Class Outline

Todo

- [x] List all sections
- [x] Make class outline
- [x] Put those sections into class outline
- [ ] Find questions for every section/class/week
- [ ] Find resources (Pluralsight videos are an option) for every section/class/week
- [ ] Slides

Outline

- Leftovers:
    - **The following book sections are not included in any of the classes below**:
        - Passing data among methods (ch. 4, page 188)
        - Encapsulating data and immutable classes (ch. 4, page 205, 207)
- Class 1:
    - Hello, World
    - Input and output
    - Reading compiler output
    - Basics of variables
    - Data types
    - Operators
    - **Book sections**:
        - Variables (ch. 1, page 25)
        - Basic syntax and data types
            - Comments (ch. 1, page 4)
        - Operators (ch. 2, page 52)
            - Arithmetic operators (ch. 2, page 53)
            - Unary operators (ch. 2, page 57)
                - Increment and decrement operators (ch. 2, page 58)
            - Assignment operator (ch. 2, page 60)
            - Compound assignment operators (ch. 2, page 62)
            - Relational operatos (ch. 2, page 63)
            - Equality operators (ch. 2, page 65)
    - **Left out**:
        - Numeric promition, casting (ch. 2, page 55)
            - Maybe this can be moved to class 14 since casting is covered then
        - Ignoring `instanceof` operator. Teach this on one of the classes were Classes are taught?
        - Logical operators (ch. 2, page 57)
- Class 2:
    - Valid variable names and declaring, and initialization

    - Conditionals (`if` , `if-then` , `if-then-else` , `switch`)
    - Loops (`while` , `do-while` , `for` , `break` , `continue` , labels)
    - **Book sections**:
        - Variables (ch. 1, page 25)
            - Valid names, identifiers (ch. 1, page 27)
            - Declaring variables (ch. 1, page 25)
            - Understanding initialization of variables (ch. 1, page 29)
            - Control flow (ch. 2, page 86)
                - Nested loops (ch. 2, page 87)
                - Labels (ch. 2, page 87)
                - `break` statement (ch. 2, page 88)
                - `continue` statement (ch. 2, page 90)
            - Statements (ch. 2)
                - `if-then` statements (ch. 2, page 67)
                - `if-then-else` statements (ch. 2, page 68)
                - `switch` statement (ch. 2, page 72)
                - `while` statement (ch. 2, page 76)
                - `do-while` statement (ch. 2, page 78)
                - `for` statement (ch. 2, page 80)

- Class 3:
    - Classes
    - Objects
    - Constructors
    - Instances
    - **Book sections**:
        - Classes (ch. 1)
            - Main method basics (ch. 1, page 6)
            - Fields (ch. 1)
                - Reading and writing to object fields (ch. 1, 18)
            - Methods (ch. 1)
                - Constructors (ch. 1, page 17)
                - Finalize (ch. 1, page 38)
            - Classes vs files (ch. 1, page 5)
            - Variables (ch. 1, page 25)
                - Instance vs local vs class variables (ch. 1, page 29, 30)

- Class 4
    - Methods
    - Fields
    - Encapsulation
    - Main
    - **Book sections**:
        - Parts of a method (ch. 4, page 165)
            - Method optional specifiers (ch. 4, page 166)
            - Return type (ch. 4, page 169)
            - Method name (ch. 4, page 170)
            - Parameter list (ch. 4, page 171)
            - Exception list (ch. 4, page 171)
            - Method body (ch. 4, page 171)
- Class 5:
    - Arrays
    - Strings
    - Difference between object references and primitives
    - Difference between value equality and indentity equality
    - Wrapper classes
    - Varargs
    - **Book sections**:
        - Arrays (ch. 3, page 119 - 123)
            - Sorting (ch. 3, page 124)
            - Searching (ch. 3, page 125)
            - Varargs (ch. 3, page 126)
            - Multidimensional arrays (ch. 3, page 126)
            - `ArrayList` (ch. 3, page 129 - 138)
            - Converting array and List (ch. 3, page 136)
        - Strings (ch. 3, page 102)
            - Concatenation (ch. 3, page 103)
            - Method chaining (ch. 3, page 110)
        - Wrapper classes and autoboxing (ch. 3, page 134 - 136)
        - Understand equality (ch. 3, page 117)
        - Basic syntax and data types

        - Difference between object references and primitives (ch. 1, page 20)
    - Varargs (ch. 4, page 172)

- Class 6:
    - Introduction to Git
    - Create a github account
    - Close base project repo
    - Students should push projects to github
    - **Project outline**: use control flows, arrays and other different data types, and classes

