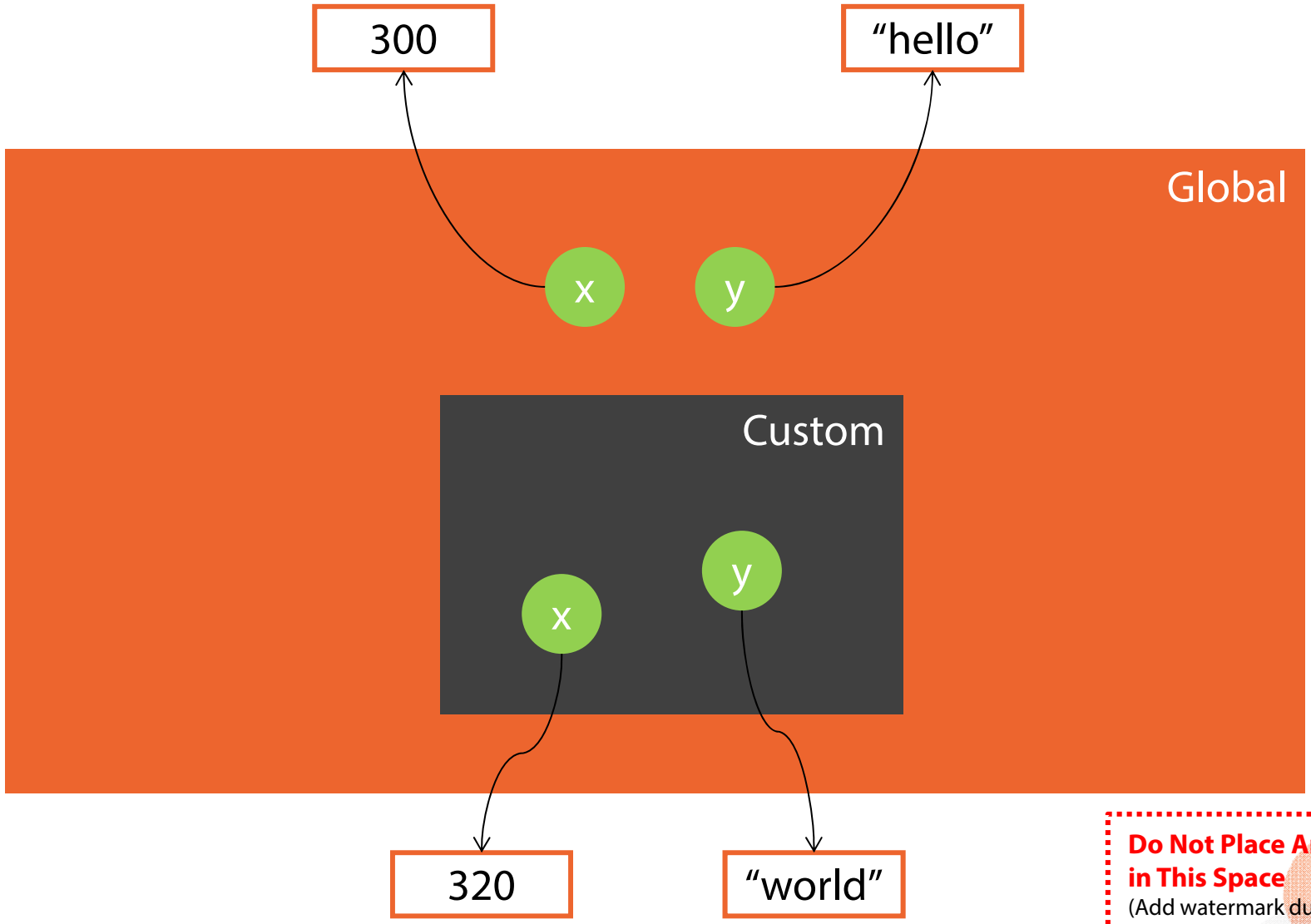
- Use assignment operator

```
x <- 10
```

- Use assign() function

```
assign("x",10)
```

Environments and Variables



Environments and Variables

- Create a new environment

```
my.environment <- new.env()
```

- Create a variable in a custom environment

```
assign("x",10,my.environment)

my.environment[["x"]] <- 10

my.environment$x <- 10
```

