K-12 BLUEPRINT

OER for Computational Thinking and Computer Science

Open Educational Resources (OER) are teaching and learning materials that are freely available online for everyone to use and can be remixed, revised, and redistributed at no cost. Most often, they are licensed through Creative Commons as opposed to a more restrictive copyright.

The following is a collection of OER and other learning resources for teachers to use as part of a computational thinking or computer science curriculum.

OER AP Computer Science Courses

AP Computer Science A (Java)

AP Computer Science A teaches object-oriented programming using the Java language and is meant to be the equivalent of a first semester, college-level course in computer science.

Educator Resources for Advanced Placement Computer Science A

The new AP Computer Science Principles course from Code.org complements AP Computer Science A as it aims to broaden participation in the study of computer science.

AP Computer Science Principles Coursew

Curriki's AP Computer Science Principles course introduces students to the creative aspects of programming, abstractions, algorithms, and large data sets.

OER Computer Science Resources

Academic Earth Computer Science Courses

Exploring fundamental questions about computation is the first step toward designing the hardware, software and complex network systems that we rely upon. This large selection of free online computer science courses includes new tools and methodologies that drive better business practice, scientific applications and social networking.

BC Open Textbooks - Computer Science

Open textbooks on CIS (Computer Information Systems) topics such as database management and information systems.

Computer Science—edX

This collection of free computer science courses covers important topics in artificial intelligence, cyber security, software engineering, and big data.

Crash Course Series: Computer Science

In this series, learners trace the origins of modern computers, take a closer look at the ideas behind current hardware and software, and discuss how and why smart devices keep getting smarter.

Future Learn—Tech & Coding Courses

Learners can develop their programming skills with these flexible courses from top universities, including online coding—from beginner to advanced level—and the ability to explore technology trends such as big data, cyber security, and data science.

James B. Duke Library

The James B. Duke library—part of South Carolina's Furman University—contains many OER materials in its vast database pertaining to Computer Science.

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Khan Academy - Computer Programming

Khan Academy is a nonprofit learning resource that provides free, world-class education for anyone, anywhere. Their collection of computer programming-related videos cover the fundamentals of programming using JavaScript. Khan Academy also offers courses on computer science.

MERLOT

MERLOT is a curated collection of free and open online teaching, learning, and faculty development services contributed and used by an international education community. This specific collection covers a wide-range of computer science-related topics.

MIT Courseware- Computer Science Course Finder

Use the MIT course finder to browse from 12 computer science specialties including: artificial intelligence, computer networks, programming languages, and software design. The "limiters to select the types of OER you would like to use including: lecture notes, interactive simulations, online textbooks, and assessments.

MIT Open Courseware—Electrical Engineering and Computer Science

MIT's Electrical Engineering and Computer Science department offers a variety of online courses. Course format includes lecture videos, interactive concept quizzes, problem sets, terms and definitions, suggested topics and links, and exams.

The National Academies Press (NAP)

This robust resource from The National Academies Sciences Engineering Medicine provides a range of textbooks on Computers and Information Technology.

OER Commons

OER Commons provides a collection of textbooks and resources for Computer Science studies, including a curated collection of affiliated resources.

OpenStax CNX—Computers

OpenStax CNX is a dynamic non-profit digital ecosystem that delivers educational content to improve learning outcomes. This resource features several open textbooks on a variety of topics related to computer science.

Open Suny Textbooks

Open SUNY Textbooks is an open access textbook publishing initiative established by State University of New York libraries. It features the resources Introduction to the Modeling and Analysis of Complex Systems which introduces students to mathematical/computational modeling and analysis developed in the emerging interdisciplinary field of Complex Systems Science.

Open Textbook Library

The Open Textbook Library provides a growing catalog of free, peer-reviewed, and openly-licensed textbooks, including a wide selection of textbooks on computer science studies.

RMIT University OER

RMIT (the Royal Melbourne Institute of Technology) is a global university of technology, design and enterprise. These open textbooks and related materials focus on Computer science topics.

Wolfram Demonstrations Project

Scientist Stephen Wolfram created the Wolfram Demonstrations Project as a way to bring computational exploration to the widest possible audience. This open code resource is expanding daily as users contribute interactive illustrations to show computational thinking concepts in a wide variety of topics.

Educator Professional Development Tools about Computational Thinking

Digital Promise

Digital Promise is helping educators integrate computational thinking to amplify and enrich lessons across the curriculum.

Google: Computational Thinking for Educators

A free online course helping educators integrate computational thinking into their curriculum.

Harvard GSE: Computational Thinking with Scratch

This site and its collection of instruments are designed for K-12 educators and researchers interested in supporting and assessing the development of computational thinking through programming.

ISTE: Introduction to Computational Thinking for Every Educator

Developed with support from Google, Introduction to Computational Thinking for Every Educator unpacks how CT can be integrated throughout subject areas and grade levels.

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