- Class 7:
    - Packages
    - Creating packages
    - Imports
    - Naming conflicts
    - **Book sections**:
        - Packages (ch. 1, page 9)
            - Order of elements in file or in class (ch. 1, page 34)
            - Declarations (ch. 1, page 13)
            - Imports (ch. 1, page 9)
                - Wildcards (ch. 1, page 10)
                - Redundant imports (ch. 1, page 11)
                - Naming conflicts (ch. 1, page 12)
                - Creating a new package (ch. 1, page 13)
                - Code formatting trickery (ch. 1, page 16)
            - Static imports (ch. 4, page 187)

- Class 8:
    - Looking up documentation and how to read it, using `ArrayList` as an example
    - `ArrayList` deep dive
    - Difference between Arrays and ArrayLists
    - **Book sections**:
        - Arrays (ch. 3, page 119 - 123)
            - `ArrayList` (ch. 3, page 129 - 138)

- Class 9:

    - `StringBuilder` deep dive
    - String pool
    - **Book sections**:
        - Strings (ch. 3, page 102)
            - Concatenation (ch. 3, page 103)
            - Immutability (ch. 3, page 104)
            - The string pool (ch. 3, page 105)
            - Key string methods (ch. 3, page 105)
            - `StringBuilder` class and important methods (ch. 3, page 111 - 114)
            - `StringBuilder vs StringBuffer` (ch. 3, page 117)

- Class 10:
    - Working with Dates and Times
    - **Book sections**:
        - Dates and times (ch. 3, page 138)
            - Manipulating dates and times (ch. 3, page 142)
            - Working with periods (ch. 3, page 145)
            - Formatting dates and times (ch. 3, page 148)
            - Parsing dates and times (ch. 3, page 151)

- Class 11:
    - **Project outline**: use Dates, Times, and ArrayLists

- Class 12:
    - Classes deep dive
    - Instance initializing blocks
    - Static initializing blocks
    - Static methods
    - Static fields
    - **Book sections**:
        - Instance and static initializer blocks and their order (ch. 1, page 18, 19, 186)
        - Access modifiers (ch. 4, page 173)
            - Static methods (ch. 4, page 181)
            - Static variables (ch. 4, page 185)
            - Calling static methods and fields (ch. 4, page 182)
            - Static vs instance (ch. 4, page 183)

- Class 13:
    - Overloading
    - Access modifiers
    - Inheritance
    - Overriding
    - Final keyword
    - **Book sections**:
        - Inheritance (ch. 5, page 234)
            - Extending classes (ch. 5, page 235)
            - Applyting access modifiers (ch. 5, page 237)
            - Creating objects (ch. 5, page 237)
            - Defining constructors (ch. 5, page 238)
            - Inherited members, methods and variables (ch. 5, page 244 - 257)
        - Final fields (ch. 4, page 202)
        - Overloading methods (ch. 4, page 191)
        - Access modifiers (ch. 4, page 173)
            - Private (ch. 4, page 173)
            - Default, package private (ch. 4, page 175)
            - Protected (ch. 4, page 176)
            - Public (ch. 4, page 180)
        - More on constructors (ch. 4, page 196)
            - Default constructor (ch. 4, page 197)
            - Overloading constructors (ch. 4, page 199)
            - Order of initialization (ch. 4, page 202)
- Class 14:
    - Abstract classes
    - Interfaces
    - Casting
    - Polymorphic parameters
    - Virtual methods
    - **Book sections**:
        - Abstract classes (ch. 5, page 259)
            - Defining abstract classes (ch. 5, page 260)
            - Creating concrete classes (ch. 5, page 262)

        - Extending abstract classes (ch. 5, page 263)
    - Interfaces (ch. 5, page 266)
        - Defining interfaces (ch. 5, page 267)
        - Inheriting an interface (ch. 5, page 269)
        - Default interface methods (ch. 5, page 274)
        - Static interface methods (ch. 5, page 278)
    - Understanding polymorphism (ch. 5, page 279)
        - Object vs. reference (ch. 5, page 281)
        - Casting objects (ch. 5, page 282)
        - Virtual methods (ch. 5, page 284)
        - Polymorphic parameters (ch. 5, page 285)
        - Polymorphism and method overriding (ch. 5, page 287)