Environments and Variables

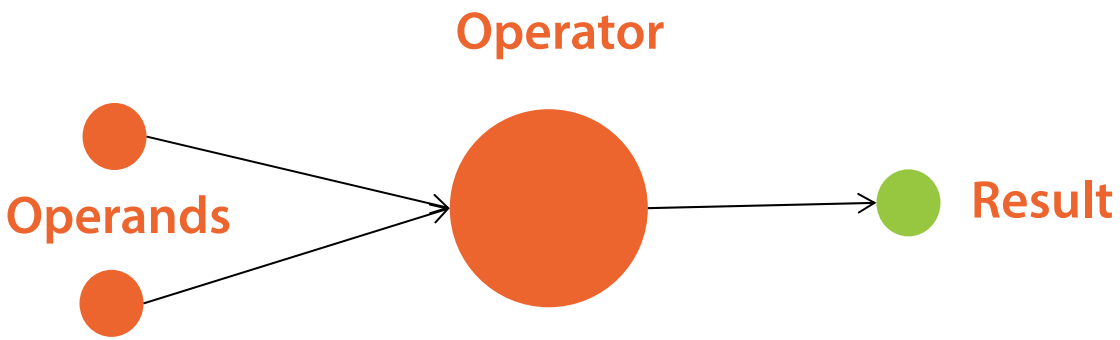
- Get a variable from a custom environment

```
get("x", my.environment)

my.environment[["x"]]

my.environment$x
```

Operators

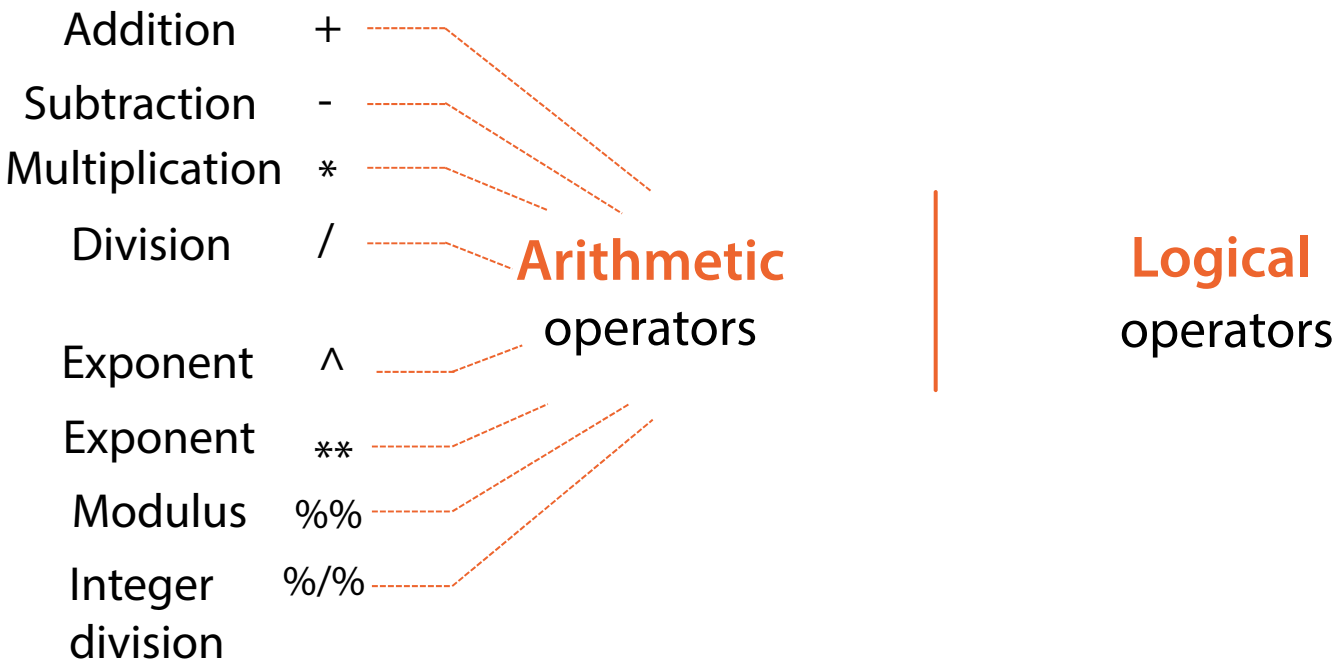


Operators

Arithmetic operators

Logical operators

Arithmetic Operators



R as Calculator

- Basic arithmetic operators
- Mathematical functions

Special Numbers

Inf & -Inf: positive & negative infinity

NaN: not a number

NA : not available

Special Numbers

Overflow condition

No mathematical sense

Missing data

Logical Operators

Arithmetic operators

Logical operators

- `>` Greater than
- `>=` Greater than equal to
- `<` Less than
- `<=` Less than equal to
- `==` Equal
- `!=` Not equal
- `!` Logical NOT
- `|` Logical OR
- `&` Logical AND

