H20.10.23

Java

Text Book
- **Java基礎 http://www.xerial.org/wiki/lecture/2008/Java/Index**
- Java Tutorial — http://java.sun.com/docs/books/tutorial/
- Advanst — Effective Java 2nd Edition — **Full of experts' experiences**

Object-Oriented Programming
- Class
  - Object
  - Class Hierarchy
- Interface — **specifies available methods**
- Inheritance — Method Override

Data Types

Primitive Types
- int/long/float/double
- boolean — true/false
- null
- byte/char

Array
- int[] elementList = new int[10];
- Arrays of Objects
- initializer — int [] elements = {0, 1, 2, 3}
- Array.length

Data Structure
- Collection
  - **List**
    - ArrayList — for random access
    - LinkedList — for sequencial access
  - **Set**
    - TreeSet — O(log n) search
    - HashSet — O(1) search
    - contains
  - **Map**
    - TreeMap
    - HashMap
    - associates a key with a value
- Generics
  - Specify Element Types
  - List<String>
  - Map<Integer, String>

Standard Data Structure
- **StringBuilder**
  - append
  - toString
- **String**
  - String.format
  - **immutable object**
  - **Regular Expression**
  - String.split("\t")
- Date

Boxed Primitive Types
- Integer/Long/Float/Double
- Boolean
- Integer.toString(int value)
- Integer.parseInt(String value)
- **inherited from Object**

Object
- **the base class for all objects**
- toString()
- hashCode()
- equals()

Exception
- Used for simplifying program flows — try {... } catch(Exception e) { ...} finally {...}
- **unchecked exception**
  - **RuntimeException**
    - IllegalArgumentException
    - IllegalStateException
    - NullPointerException
  - no need to explicitly catch
- **checked exception** — void someMethod(...) throws YourCheckedException

Database
- **JDBC** — Java Database Connection
- DBMS for Java
  - SQLite JDBC — **http://www.xerial.org/trac/Xerial/wiki/SQLiteJDBC**
  - H2 — **http://www.h2database.com**
- **SQL**
  - **Queries**
    - SELECT column,... FROM table, ... WHERE condition
    - ORDER BY
    - JOIN
      - LEFT JOIN
      - concatenate tables
    - LIMIT, OFFSET
    - GROUP BY — **Pivotting** — Microsoft Exce
  - **Updates**
    - CREATE TABLE — **Schema Definition** — Table Structure
    - CREATE INDEX — speed up query processing
    - INSERT INTO table VALUES(..)
    - UPDATE SET ...
- **Microsoft Access** — User-friendly Interface

Defining Objects

Class Scope
- public class
- package class
- private class
- anonymous class

Field Members
- public/private
- package scope

- Static Members
- Member Methods
- Accessor
  - public/protected/private
  - static
  - **final** — create immutable fields
- Constructor
- Factory Method — newInstance
- **toString()** — Provides Object Information
- static initializer — static { ... }
- object initializer — object { ... }
- getter/setter

API — **java.io**

Stream
- **Reading File/Network Data**
- InputStream/OutputStream
  - **BinaryData**
  - FileInputStream
- Reader/Writer
  - BufferedReader/Writer — readLine()
  - FileReader/Writer
  - **Text Data**
- **open, write, flush, then close**
- **URLConnection**
  - openConnection
  - retrieve network data

Methods
- return type — void
- arguments
- accessor — public/private/protected
- static method — used to define methods that use no instance variables

Syntax

Comment
- // single line comment
- /* multi-line comment */

Flow Control
- for
  - for(int each : integerList) { ... }
  - for(int i=0; i<n; i++) { .. }
- while
- if/then/else

Expression
- and (&&), or(||), not (!)
- equal (==), not equal (!=)
- +, -, *, /, %

Entry Point — **public static void main(String[] args)**

Eclipse
- Install — **http://www.eclipse.org**
- New Project
- New Class
- Errors
- Debug
  - Breakpoint
  - Step Forward
  - Stack Trace
  - Variable
- Shortcut Keys
  - Ctrl+F8 (swithc perspective)
  - Ctrl+1 (Correct Errors)
  - Ctrl+Space (Input Assist)
  - Ctrl + S (Save)