

TRIK Studio

Educational robot programming environment

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09.09.2017

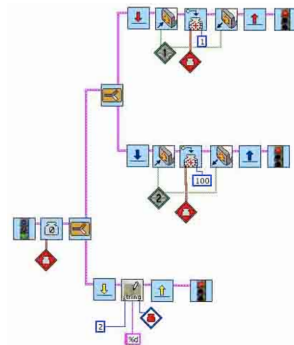
Educational robotics

- ▶ LOGO, 1967
- ▶ Lego Mindstorms, 1998, 2009, 2013
- ▶ TRIK, 2013



Existing visual programming tools for robots

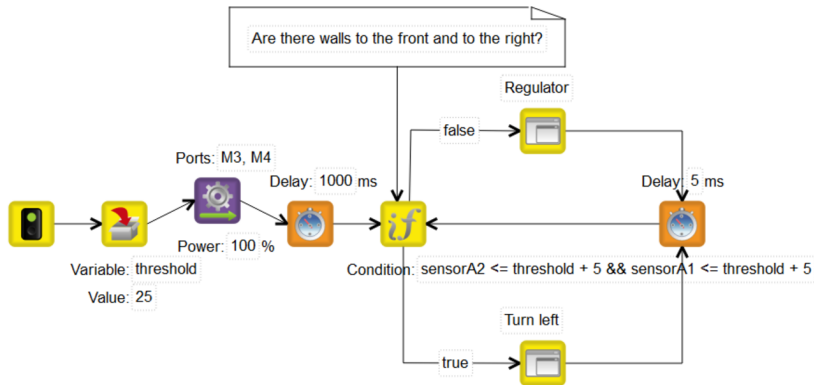
- ▶ NXT-G, EV3-G
- ▶ Robolab
- ▶ Scratch
 - ▶ S4A, mBlock, Enchanting, ScratchDuino, Blockly, App Inventor
- ▶ 12Blocks
- ▶ Open Roberta
- ▶ Ardublock
- ▶ ...



TRIK Studio

- ▶ Lego Mindstorms NXT/EV3 and TRIK robotic kits
 - ▶ control-flow and data-flow languages
 - ▶ a number of textual languages
- ▶ Several program execution modes
 - ▶ 2D simulator
 - ▶ debugging on a PC + sending commands to robots over USB, Bluetooth and Wi-Fi
 - ▶ code generation and binary execution on robots
- ▶ Cross-platform (Windows, Mac OS X, Linux)
- ▶ Open-source and free to use
 - ▶ Third-party plugins, like Pioneer quadcopter or YoTik kit
- ▶ Currently supports English, Russian and French languages

Visual Language



QReal DSM platform

- ▶ Metamodeling tools
 - ▶ metaeditor, shapes editor etc.
- ▶ Generic kernel
 - ▶ common visual IDE tools
- ▶ Language plugins
 - ▶ automatically generated from language metamodels
- ▶ Tool plugins
 - ▶ code generators, interpreters, version control support, ...



Online education

- ▶ MOOC on educational robotics (in Russian)
 - ▶ <https://stepik.org/s/7qe3xj4Z>
- ▶ Automatic checking of solution correctness
 - ▶ based on 2D model simulation with specified constraints on robot behavior
- ▶ Web-based 2D model environment with the ability to replay robot track

Conclusion

- ▶ approx. 10K users across the globe
- ▶ Russian, English and French languages support
- ▶ Written in C++/Qt, approx. 100K LOC (+ 120K LOC of QReal core)
- ▶ Cross-platform, open-source and free to use
 - ▶ <https://github.com/qreal/qreal>
 - ▶ <http://blog.trikset.com/p/trik-studio.html>

Demonstration