

Curriculum to Use the Sphero RVR in IT-Adventures

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Presentation Timeline

- Project Overview
- Semester Goals
 - Robotics
 - Smart-IT
- Technical Challenges
 - Robotics
 - Smart-IT
- Conclusion

Project Overview

IT Adventures is a group at Iowa State that seeks to inspire students to pursue dreams in IT and STEM fields. This is done through three programs for high school students:

- Robotics (Introduction program)
- Smart-IT (Advanced programming)
- Cyber Defense (Cyber Defense program, similar to ISEAGE)

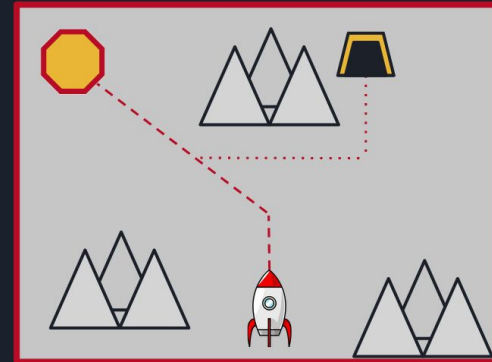
In the last year, they updated their kits for Robotics and Smart-IT, so we've been tasked with creating new curriculum and challenges for the Robotics and Smart-IT programs.



Semester Goals - Robotics

- Implement, test, and finalize remaining lesson plans and challenges
- Construct the final challenge for IT-Olympics
- Prep multiple small challenges for the competition
- Take feedback and iterate on lessons as they are done

Oct 25	Practice Challenge 1:
Nov 1	Button & Buzzer [Digital I/O]
Nov 8	Servo & Slide Dimmer [Analog I/O]
Nov 15	Catch-up Week
Nov 22	Thanksgiving Break
Nov 29	Proximity Sensor
Dec 6	Practice Challenge 2: Factory Robot
Dec 13	Catch-up Week
Return from Winter Break	Optional Learning Challenge: Remote Trigger
	Prepare for IT-Olympics Competition
April	IT-Olympics Competition at ISU!



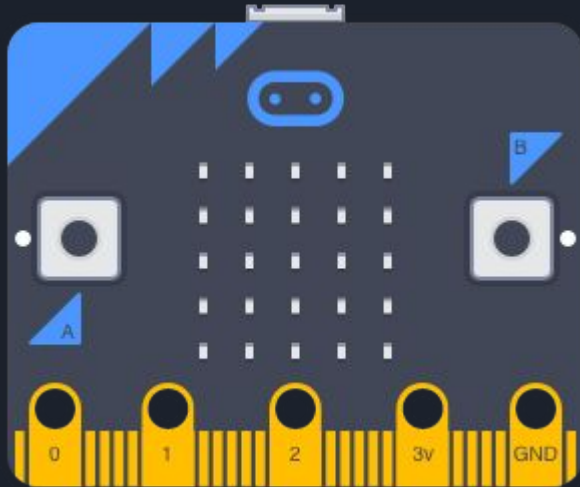
Semester Goals - SmartIT

- Implement, test, and finalize remaining lesson plans and challenges for both our python and RVR learning
- Construct the final challenge for IT-Olympics
- Prep multiple small challenges for the competition
- Take feedback and iterate on lessons as they are done

October 25	Monthly Challenge
November 1	Lesson: Files
November 8	Lesson: Cyphers and Encryption
November 15	Lesson: Google Dorks
November 22	Lesson: Inheritance
November 29	Monthly Challenge
December 6	Lesson: Scripting
December 13	Monthly Challenge
Return from Winter Break	Course Review
	Prepare for Competition
April	IT-Olympics Competition at ISU



