

# Unit M: RoboCode

Content Area: **Business/Tech.**  
Course(s): **Advance Placement Computer Science A - Java**  
Time Period: **April**  
Length: **20 days**  
Status: **Published**

## Unit Overview

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This unit is designed to review after the AP Computer Science Exam using the RoboCode program

## Enduring Understandings

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- The RoboCode program is designed to allow students to incorporate what they learned throughout the year .

## Essential Questions

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TEC.K-12.8.1.A.a	In a world of constant technological change, what skills should we learn?
TEC.K-12.8.1.A.b	How do I choose which technological tools to use and when it is appropriate to use them?
TEC.K-12.8.1.B.a	How can I transfer what I know to new technological situations/experiences?
TEC.K-12.8.1.B.b	What are my responsibilities for using technology? What constitutes misuse and how can it best be prevented?
TEC.K-12.8.2.B.a	How does technology extend human capabilities? What are the positive and negative consequences of technology? Should technologies that produce negative impact continue to be used?
TEC.K-12.8.2.B.b	When are the most sophisticated tools required and when are the simplest tools best?
TEC.K-12.8.2.C.a	Can a system continue to operate with a missing or malfunctioning component?

## Lesson Titles/Objectives

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- Activity: All In Battle
- Activity: Individual 1v1 Battle
- Activity: Team Battle
- Lesson: Advanced Robot
- Lesson: Introduction to the Tanks
- Lesson: Robot class

Key Ideas and Details

Craft and Structure

Integration of Knowledge and Ideas

CRP.K-12.CRP1	Act as a responsible and contributing citizen and employee.
CRP.K-12.CRP2	Apply appropriate academic and technical skills.
CRP.K-12.CRP6	Demonstrate creativity and innovation.
CRP.K-12.CRP7	Employ valid and reliable research strategies.
CRP.K-12.CRP8	Utilize critical thinking to make sense of problems and persevere in solving them.
CRP.K-12.CRP11	Use technology to enhance productivity.
SCI.9-12.5.1.12.A	Students understand core concepts and principles of science and use measurement and observation tools to assist in categorizing, representing, and interpreting the natural and designed world.
SCI.9-12.5.1.12.B	<p>Students master the conceptual, mathematical, physical, and computational tools that need to be applied when constructing and evaluating claims.</p> <p>Random processes can be described mathematically by using a probability model: a list or description of the possible outcomes (the sample space), each of which is assigned a probability. In situations such as flipping a coin, rolling a number cube, or drawing a card, it might be reasonable to assume various outcomes are equally likely. In a probability model, sample points represent outcomes and combine to make up events; probabilities of events can be computed by applying the Addition and Multiplication Rules. Interpreting these probabilities relies on an understanding of independence and conditional probability, which can be approached through the analysis of two-way tables.</p> <p>Randomization has two important uses in drawing statistical conclusions. First, collecting data from a random sample of a population makes it possible to draw valid conclusions about the whole population, taking variability into account. Second, randomly assigning individuals to different treatments allows a fair comparison of the effectiveness of those treatments. A statistically significant outcome is one that is unlikely to be due to chance alone, and this can be evaluated only under the condition of randomness. The conditions under which data are collected are important in drawing conclusions from the data; in critically reviewing uses of statistics in public media and other reports, it is important to consider the study design, how the data were gathered, and the analyses employed as well as the data summaries and the conclusions drawn.</p> <p>Data are gathered, displayed, summarized, examined, and interpreted to discover patterns and deviations from patterns. Quantitative data can be described in terms of key characteristics: measures of shape, center, and spread. The shape of a data distribution might be described as symmetric, skewed, flat, or bell shaped, and it might be summarized by a statistic measuring center (such as mean or median) and a statistic measuring spread (such as standard deviation or interquartile range). Different distributions can be compared numerically using these statistics or compared visually using plots. Knowledge of center and spread are not enough to describe a distribution. Which statistics to compare, which plots to use, and what the results of a comparison might mean, depend on the question to be investigated and the real-life actions to be taken.</p>

## Standards

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TECH.8.2.12.E.1	Demonstrate an understanding of the problem-solving capacity of computers in our world.
TECH.8.2.12.E.2	Analyze the relationships between internal and external computer components.
TECH.8.2.12.E.3	Use a programming language to solve problems or accomplish a task (e.g., robotic functions, website designs, applications, and games).
TECH.8.2.12.E.4	Use appropriate terms in conversation (e.g., troubleshooting, peripherals, diagnostic software, GUI, abstraction, variables, data types and conditional statements).
TECH.8.2.12.E.CS1	Computational thinking and computer programming as tools used in design and

engineering.

## Indicators

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## Career Readiness, Life Literacies, & Key Skills

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12.9.3.IT-PRG.1	Analyze customer software needs and requirements.
12.9.3.IT-PRG.2	Demonstrate the use of industry standard strategies and project planning to meet customer specifications.
12.9.3.IT-PRG.3	Analyze system and software requirements to ensure maximum operating efficiency.
12.9.3.IT-PRG.4	Demonstrate the effective use of software development tools to develop software applications.
12.9.3.IT-PRG.5	Apply an appropriate software development process to design a software application.
12.9.3.IT-PRG.6	Program a computer application using the appropriate programming language.
12.9.3.IT-PRG.7	Demonstrate software testing procedures to ensure quality products.
12.9.3.IT-PRG.8	Perform quality assurance tasks as part of the software development cycle.
12.9.3.IT-PRG.9	Perform software maintenance and customer support functions.
12.9.3.IT-PRG.10	Design, create and maintain a database.
TECH.9.4.12.CI.1	Demonstrate the ability to reflect, analyze, and use creative skills and ideas (e.g., 1.1.12prof.CR3a).
TECH.9.4.12.CI.2	Identify career pathways that highlight personal talents, skills, and abilities (e.g., 1.4.12prof.CR2b, 2.2.12.LF.8).
TECH.9.4.12.CI.3	Investigate new challenges and opportunities for personal growth, advancement, and transition (e.g., 2.1.12.PGD.1).
TECH.9.4.12.CT.1	Identify problem-solving strategies used in the development of an innovative product or practice (e.g., 1.1.12acc.C1b, 2.2.12.PF.3).

