

DANCING/SINGING ROBOT

STEM CLUB ACTIVITY

CHALLENGE

Shimon is a marimba-playing robot that composes and plays its own music (<https://www.youtube.com/watch?v=l9OUbqWHOSk>). Can you think of advantages robots might have when playing instruments, or even dancing? One of the human members of Shimon's band has a prosthesis that uses robotic assistive technology to help him play the drums. What type of music would you be able to create with the help of a robot that you wouldn't be able to do on your own?

This month, your challenge is to design, build, program, test, and share a robot that makes music and dances along. You might work within your club to compose an entire song and dance routine with all your robots working together, just like Shimon's band. Have fun!

VOCABULARY

Loop: In computer programming, a loop is a programming structure that repeats a set of instructions until a certain condition is met.

How could you use a loop in your musical dancing robot?

DO

1. Begin by choosing your materials. Will you use the LEGO® Mindstorms® EV3? Hummingbird™ Bit? Scratch programming and craft supplies?
2. Next, design your song and dance you would like your robot to perform.
3. Build and program your robot to carry out your plan.
 - If you are using craft supplies, program your own animation in Scratch to go along with your craft supply robot.
 - Consider including the music within your Scratch animation.

GRADES: 4-8

SKILL LEVEL: Beginning, Intermediate, or Advanced options

GROUP SIZE: 1-3 students per robot

TIME: 2-3 hours

IOWA COMPUTER SCIENCE STANDARDS: 1B-AP-15 Test and debug (identify and fix errors) a program or algorithm to ensure it runs as intended.

NEXT GENERATION SCIENCE STANDARDS: MS-ETS1-4 Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.

MATERIALS:

- Computer with internet access
- Robotics kit: LEGO® MINDSTORMS® EV3, Hummingbird Bit Premium Kit, or Ozobot or Edison Robot
- Adhesives: Glue gun and/or masking tape
- Scissors
- Craft supplies (optional): cardboard, construction paper, markers/colored pencils/crayons, tubes, disposable cups, popsicle sticks, craft foam sheets, and anything else you would like to use



REFLECT

1. What did you enjoy about this activity?
2. What challenges did you face along the way, and how did you solve them?
3. Did your robot end up different from your original plan?



APPLY

1. How is programming a song routine similar to composing a piece of music or writing dance choreography?
2. What robot building and/or programming techniques did you learn that you can apply to future robots you design?



CAREER CONNECTION: COMPUTER SCIENTIST

Computer scientists write programs to solve problems and reimagine the way we use technology. For more information about Iowa State University's Computer Science program, visit <https://www.cs.iastate.edu/content/about-us>.



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