Why should all kids learn programming?
@Felienne

How Do Kids Program in the Wild?
@Felienne

Do Kids Program
in the Wild?
@Felienne

Do Kids Program in the Wild?
YES!

Anybody can learn | Cod

https://code.org

LEARN TEACH STATS HELP US ABOUT Sign in

An Hour of Code for every student.

285,943,838 served

Join us Try it

Watch the video

13,480,772 student accounts on Code Studio

Every student in every school should have the opportunity to learn computer science

Take the diversity pledge I agree Join 2,233,252 others

Hour of Code
Anybody can learn. Start today

Students
Explore our courses

Educators
Teach your students

Advocates
Support diversity in computing

Scratch - Imagine, Progr

https://scratch.mit.edu

Maak Ontdek Overleg Over Help Zoeken Word Scratcher Inloggen

Create stories, games, and animations
Share with others around the world

A creative learning community with 17.603.341 projects shared

OVER SCRATCH | VOOR ONDERWIJZERS | VOOR OUDERS

Uitgelichte projecten

Famous Scientists
-Star-Dusty-

Paw Pals Halloween
tinkerpixierule

♦Learning Mandarin | E
amy482004

Web Hunt
applepiesleth

Cameo Creator
-little-

Uitgelichte studio's

Songs Made In Scratch N

Scratchers Around The W

Lyrics Taken Literally

✪ Learn Creatively ✪

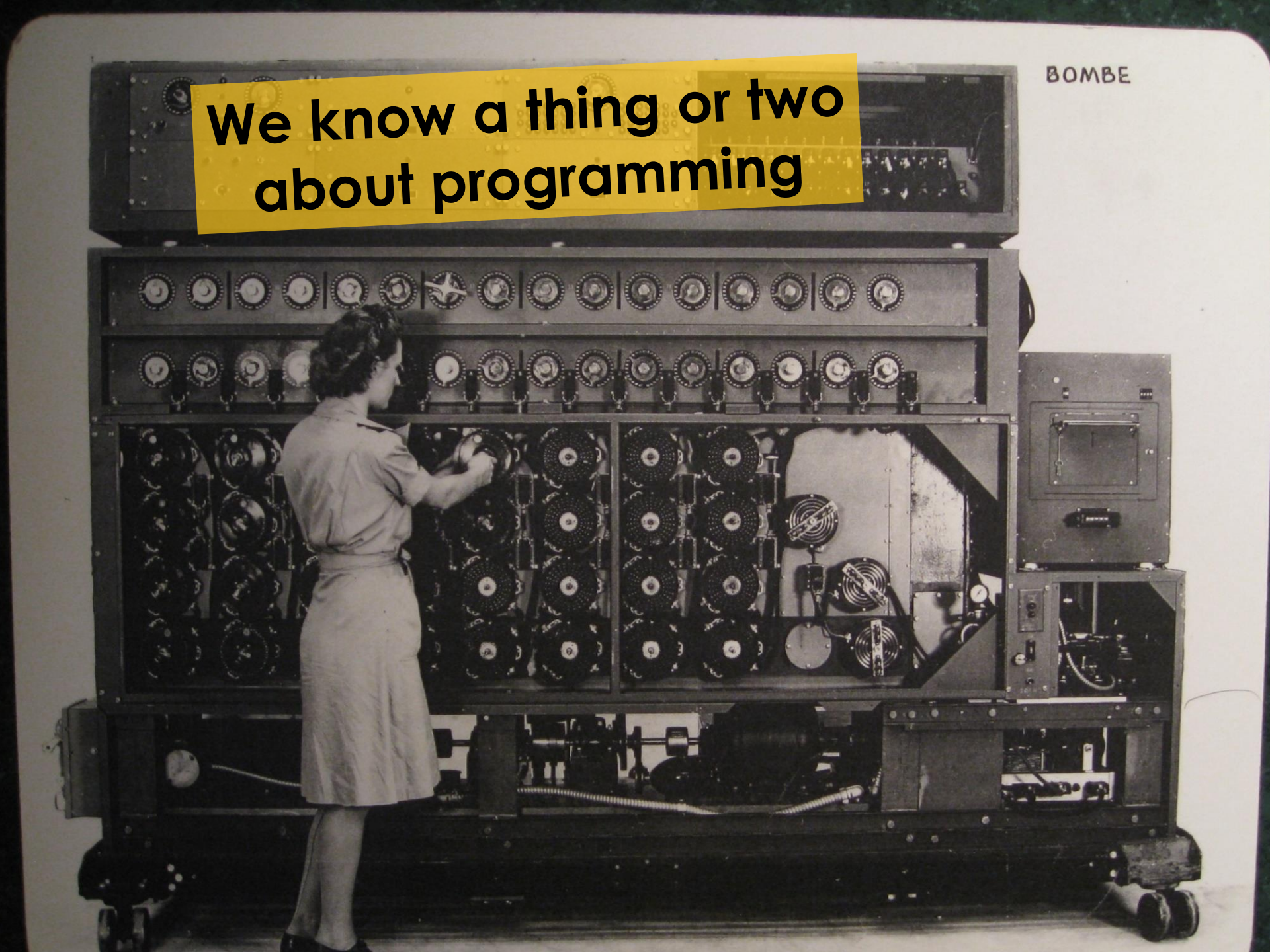
Codeca

Projecten beheerd door Fuzzbutt

Meer leren

Just a toy?

Or do they write good code?



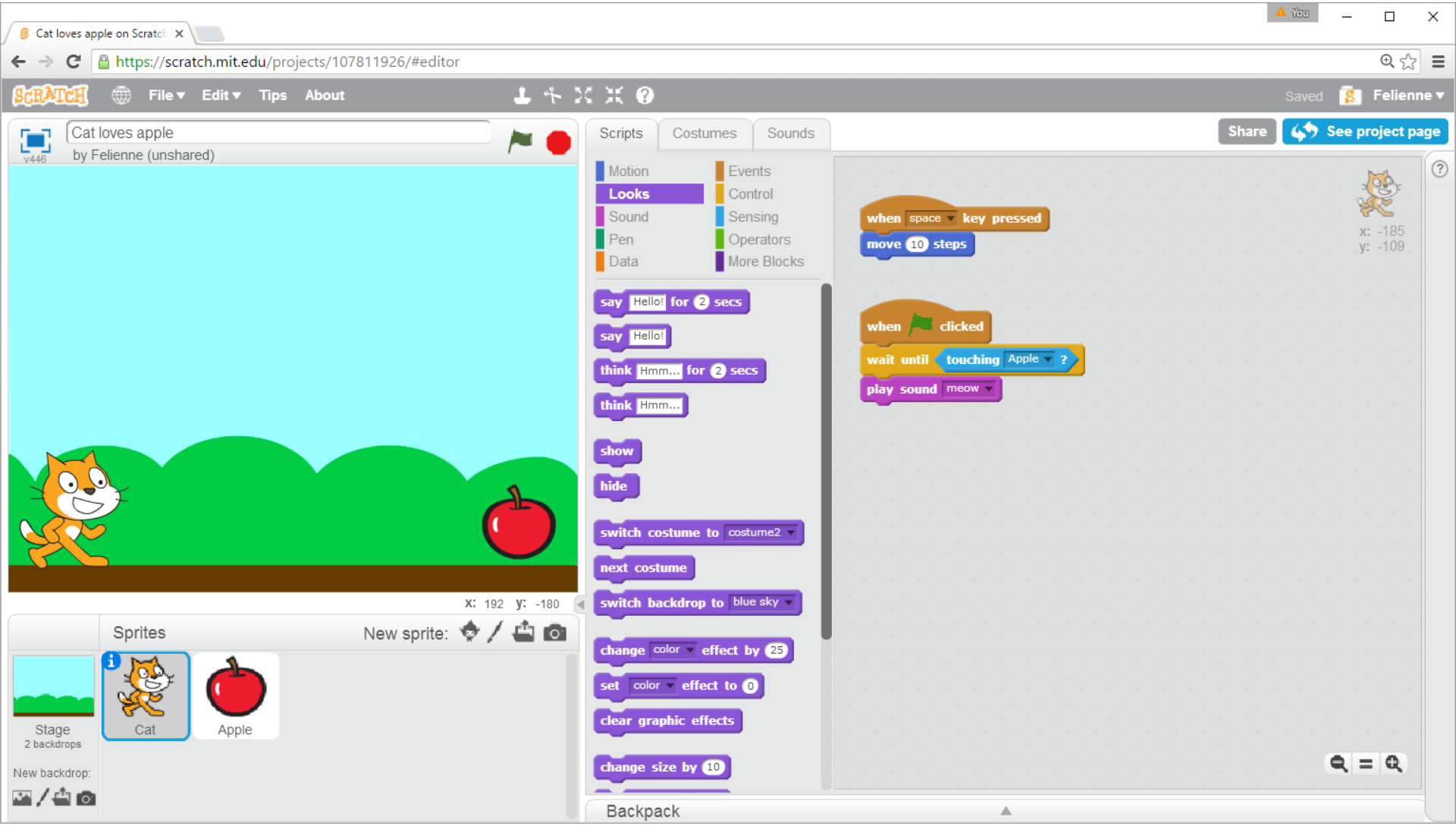
We know a thing or two about programming

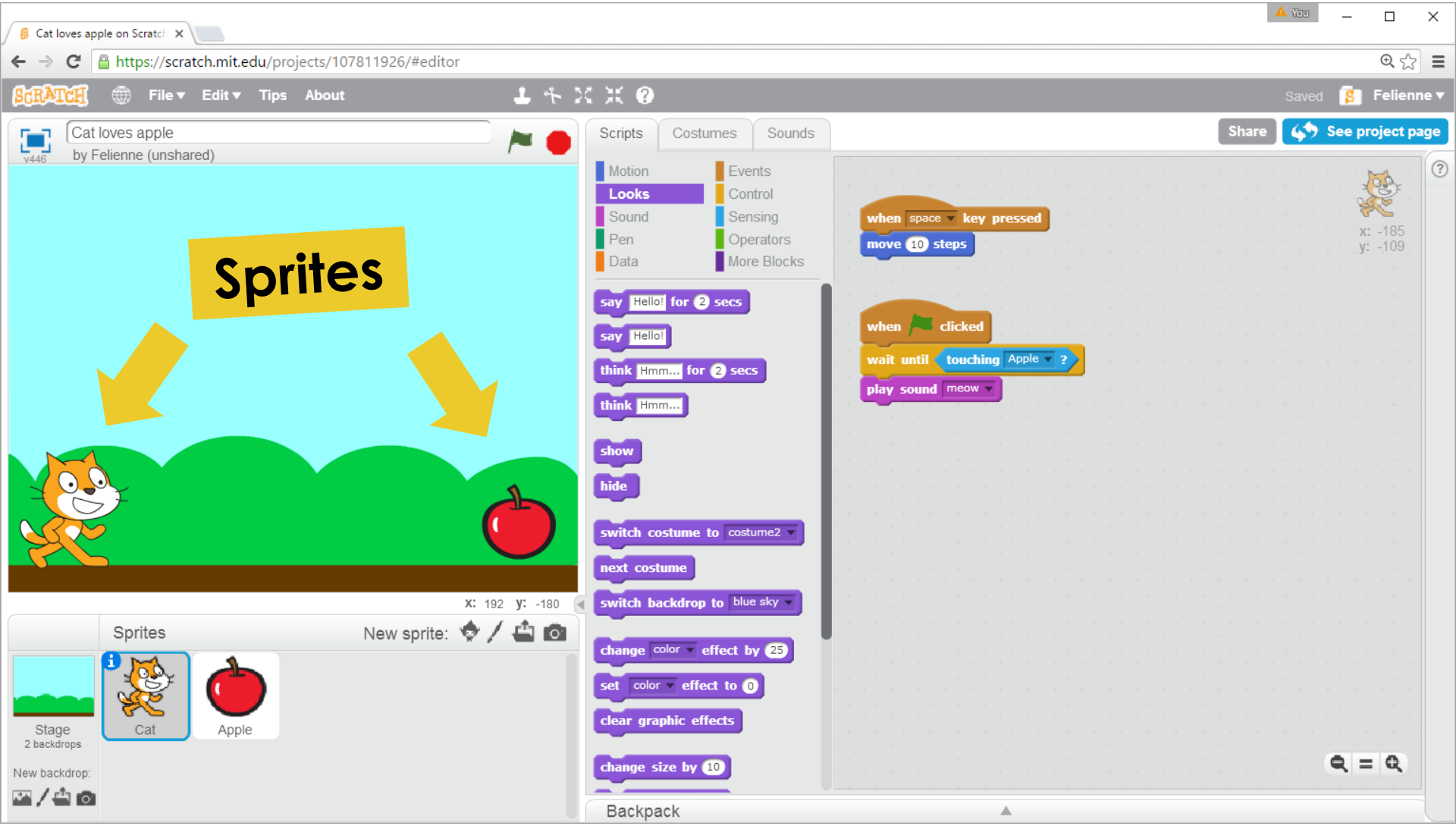
Object oriented
programming
AWN
TING

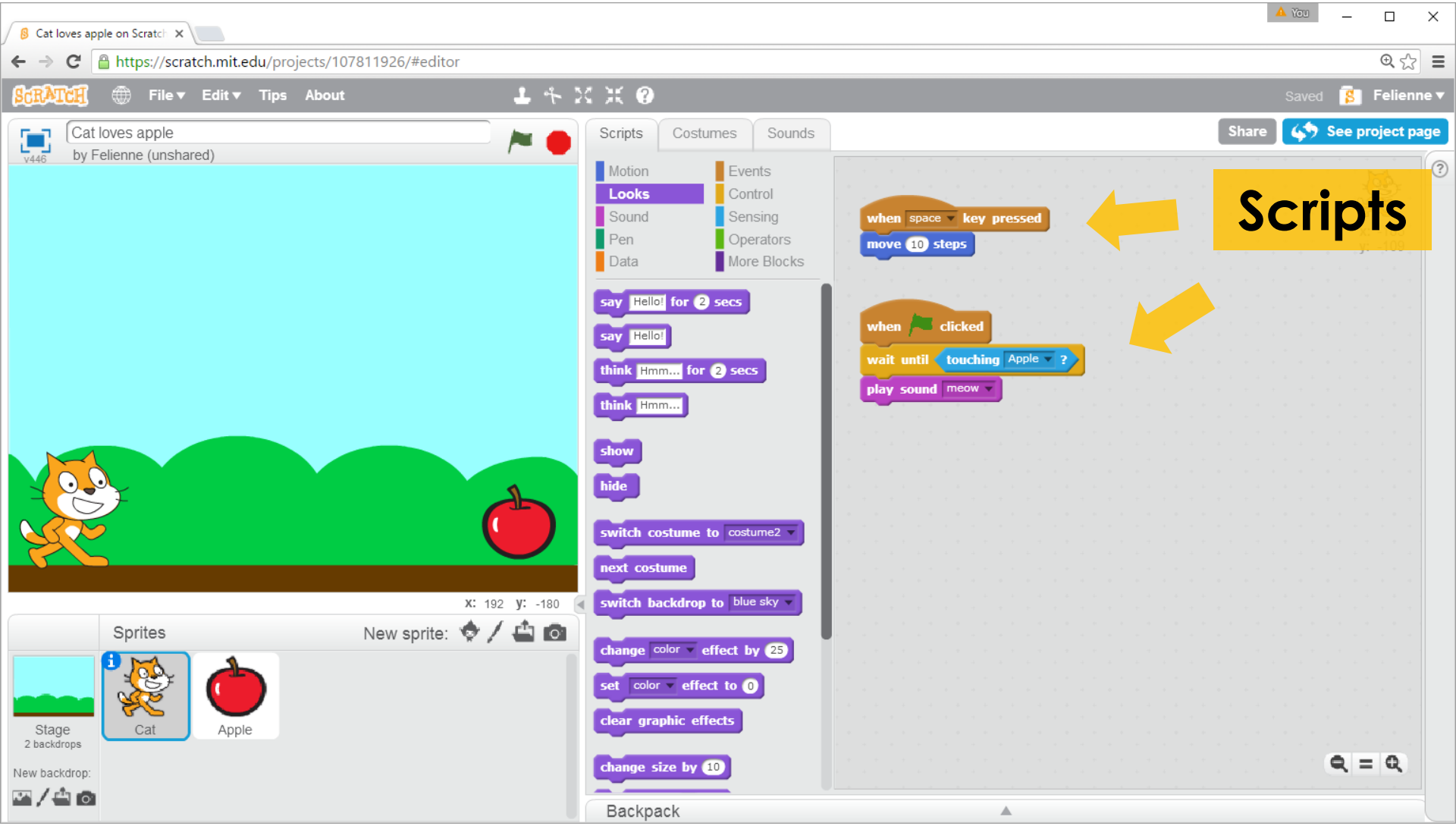
Smells and
refactorings

VAIO
Does code smells matter?

