

TEACHER GUIDE

Robot Algorithms

Session Objectives By the end of the session students should:	Evidence of Session Success Facilitators and observers should see:
<ul style="list-style-type: none"> • Be able to represent algorithmic processes without using a programming language. • Be able to implement an algorithm in a complete program. • Determine the result of code segments. 	<ul style="list-style-type: none"> • Students should be able to think through an algorithm to solve a common computing problem. • Students will prove their algorithm by demonstration. • Students should be able to identify the necessary inputs, processing, and outputs needed to implement an algorithm in a complete program.

Session Materials
<p>Students will need:</p> <ul style="list-style-type: none"> • The Participant Guide • AP CSP Exam Reference Sheet (AP CSP Student Handouts taken from the CED)

Preparing for the session

Review the questions and answers provided in the Participant Guide Key.

Hook Activity/Pre-Assessment (5-10 minutes)

- Have students watch the first video and explain what an algorithm is.
- Provide time for students to watch the second video individually and explain how the grid and the robot looks like on the AP test.

Mini Lesson (10 minutes)

- Using the whiteboard in Blackboard Collaborate, draw a grid. Talk about the properties of the Robot. Sharing a PDF on the screen, using a markup tool with students is also an option. Facilitators may assign markup capabilities to students.
- Mark the starting point for the Robot -- maybe an arrow to represent the Robots current direction. Mark on the grid the ending point the Robot must reach.
- List the methods for the Robot:
 - ROTATE_RIGHT() //always 90 degrees clockwise
 - ROTATE_LEFT //always 90 degrees counterclockwise
 - MOVE_FORWARD //one step
 - CAN_MOVE //check to see if MOVE_FORWARD is possible
- Demonstrate possible movements for the Robot on the whiteboard grid. Go over the problem presented in mini lesson 2.

Guided Problem-Solving Activities (35 minutes)

- Have the students solve the 8 robot problems in their Participant Handout.
- Depending on the class, students may work alone or in pairs
- If students will be solving problems in groups, do not give them more than 15 minutes in the break out rooms. Spend the rest of the time answering questions when students return.
- If time is available, have students look at the additional resources.

Closing/Reflection (5 minutes)

- Have students answer the reflection question.
- Remind students of the Online Student Support Module AP CSP: Robot Algorithms (asynchronous module) that goes along with this topic. They will find summaries, readings, videos, and practice problems there. You will need to provide information to students so that they may register to access this resource.

Image Credits

Participant Guide

- Trophy images all from pixabay.com (free for commercial use).