

# Whisker: Automated Testing of Scratch Programs

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# What is Scratch?

# Why Scratch?

# Why Scratch? Scratch's online community

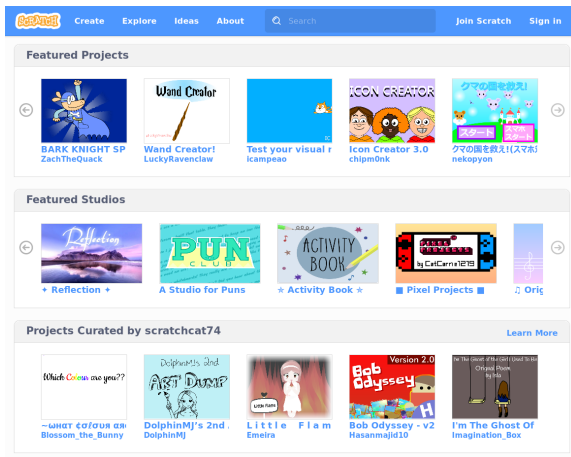


Figure: Scratch's online repository

# Why Scratch? Scratch's online community

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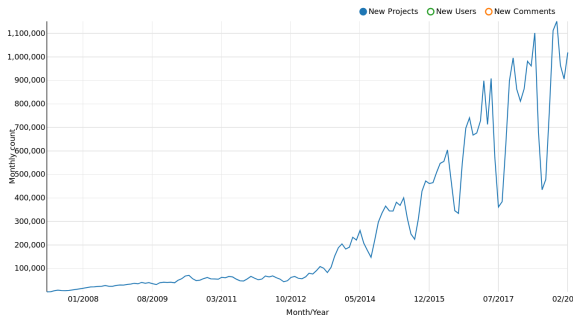


Figure: Submitted Scratch projects per month

- ▶ over 38 million projects shared
- ▶ over 36 million users

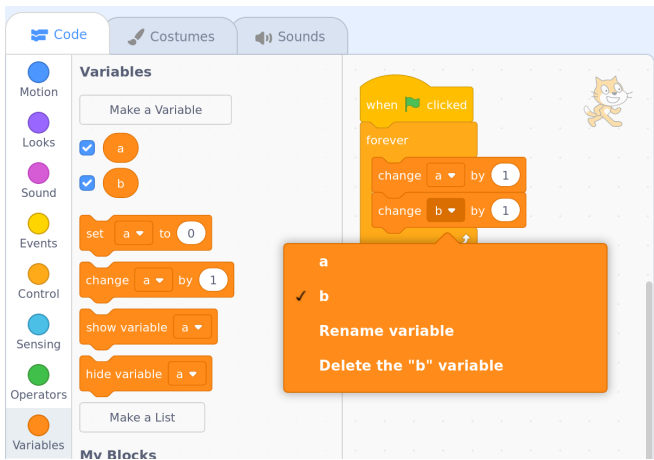
## *Why Scratch? Good introduction to programming*

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Many schools and universities deploy Scratch as a gentle introduction to programming

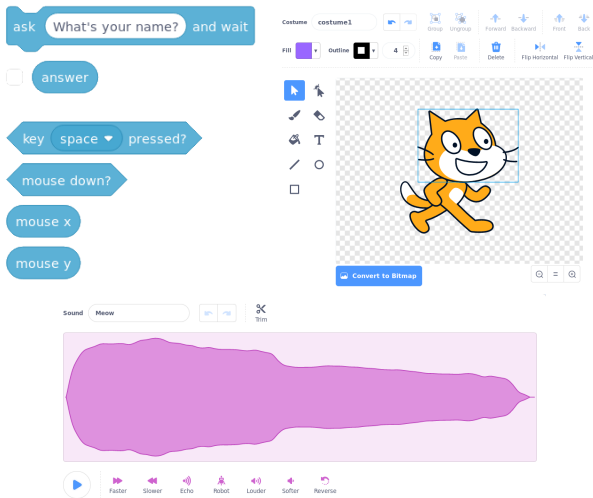
# Why Scratch? Good introduction to programming

Intuitive: Block based code system only allows valid code



# Why Scratch? Good introduction to programming

Engaging: User interaction, easy integration of graphics and sounds





# Why automated testing for Scratch?

## *Why automated testing for Scratch?*

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Grading Scratch assignments is very time consuming

- ▶ every project has to be opened individually
- ▶ programs require large amounts of user interaction

Some courses are attended by a large number of students ( $> 200$ ), making manual grading infeasible.

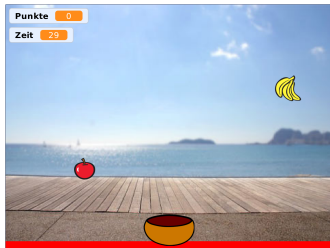
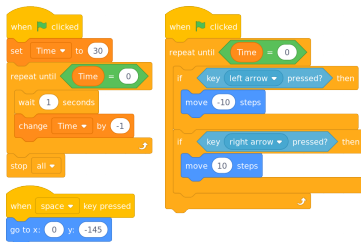
Students can also use automated tests to get feedback for their own implementations.

# Why is automated testing for Scratch difficult?

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Usually functional testing is deployed to automatically assess student solution, but this is not straightforward for Scratch

- ▶ Scratch is only accessible through its GUI
- ▶ no functions that take parameters and return a value
- ▶ no textual IO, keyboard and mouse input and graphical output



# How to automatically test Scratch programs?

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Approach: Test on a system level by automating Scratch's IO