The Scratch programming language




Cat loves apple on Scratch
https://scratch.mit.edu/projects/107811926/#editor
File
Edit
Tips
About
Saved
Felienne
Cat loves apple
by Felienne (unshared)
Sprites
Scripts
Costumes
Sounds
Share
See project page
Motion
Looks
Sound
Pen
Data
Events
Control
Sensing
Operators
More Blocks
when space key pressed
move 10 steps
when clicked
wait until touching Apple ?
play sound meow
say Hello! for 2 secs
say Hello!
think Hmm... for 2 secs
think Hmm...
show
hide
switch costume to costume2
next costume
switch backdrop to blue sky
change color effect by 25
set color effect to 0
clear graphic effects
change size by 10
x: -185
y: -109
x: 192 y: -180
Sprites
New sprite:
Stage
2 backdrops
New backdrop:
Cat
Apple
Backpack


Cat loves apple on Scratch
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Felienne
Cat loves apple
by Felienne (unshared)
Scripts
Costumes
Sounds
Share
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Events
Control
Sensing
Operators
More Blocks
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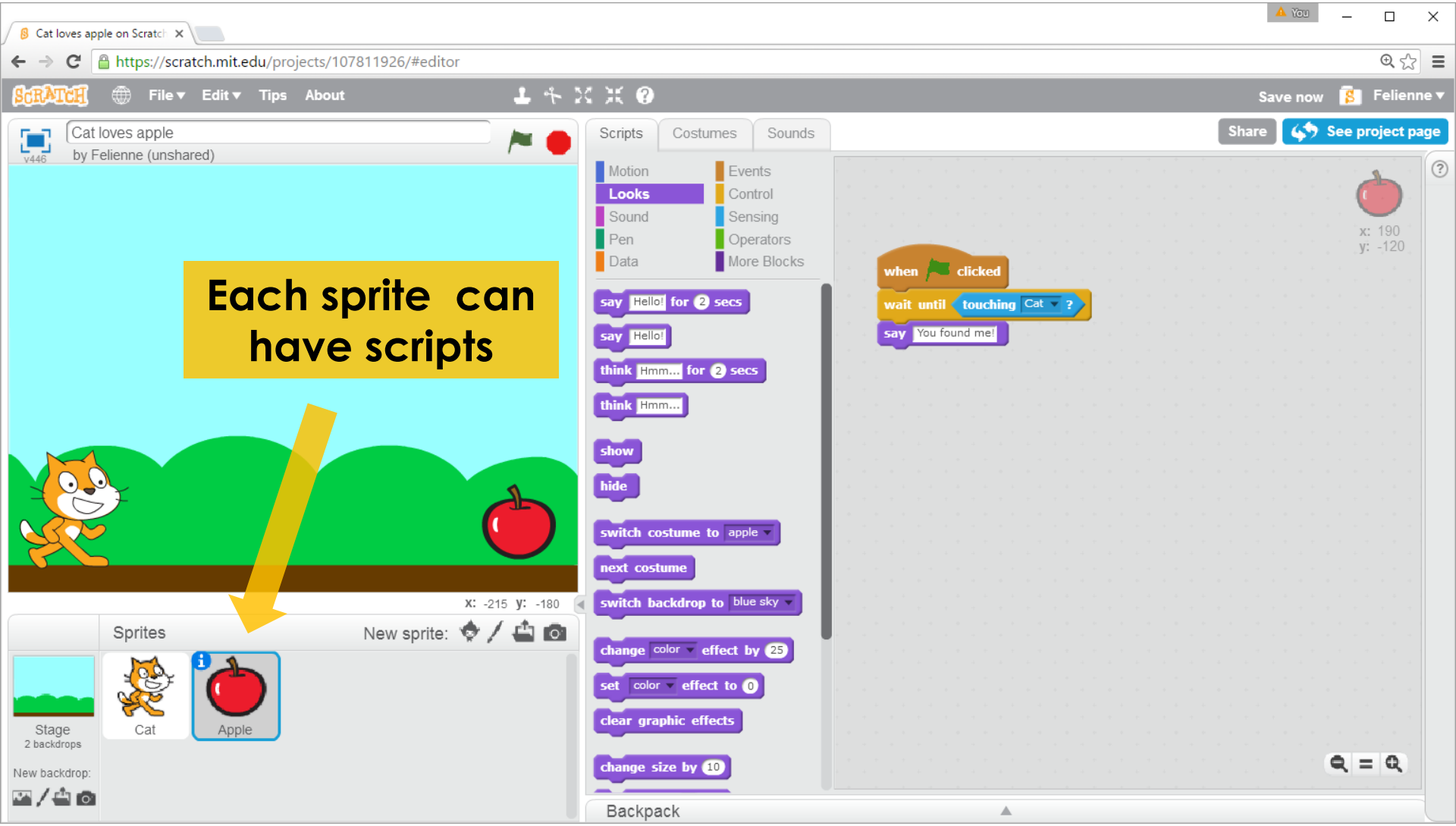
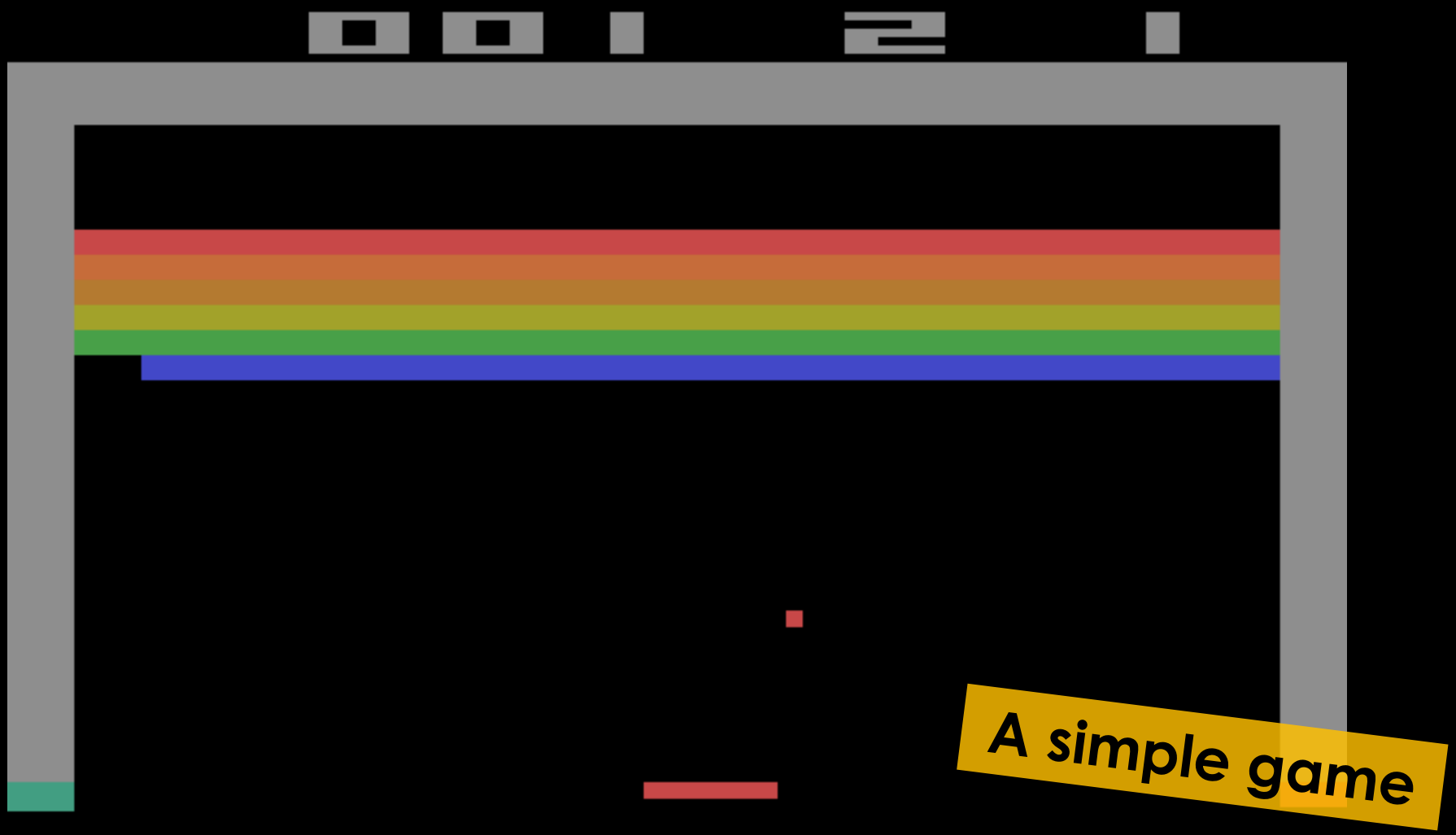
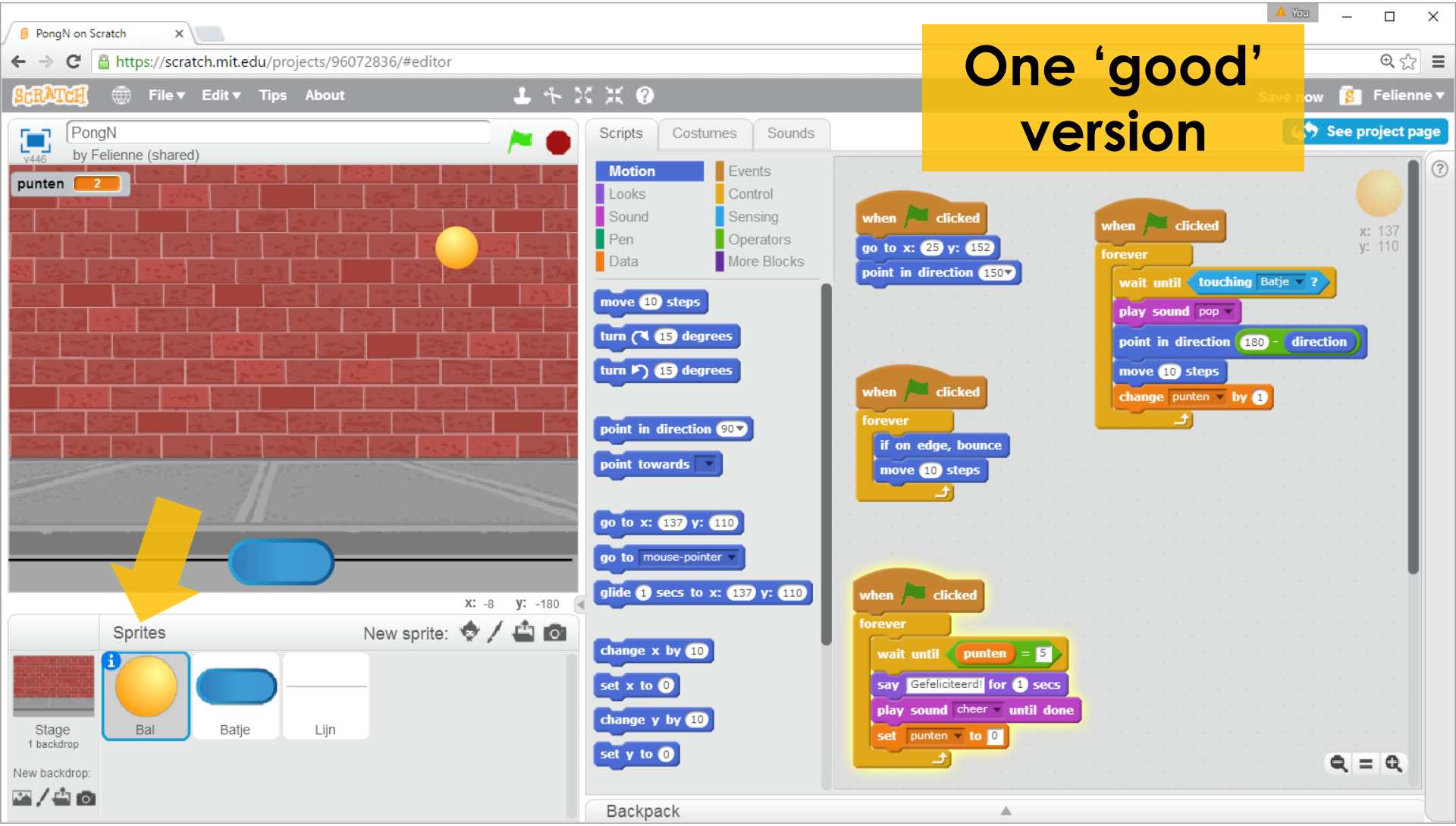
say Hello!
think Hmm... for 2 secs
think Hmm...
show
hide
switch costume to costume2
next costume
switch backdrop to blue sky
change color effect by 25
set color effect to 0
clear graphic effects
change size by 10
when space key pressed
move 10 steps
when clicked
wait until touching Apple ?
play sound meow
Scripts
x: 192 y: -180
Sprites
New sprite:
Stage
2 backdrops
New backdrop:
Cat
Apple
Backpack


Cat loves apple on Scratch
https://scratch.mit.edu/projects/107811926/#editor
File
Edit
Tips
About
Save now
Felienne
Cat loves apple
by Felienne (unshared)
Each sprite can have scripts
Scripts
Costumes
Sounds
Share
See project page
Motion
Looks
Sound
Pen
Data
Events
Control
Sensing
Operators
More Blocks
say Hello! for 2 secs
say Hello!
think Hmm... for 2 secs
think Hmm...
show
hide
switch costume to apple
next costume
switch backdrop to blue sky
change color effect by 25
set color effect to 0
clear graphic effects
change size by 10
when clicked
wait until touching Cat ?
say You found me!
x: 190
y: -120
x: -215 y: -180
Sprites
New sprite:
Stage
2 backdrops
New backdrop:
Cat
Apple
Backpack

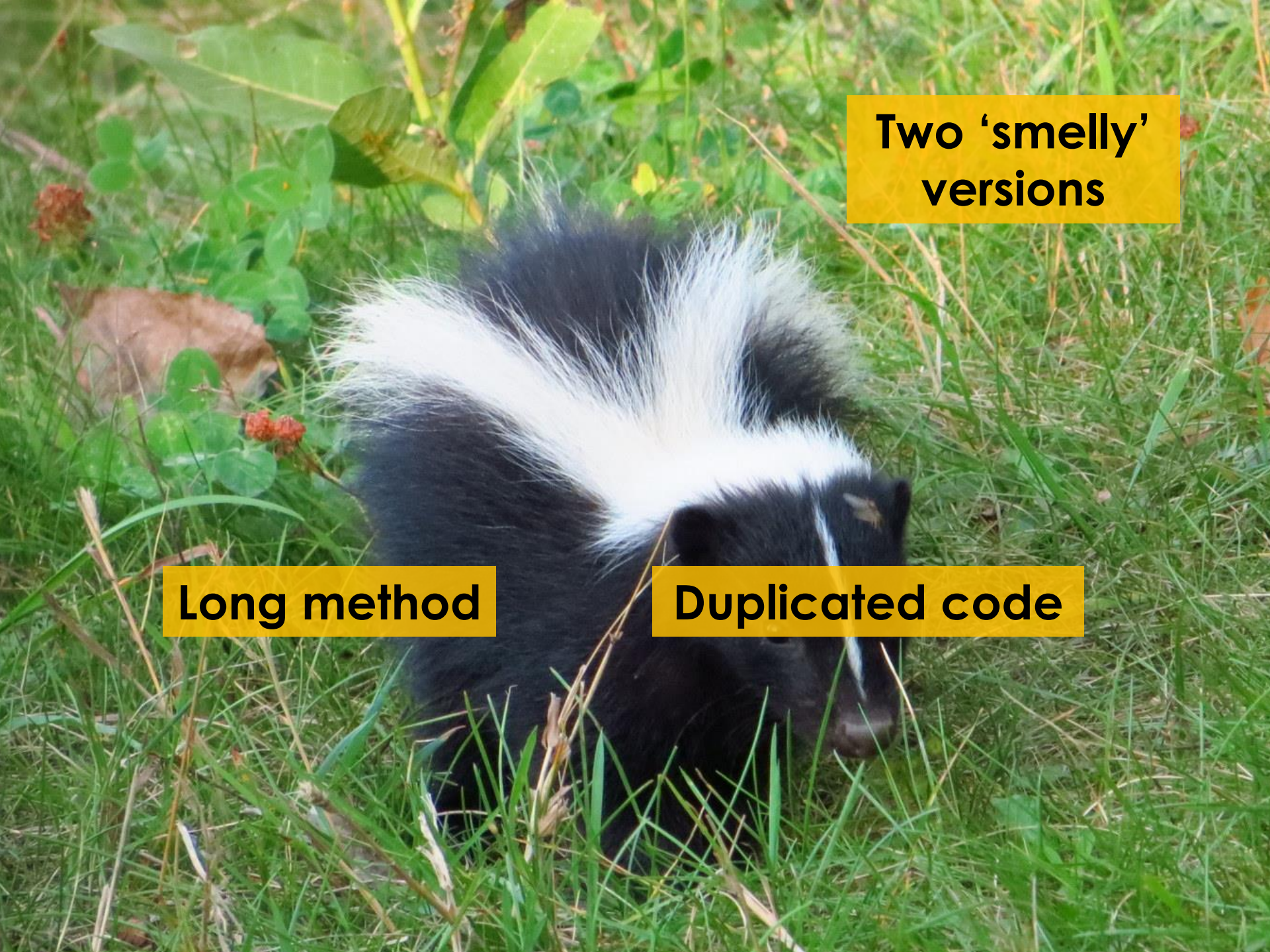
Do code smells
matter to kids?