## Inter-Disciplinary Connections

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- Art
- English
- History
- Math

- Music
- Science

## **Warm-Up**

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- Students will enter room log onto computers and load appropriate program(s) for class

## **Instructional Strategies, Learning Activities, and Levels of Blooms/DOK:**

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- IS: • Extra Time to complete Programs
- Connect Previous Lessons for Programs
- Create Creative Code
- Critically Think Battles
- Debug Code
- Design Strategies
- IS: • NHS Assistance and Tutoring
- IS: • One on One tutoring during Delsea One
- Organize Teams

## **ELL Modifications**

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- - Choice of test format (multiple-choice, essay, true-false)
  - Continue practicing vocabulary
  - Provide study guides prior to tests
  - Read directions to the student
  - Read test passages aloud (for comprehension assessment)
  - Vary test formats

## **IEP & 504 Modifications**

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- - Allow for redos/retakes
  - Assign fewer problems at one time (e.g., assign only odds or evens)
  - Differentiated center-based small group instruction
  - Extra time on assessments
  - Highlight key directions
  - If a manipulative is used during instruction, allow its use on a test
  - Opportunities for cooperative partner work
  - Provide reteach pages if necessary

- Provide several ways to solve a problem if possible
- Provide visual aids and anchor charts
- Test in alternative site
- Tiered lessons and assignments
- Use of a graphic organizer
- Use of concrete materials and objects (manipulatives)
- Use of word processor

## **G&T Modifications**

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- - Alternate assignments/enrichment assignments
  - Enrichment projects
  - Extension activities
  - Higher-level cooperative learning activities
  - Pairing direct instruction with coaching to promote self-directed learning
  - Provide higher-order questioning and discussion opportunities
  - Provide texts at a higher reading level
  - Tiered assignments
  - Tiered centers

## **At Risk Modifications**

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- Additional time for assignments
- Adjusted assignment timelines
- Agenda book and checklists
- Answers to be dictated
- Assistance in maintaining uncluttered space
- Books on tape
- Concrete examples
- Extra visual and verbal cues and prompts
- Follow a routine/schedule
- Graphic organizers
- Have students restate information
- No penalty for spelling errors or sloppy handwriting
- Peer or scribe note-taking
- Personalized examples
- Preferential seating
- Provision of notes or outlines

- Reduction of distractions
- Review of directions
- Review sessions
- Space for movement or breaks
- Support auditory presentations with visuals
- Teach time management skills
- Use of a study carrel
- Use of mnemonics
- Varied reinforcement procedures
- Work in progress check

### **Alternative Assessments**

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Performance tasks

Project-based assignments

Problem-based assignments

Presentations

Reflective pieces

Concept maps

Case-based scenarios

Portfolios

### **Benchmark Assessments**

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Skills-based assessment

Reading response

Writing prompt

Lab practical

### **Formative Assessment**

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- Load and Save Programs
- Prepare Workstation

### **Summative Assessment**

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- Classwork: Battles
- Quiz: Properties of the Tanks

- Test: Robocode

## Resources & Materials

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- College Board. AP CAsE Study Materials
- Eclipse IDE
- <http://robocode.sourceforge.net/>
- Internet
- Microsoft Office
- RoboCode IDE
- Student Handout
- SychonEyes
- Tony Gaddis: Starting Out with Java: Early Objects. 4/E., 2010, Pearson

## Technology

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- ClearTouch
- Computer
- Eclipse IDE
- Google Classroom
- Google Docs
- <http://robocode.sourceforge.net/>
- Internet
- RoboCode IDE

TECH.8.1.12	Educational Technology: All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.
TECH.8.1.12.A	Technology Operations and Concepts: Students demonstrate a sound understanding of technology concepts, systems and operations.
TECH.8.1.12.A.CS1	Understand and use technology systems.
TECH.8.1.12.B	Creativity and Innovation: Students demonstrate creative thinking, construct knowledge and develop innovative products and process using technology.
TECH.8.1.12.C	Communication and Collaboration: Students use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others.
TECH.8.1.12.D	Digital Citizenship: Students understand human, cultural, and societal issues related to technology and practice legal and ethical behavior.
TECH.8.1.12.E	Research and Information Fluency: Students apply digital tools to gather, evaluate, and use information.
TECH.8.1.12.F	Critical thinking, problem solving, and decision making: Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.

TECH.8.2.12.A	The Nature of Technology: Creativity and Innovation: Technology systems impact every aspect of the world in which we live.
TECH.8.2.12.B	Technology and Society: Knowledge and understanding of human, cultural and society values are fundamental when designing technology systems and products in the global society.
TECH.8.2.12.C	Design: The design process is a systematic approach to solving problems.
TECH.8.2.12.D	Abilities for a Technological World: The designed world is the product of a design process that provides the means to convert resources into products and systems.
TECH.8.2.12.E	Computational Thinking: Programming: Computational thinking builds and enhances problem solving, allowing students to move beyond using knowledge to creating knowledge.