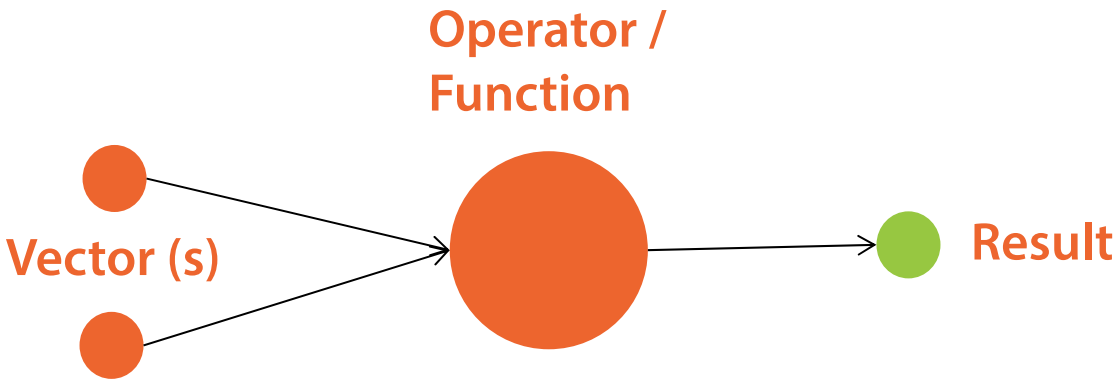
Vectorized Operation

- **Vector**
  - One dimensional set of values of similar type

Student marks	10	20	30	40

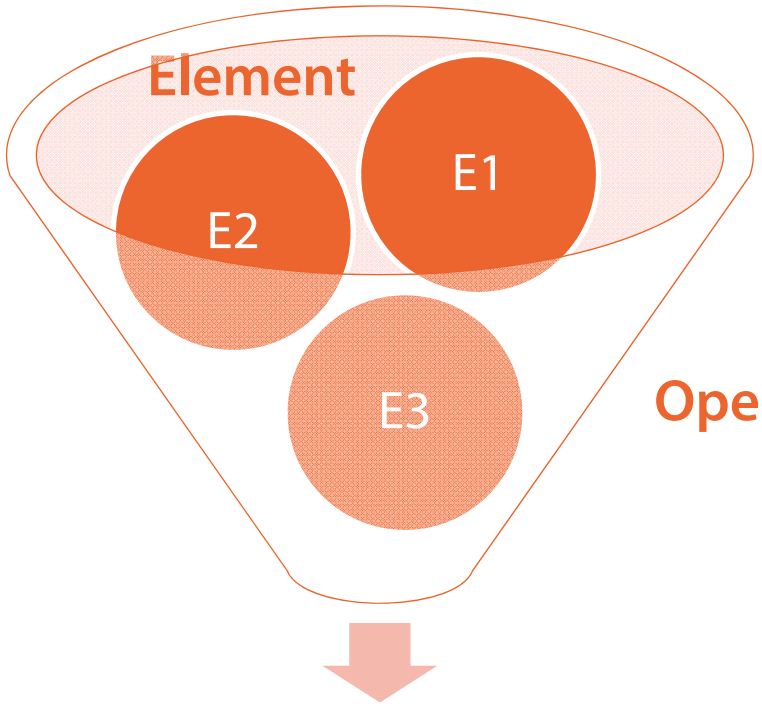
```
student.marks <- c(10, 20, 30,  40)
```