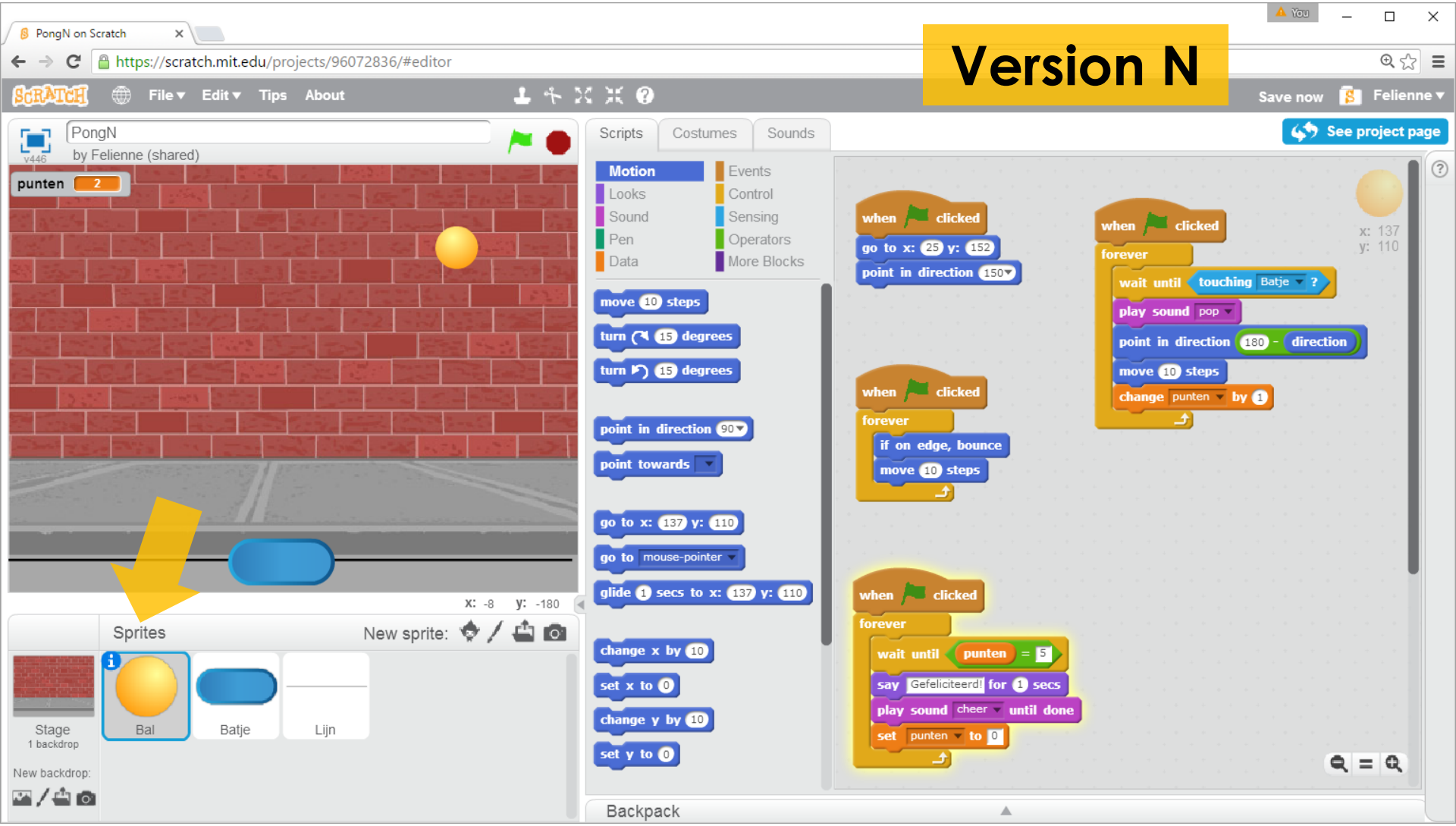

A simple game

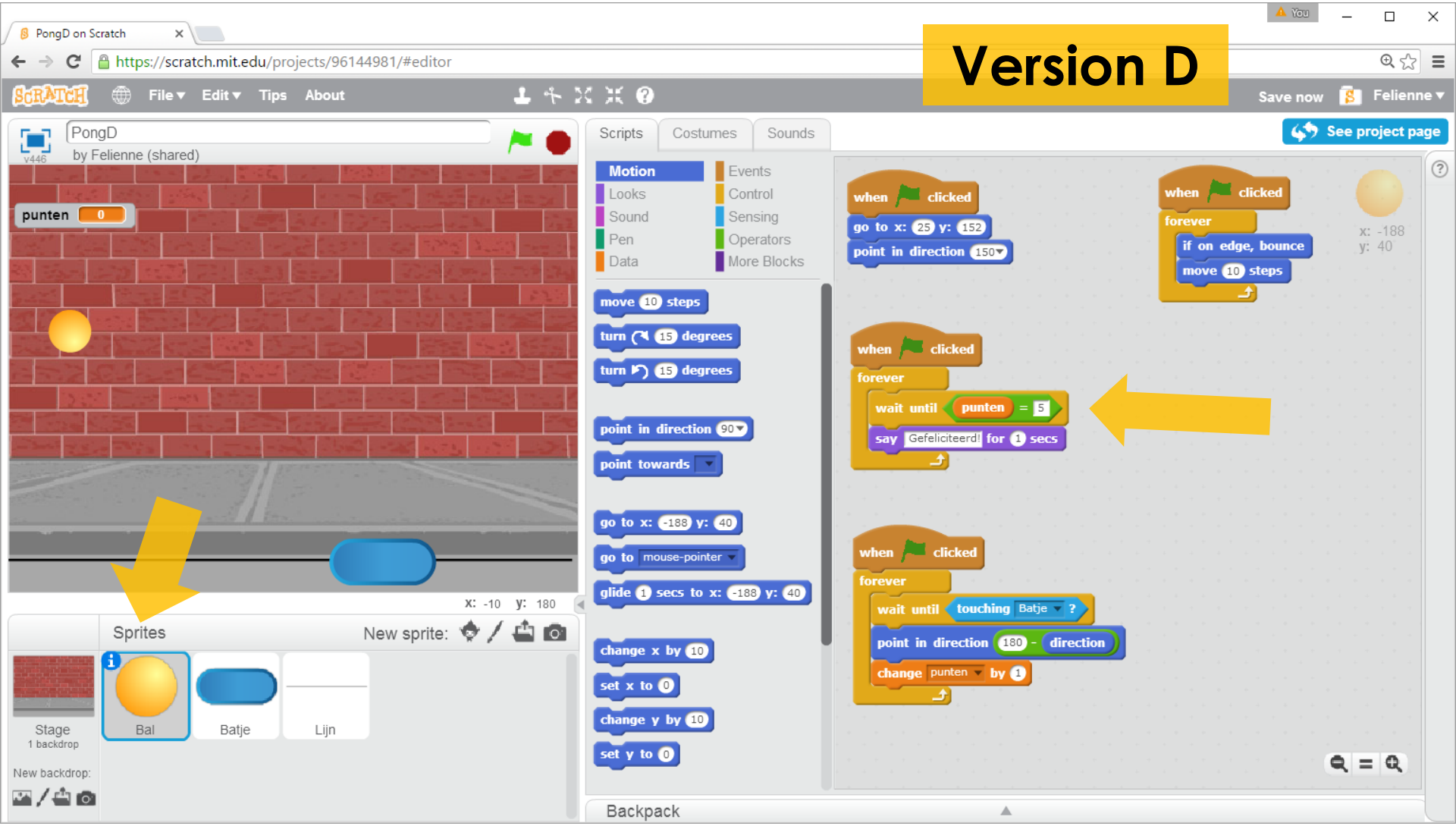


One 'good' version

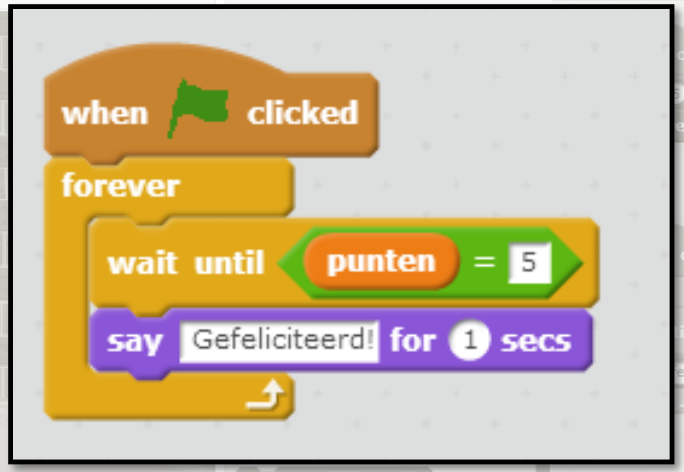
Two ‘smelly’ versions

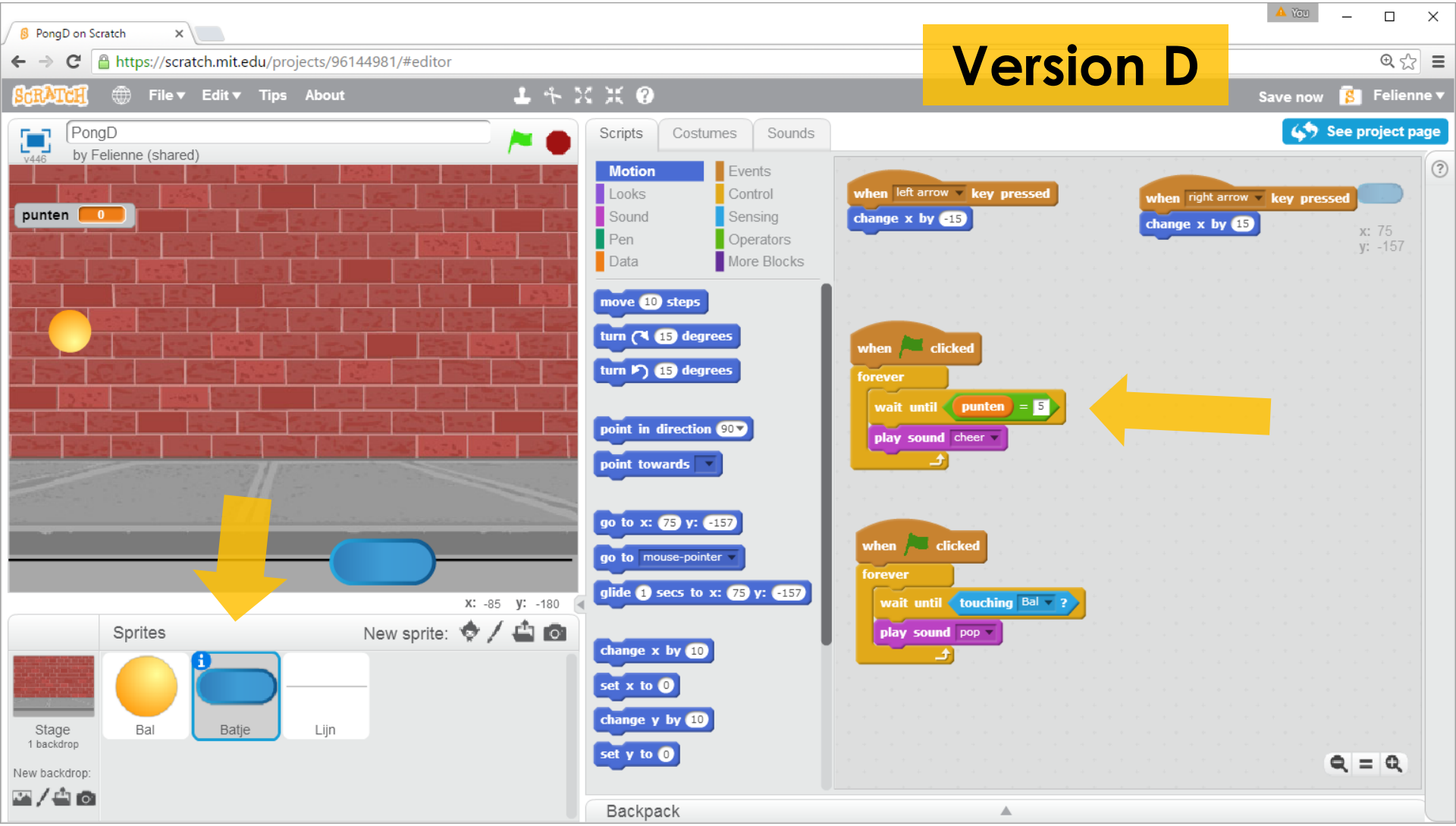

Two ‘smelly’ versions
Long method
Duplicated code


Version N
PongN on Scratch
https://scratch.mit.edu/projects/96072836/#editor
File
Edit
Tips
About
Save now
Felienne
PongN
by Felienne (shared)
punten 2
Scripts
Costumes
Sounds
See project page
Motion
Looks
Sound
Pen
Data
Events
Control
Sensing
Operators
More Blocks
move 10 steps
turn 15 degrees
turn 15 degrees
point in direction 90
point towards
go to x: 137 y: 110
go to mouse-pointer
glide 1 secs to x: 137 y: 110
change x by 10
set x to 0
change y by 10
set y to 0
when clicked
go to x: 25 y: 152
point in direction 150
when clicked
forever
if on edge, bounce
move 10 steps
when clicked
forever
wait until touching Batje ?
play sound pop
point in direction 180 - direction
move 10 steps
change punten by 1
x: 137
y: 110
when clicked
forever
wait until punten = 5
say Gefeliciteerd! for 1 secs
play sound cheer until done
set punten to 0
x: -8 y: -180
Sprites
New sprite:
Stage
1 backdrop
Bal
Batje
Lijn
New backdrop:
Backpack

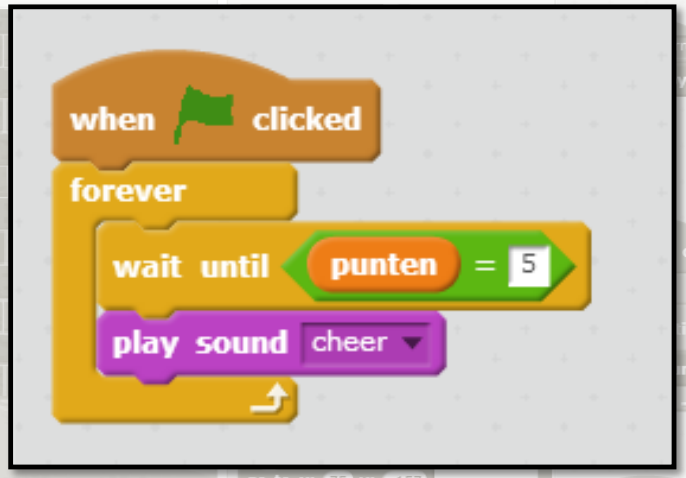

PongD on Scratch
https://scratch.mit.edu/projects/96144981/#editor
Version D
File
Edit
Tips
About
Save now
Felienne
PongD
by Felienne (shared)
punten 0
Scripts
Costumes
Sounds
See project page
Motion
Looks
Sound
Pen
Data
Events
Control
Sensing
Operators
More Blocks
move 10 steps
turn 15 degrees
turn 15 degrees
point in direction 90
point towards
go to x: -188 y: 40
go to mouse-pointer
glide 1 secs to x: -188 y: 40
change x by 10
set x to 0
change y by 10
set y to 0
when clicked
go to x: 25 y: 152
point in direction 150
when clicked
forever
if on edge, bounce
move 10 steps
x: -188
y: 40
when clicked
forever
wait until punten = 5
say Gefeliciteerd! for 1 secs
when clicked
forever
wait until touching Batje ?
point in direction 180 - direction
change punten by 1
x: -10 y: 180
Sprites
New sprite:
Stage
1 backdrop
New backdrop:
Bal
Batje
Lijn
Backpack

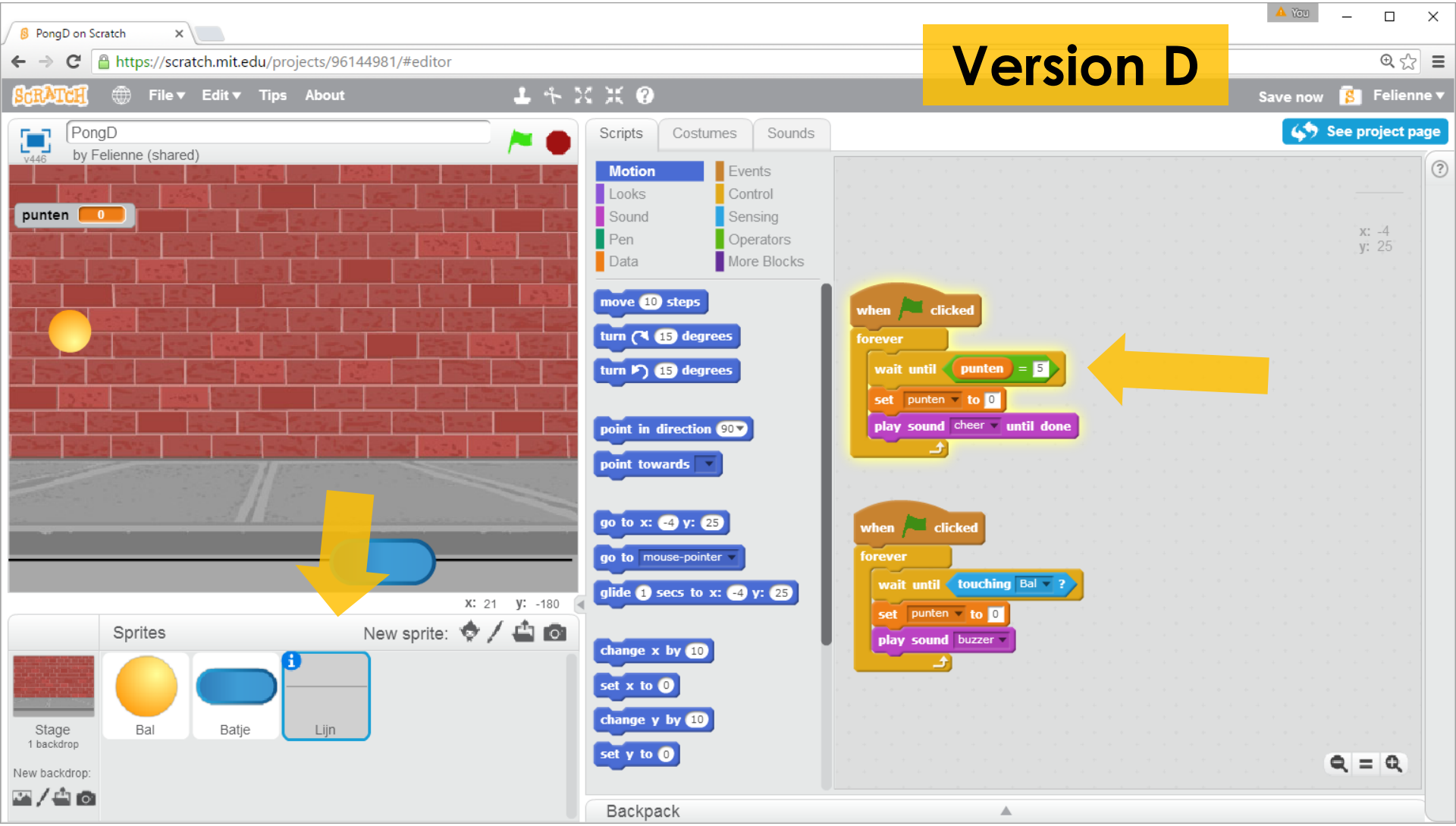
Version D


when clicked
forever
wait until punten = 5
say Gefeliciteerd! for 1 secs


PongD on Scratch
https://scratch.mit.edu/projects/96144981/#editor
Version D
File
Edit
Tips
About
Save now
Felienne
PongD
by Felienne (shared)
punten 0
Scripts
Costumes
Sounds
See project page
Motion
Looks
Sound
Pen
Data
Events
Control
Sensing
Operators
More Blocks
move 10 steps
turn 15 degrees
turn 15 degrees
point in direction 90
point towards
go to x: 75 y: -157
go to mouse-pointer
glide 1 secs to x: 75 y: -157
change x by 10
set x to 0
change y by 10
set y to 0
when left arrow key pressed
change x by -15
when right arrow key pressed
change x by 15
x: 75
y: -157
when clicked
forever
wait until punten = 5
play sound cheer
when clicked
forever
wait until touching Bal ?
play sound pop
x: -85 y: -180
Sprites
New sprite:
Stage
1 backdrop
New backdrop:
Bal
Batje
Lijn
Backpack

