Ruby Fundies: Weekly Student Guide

This document explains the weekly operations to the Ruby Fundamentals course to students

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Author: Ethan Puzarne - epuzarne@gmail.com

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Prework

How to succeed in this class

- **Weekly Prep:** Spend 30 minutes on the prework each week
- **Take Notes:** Write down every "Aha!" moment. I recommend evernote
- **Engage in the class:** Be part of the discussion. Complete all in class exercises
- **Do not "try to figure it out at home":** Your teacher is the best resource. If you are confused, address it *in class,* not at home
- **Connect with your classmates:** They are a great resource. You will get much more out of the class working as a group

Technology

- **Slack:** Is an instant messaging service and will be the primary form of communication for the class. Download the desktop app to have easy access
- **Repl.it:** Repl.it is an online programming environment that gets you coding immediately
- **Google:** Google is your best friend. When searching for answers, make sure to include the word "ruby" in the search

Helpful References

- **Symbol glossary:** Ruby has a lot of weird symbols that are hard to google. This glossary will tell you their names so that you can Google them
- **Books:** Launch School has a great free Intro to Ruby book if you are looking for more detail
- **Computer Hotkeys:** Programming is faster and more fun when you know keyboard shortcuts
- **List of commonly used methods**

Getting Started Checklist

- **Slack:** Sign up for Slack and join your channel (For Boston Fall '16, join sibos_ruby_dec16)
- **Repl.IT:** Follow this guide to get set up with Repl.it
- **First class prep:** Jump down to the Week 1 guide, read it, and complete the prework

Week 1: Basics

Summary

This class covers the basics of using the Ruby language. By the end, you will be comfortable using Repl.it and will have written a small game

Topics Covered

- **Syntax:** Comments
- **Data Types:** Integers (Fixnums), Strings
- **Tools:** User input/output, Boolean Comparison/Operators, Control Flow
- **Abstractions:** Variables
- **Main Exercise:** Number guessing game

Prework

- You should be signed up for Repl.it
- Click this link to go to the first script
- Spend 30 minutes following the script and playing with Repl.it. Don't worry if you don't fully understand, we will cover all this in class as well.

Classwork

- Learn how to create a Repl.it session
- Copy the contents of this script to a new repl.it ruby session
- Proceed through the script as a group

Homework

- Review in class work and compare it to the answer guide
- Answer the following questions using google:
    a. Strings: What is string interpolation?
    b. Strings: What does it mean to "escape" a character?
    c. User input: Why do we need "chomp" when getting user input?
    d. Numbers: Integers are whole numbers. What data type is for decimals?
    e. Control Flow: What does the "elsif" operator do?

Week 2: Arrays and Methods

Summary

In this class, we will learn how to create a list (Array) of things, and we will learn how to group instructions into a callable “Method”

Topics Covered

- **Data Types:** Arrays
- **Tools:** Boolean Operators (AND, NOT)
- **Abstractions:** Methods
- **Concepts:** Scope
- **Main Exercise**: Rock Paper Scissors

Prework

- Copy the week 2 script into a new Repl.it session
- Get as far as you can in 30 minutes

Classwork

- Discuss homework answers
- Work through week 2 script

Homework

- Review in class work and compare it to the answer guide
- Answer the following questions on google
    a. Method Definitions: What is an explicit return?
    b. Arrays: How can you add two arrays together? (Hint: “concat”)
    c. Arrays: How to get the number of items in an array?
    d. Arrays: If you have nested arrays (arrays inside arrays) what method will turn it into a single, unnested array?

Week 3: Arguments and Algorithms

Summary

In this class, we will expand our knowledge of Methods and Arrays, and then we will design our own algorithm for creating a Peanut Butter and Jelly Sandwich

Topics Covered

- **Data Types:** Nil
- **Tools:** Method Arguments, Array Modification
- **Main Exercise:** Algorithm Design - Peanut Butter Jelly Time

Prework

- Copy the week 3 script into a Repl.it session
- Get as far as you can in 30 minutes

Classwork

- Discuss homework answers
- Work through script
- Peanut Butter Jelly Time
- Designing Tic Tac Toe

Homework

- Review in class work and compare it to the answer guide
- Answer the following questions on google
    a. Arrays: What if you use a negative index to get a value?
    b. Method: How do you make arguments optional?

