



CALVERT HOMESCHOOL™ CURRICULUM CATALOG

Fundamentals of Programming
and Software Development

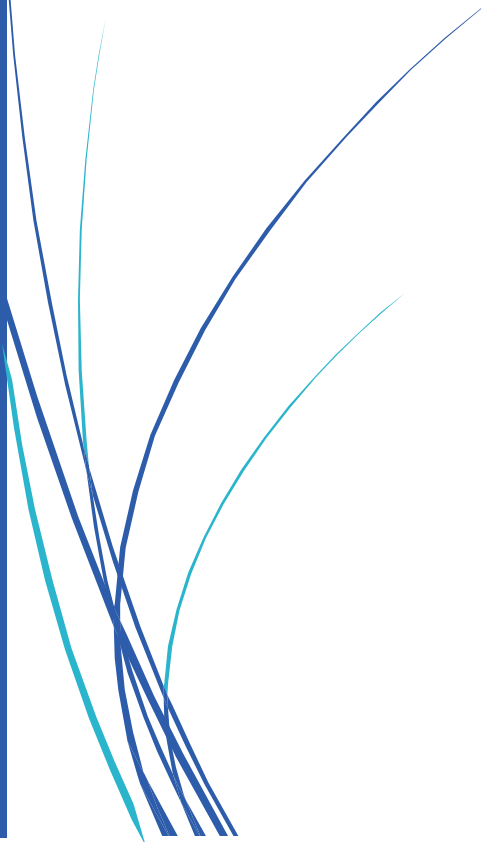


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Fundamentals of Programming and Software Development Course Overview

This course will provide students with an understanding of basic software development concepts and practices, issues affecting the software industry, careers within the software industry, and the skills necessary to perform well in these occupations.

Students will learn details about core concepts in programming using Java. Concepts include writing and debugging code, proper syntax, flow of control, order of operations, comparison operators, and program logic tools and models. They will learn the function of key program techniques, including if statements, looping, and arrays. They will also learn about web development using HTML and drag-and-drop development of user interfaces in an Integrated Development environment.

Students will also learn about the software development life cycle and the different variations used to create software. They will learn about different programming languages and paradigms. They will learn about the importance of usability and user-centered design processes. Students will also learn about careers in the software industry, the education and skills required to work in the industry, and related career resources. Finally, the capstone project will allow students to explore and state opinions on key issues and trends impacting the software industry, and to learn about the experience of working in the industry.

Objectives

- Understand the relationship between computer hardware and software.
- Describe the purpose and high-level organization of the central processing unit.
- Understand categories of software and be able to properly assign software products into the correct category.
- Describe the key functions of systems software.
- Describe the functionality of popular software applications (e.g., word processing, database management, spreadsheet development).
- Understand the function and operation of compilers and interpreters.

For topics in this course, it is helpful for students to be familiar with the basics of using desktop and laptop computers as well as accessing websites over the Internet. If students are unfamiliar with these topics, it is recommended, though not required, that they familiarize themselves with creating and saving files in a text editing or word processing application and with using web browsers and conducting searches on the Internet.

Additionally, activities in this course require that the Java Software Development Kit (SDK) and the NetBeans Integrated Development Environment (IDE) is installed on students' computers. Instructions are included in the Unit 1 lesson titled "Introduction to Java Programming."

Unit 1: Introduction to Computers	
Assignments	
1. Course Overview	10. Project: Writing Your First Java Program
2. Computer History	11. Java Syntax Overview
3. Project: Computer Generations	12. Project: Hello World! Documentation
4. Introduction to Computer Hardware	13. Quiz 2: How Computers and Programs Think
5. Project: Understanding Hardware	14. Special Project*
6. Introduction to Computer Software	15. Test
7. Quiz 1: Perspective and Foundations	16. Course Project Part 1: The Impact of GUI Computing*
8. Design and Function of the Central Processing Unit	17. Glossary and Credits
9. Introduction to Java Programming	

Fundamentals of Programming and Software Development	Unit 2: Java	
	Assignments	
	<ol style="list-style-type: none"> 1. Introduction to Java Variables 2. Project: Using Variables in Java 3. Java Math Operations 4. Project: Using Mathematical Operators in Java 5. Operators and Escape Sequences 6. Quiz 1: Processing Data 7. New Data Types and the If Statement 8. Project: Using If and If-Else Statements and Reading User Input 	<ol style="list-style-type: none"> 9. Switch and Case 10. Project: Using Switch-Case and Nested If Statements 11. User-Defined Methods 12. Quiz 2: Branching and Methods 13. Special Project* 14. Test 15. Course Project Part 2: Ethics in Programming* 16. Glossary and Credits

Fundamentals of Programming and Software Development	Unit 3: Programming	
	Assignments	
	<ol style="list-style-type: none"> 1. Introduction to the For Loop 2. Project: Grading on a Loop 3. Loops–Practice with the Do-While Loop 4. Loops–Practice with the While Loop 5. Project: Using Loops in a Guessing Game 6. Quiz 1: Loops–Power and Simplicity 7. Arrays–Syntax and Use 8. Arrays–Passing by Reference 9. Project: Professional Associations Research 	<ol style="list-style-type: none"> 10. Parallel and Multidimensional Arrays 11. Project: The Logic of Multidimensional Arrays 12. Quiz 2: Managing Complex Data 13. Special Project* 14. Test 15. Course Project Part 3: The Life of a Software or Web Developer* 16. Glossary and Credits

Fundamentals of Programming and Software Development	Unit 4: Advanced Programming	
	Assignments	
	<ol style="list-style-type: none"> 1. Classes and Objects 2. Project: The Importance of Usability 3. Constructors and Packages 4. Project: Creating Packages 5. Flowcharts Mapping 6. Quiz 1: Program Components and Logic 7. HTML Basics 8. Project: A Web Page Essay About the Web 	<ol style="list-style-type: none"> 9. HTML Images, Links, and Web Development Tools 10. Project: Your Favorite Recipe – On a Web Page 11. Event-Driven Programming and Visual Basic 12. Quiz 2: Interactive and Graphical Programming 13. Special Project* 14. Test 15. Course Project Part 4: Open-Source Programming* 16. Glossary and Credits

Fundamentals of Programming and Software Development	Unit 5: GUI Programming and Web Applications	
	Assignments	
	<ol style="list-style-type: none"> 1. Software Development Life Cycle 2. Project: Planning a Software Development Project 3. Programming Languages 4. User-Centered Software Design 5. Project: User-Testing a Product Prototype 6. Quiz 1: Creating Software Products 7. Skills and Interests for Software Careers 8. Project: Taking Stock 	<ol style="list-style-type: none"> 9. Software Industry Careers 10. Project: Planning Your Computer Science Degree 11. New Trends and Technologies 12. Quiz 2: Preparing for a Career in Software Development 13. Special Project* 14. Test 15. Course Project Part 5: Impacts of Future Technologies* 16. Glossary and Credits

FPSD	Unit 6: Course Project, Review, and Exam	
	Assignments	
	<ol style="list-style-type: none"> 1. Course Project Part 6: Issues and Experiences in the World of Software Development* 	<ol style="list-style-type: none"> 2. Review 3. Exam

(*) Indicates alternative assignment