



Java II Summer Syllabus

Textbook:

Java Tutorials http://www.tutorialspoint.com/java/java_tutorial.pdf

Reference: [Introduction to Programming Using Java, Seventh Edition \(pdf\)](#)

Material Covered

The Java II course is the continuation of the Java I course. We assume students have successfully taken the Java I course or passed the Java I placement test.

The Java II course will continue to explore the Java language and fundamentals including (1) introducing array, array operation and two-dimensional array; (2) more Java statements and operators which are not covered in Java I such as branching statements, “?” operator and bitwise operators, binary representations and ASCII values; (3) Introducing functions/methods and recursions; (4) briefly discussing class, inheritance, encapsulation and object-oriented programming concept; (5) Understanding Java exception handling; (6) USACO Bronze problem case study - Using the knowledge and skills learned from the Java I and Java II to solve real USACO Bronze level problems.

After successfully completing the Java II course, students will have the **Java language foundations** to create Java applications which can solve real problems of mathematics, modeling, computation, and USA computing Olympiad.

Class Structure

Except for the first day, the first hour is spent reviewing the previous day’s homework, material, and quiz or exam. Over the next two hours we cover new material, with example problems solved by the students throughout. During the last 30 minutes, there is a comprehensive quiz with an emphasis on that day’s material and in-class problem solving exercise. On Fridays, there is only one hour of new material followed by the overview of the materials taught in the week, and then the students take an hour-long comprehensive exam. Each class will include three breaks of ten minutes each.



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Schedule:

Date	Topic	Objective
Week 1		
Monday	Introduction, IDE setup and prerequisite review, read java docs	Java II course overview. Setting up development environment. Prerequisite knowledge/skill reviews. Mini quiz to understand student levels.
Tuesday	Arrays, int array, string array, initialization	Introducing array of different data types. Understanding of array variable declaration, creation, initialization, iteration and random access. String to char array conversion. Chapter 14. Reference Text book Chapter 3.8
Wednesday	Array operations, Two dimensional arrays	More array – copying arrays, copying array range, searching array, comparing arrays. Introducing two dimensional arrays.
Thursday	More controls/branching statements– break, continue and return. More Decision Making statement: ? operator.	Introducing branching statements – break, continue and return, and understanding execution flow with branching in loop and conditional statements. Introducing the powerful “?:” operator.
Friday	ASCII, binary and bitwise operations	Introducing ASCII table and understanding char value. Introducing binary representation and bitwise operators (&, , ^, ~, <<, >>,).
Week 2		
Monday	Classes, Objects, inheritance, extends	Introducing object-oriented



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		programming concepts. Understanding class definition, inheritance, object creation, instance, class member methods and fields/data-members, packages. Chapters 21-27
Tuesday	Functions/Methods	Introducing function/method, its modifier, return type, parameters, method invocation, method local variables and class member variables. Chapter 17
Wednesday	Recursion	The idea of calling one function from another immediately suggests the possibility of a function calling <i>itself</i> . The function-call mechanism in Java supports this possibility, which is known as <i>recursion</i> . Introducing recursion. Understanding how it can simplify certain sets of problems and its limitations. Reference materials.
Thursday	Constant, Enumeration, exceptions	Introducing exception and its handling, try..catch and throw. Using static final to define constants and enumerated types. Reference book. Chapter

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		2.3.4.
Friday	USACO Bronze problem case study, Debug, runtime error and Online judging system	Using the knowledge learned in Java II to solve 2 real USACO Bronze problems. Getting familiar with USACO online judging system.

- Do the reading and the homework. I will go over the material in class beforehand. Programming, like mathematics, is comprehensive. You need a lot more practice, especially writing your own programs.
- Write comments for major blocks. The comments help your source code readers and help yourself when you read it in a late time.
- Avoid cut/paste source code segments from somewhere else. Writing your own code helps in remembering the language, syntax and common class methods.
- Getting yourself familiar with online Java SE API (<https://docs.oracle.com/javase/8/docs/api/index.html>)