Version D




PongD on Scratch
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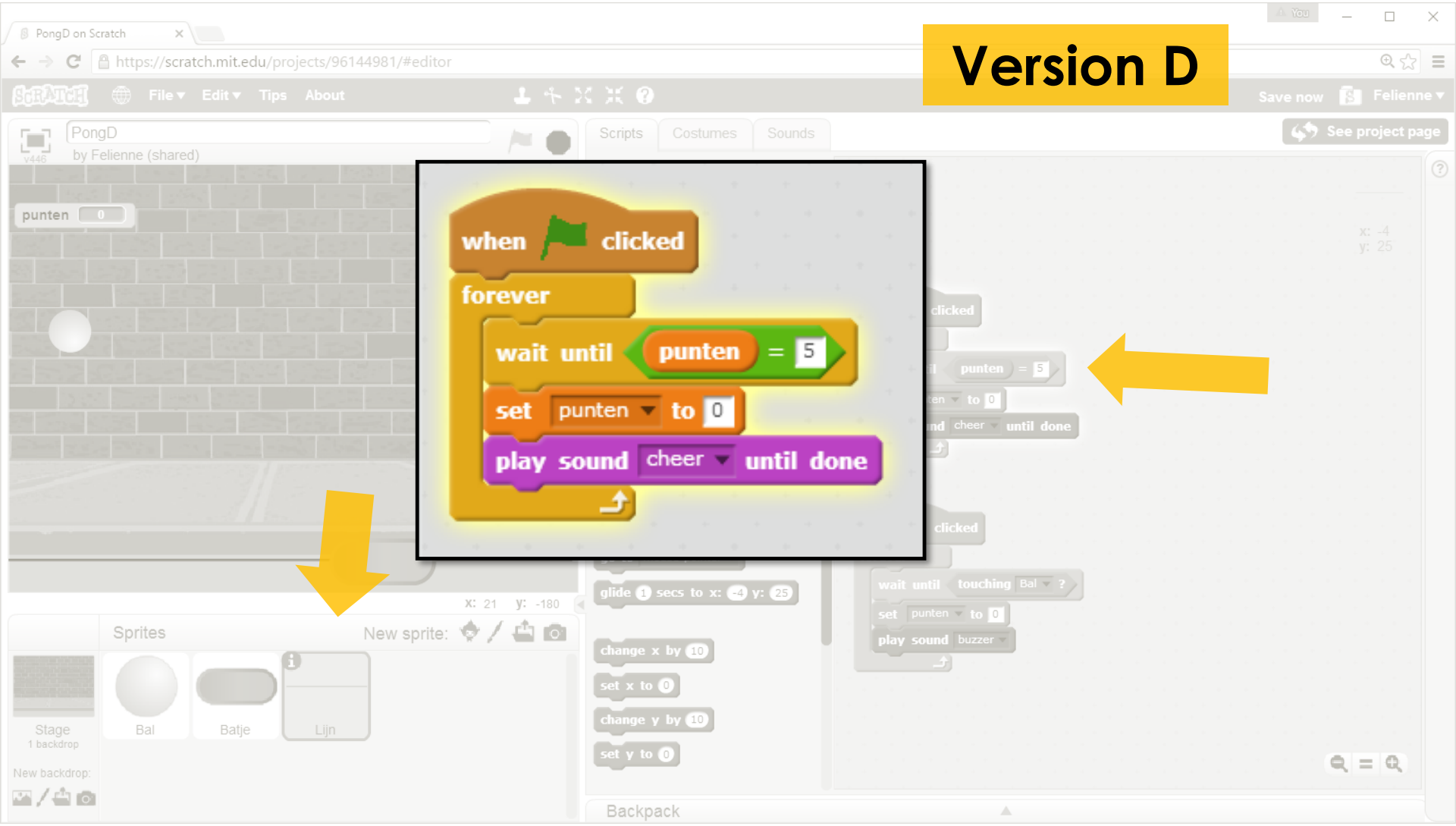
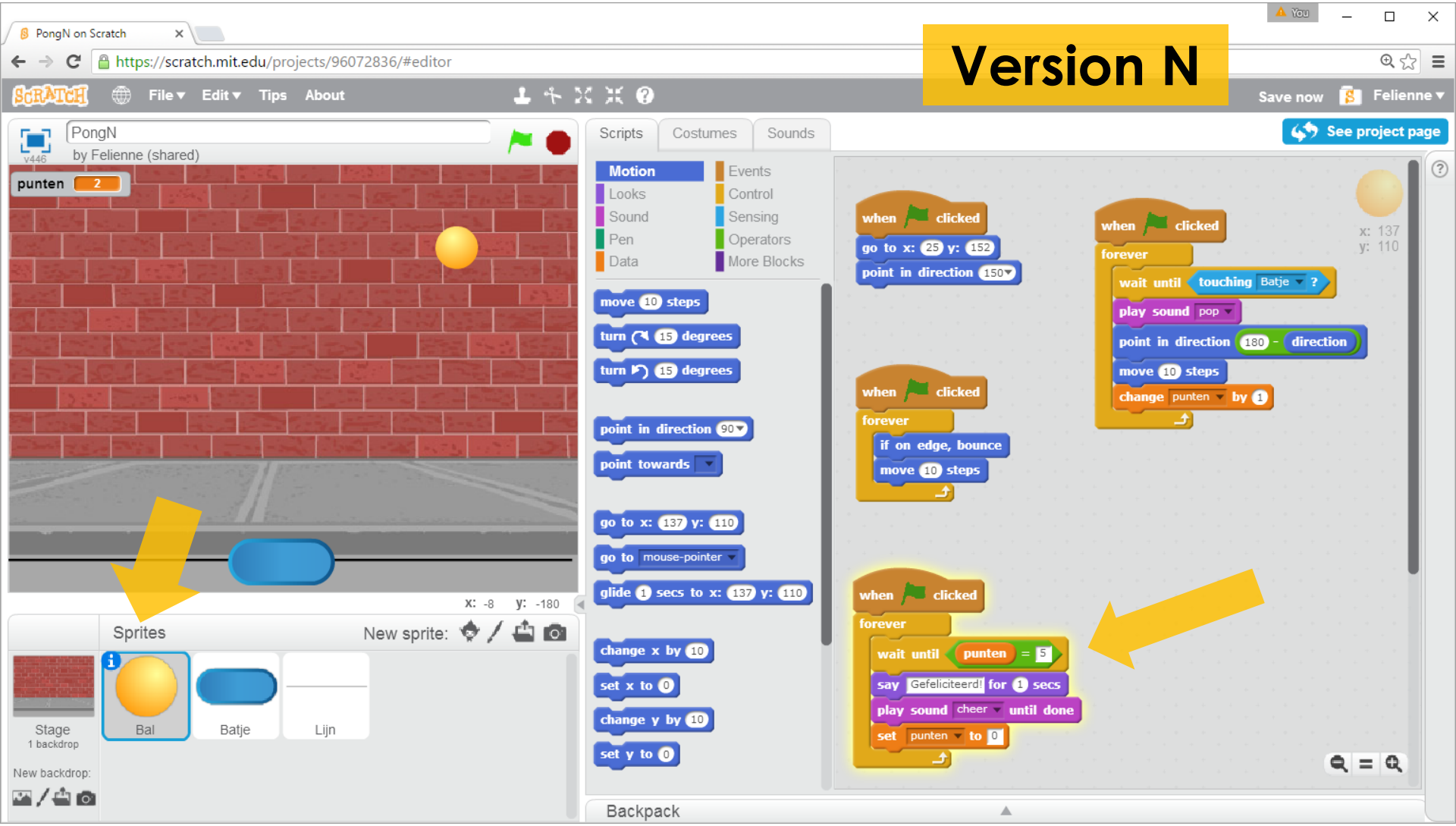
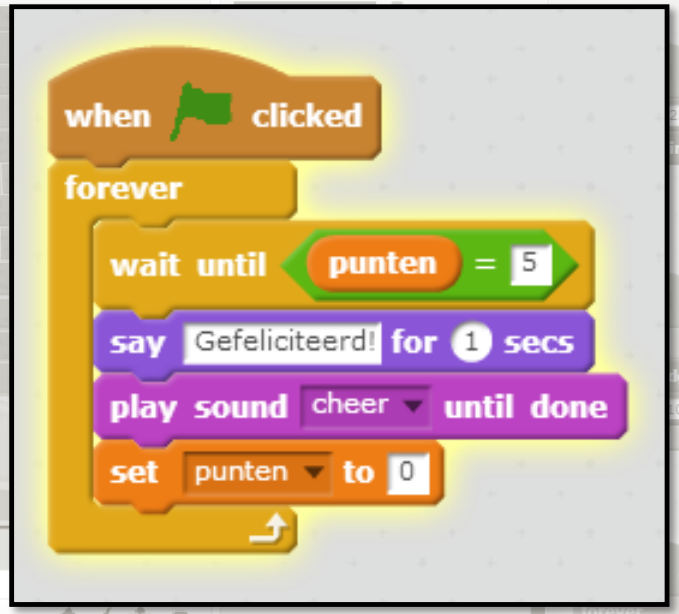
Version D
File
Edit
Tips
About
Save now
Felienne
PongD
by Felienne (shared)
punten 0
Scripts
Costumes
Sounds
See project page
Motion
Looks
Sound
Pen
Data
Events
Control
Sensing
Operators
More Blocks
move 10 steps
turn 15 degrees
turn 15 degrees
point in direction 90
point towards
go to x: -4 y: 25
go to mouse-pointer
glide 1 secs to x: -4 y: 25
change x by 10
set x to 0
change y by 10
set y to 0
when clicked
forever
wait until punten = 5
set punten to 0
play sound cheer until done
when clicked
forever
wait until touching Bal ?
set punten to 0
play sound buzzer
x: -4
y: 25
x: 21 y: -180
Sprites
New sprite:
Stage
1 backdrop
New backdrop:
Bal
Batje
Lijn
Backpack

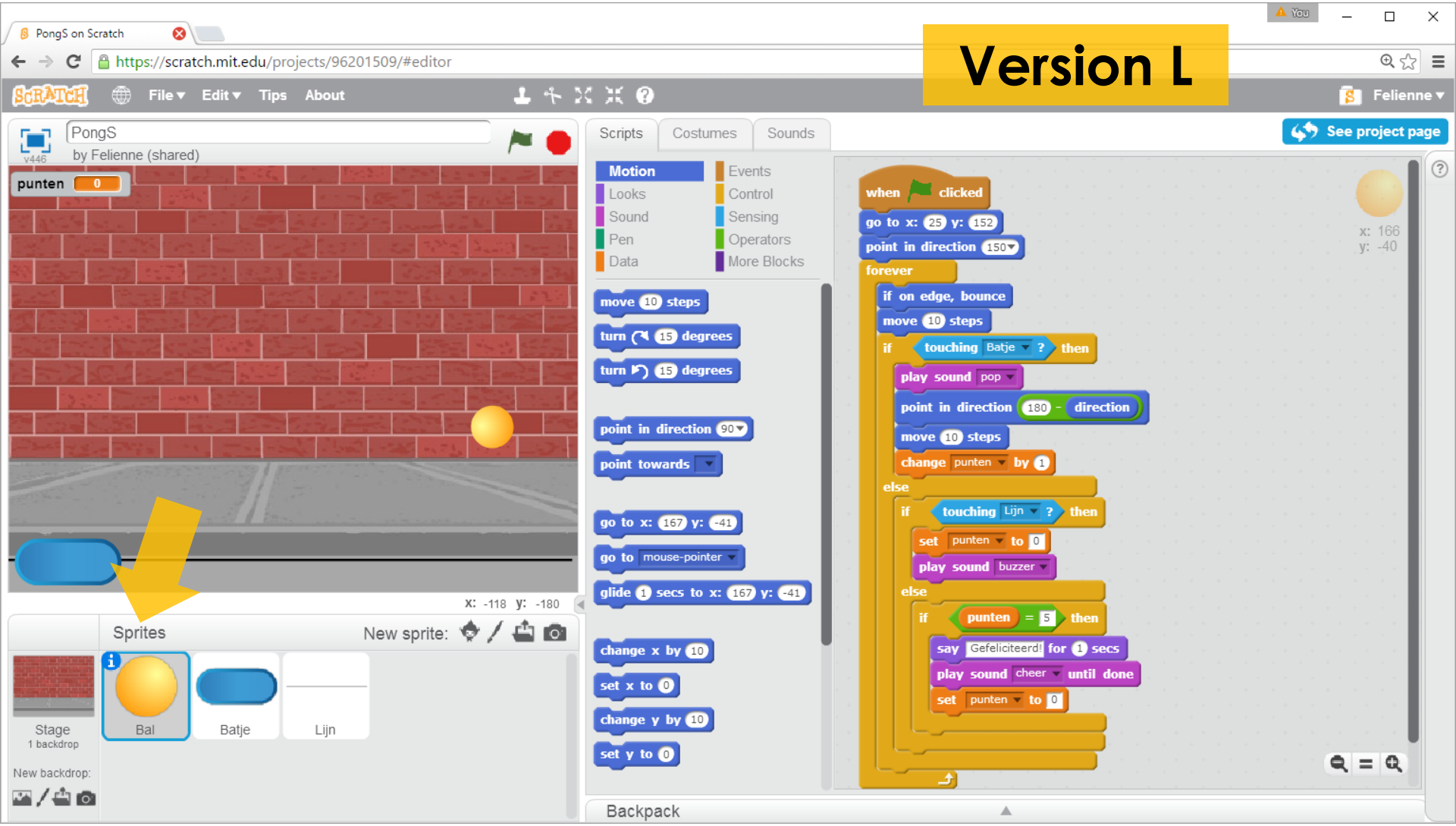
Version D


when clicked
forever
wait until punten = 5
set punten to 0
play sound cheer until done
PongD on Scratch
https://scratch.mit.edu/projects/96144981/#editor
File
Edit
Tips
About
Save now
Felienne
PongD
by Felienne (shared)
Scripts
Costumes
Sounds
See project page
punten 0
Sprites
New sprite:
Stage
1 backdrop
Bal
Batje
Lijn
New backdrop:
glide 1 secs to x: -4 y: 25
change x by 10
set x to 0
change y by 10
set y to 0
wait until touching Bal ?
set punten to 0
play sound buzzer
Backpack


Version N
PongN on Scratch
https://scratch.mit.edu/projects/96072836/#editor
File
Edit
Tips
About
Save now
Felienne
PongN
by Felienne (shared)
punten 2
Scripts
Costumes
Sounds
See project page
Motion
Looks
Sound
Pen
Data
Events
Control
Sensing
Operators
More Blocks
move 10 steps
turn 15 degrees
turn 15 degrees
point in direction 90
point towards
go to x: 137 y: 110
go to mouse-pointer
glide 1 secs to x: 137 y: 110
change x by 10
set x to 0
change y by 10
set y to 0
when clicked
go to x: 25 y: 152
point in direction 150
when clicked
forever
if on edge, bounce
move 10 steps
when clicked
forever
wait until touching Batje ?
play sound pop
point in direction 180 - direction
move 10 steps
change punten by 1
x: 137
y: 110
when clicked
forever
wait until punten = 5
say Gefeliciteerd! for 1 secs
play sound cheer until done
set punten to 0
x: -8 y: -180
Sprites
New sprite:
Stage
1 backdrop
Bal
Batje
Lijn
New backdrop:
Backpack

Version N


when clicked
forever
wait until punten = 5
say Gefeliciteerd! for 1 secs
play sound cheer until done
set punten to 0


PongS on Scratch
https://scratch.mit.edu/projects/96201509/#editor
Version L
File
Edit
Tips
About
Felienne
PongS
by Felienne (shared)
See project page
punten 0
Scripts
Costumes
Sounds
Motion
Looks
Sound
Pen
Data
Events
Control
Sensing
Operators
More Blocks
move 10 steps
turn 15 degrees
turn 15 degrees
point in direction 90
point towards
go to x: 167 y: -41
go to mouse-pointer
glide 1 secs to x: 167 y: -41
change x by 10
set x to 0
change y by 10
set y to 0
when clicked
go to x: 25 y: 152
point in direction 150
forever
if on edge, bounce
move 10 steps
if touching Batje ? then
play sound pop
point in direction 180 - direction
move 10 steps
change punten by 1
else
if touching Lijn ? then
set punten to 0
play sound buzzer
else
if punten = 5 then
say Gefeliciteerd! for 1 secs
play sound cheer until done
set punten to 0
x: 166
y: -40
x: -118 y: -180
Sprites
New sprite:
Stage
1 backdrop
Bal
Batje
Lijn
New backdrop:
Backpack

Do code smells
matter to kids?

tl;dr
Yes

tl;dr
Yes
Kids performed significantly better on the non-smelly program

tl;dr
Yes
But, differences tasks are impacted differently

Let's take a closer look!

Let's take a closer look!
Understanding seems affected more by the Long Method smell

Let's take a closer look!
Modification is hampered most by Duplication

Smells are bad!
(also for kids)

Smells are bad!
(also for kids)
Are smells
common?

Thanks MIT

Scratch Statistics - Imagi

https://scratch.mit.edu/statistics/

Create Explore Discuss About Help Search Felienne

Community statistics at a glance

- 16,622,772 projects shared,
- 13,415,350 users registered,
- 89,208,180 comments posted,
- 2,865,297 studios created

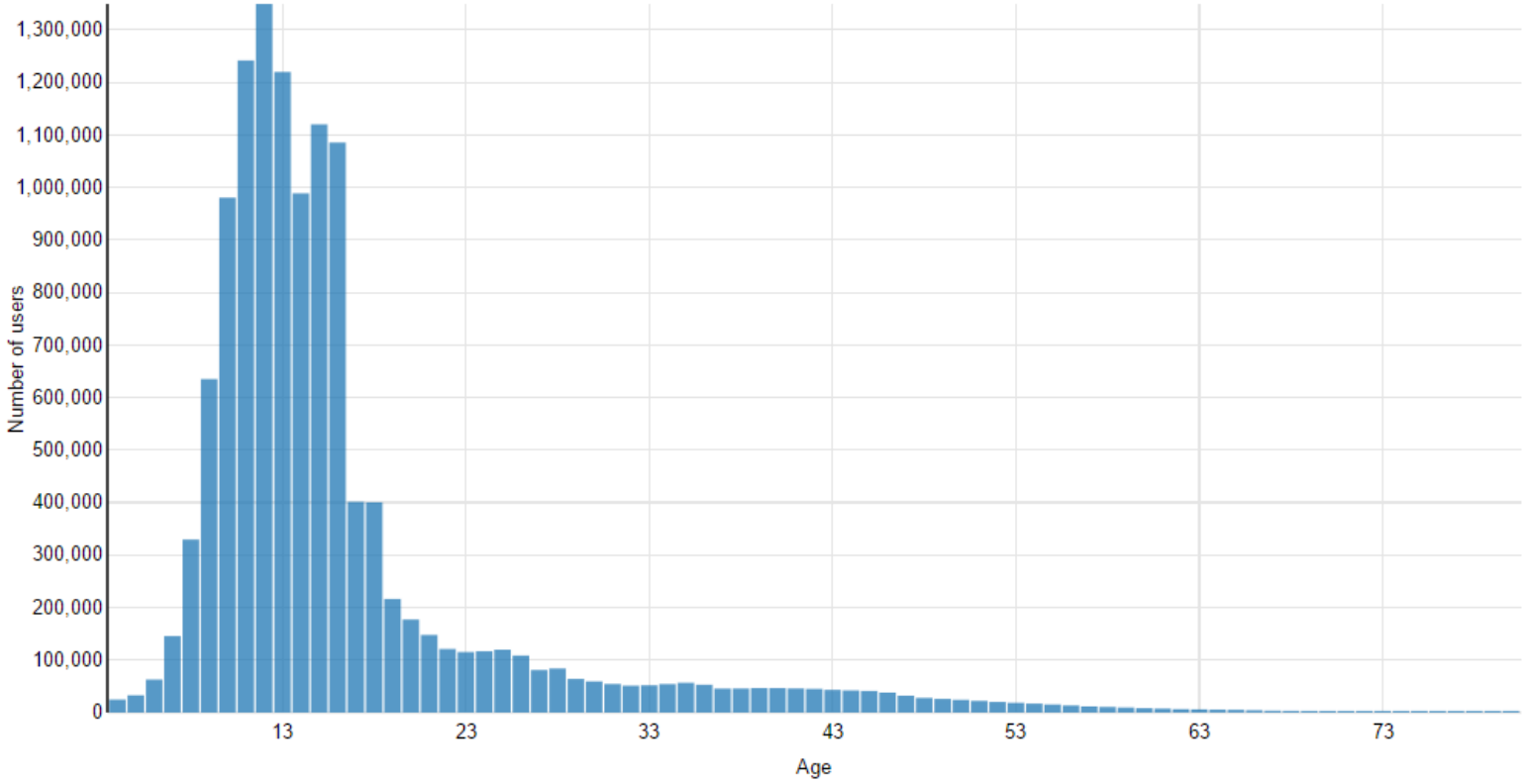
...and growing!

