

# Automatic Detection of Bad Programming Habits in Scratch

## A Preliminary Study

Jesús Moreno León, Gregorio Robles

jesus.moreno@programamos.es, grex@gsyc.urjc.es  
GSyC/Libresoft, Universidad Rey Juan Carlos

FIE 2014, Madrid, October 23 2014





(cc) 2014 Gregorio Robles and Jesús Moreno León  
Some rights reserved. This work licensed under Creative Commons  
Attribution-ShareAlike License. To view a copy of full license, see  
<http://creativecommons.org/licenses/by-sa/3.0/> or write to  
Creative Commons, 559 Nathan Abbott Way, Stanford,  
California 94305, USA.

Some of the figures have been taken from the Internet  
Source, and author and licence if known, is specified.

For those images, *fair use* applies.

# Goal of our paper

Are bad programming habits a common practice in the Scratch community?



# Audience

Who should/could be interested in this talk?

- Educators teaching to code
- Students learning to code
- Programming learning tools developers

## Learning to code with Scratch

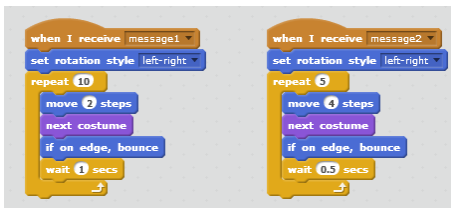
- Success to teach both basic and advanced programming concepts
- Bad programming habits detected
- Lack of automatic tools to check for *correctness*
- Hairball: Lint-inspired Static Analysis of Scratch Projects

# Bad programming habits with Scratch: objects naming

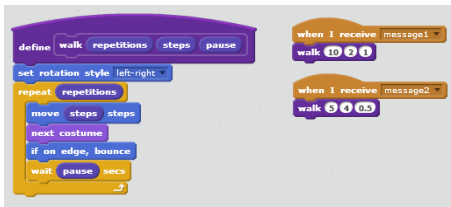


Sprites naming

# Bad programming habits with Scratch: repetition code



## Repetition code



## Creating blocks to avoid repetition code

# Hairball plug-ins development

ucsb-cs-education / **hairball** ★ Star 4 Y Fork 2

branch: master **hairball / hairball / plugins / duplicate.py**

bboe on Apr 15 Merge caching support.

2 contributors

We developed two plug-ins for Hairball to automatically detect bad programming habits:

• convention.SpriteNaming

• duplicate.DuplicateScripts

44 lines (34 sloc) 1.56 kb

Raw Blame History

```

1  """This module provides plugins for basic duplicate code detection."""
2
3  from __future__ import print_function
4  from hairball.plugins import HairballPlugin
5
6  class DuplicateScripts(HairballPlugin):
7
8      """Plugin that detects duplicate scripts within a project."""
9
10
11     def __init__(self):
12         """Initialize an instance of the DuplicateScripts plugin."""
13         super(DuplicateScripts, self).__init__()
14         self.total_duplicate = 0
15         self.list_duplicate = []
16
17     def finalize(self):
18         """Output the duplicate scripts detected."""
19         if self.total_duplicate > 0:

```



# Scratch projects repository analysis

	Default names	Duplicated scripts	Defined blocks
Projects	79	62	17
Mean	5.94	7.23	1.11
Median	3	2	0
Maximum	67	71	25

**Table:** Analysis of 100 ramdonly downloaded projects

# Future Work

- Extend the scope of the study developing new plug-ins
- Analyze dataset with 5 years data from Scratch website
- Dr.Scratch: <http://drscratch.programamos.es>

Background picture: Simon Cunningham

# Automatic Detection of Bad Programming Habits in Scratch

## A Preliminary Study

Jesús Moreno León, Gregorio Robles

jesus.moreno@programamos.es, grex@gsyc.urjc.es  
GSyC/Libresoft, Universidad Rey Juan Carlos

FIE 2014, Madrid, October 23 2014

