

Class Outline

Todo

- ☒ List all sections
- ☒ Make class outline
- ☒ 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 operators (ch. 2, page 63)
 - Equality operators (ch. 2, page 65)
 - **Left out:**
 - Numeric promotion, 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)
 - Applying 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 operators (ch. 2, page 63)
 - logical operators (ch. 2, page 64)
 - equality operators (ch. 2, page 65)
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 - 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 promotion, 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)
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 - searching (ch. 3, page 125)
 - `varargs` (ch. 3, page 126)
 - multidimensional arrays (ch. 3, page 126)
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 - 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)
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 - 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)
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- static imports (ch. 4, page 187)
- passing data among methods (ch. 4, page 188)
- overloading methods (ch. 4, page 191)
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 - 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)

- applying access modifiers (ch. 5, page 237)
 - creating objects (ch. 5, page 237)
 - defining constructors (ch. 5, page 238)
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- 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)
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 - defining interfaces (ch. 5, page 267)
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 - 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)
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 - recognizing common exception types (ch. 6, page 313)
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 - checked exceptions (ch. 6, page 317)
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 - 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>