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CS PATHWAYS

JULY 1, 2019

UNIVERSITY OF MARYLAND

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Department of Computer Science

CMSC131 Object-Oriented Programming I (Topics)

- Intro to Computer Systems
- Programming Basics: Variables, Operators, Expressions, Statements, Methods
- Java Text Input/Output
- Conditionals
- Loops
- Principles of Object Oriented Programming
- Basics of Program Design
- Testing and Debugging
- Java Memory Map
- Arrays and Java ArrayLists
- Java interfaces
- Inheritance Overview
- Recursion

CMSC131 Object-Oriented Programming I (Grading)

- ▶ Projects (26%)
- ▶ Quizzes, Exercises, Lab Work (16%)
- ▶ Semester exams (30%)
- ▶ Final Exam (28%)

CMSC131 Object-Oriented Programming I (Projects)

- Proj #1 – Hello World
- Proj #2 – Money Id Program (conditionals)
- Proj #3 – Flags (Nested loops, static methods)
- Proj #4 – Name Class (Class basics)
- Proj #5 – Photo Processing (Classes)
- Proj #6 – Poker (One-dimensional arrays)
- Proj #7 – Marquee (Two-dimensional arrays)
- Proj #8 – Media Rental Manager (Interfaces, Design)

CMSC131 Object-Oriented Programming I (Tools/Support)

- Submit Server – Public/Release/Secret Tests
- Gradescope
- Piazza

CMSC132 Object-Oriented Programming I (Topics)

- ▶ Object-oriented software development
 - ▶ Software life cycle
 - ▶ Requirements & specifications
 - ▶ Designing objects & classes
 - ▶ Testing & code coverage
 - ▶ Programming paradigms
 - ▶ Design patterns
- ▶ Algorithms & data structures
 - ▶ Asymptotic efficiency
 - ▶ Lists, stacks, queues
 - ▶ Trees, heaps
 - ▶ Sets, maps, graphs
 - ▶ Recursion

CMSC132 Object-Oriented Programming I (Topics)

- Programming skills
 - Inheritance in Java
 - Java collection framework
 - Threads, synchronization
 - Exceptions

CMSC132 Object-Oriented Programming I (Grading and Tools)

- ▶ Similar to cmisc131

CMSC132 Object-Oriented Programming I (Projects)

- Proj #1 – Blackjack (Reviewing interfaces, one-dim arrays)
- Proj #2 – Web Page Generator (Classes extending classes)
- Proj #3 – Clear Cell Game (Abstract classes)
- Proj #4 – Interest Table (Anonymous Classes, Lambda)
- Proj #5 – Linked Lists (Also covers Generics)
- Proj #6 – Online Test (Design)
- Proj #7 – Polymorphic BST
- Proj #8 – Orders Processor (Threads)
- Proj #9 – Graphs (BFS, DFS, Dijkstras)

CMSC133 Object-Oriented Programming I Beyond Fundamentals

- ▶ 2-Credits class for students with prior Java programming knowledge
 - ▶ Conditionals
 - ▶ Loops
 - ▶ Classes
 - ▶ Constructors
 - ▶ Get / set methods
 - ▶ Equals
 - ▶ Private, public
 - ▶ Exceptions
- ▶ Skips first 7 weeks of cmsc131

CMSC216 Introduction to Computer Systems (Topics)

- ▶ Unix Memory Model
- ▶ Moving from Java to C
- ▶ Pointers and dynamic data structures in C
- ▶ I/O, standard libraries
- ▶ Testing
- ▶ Assembly Language
- ▶ Process control
- ▶ Systems programming
- ▶ Program measurement and optimization
- ▶ Multithreaded programming with pthreads
- ▶ Libraries and linking

CMSC216 Introduction to Computer Systems (Grading and Tools)

- ▶ Grading – Similar to cmisc131/cmisc132
- ▶ Tools
 - ▶ Linux environment provided by the school
 - ▶ gcc compiler
 - ▶ Emacs / vi editor
 - ▶ valgrind

CMSC216 Introduction to Computer Systems (Projects)

- ▶ Grades Calculator – Functions and one-dimensional arrays
- ▶ Document Manager – Structures and arrays of strings
- ▶ User Interface – File I/O and parsing
- ▶ Calendar – Dynamic Memory Allocation, Function Pointers
- ▶ Assembly – Relying on AVR assembly (using gcc and simulator for development)
 - ▶ palindrome, fibonacci, reverse prefix sum
- ▶ Shell – Practice with process manipulation (fork, exec, pipes)
- ▶ Several exercises (to cover fundamentals)
- ▶ Two Exercises based on Circuit Playground
 - ▶ <https://learn.adafruit.com/introducing-circuit-playground/overview>

Representative Class Web Sites

- ▶ CMSC131 - <http://www.cs.umd.edu/class/spring2019/cmssc131-02XX/>
- ▶ CMSC132 - <http://www.cs.umd.edu/class/fall2018/cmssc132/>
- ▶ CMSC216 - <http://www.cs.umd.edu/class/spring2019/cmssc216/>