

Arithmetic & Relational Operators

Talk to a Teacher

<http://spoken-tutorial.org>

National Mission on Education through ICT

<http://sakshat.ac.in>

Script: Spoken Tutorial Team, IIT Bombay

Video: Anjana Nair

22 April 2013



Learning Objectives



Learning Objectives

- **Arithmetic Operators**



Learning Objectives

- **Arithmetic Operators**
- **Operator Precedence**



Learning Objectives

- Arithmetic Operators
- Operator Precedence
- Relational Operators



System Requirement



System Requirement

- **Ubuntu Linux version 12.04**



System Requirement

- **Ubuntu Linux version 12.04**
- **Ruby 1.9.3**



Pre-requisites



Pre-requisites

- Knowledge of Terminal and Text editor



Pre-requisites

- Knowledge of **Terminal** and **Text editor**
- **Also, be familiar with **irb****



Pre-requisites

- Knowledge of **Terminal** and **Text editor**
- Also, be familiar with **irb**
- **If not, for relevant tutorials, please visit <http://spoken-tutorial.org>**



Arithmetic Operators

Ruby has the following arithmetic operators



Arithmetic Operators

Ruby has the following arithmetic operators

- **+** **Addition:** eg. $a + b$



Arithmetic Operators

Ruby has the following arithmetic operators

- **+** Addition: eg. $a + b$
- **-** Subtraction: eg. $a - b$



Arithmetic Operators

Ruby has the following arithmetic operators

- **+** Addition: eg. $a + b$
- **-** Subtraction: eg. $a - b$
- **/** Division: eg. a/b



Arithmetic Operators

Ruby has the following arithmetic operators

- **+** Addition: eg. $a + b$
- **-** Subtraction: eg. $a - b$
- **/** Division: eg. a/b
- ***** **Multiplication: eg. $a * b$**



Arithmetic Operators

Ruby has the following arithmetic operators

- **+** Addition: eg. $a + b$
- **-** Subtraction: eg. $a - b$
- **/** Division: eg. a/b
- ***** Multiplication: eg. $a * b$
- **%** Modulus: eg. $a \% b$



Arithmetic Operators

Ruby has the following arithmetic operators

- **+** Addition: eg. $a + b$
- **-** Subtraction: eg. $a - b$
- **/** Division: eg. a/b
- ***** Multiplication: eg. $a * b$
- **%** Modulus: eg. $a \% b$
- ****** Exponent : eg $a ** b$



What is Operator Precedence?



What is Operator Precedence?

When several operations occur in a mathematical expression

- each part is evaluated



What is Operator Precedence?

When several operations occur in a mathematical expression

- each part is evaluated
- **and resolved in a predetermined order**



What is Operator Precedence?

When several operations occur in a mathematical expression

- each part is evaluated
- and resolved in a predetermined order
- **called operator precedence**



What is Operator Precedence?



What is Operator Precedence?

- This means that the operator which has highest priority is executed first



What is Operator Precedence?

- This means that the operator which has **highest priority** is executed **first**
- **Followed by the next operator in the priority order and so on**