Website traffic last month

- 83,015,850 pageviews
- 13,843,300 visits
- 6,390,970 unique visitors

Monthly Activity Trends

Age Distribution of New Scratchers



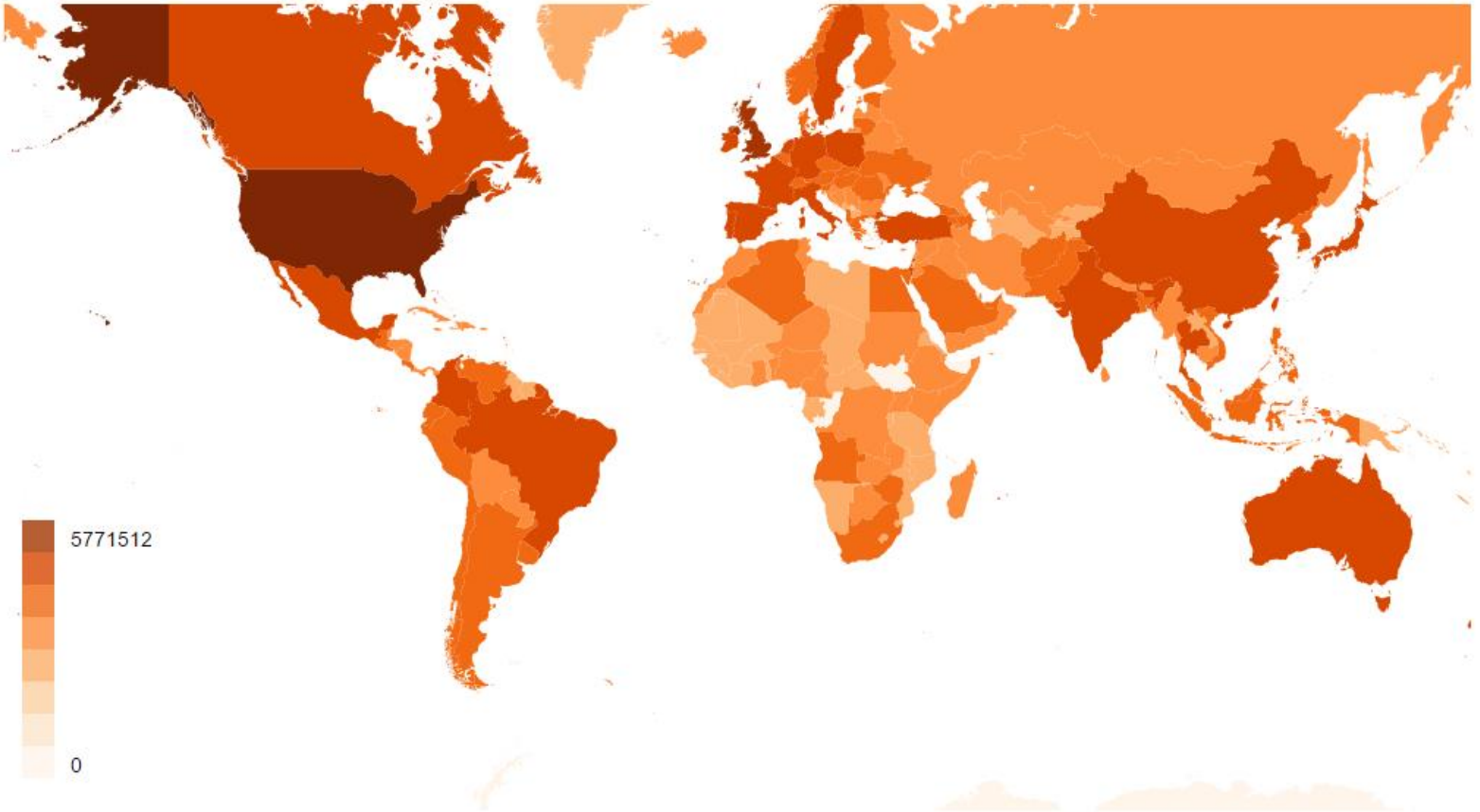
Scratchers Worldwide

Scratch Statistics - Imagi

https://scratch.mit.edu/statistics/

Create Explore Discuss About Help Search Felienne

Scratchers Worldwide



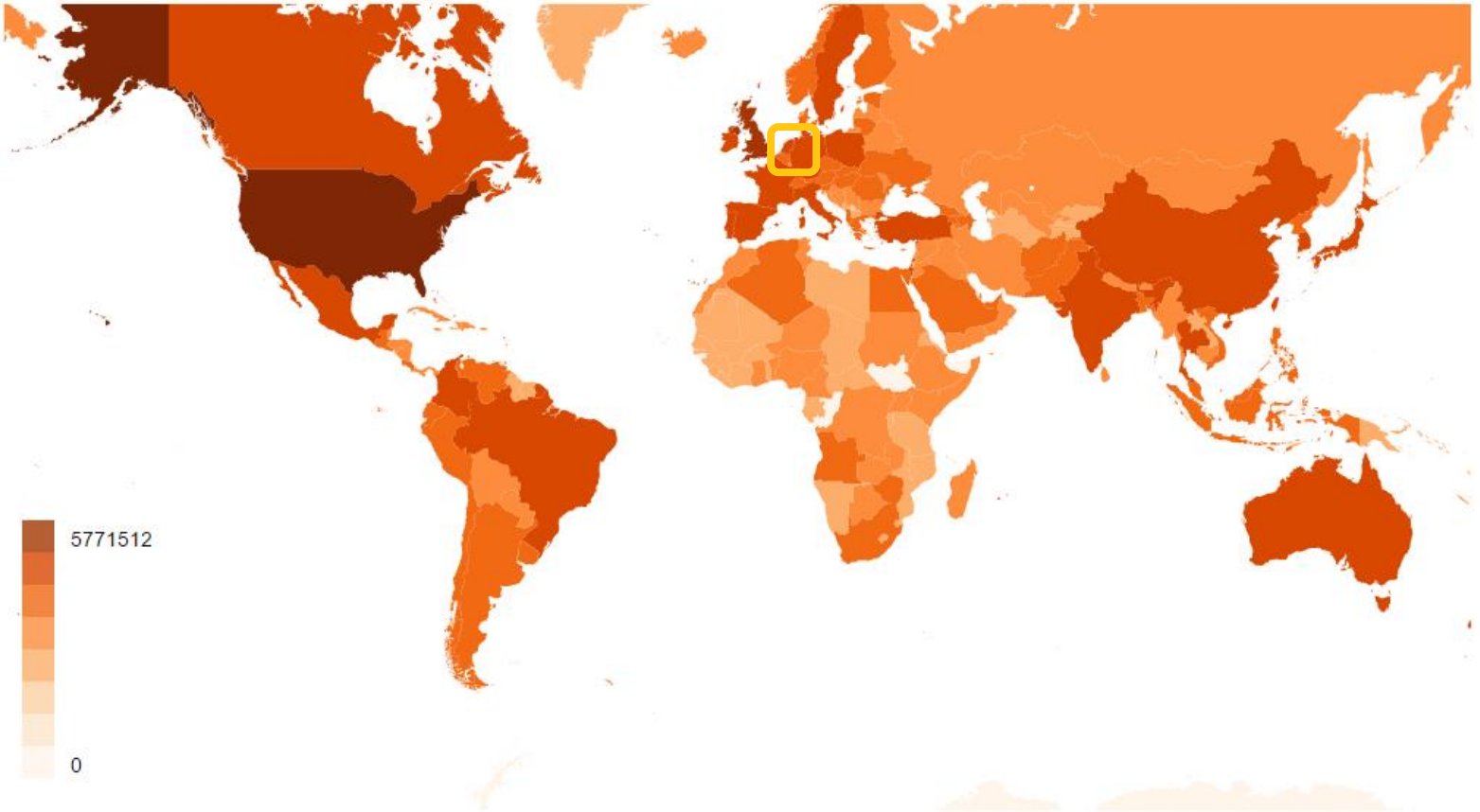
Monthly Project Shares

Scratch Statistics - Imagi

https://scratch.mit.edu/statistics/

Create Explore Discuss About Help Search Felienne

Scratchers Worldwide



Monthly Project Shares

What do kids do in Scratch?
THE ART OF WAR
BY
SUN TZU

Let's look at some programs!

Downloaded all
shared programs
for 24 hours

https://cdn.projects.scrat

https://cdn.projects.scratch.mit.edu/internalapi/project/97802745/get/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                "isDraggable": false,
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                }
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                        [20.25, 5, [["whenKeyPressed", "right arrow"], ["changeXposBy:", 10], ["lookLike:", "rechts"]]],
                        [20.2, 106.7, [["whenKeyPressed", "up arrow"], ["changeYposBy:", 10]]],
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                                280.5,
                                [["whenGreenFlag"],
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                                        ["doForever",
                                                [["doIf", ["touching:", "Fish3"], [["setSizeTo:", 20], ["broadcast:", "raakRodeVis"]]]]]],
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250.000 JSON files

allBlocks.csv (~\Dropbox\Code\KragleData) - GVIM

File Edit Tools Syntax Buffers Window Help

```
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10519701,68-60,0,sprite,"Sprite3",1,1,"say:duration:elapsed:from:","its a magic powne flying through the sky on a magic program :D",10
10519701,68-60,0,sprite,"Sprite3",1,2,"broadcast:","SKY HIE!"
10519701,108-143,1,sprite,"Sprite4",1,0,"whenIReceive","SKY HIE!"
10519701,108-143,1,sprite,"Sprite4",1,1,"say:duration:elapsed:from:","Shoot it down!",5
10519701,108-143,1,sprite,"Sprite4",1,2,"wait:elapsed:from:",1
10519701,108-143,1,sprite,"Sprite4",1,3,"nextCostume"
10519701,129-121,2,sprite,"Sprite1",1,0,"whenGreenFlag"
10519701,129-121,2,sprite,"Sprite1",1,1,"broadcast:","POWNE!!!!"
10541430,22-17,0,stage,"stage",1,0,"whenGreenFlag"
10541430,22-17,0,stage,"stage",1,1,"setVar:to:","x",0
10541430,22-17,0,stage,"stage",3,3,"changeVar:by:","x",-15
10541430,22-17,0,stage,"stage",1,2,"doForever"
10541430,21-14,1,sprite,"Tree_3",1,0,"whenGreenFlag"
10541430,21-14,1,sprite,"Tree_3",1,1,"show"
10541430,21-14,1,sprite,"Tree_3",1,2,"goBackByLayers:",100
10541430,21-14,1,sprite,"Tree_3",1,3,"ypos:",0
10541430,21-14,1,sprite,"Tree_3",1,4,"setSizeTo:",100
10541430,21-14,1,sprite,"Tree_3",7,10,"readVariable","x"
10541430,21-14,1,sprite,"Tree_3",6,9,"*",0.1
10541430,21-14,1,sprite,"Tree_3",5,8,"%",800
10541430,21-14,1,sprite,"Tree_3",4,7,"+",-400
10541430,21-14,1,sprite,"Tree_3",3,6,"xpos:"
10541430,21-14,1,sprite,"Tree_3",1,5,"doForever"
10541430,21-14,2,sprite,"Tree_2",1,0,"whenGreenFlag"
10541430,21-14,2,sprite,"Tree_2",1,1,"show"
10541430,21-14,2,sprite,"Tree_2",1,2,"goBackByLayers:",100
10541430,21-14,2,sprite,"Tree_2",1,3,"ypos:",85
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10541430,21-14,2,sprite,"Tree_2",5,8,"%",3200
10541430,21-14,2,sprite,"Tree_2",4,7,"+",-1600
10541430,21-14,2,sprite,"Tree_2",3,6,"xpos:"
10541430,21-14,2,sprite,"Tree_2",1,5,"doForever"
10541430,14-18,3,sprite,"Scratch Cat",1,0,"whenGreenFlag"
10541430,14-18,3,sprite,"Scratch Cat",3,2,"wait:elapsed:from:",0.02
10541430,14-18,3,sprite,"Scratch Cat",3,3,"nextCostume"
10541430,14-18,3,sprite,"Scratch Cat",1,1,"doForever"
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10541430,83-290,4,sprite,"Scratch Cat",1,2,"clearPenTrails"
10541430,83-290,4,sprite,"Scratch Cat",1,3,"lookLike:","Walk1"
10541430,83-290,4,sprite,"Scratch Cat",3,5,"stampCostume"
10541430,83-290,4,sprite,"Scratch Cat",3,6,"changeXposBy:",55
10541430,83-290,4,sprite,"Scratch Cat",3,7,"nextCostume"
10541430,83-290,4,sprite,"Scratch Cat",1,4,"doRepeat",8
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10541430,21-14,5,sprite,"grass3",1,0,"whenGreenFlag"
10541430,21-14,5,sprite,"grass3",1,1,"ypos:",0
10541430,21-14,5,sprite,"grass3",6,6,"readVariable","x"
```
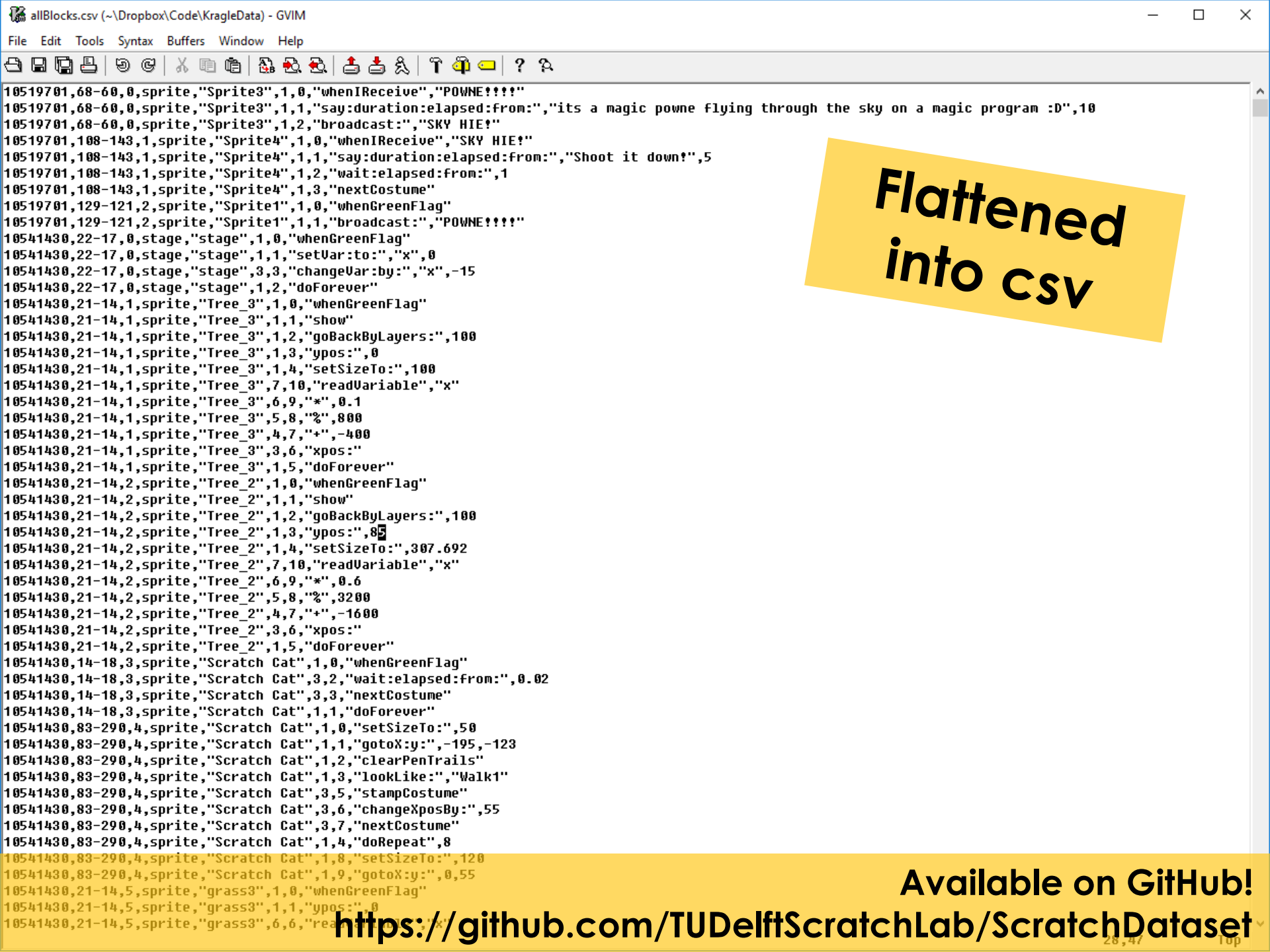
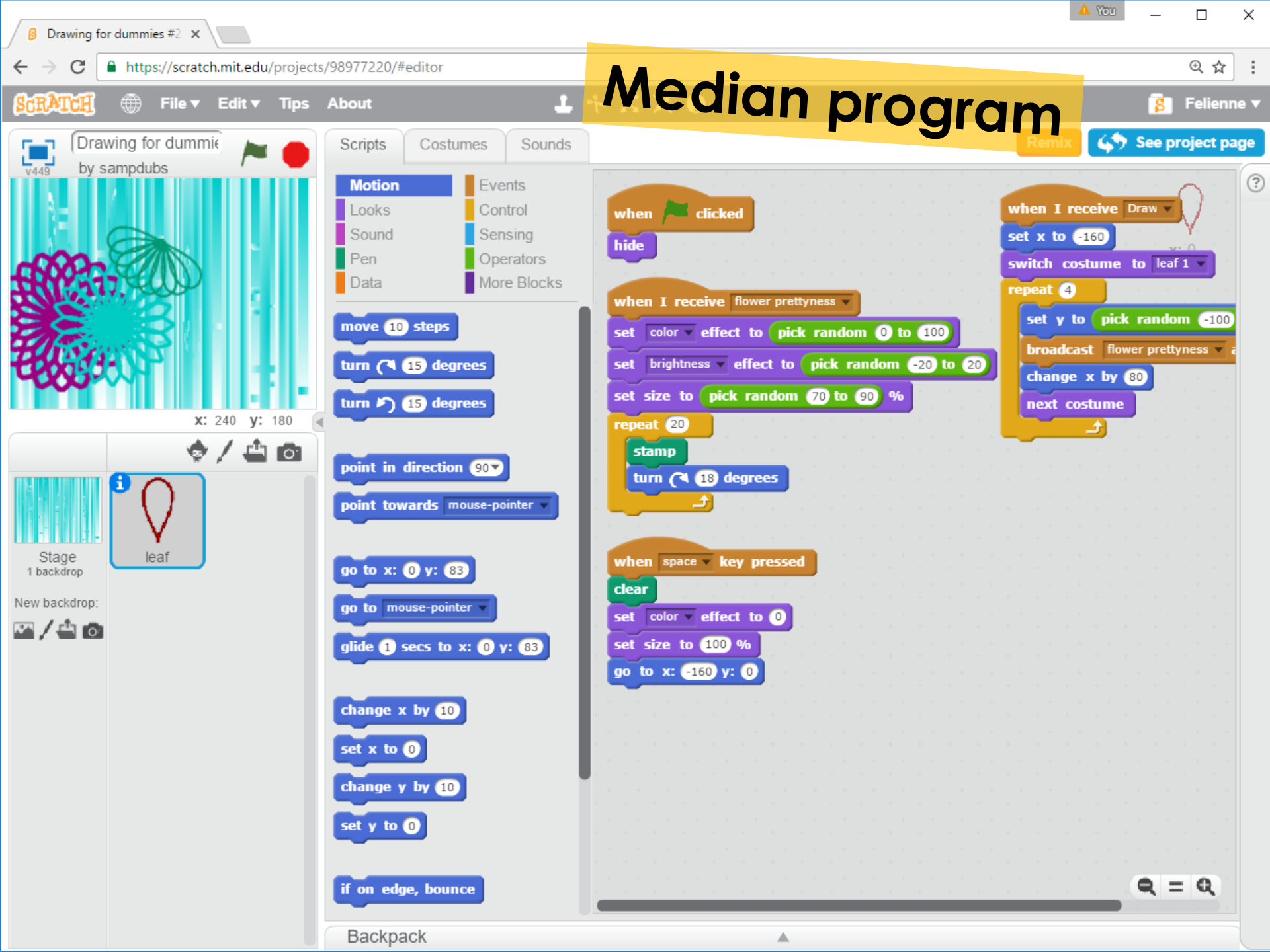