- Class 15:
    - **Project outline**: use classes, inheritance, polymorphism, method overriding, Overloading, and initialization blocks
- Class 16:
    - Exceptions
    - What their role is
    - `try-catch` blocks
    - Throwing exceptions
    - `finally` blocks
    - Different types of exceptions: Runtime, Checked, Errors
    - **Book sections**:
        - Exceptions (ch. 6, page 300)
            - The role of exceptions (ch. 6, page 300)
            - Exceptions types (ch. 6, page 302)
            - Throwing exceptions (ch. 6, page 304)
            - `try` statements (ch. 6, page 305)
            - `finally` blocks (ch. 6, page 307)
            - Catching various types of exceptions (ch. 6, page 309)
            - Throwing a second exception (ch. 6, page 311)
            - Recognizing common exception types (ch. 6, page 313)
                - Runtime exceptions (ch. 6, page 314)
                - Checked exceptions (ch. 6, page 317)

        - Errors (ch. 6, page 317)
      - Calling methods that throw exceptions (ch. 6, page 318)
      - Exceptions in subclasses (ch. 6, page 319)
      - Printing exceptions (ch. 6, page 321)

- Class 17:
  - Lambdas
  - Scopes
  - Garbage collection
  - finalize methods
  - **Book sections**:
    - Object destruction and garbage collector (ch. 1, page 36)
    - Variables (ch. 1, page 25)
      - Scope (ch. 1, page 31)
    - Lambdas (ch. 4, page 208)
      - Syntax (ch. 4, page 211)
      - Predicates (ch. 4, page 214)

- Class 18:
  - **Project outline**: use exceptions

- Class 19, 20, 21, 22:
  - Reviews and practice tests
  - **Book sections**:
    - Review (appx. A, page 333)
      - Java building blocks (appx. A, page 334)
      - Operators and statements (appx. A, page 336)
      - Core java APIs (appx. A, page 339)
      - Methods and encapsulation (appx. A, page 342)
      - Class design (appx. A, page 346)
      - Exceptions (appx. A, page 349)
    - Study tips (appx. B, page 353 - 366)

Sections

- basic syntax and data types
  - difference between object references and primitives (ch. 1, page 20)
  - comments (ch. 1, page 4)
  - assignment operator (ch. 2, page 60)
  - compound assignment operators (ch. 2, page 62)
  - relational operatos (ch. 2, page 63)
  - logical operators (ch. 2, page 64)
  - equality operators (ch. 2, page 65)
- statements (ch. 2)
  - if-then statements (ch. 2, page 67)
  - if-then-else statements (ch. 2, page 68)
  - switch statement (ch. 2, page 72)
  - while statement (ch. 2, page 76)
  - do-while statement (ch. 2, page 78)
  - for statement (ch. 2, page 80)
- control flow (ch. 2, page 86)
  - nested loops (ch. 2, page 87)
  - labels (ch. 2, page 87)
  - break statement (ch. 2, page 88)
  - continue statement (ch. 2, page 90)
- variables (ch. 1, page 25)
  - valid names, identifiers (ch. 1, page 27)
  - declaring variables (ch. 1, page 25)
  - scope (ch. 1, page 31)
  - understanding initialization of variables (ch. 1, page 29)
  - instance vs local vs class variables (ch. 1, page 29, 30)
- operators (ch. 2, page 52)
  - arithmetic operators (ch. 2, page 53)
  - numeric promition, casting (ch. 2, page 55)
  - unary operators (ch. 2, page 57)
    - logical operators (ch. 2, page 57)
    - increment and decrement operators (ch. 2, page 58)
- classes (ch. 1)

    - main method basics (ch. 1, page 6)
    - fields (ch. 1)
        - reading and writing to object fields (ch. 1, 18)
    - methods (ch. 1)
        - constructors (ch. 1, page 17)
        - finalize (ch. 1, page 38)
    - classes vs files (ch. 1, page 5)
    - instance and static initializer blocks and their order (ch. 1, page 18, 19, 186)
- object destruction and garbage collector (ch. 1, page 36)
- packages (ch. 1, page 9)
    - order of elements in file or in class (ch. 1, page 34)
    - declarations (ch. 1, page 13)
    - imports (ch. 1, page 9)
        - wildcards (ch. 1, page 10)
        - redundant imports (ch. 1, page 11)
        - naming conflicts (ch. 1, page 12)
        - creating a new package (ch. 1, page 13)
        - code formatting trickery (ch. 1, page 16)
- strings (ch. 3, page 102)
    - concatenation (ch. 3, page 103)
    - immutability (ch. 3, page 104)
    - the string pool (ch. 3, page 105)
    - key string methods (ch. 3, page 105)
    - method chaining (ch. 3, page 110)
    - `StringBuilder` class and important methods (ch. 3, page 111 - 114)
    - `StringBuilder vs StringBuffer` (ch. 3, page 117)
- arrays (ch. 3, page 119 - 123)
    - sorting (ch. 3, page 124)
    - searching (ch. 3, page 125)
    - varargs (ch. 3, page 126)
    - multidimensional arrays (ch. 3, page 126)
    - `ArrayList` (ch. 3, page 129 - 138)
    - converting array and List (ch. 3, page 136)
- wrapper classes and autoboxing (ch. 3, page 134 - 136)
- understand equality (ch. 3, page 117)
- dates and times (ch. 3, page 138)