Operator Precedence

List of all operators from highest precedence to lowest



Operator Precedence

List of all operators from highest precedence to lowest

- $\{ \}$ $()$ – 1st Priority



Operator Precedence

List of all operators from highest precedence to lowest

● $\{ \}$ $()$

– 1st Priority

● $*$ $/$ $\%$

– 2nd priority



Operator Precedence

List of all operators from highest precedence to lowest

● $\{ \}$ $()$

– 1st Priority

● $*$ $/$ $\%$

– 2nd priority

● $+$ $-$

– 3rd Priority



Operator Precedence

List of all operators from highest precedence to lowest

● $\{ \}$ $()$

– 1st Priority

● $*$ $/$ $\%$

– 2nd priority

● $+$ $-$

– 3rd Priority

● $<$ $<=$ $>$ $>=$

– 4th Priority



Operator Precedence

List of all operators from highest precedence to lowest

● $\{ \}$ $()$

– 1st Priority

● $*$ $/$ $\%$

– 2nd priority

● $+$ $-$

– 3rd Priority

● $<$ $<=$ $>$ $>=$

– 4th Priority

● $=$ $==$ $!=$

– 5th Priority



Operator Precedence

List of all operators from highest precedence to lowest

● $\{ \}$ $()$

– 1st Priority

● $*$ $/$ $\%$

– 2nd priority

● $+$ $-$

– 3rd Priority

● $<$ $<=$ $>$ $>=$

– 4th Priority

● $=$ $==$ $!=$

– 5th Priority

● and so on



Example of Operator Precedence



Example of Operator Precedence

For example -

● $3 + 4 * 5$ returns 23 and not 35



Example of Operator Precedence

For example -

- $3 + 4 * 5$ returns 23 and not 35
- **Multiplication $*$ has higher precedence than the addition $+$**



Relational Operator

- **Relational operators** are also known as **comparison operators**



Talk to a Teacher

Relational Operator

- Relational operators are also known as **comparison** operators
- Expressions using relational operators return **boolean** values



Relational Operator

Relation Operators in Ruby are

- **== Equals to** **Eg. $a == b$**



Relational Operator

Relation Operators in Ruby are

- **== Equals to** **Eg. $a == b$**
- **.eq/? Equals to** **Eg. $a.eq/?b$**



Relational Operator

Relation Operators in Ruby are

- **== Equals to** Eg. $a == b$
- **.eq/? Equals to** Eg. $a.eq/?b$
- **!= Not equals to** Eg. $a! = b$



Relational Operator

Relation Operators in Ruby are

- **== Equals to** Eg. $a == b$
- **.eq/? Equals to** Eg. $a.eq/?b$
- **!= Not equals to** Eg. $a! = b$
- **< Less than** Eg. $a < b$



Talk to a Teacher

Relational Operator

Relation Operators in Ruby are

- **== Equals to** Eg. $a == b$
- **.eq/? Equals to** Eg. $a.eq/?b$
- **!= Not equals to** Eg. $a! = b$
- **< Less than** Eg. $a < b$
- **> Greater than** Eg. $a > b$



Relational Operator

Relation Operators in Ruby are

- **\leq Lesser than or equal to**

Eg. $a \leq b$



Relational Operator

Relation Operators in Ruby are

- **\leq Lesser than or equal to**
Eg. $a \leq b$
- **\geq Greater than or equal to**
Eg. $a \geq b$



Relational Operator

Relation Operators in Ruby are

- **\leq Lesser than or equal to**
Eg. $a \leq b$
- **\geq Greater than or equal to**
Eg. $a \geq b$
- **$\leq >$ Combined comparison**
Eg. $a \leq > b$



Assignment

Solve the following examples using **irb** and check the output

- $10 + (2 * 5)(8/2) = ?$
- $4 * 5/2 + 7 = ?$
- Also, try arithmetic operators using **methods**



Summary

- **Arithmetic Operators** $+$ $-$ $*$ $/$
- **Operator Precedence**
- **Relational Operators**
- **using many examples**



About the Spoken Tutorial Project

- Watch the video available at http://spoken-tutorial.org/What_is_a_Spoken_Tutorial
- It summarises the Spoken Tutorial project



About the Spoken Tutorial Project

- Watch the video available at http://spoken-tutorial.org/What_is_a_Spoken_Tutorial
- It summarises the Spoken Tutorial project
- If you do not have good bandwidth, you can download and watch it



Spoken Tutorial Workshops

The Spoken Tutorial Project Team

- Conducts workshops using spoken tutorials
- Gives certificates to those who pass an online test
- For more details, please write to contact@spoken-tutorial.org



Acknowledgements

- Spoken Tutorial Project is a part of the Talk to a Teacher project
- It is supported by the National Mission on Education through ICT, MHRD, Government of India
- More information on this Mission is available at <http://spoken-tutorial.org/NMEICT-Intro>

