

Automatic Detection of Bad Programming Habits in Scratch

A Preliminary Study

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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 how to code
- Students learning to program
- Developers of programming learning tools

Scratch

Learning to code with Scratch

- Scratch has shown to be successful in teaching basic and advanced programming concepts
- However, bad programming habits have been detected
- There are no automatic tools to check for *correctness*
- Hairball: lint-inspired static analysis of Scratch projects

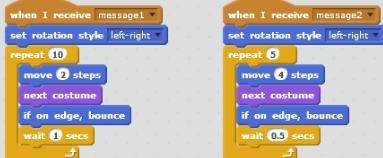
Bad programming habits with Scratch (I)



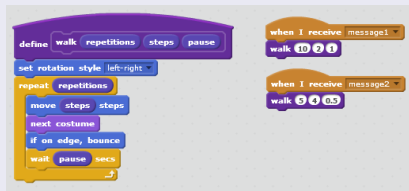
Bad/default naming of sprites

Bad programming habits in Scratch (and II)

Example of repeated code



Solution to avoid repeated code






Blocks should be created to avoid repetition of code

Hairball plug-ins development

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

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

 bboe on Apr 15 Merge caching support.

2 contributors  

44 lines (34 sloc) | 1.5k

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

- ① convention.SpriteNaming
- ② duplicate.DuplicateScripts

```

1  """This module
2
3  from __future__ import
4  from hairball
5
6
7  class DuplicateScripts
8
9  """Plugin
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:

```

Navigation icons: back, forward, search, etc.

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 Scratch projects

Future Work

- ① Extend the scope of the study developing new plug-ins
- ② Analyze dataset with 5 years of data from the Scratch website
- ③ Dr. Scratch (alpha version): <http://drscratch.programamos.es>

Background picture: Simon Cunningham

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