Vectorized Operation



Vectorized Operation

V = {E1, E2, E3}



Operator / Function

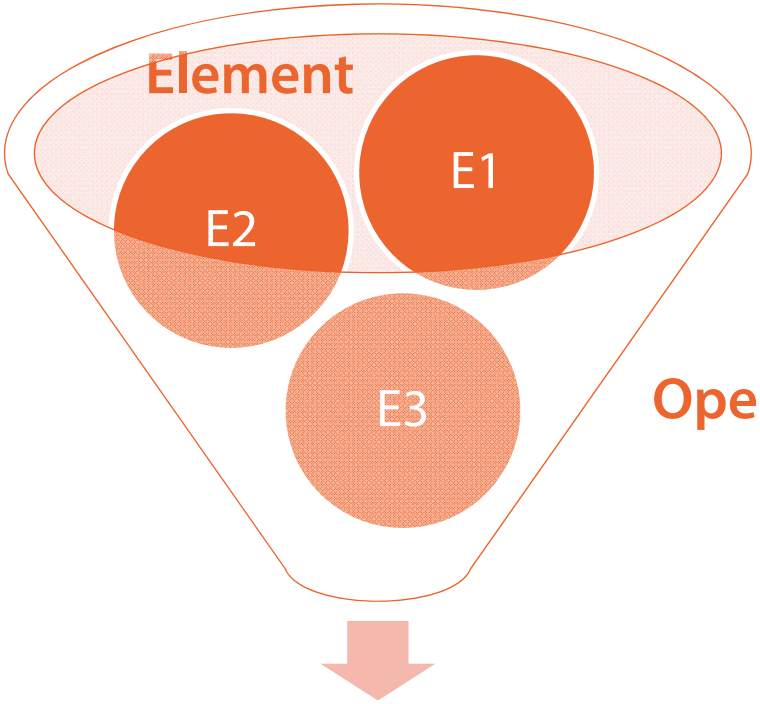
mean(V)

Scalar result E=(E1 + E2 + E3)/3

Vector of length 1

Vectorized Operation

V = {E1, E2, E3}



Operator / Function

sqrt(V)

Vector result

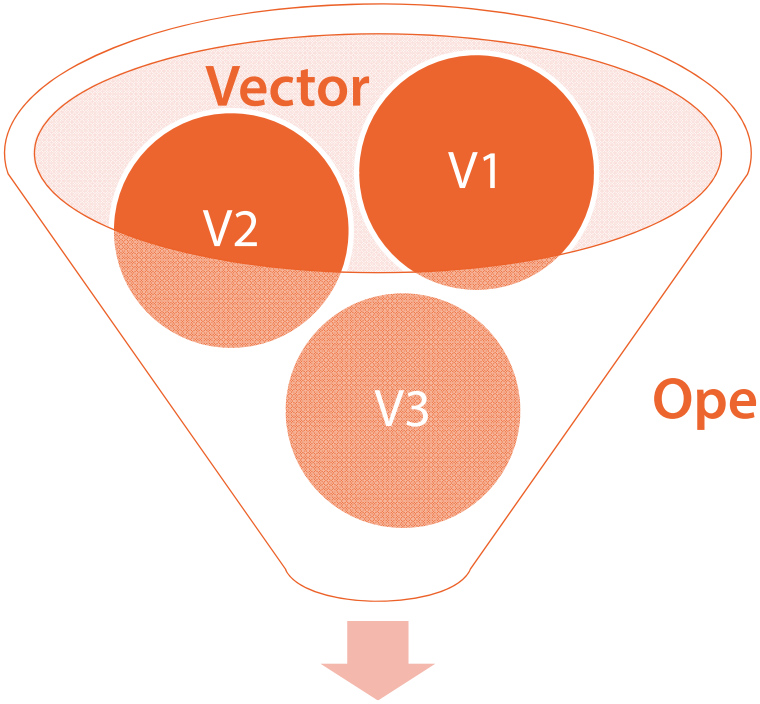
{ sqrt(E1), sqrt(E2), sqrt(E3) }

Vectorized Operation

V 1= {E11, E12, E13}

V 2= {E21, E22, E23}

V 3= {E31, E32, E33}



Operator / Function

V1 + V2 + V3

Vector result

V = { (E11 + E21 + E31),
(E12 + E22 + E23),
(E31 + E32 + E33) }

Summary

Variables

Naming convention

Google R style guide

Assign variable

Environments

Operators

Arithmetic operators

Special numbers

Logic operators

Vectorized operation

Flavors of vectorized operations