    - manipulating dates and times (ch. 3, page 142)
    - working with periods (ch. 3, page 145)
    - formatting dates and times (ch. 3, page 148)
    - parsing dates and times (ch. 3, page 151)
- parts of a method (ch. 4, page 165)
    - method optional specifiers (ch. 4, page 166)
    - return type (ch. 4, page 169)
    - method name (ch. 4, page 170)
    - parameter list (ch. 4, page 171)
    - exception list (ch. 4, page 171)
    - method body (ch. 4, page 171)
- varargs (ch. 4, page 172)
- access modifiers (ch. 4, page 173)
    - private (ch. 4, page 173)
    - default, package private (ch. 4, page 175)
    - protected (ch. 4, page 176)
    - public (ch. 4, page 180)
    - static methods (ch. 4, page 181)
    - static variables (ch. 4, page 185)
    - calling static methods and fields (ch. 4, page 182)
    - static vs instance (ch. 4, page 183)
- static imports (ch. 4, page 187)
- passing data among methods (ch. 4, page 188)
- overloading methods (ch. 4, page 191)
- more on constructors (ch. 4, page 196)
    - default constructor (ch. 4, page 197)
    - overloading constructors (ch. 4, page 199)
    - order of initialization (ch. 4, page 202)
- final fields (ch. 4, page 202)
- encapsulating data and immutable classes (ch. 4, page 205, 207)
- lambdas (ch. 4, page 208)
    - syntax (ch. 4, page 211)
    - predicates (ch. 4, page 214)
- inheritance (ch. 5, page 234)
    - extending classes (ch. 5, page 235)

    - applyting access modifiers (ch. 5, page 237)
    - creating objects (ch. 5, page 237)
    - defining constructors (ch. 5, page 238)
    - inherited members, methods and variables (ch. 5, page 244 - 257)
- abstract classes (ch. 5, page 259)
    - defining abstract clasess (ch. 5, page 260)
    - creating concrete classes (ch. 5, page 262)
    - extending abstract classes (ch. 5, page 263)
- interfaces (ch. 5, page 266)
    - defining interfaces (ch. 5, page 267)
    - inheriting an interface (ch. 5, page 269)
    - default interface methods (ch. 5, page 274)
    - static interface methods (ch. 5, page 278)
- understanding polymorphism (ch. 5, page 279)
    - object vs. reference (ch. 5, page 281)
    - casting objects (ch. 5, page 282)
    - virtual methods (ch. 5, page 284)
    - polymorphic parameters (ch. 5, page 285)
    - polymorphism and method overriding (ch. 5, page 287)
- exceptions (ch. 6, page 300)
    - the role of exceptions (ch. 6, page 300)
    - exceptions types (ch. 6, page 302)
    - throwing exceptions (ch. 6, page 304)
    - `try` statements (ch. 6, page 305)
    - `finally` blocks (ch. 6, page 307)
    - catching various types of exceptions (ch. 6, page 309)
    - throwing a second exception (ch. 6, page 311)
    - recognizing common exception types (ch. 6, page 313)
        - runtime exceptions (ch. 6, page 314)
        - checked exceptions (ch. 6, page 317)
        - errors (ch. 6, page 317)
    - calling methods that throw exceptions (ch. 6, page 318)
    - exceptions in subclasses (ch. 6, page 319)
    - printing exceptions (ch. 6, page 321)
- review (appx. A, page 333)
    - java building blocks (appx. A, page 334)

    - operators and statements (appx. A, page 336)
    - core java APIs (appx. A, page 339)
    - methods and encapsulation (appx. A, page 342)
    - class design (appx. A, page 346)
    - exceptions (appx. A, page 349)
- study tips (appx. B, page 353 - 366)

Resources

- http://docs.oracle.com/javase/tutorial/java/nutsandbolts/datatypes.html