Week 4: Tic Tac Toe

Summary

In this class, we will design the game Tic Tac Toe and then build it using the concepts discussed in the previous few weeks

Topics Covered

- **Concepts:** Abstraction, Program Design
- **Main Exercise:** Tic Tac Toe

Prework

- Copy the week 4 script into a Repl.IT session
- Get as far as you can in 30 minutes

Classwork

- Discuss homework answers
- Review and expand on Tic Tac Toe design
- Work through Tic Tac Toe script

Homework

- Review in class work and compare it to the answer guide
- Finish the Tic Tac Toe game if not already completed
- Answer the following questions on google
  a. Arrays: How can we select a subset of an array? (e.g. only the first 3 indexes) (Hint: Range)
  b. Arrays: How can we combine the elements of an array into a string? How can we do the opposite to turn a string into an array? (Hint: Built in methods)

Week 5: Iterators

Summary

In this class, we will learn how to repeat operations by “Traversing” an array with an iterator. By the end of this class, we will be able to write our own versions of the built in array methods.

Topics Covered

- **Tools:** Iterators
- **Concepts:** Accumulation
- **Syntax:** Block arguments
- **Main Exercise:** Name guessing game

Prework

- Copy the week 5 script into Repl.it
- Get as far as you can in 30 minutes

Classwork

- Discuss homework answers
- Work through script

Homework

- Continue in class work and compare it to the answer guide
- Answer the following questions on google
    a. We’ve learned the block syntax `do |variable| … end`. What is the other syntax for passing a block? (Hint: It’s used in the ruby documentation)
    b. We wrote a method that sums an array. What array method can we use instead?
    c. We wrote a method to select all the even values in an array. Instead, what built-in iterator could we use to select values? (hint: the name is what you would expect). What iterator allows us to do the opposite?
    d. In class, we used the 'each' iterator to double the values in an array. We had to create a new array and save the new values in it. What built in iterator could we use that would save us those steps?

Week 6: Hashes

Summary

In this class, we will learn about the Hash data structure and then use it to model data about people

Topics Covered

- **Data Types:** Hashes
- **Syntax:** Multivariable Blocks
- **Tools:** Hash Iteration
- **Main Exercise:** Guess Who

Prework

- Copy the week 6 script into Repl.it
- Get as far as you can in 30 minutes

Classwork

- Discuss homework answers
- Work through script

Homework

- Continue in class work and compare it to the answer guide
- Answer the following questions on google
    a. What method allows us to combine two hashes? What happens if both have the same key?
    b. What method gives us an array of all the keys in a hash? What method gives us all the values? (Hint: It's what you would expect)
    c. What method removes a key/value pair from a hash?
    d. By default, a hash will return "nil" if you attempt to use a key that is not in the hash. How can you change the default?

Week 7: Classes and Objects

Summary

In this class, we will learn about classes, a more complex data structure. By the end of this class, you will have a basic understanding of how to model the real world using classes

Topics Covered

- **Data Types:** Classes
- **Concepts:** State
- **Main Exercise:** Object Architecture - A supermarket

Prework

- Copy the week 7 script into repl.it
- Get as far as you can in 30 minutes

Classwork

- Discuss homework answers
- Work through script
- Design a supermarket

Homework

- Continue in class work and compare it to the answer guide
- Answer the following questions on google
    a. How do you reference a nested class (a class defined in another class) (Hint: Namespacing)
    b. What is class inheritance?
    c. What is monkeypatching?

Week 8: Exploring Real Code

Summary

In this class, we will explore the Ruby Standard Library to see what real code looks like. We will also show some examples of common tasks you may need

Topics Covered

- **Tools:** Sublime Text Editor
- **Main Exercise:** Reading the Standard Library

Prework

- Go to this page to see instructions
- Follow the instructions

Classwork

- Discuss homework answers
- Read through Ruby Abbrev module
- Read through example code of your choice
- Read through Ruby Observer module

Homework

Keep on learning!