Flattened into csv

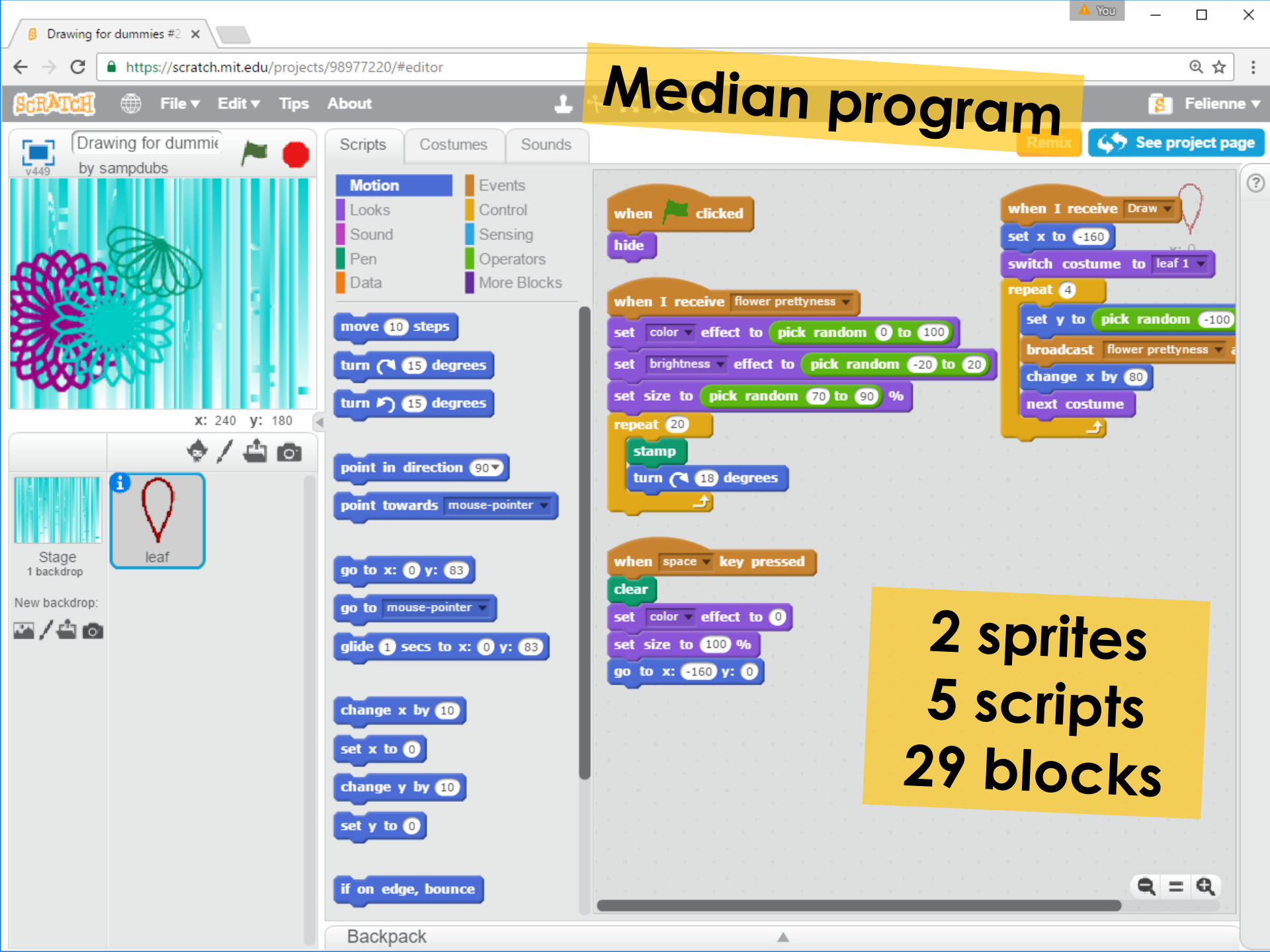
28,47 Top


allBlocks.csv (~\Dropbox\Code\KragleData) - GVIM
File Edit Tools Syntax Buffers Window Help
10519701,68-60,0,sprite,"Sprite3",1,0,"whenIReceive","POWNE!!!!"
10519701,68-60,0,sprite,"Sprite3",1,1,"say:duration:elapsed:from:","its a magic powne flying through the sky on a magic program :D",10
10519701,68-60,0,sprite,"Sprite3",1,2,"broadcast:","SKY HIE!"
10519701,108-143,1,sprite,"Sprite4",1,0,"whenIReceive","SKY HIE!"
10519701,108-143,1,sprite,"Sprite4",1,1,"say:duration:elapsed:from:","Shoot it down!",5
10519701,108-143,1,sprite,"Sprite4",1,2,"wait:elapsed:from:",1
10519701,108-143,1,sprite,"Sprite4",1,3,"nextCostume"
10519701,129-121,2,sprite,"Sprite1",1,0,"whenGreenFlag"
10519701,129-121,2,sprite,"Sprite1",1,1,"broadcast:","POWNE!!!!"
10541430,22-17,0,stage,"stage",1,0,"whenGreenFlag"
10541430,22-17,0,stage,"stage",1,1,"setVar:to:","x",0
10541430,22-17,0,stage,"stage",3,3,"changeVar:by:","x",-15
10541430,22-17,0,stage,"stage",1,2,"doForever"
10541430,21-14,1,sprite,"Tree_3",1,0,"whenGreenFlag"
10541430,21-14,1,sprite,"Tree_3",1,1,"show"
10541430,21-14,1,sprite,"Tree_3",1,2,"goBackByLayers:",100
10541430,21-14,1,sprite,"Tree_3",1,3,"ypos:",0
10541430,21-14,1,sprite,"Tree_3",1,4,"setSizeTo:",100
10541430,21-14,1,sprite,"Tree_3",7,10,"readVariable","x"
10541430,21-14,1,sprite,"Tree_3",6,9,"*",0.1
10541430,21-14,1,sprite,"Tree_3",5,8,"%",800
10541430,21-14,1,sprite,"Tree_3",4,7,"+",-400
10541430,21-14,1,sprite,"Tree_3",3,6,"xpos:"
10541430,21-14,1,sprite,"Tree_3",1,5,"doForever"
10541430,21-14,2,sprite,"Tree_2",1,0,"whenGreenFlag"
10541430,21-14,2,sprite,"Tree_2",1,1,"show"
10541430,21-14,2,sprite,"Tree_2",1,2,"goBackByLayers:",100
10541430,21-14,2,sprite,"Tree_2",1,3,"ypos:",85
10541430,21-14,2,sprite,"Tree_2",1,4,"setSizeTo:",307.692
10541430,21-14,2,sprite,"Tree_2",7,10,"readVariable","x"
10541430,21-14,2,sprite,"Tree_2",6,9,"*",0.6
10541430,21-14,2,sprite,"Tree_2",5,8,"%",3200
10541430,21-14,2,sprite,"Tree_2",4,7,"+",-1600
10541430,21-14,2,sprite,"Tree_2",3,6,"xpos:"
10541430,21-14,2,sprite,"Tree_2",1,5,"doForever"
10541430,14-18,3,sprite,"Scratch Cat",1,0,"whenGreenFlag"
10541430,14-18,3,sprite,"Scratch Cat",3,2,"wait:elapsed:from:",0.02
10541430,14-18,3,sprite,"Scratch Cat",3,3,"nextCostume"
10541430,14-18,3,sprite,"Scratch Cat",1,1,"doForever"
10541430,83-290,4,sprite,"Scratch Cat",1,0,"setSizeTo:",50
10541430,83-290,4,sprite,"Scratch Cat",1,1,"gotoX:y:",-195,-123
10541430,83-290,4,sprite,"Scratch Cat",1,2,"clearPenTrails"
10541430,83-290,4,sprite,"Scratch Cat",1,3,"lookLike:","Walk1"
10541430,83-290,4,sprite,"Scratch Cat",3,5,"stampCostume"
10541430,83-290,4,sprite,"Scratch Cat",3,6,"changeXposBy:",55
10541430,83-290,4,sprite,"Scratch Cat",3,7,"nextCostume"
10541430,83-290,4,sprite,"Scratch Cat",1,4,"doRepeat",8
10541430,83-290,4,sprite,"Scratch Cat",1,8,"setSizeTo:",120
10541430,83-290,4,sprite,"Scratch Cat",1,9,"gotoX:y:",0,55
10541430,21-14,5,sprite,"grass3",1,0,"whenGreenFlag"
10541430,21-14,5,sprite,"grass3",1,1,"ypos:",0
10541430,21-14,5,sprite,"grass3",6,6,"rea
Flattened into csv
Available on GitHub!
https://github.com/TUDelftScratchLab/ScratchDataset

What we found...
THE ART OF WAR
BY
SUN TZU

Many programs
are small...


Drawing for dummies #2
https://scratch.mit.edu/projects/98977220/#editor
Median program
File
Edit
Tips
About
Felienne
Drawing for dummie
by sampdubs
v449
See project page
Remix
Scripts
Costumes
Sounds
Motion
Looks
Sound
Pen
Data
Events
Control
Sensing
Operators
More Blocks
move 10 steps
turn 15 degrees
turn 15 degrees
point in direction 90
point towards mouse-pointer
go to x: 0 y: 83
go to mouse-pointer
glide 1 secs to x: 0 y: 83
change x by 10
set x to 0
change y by 10
set y to 0
if on edge, bounce
when clicked
hide
when I receive flower prettyness
set color effect to pick random 0 to 100
set brightness effect to pick random -20 to 20
set size to pick random 70 to 90 %
repeat 20
stamp
turn 18 degrees
when space key pressed
clear
set color effect to 0
set size to 100 %
go to x: -160 y: 0
when I receive Draw
set x to -160
switch costume to leaf 1
repeat 4
set y to pick random -100
broadcast flower prettyness
change x by 80
next costume
x: 240 y: 180
Stage
1 backdrop
New backdrop:
leaf
Backpack


Drawing for dummies #2
https://scratch.mit.edu/projects/98977220/#editor
Median program
File
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Tips
About
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Drawing for dummie
by sampdubs
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Scripts
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Data
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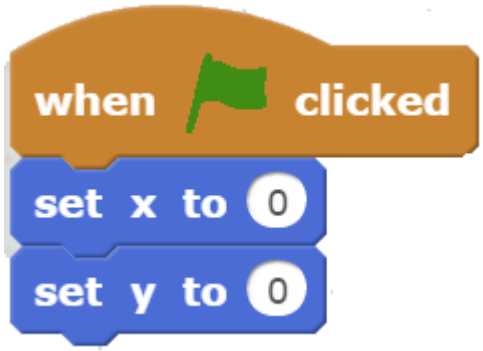
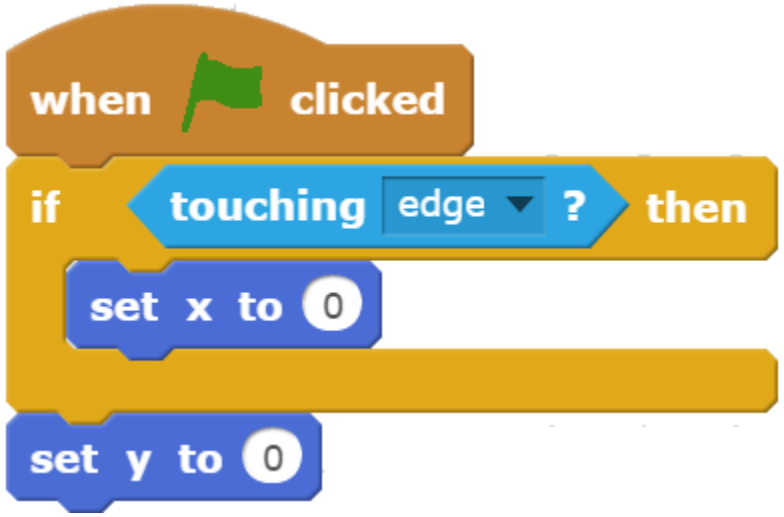
Control
Sensing
Operators
More Blocks
move 10 steps
turn 15 degrees
turn 15 degrees
point in direction 90
point towards mouse-pointer
go to x: 0 y: 83
go to mouse-pointer
glide 1 secs to x: 0 y: 83
change x by 10
set x to 0
change y by 10
set y to 0
if on edge, bounce
when clicked
hide
when I receive flower prettyness
set color effect to pick random 0 to 100
set brightness effect to pick random -20 to 20
set size to pick random 70 to 90 %
repeat 20
stamp
turn 18 degrees
when space key pressed
clear
set color effect to 0
set size to 100 %
go to x: -160 y: 0
when I receive Draw
set x to -160
switch costume to leaf 1
repeat 4
set y to pick random -100
broadcast flower prettyness
change x by 80
next costume
x: 240 y: 180
Stage
1 backdrop
New backdrop:
leaf
2 sprites
5 scripts
29 blocks
Backpack

Most programs are simple...

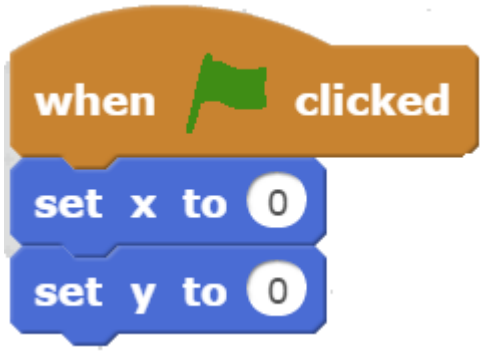




Cyclomatic complexity: 1

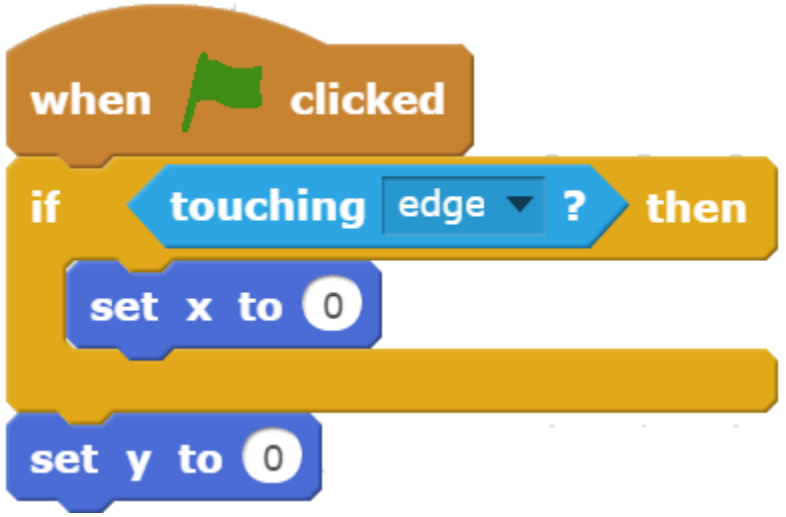
Cyclomatic complexity: 2

Most programs are simple...



