

برنامه نویسی شی گرا

Object Oriented Programming

در این درس با مبانی برنامه نویسی شی گرا و نیز زبان Java آشنا خواهید شد. علاوه بر این مباحث اولیه ساختمان داده و طراحی الگوریتم در لابلای مطالب و تمرینهای درس گنجانده شده است تا دانشجویان تمام گرایشهای دانشکده با این مباحث آشنایی کلی پیدا کنند.

پیشنیاز: مبانی برنامه سازی

منابع درس برای مطالعه دانشجویان:

<https://www.tutorialspoint.com/java>

<https://www.w3schools.in/java-tutorial/intro>

Bruce Eckel, "Thinking in Java", Prentice Hall, 4th Edition

سیلابس درس:

High level category	Sessions	List of topics
Outline	1	Course outline, rules, homework and project submission system (recommended: Quera), grading, etc.
Java basics	1	Basic concepts of Java, JVM, JRE, JDK, platform independence, installation, Java IDE (recommended: IntelliJ Community)
Basic syntax	1	CamleCase style, data types, variables, assignment, casting, final, conditional statements (if-else, switchcase), for, while, do-while, break and continue
	0.25	Comments for Java Doc
	1	Methods, Scan, print (print, printf, println)
	0.5	Debuging in IDE
Simple Java data structures	1	Arrays, multidimensional arrays, pass/return array to/from methods, modify array inside a method
	1	String class and its methods, regular expression (regex)
Basics of OOP	1	Concepts of class and object, field, method, create new object, encapsulation
	1.5	this, constructor, multiple constructors, private and protected, setter and getter, modify an object field, pass/return object to/from methods
Package	0.5	Package and import
Java data structures	2	LinkedList, two-way LinkedList, ArrayList, List, Heap, Stack, Queue, and their complexity analysis

Basic sort & search algorithms	2	Bubble sort, insertion sort, merge sort, quick search
OOP	1	Static methods, static fields, why cannot use static fields in non-static methods, when to use static.
	0.25	Overloading methods
	1	Inheritance (is a), class hierarchies, super, overriding methods
	1	Abstract class, abstract method, inheritance for abstract classes
	1	Polymorphism
	1	Interfaces, difference of abstract class and interface, inheritance for interfaces
	0.5	Inner class (has a), why and when to use inner class
	0.5	Cloning objects and arrays, how to write a clone function for an object
	0.5	Four principles of OOP
Exception	1	Exception, throw, try-catch-finally
Memory management	0.5	Garbage collection
IO	1	OS, file read/write, how to create file and folders, how to check existence of files and folders.
GUI	2	Introduction to Swing
Python	4	Introduction to Python programming
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