Technical Challenges - Robotics



1. Final Project

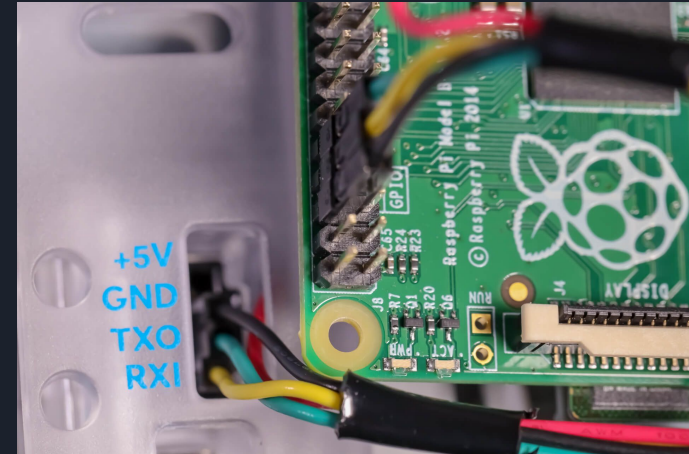
- Requires use of multiple sensors and preferably multiple teams
- Limited SDK for micro:bit is greatly limiting native RVR capabilities
- Requires a cheap, durable field that teams can make to practice with (*without* requiring another team to practice against as well)

2. Limited micro:bit SDK

- The primary SDK for the micro:bit doesn't have direct access to sensors, at least through the block-coding
 - Focus of the curriculum is block-coding, as this is meant to be a basic introduction to programming

Technical Challenges - SmartIT

1. Raspberry Pi to Sphero RVR communication
 - a. Sphero did not provide clear definition of how to resolve all dependencies
 - b. Required to teach Linux basics, SSH, VNC, and other tools to use
 - c. Need clear and concise instructions as multiple schools will follow along
2. Driven by Raspberry Pi
 - a. 3rd party Python code is virtually non-existent
 - b. Code provided by Sphero is good, but limited
 - i. Can be difficult to follow along
 - c. JSON required to learn & teach for IR and color sensor inputs
 - d. Cannot debug RVR code in Python IDE
 - e. Limited amount of test subjects to help test and develop new code

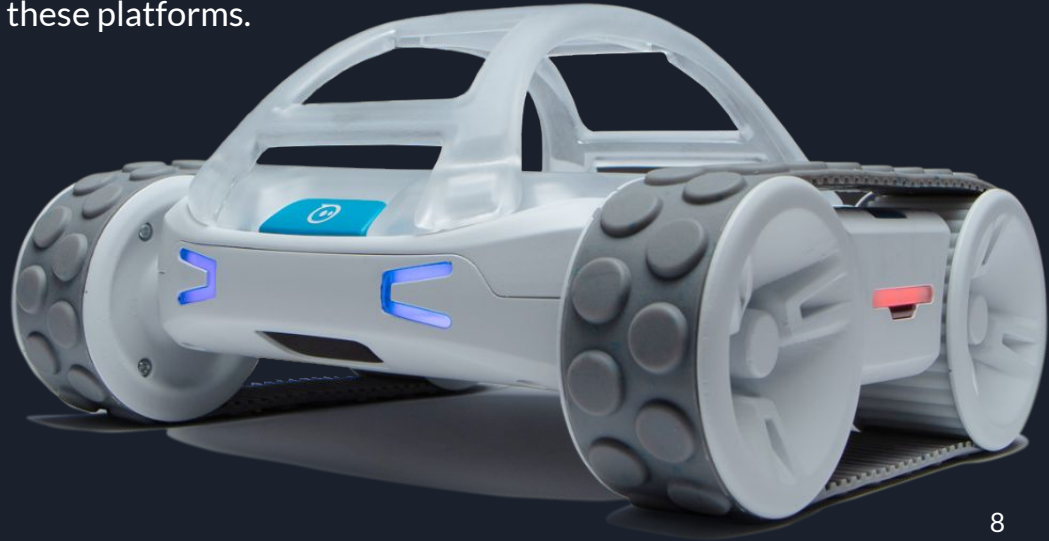




Conclusion

Overall, the two sets of curriculum are coming along well, generally being done weeks before being published. While there have been some technical issues with both platforms, these are either being solved or engineered around, keeping in mind the goal that high school students will be interacting with this curriculum and these platforms.

The focus in the coming weeks (for both groups) will be on both finalizing semester 1 and really deciding on the semester 2 challenges.



Thank you for listening!

Questions or Concerns?