78%

Cyclomatic complexity: 1



Cyclomatic complexity: 2

Loops

repeat until
touching
edge
?
move
10
steps

forever
move
10
steps

repeat
10
move
10
steps

Loops

in 77% of projects

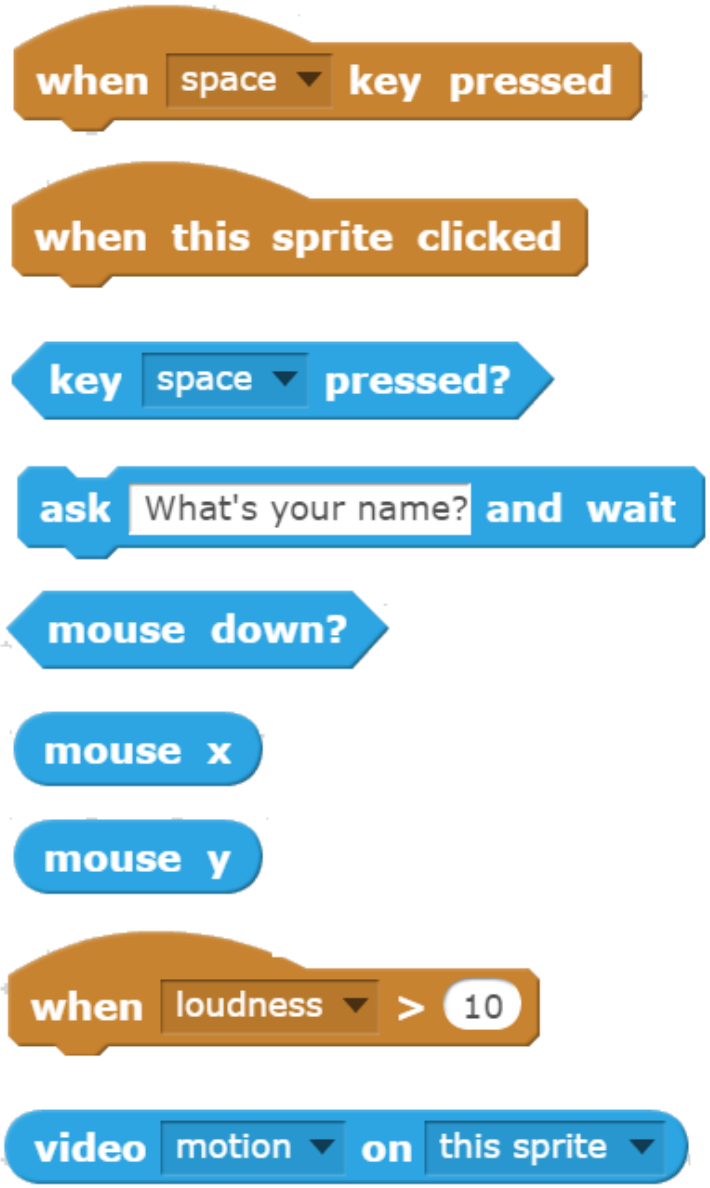
Loops

12%

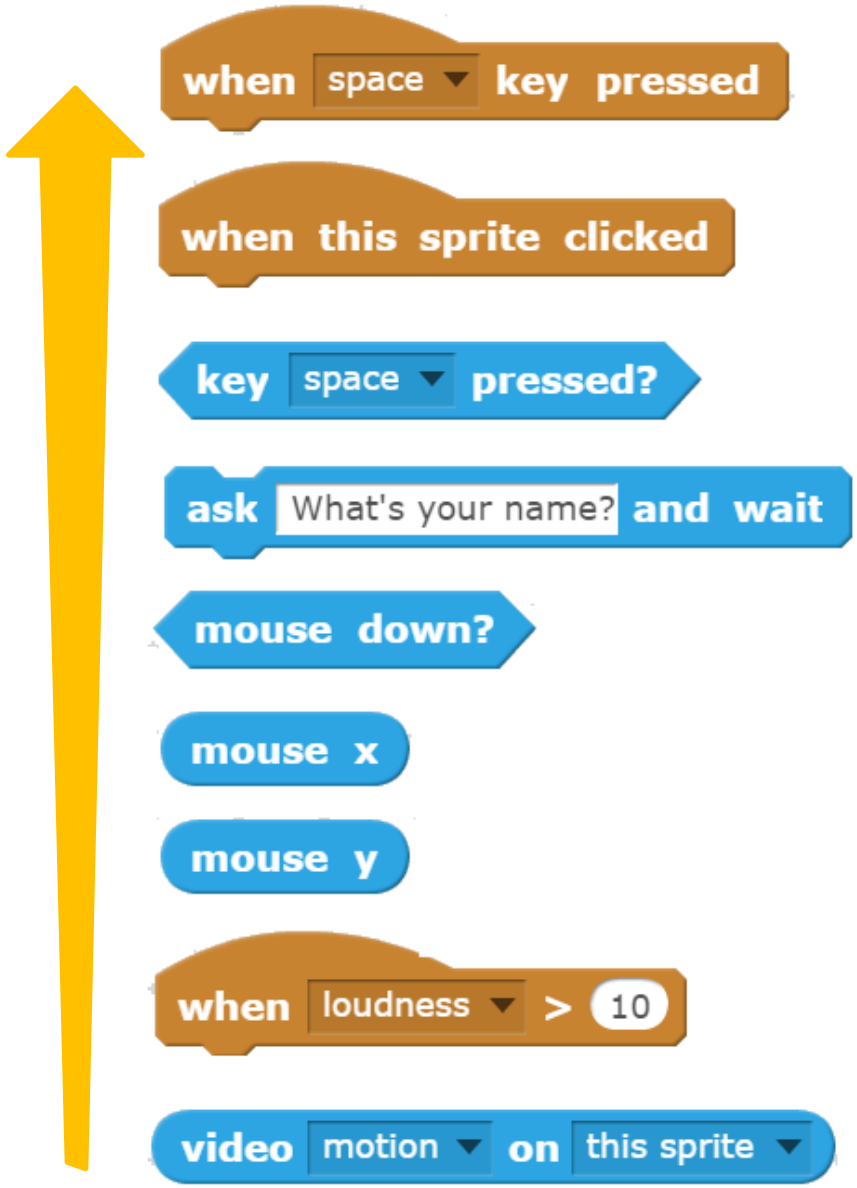
52%

36%

Interaction



Interaction



In 56% of projects

Variables

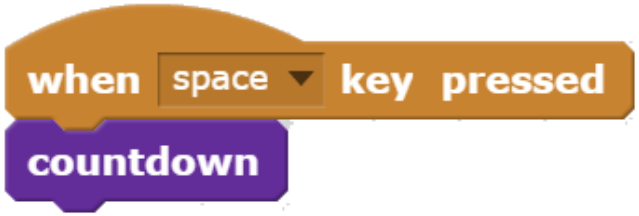
set x to 0
if x = 0 then
change x by 1
show variable x
hide variable x

Variables

In 33% of projects

>4 in 7% of projects

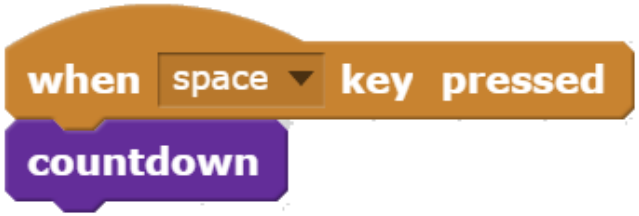
Procedures


when space key pressed
countdown

define countdown
set y to 10
repeat 10
say y for 1 secs
change y by -1

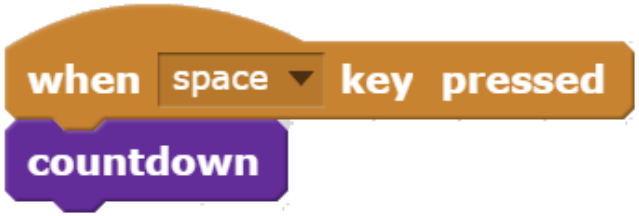
Procedures

In 8% of projects



Procedures

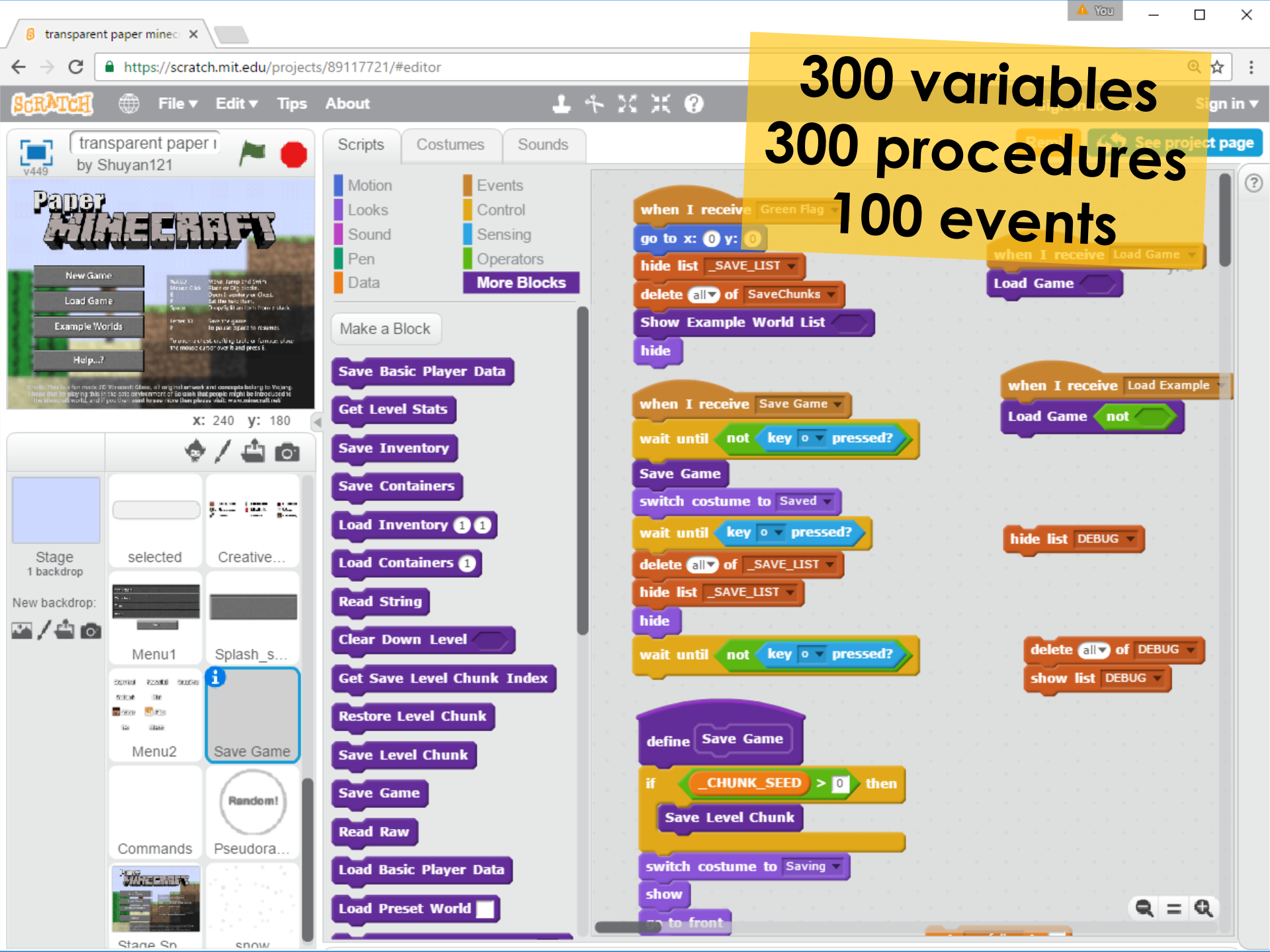
In 8% of projects



62% only invoked once

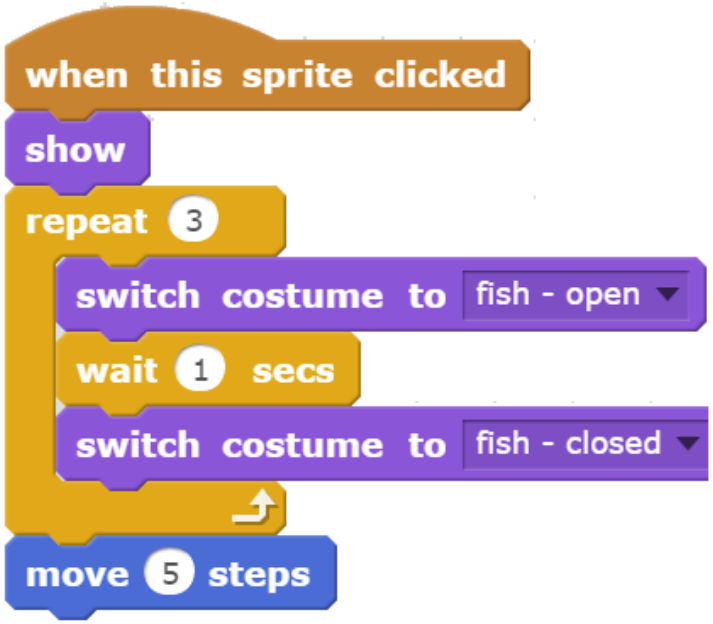
Many programs
are small & simple

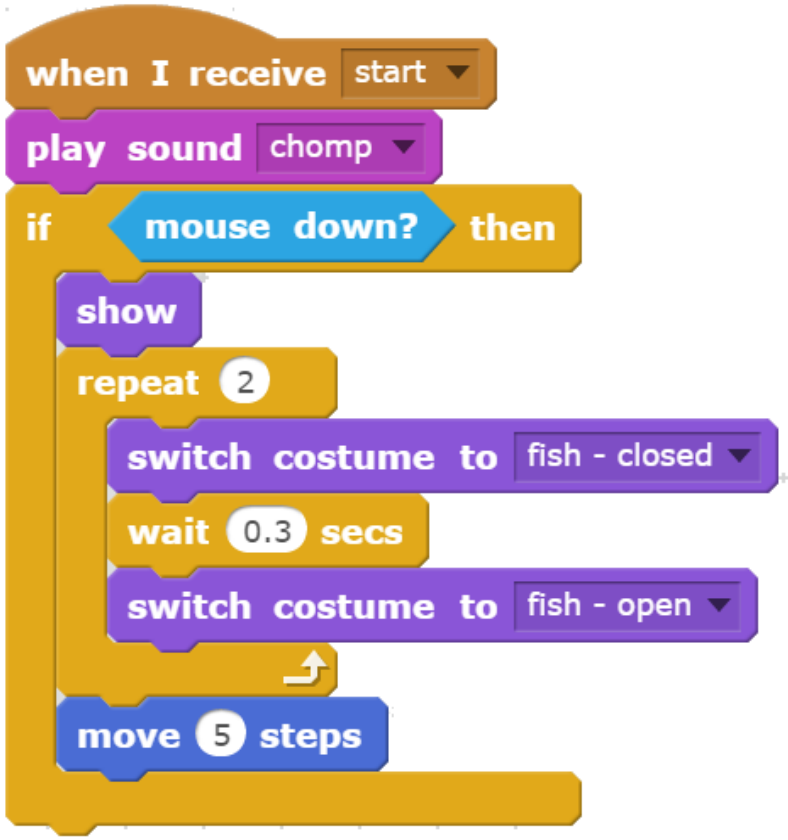
But....


transparent paper minec
https://scratch.mit.edu/projects/89117721/#editor
File
Edit
Tips
About
Sign in
transparent paper
by Shuyan121
v449
Paper MINECRAFT
New Game
Load Game
Example Worlds
Help...?
x: 240 y: 180
Scripts
Costumes
Sounds
Motion
Looks
Sound
Pen
Data
Events
Control
Sensing
Operators
More Blocks
Make a Block
Save Basic Player Data
Get Level Stats
Save Inventory
Save Containers
Load Inventory 1 1
Load Containers 1
Read String
Clear Down Level
Get Save Level Chunk Index
Restore Level Chunk
Save Level Chunk
Save Game
Read Raw
Load Basic Player Data
Load Preset World
Stage
1 backdrop
New backdrop:
selected
Creative...
Menu1
Splash_s...
Menu2
Save Game
Commands
Pseudora...
Random!
Stage Sp
snow
300 variables
300 procedures
100 events
when I receive Green Flag
go to x: 0 y: 0
hide list _SAVE_LIST
delete all of SaveChunks
Show Example World List
hide
when I receive Save Game
wait until not key o pressed?
Save Game
switch costume to Saved
wait until key o pressed?
delete all of _SAVE_LIST
hide list _SAVE_LIST
hide
wait until not key o pressed?
define Save Game
if _CHUNK_SEED > 0 then
Save Level Chunk
switch costume to Saving
show
go to front
when I receive Load Game
Load Game
when I receive Load Example
Load Game not
hide list DEBUG
delete all of DEBUG
show list DEBUG

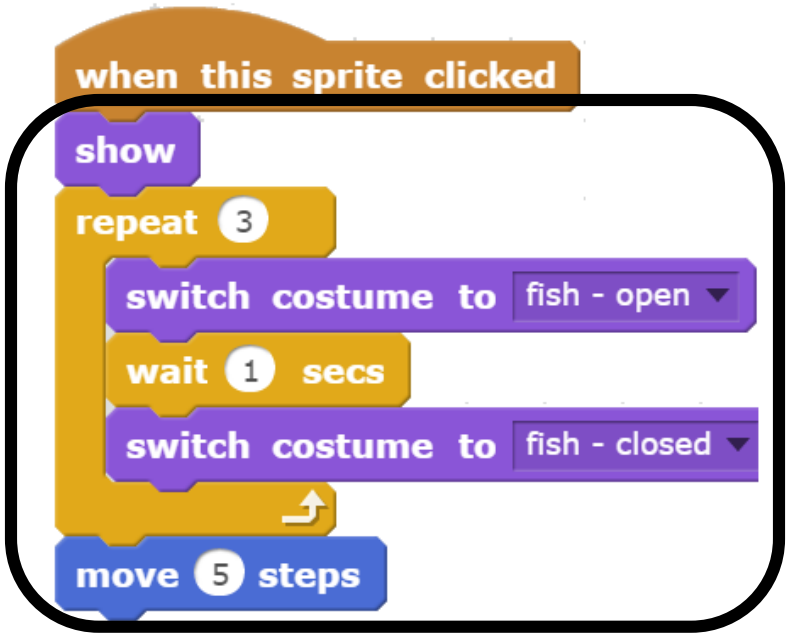
And what
about smells?

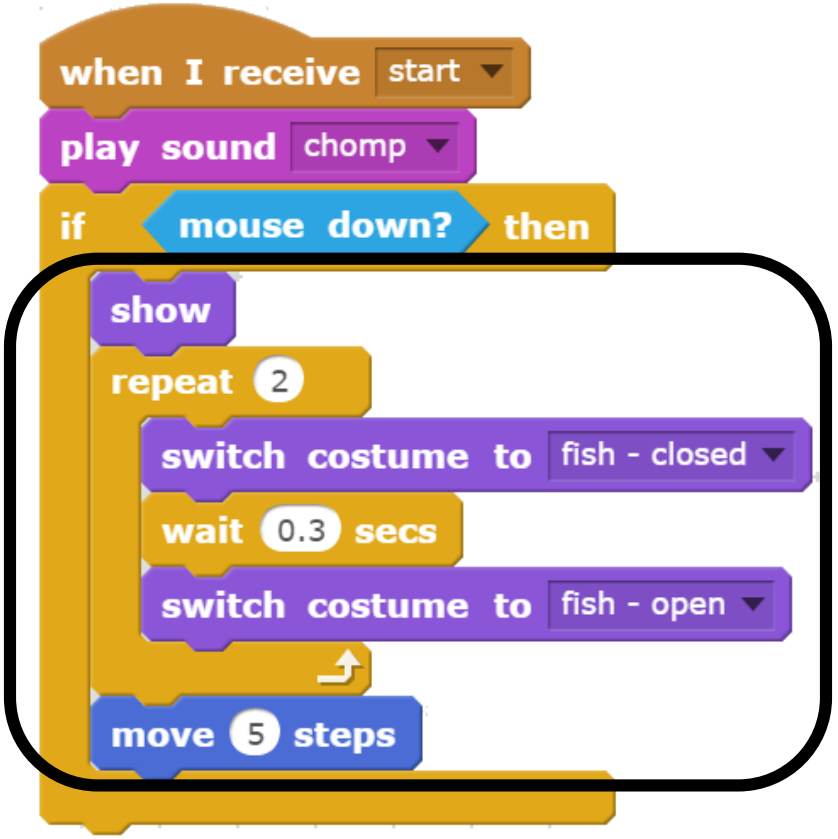
Duplicated Code



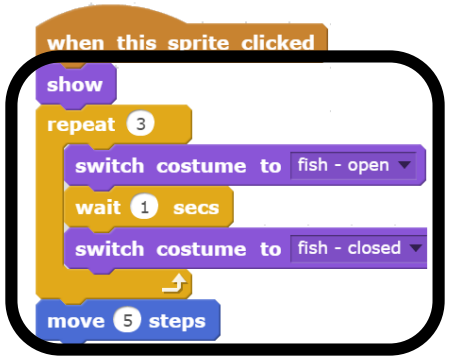


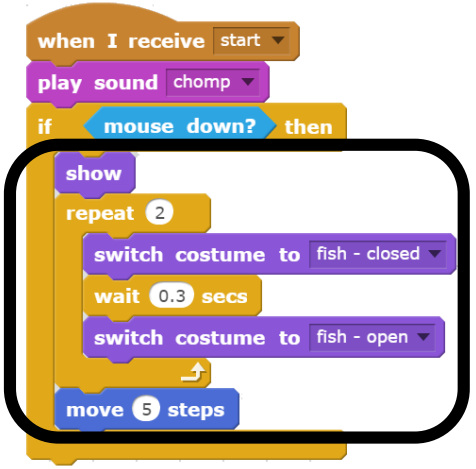
Duplicated Code





Duplicated Code

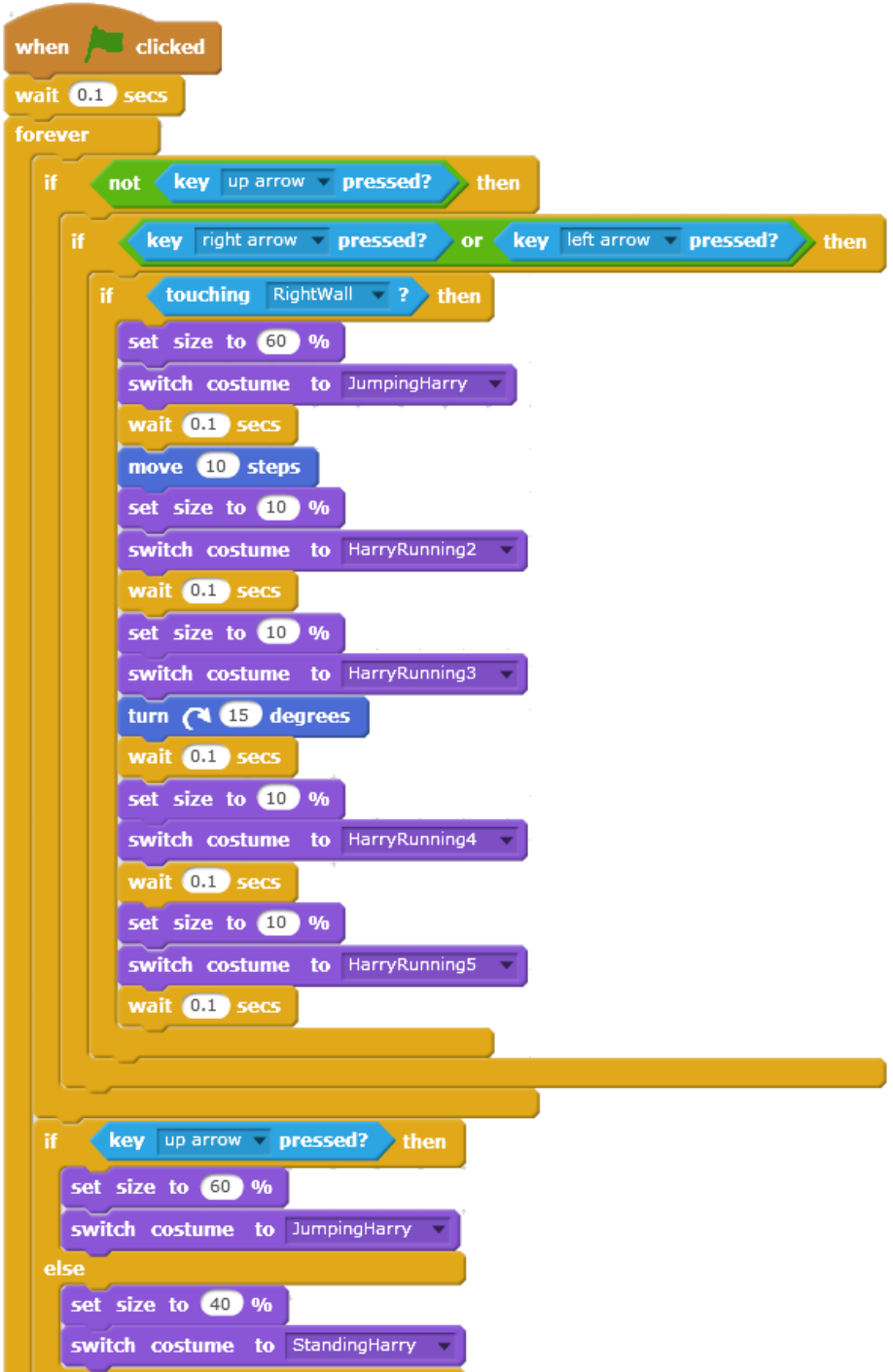




Across sprites: in **26%** of the projects

Within sprites: in **10%** of the projects

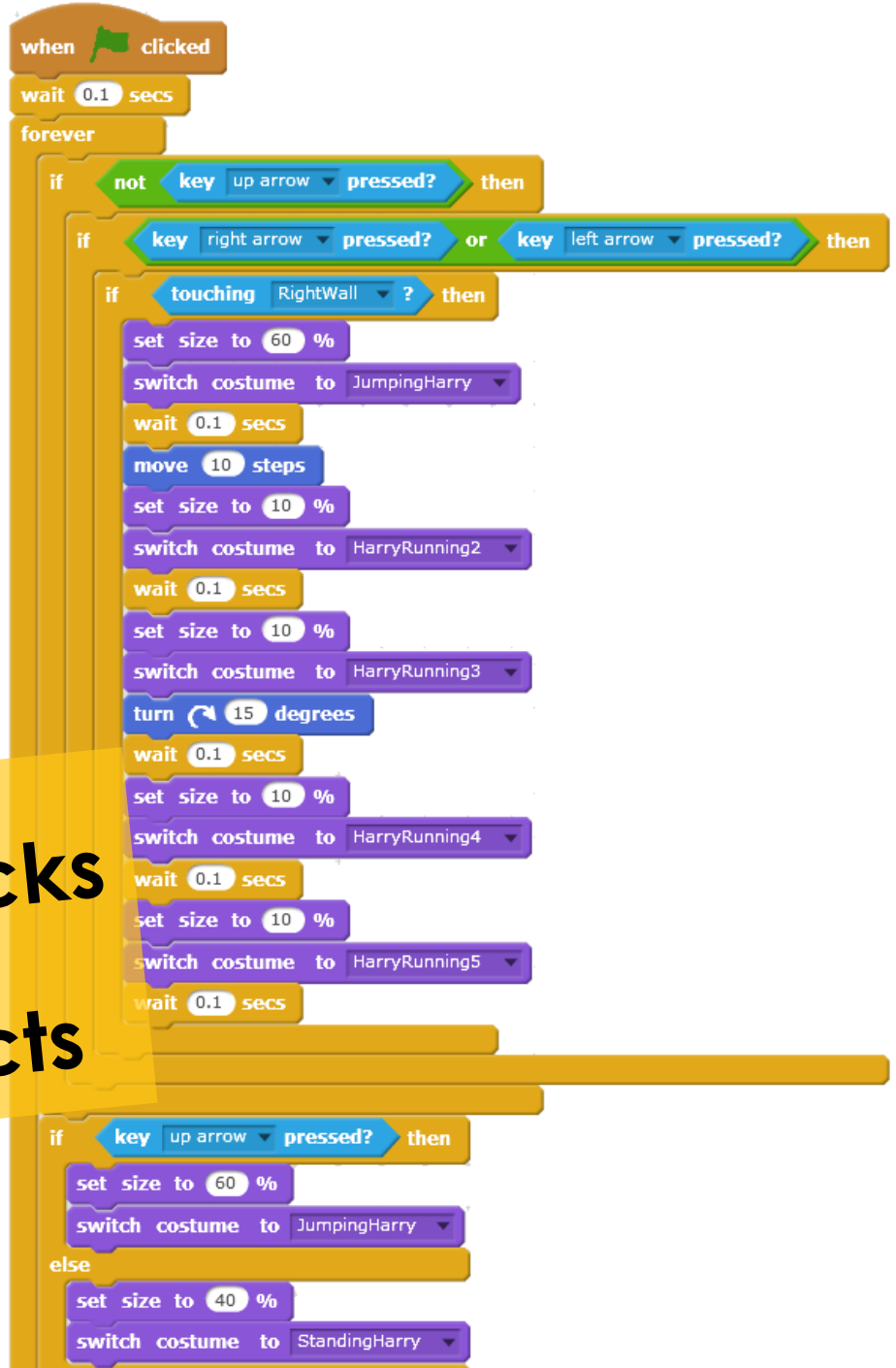
Large Script



Large Script

scripts with >18 blocks

in 30% of the projects

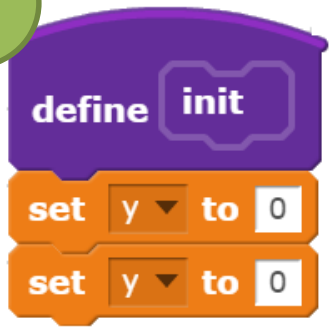


Dead Code

1

2

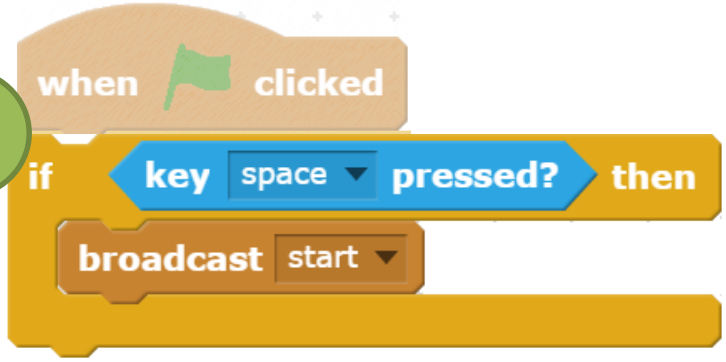
3



4

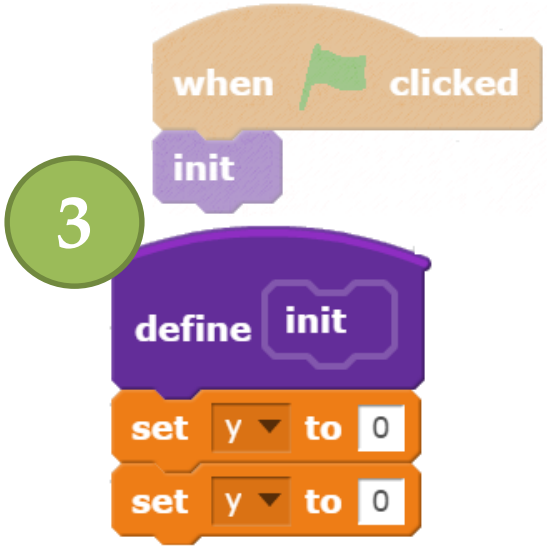
Dead Code

1

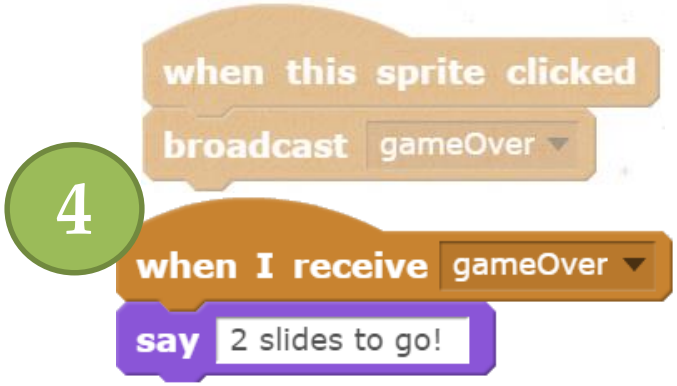


2

3



4



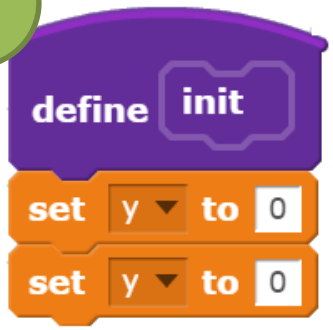
Dead Code

24%

1

1%

3



24%

2

8%

4

Dead Code

Any: 28% of the projects

1

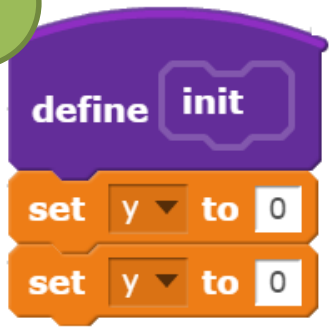
24%

2

24%

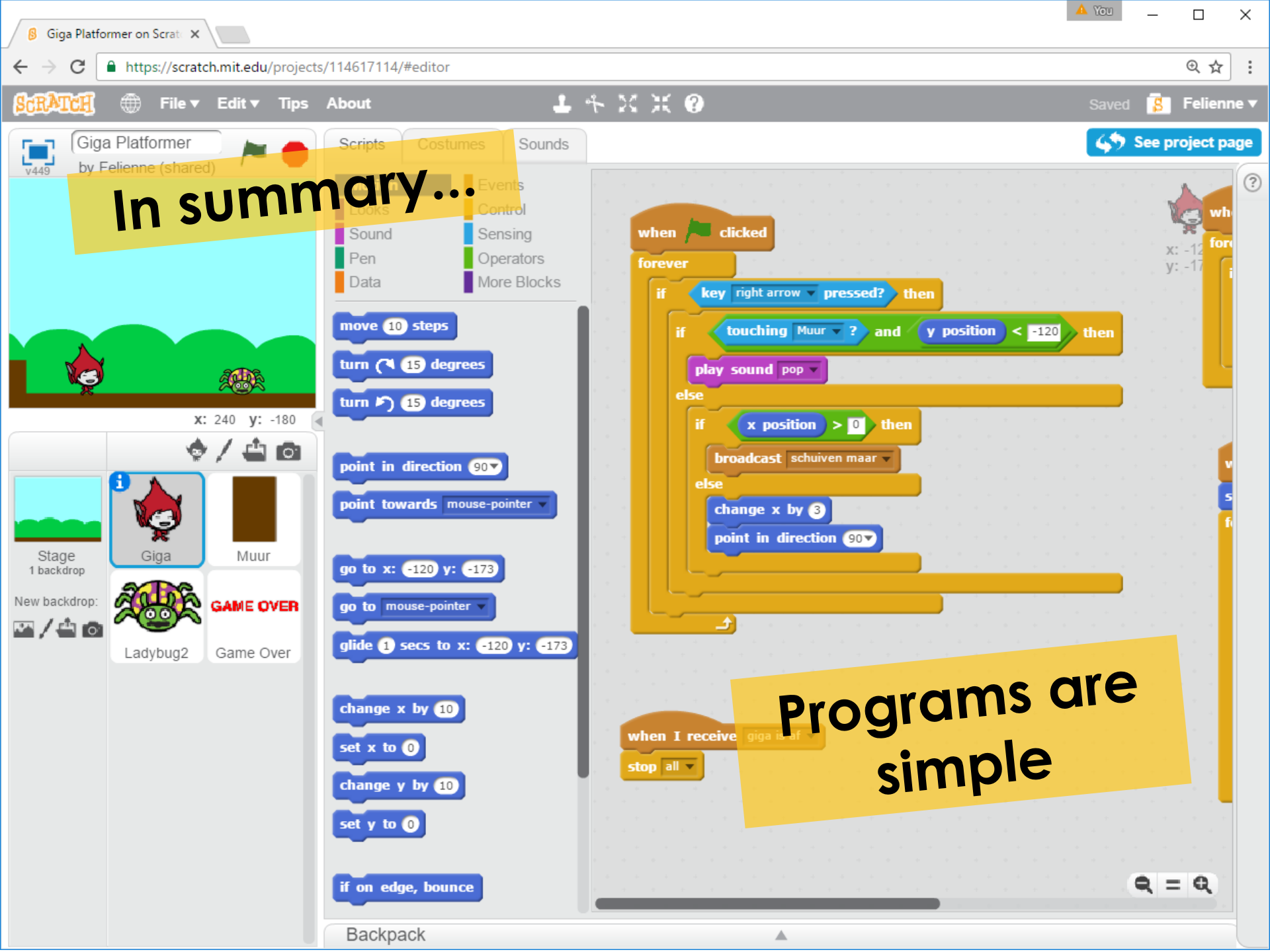
3

1%



4

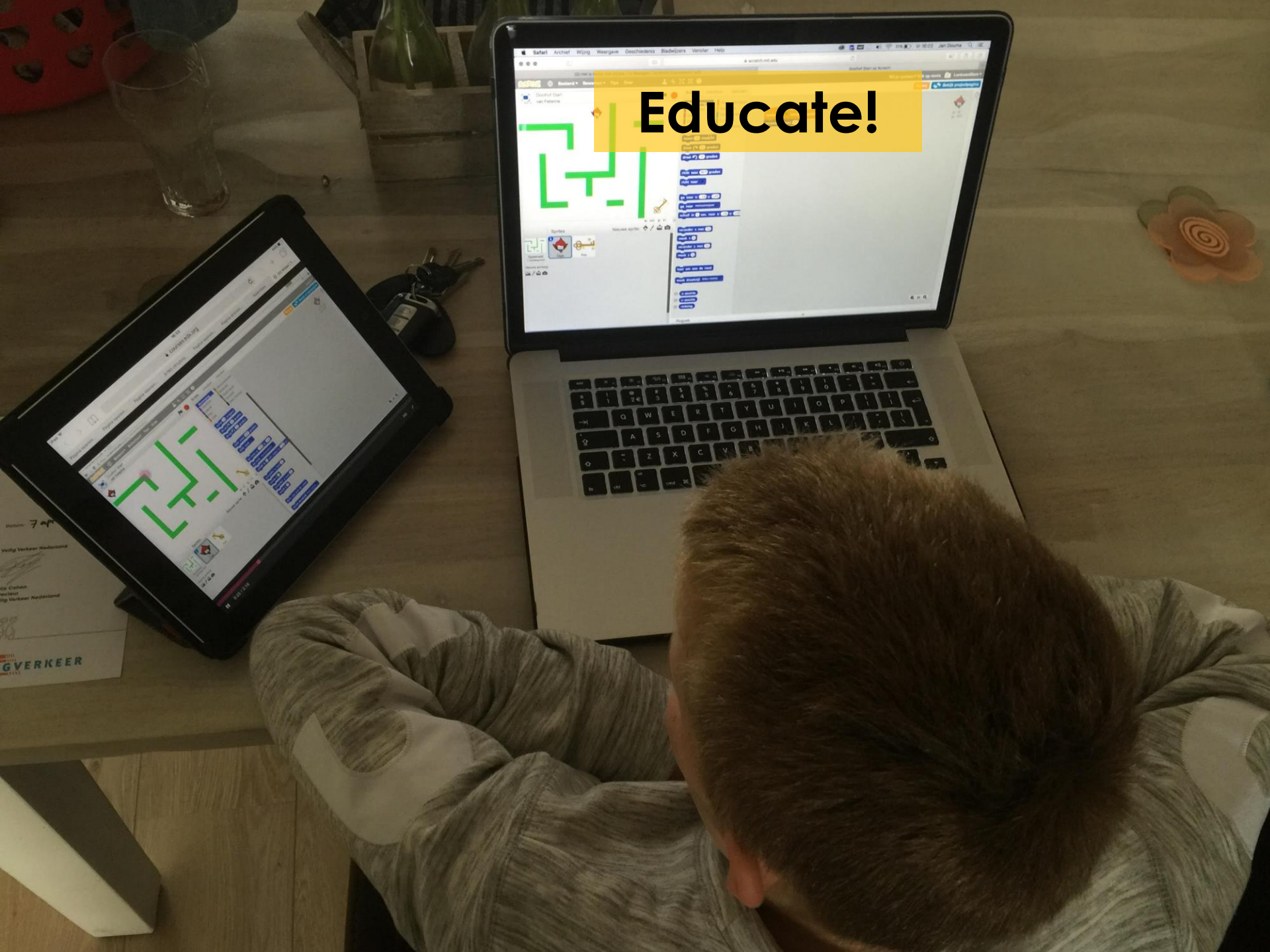
8%


Giga Platformer on Scrat
https://scratch.mit.edu/projects/114617114/#editor
File
Edit
Tips
About
Saved
Felienne
Giga Platformer
by Felienne (shared)
v449
Scripts
Costumes
Sounds
See project page
In summary...
Events
Control
Sound
Sensing
Pen
Operators
Data
More Blocks
move 10 steps
turn 15 degrees
turn 15 degrees
point in direction 90
point towards mouse-pointer
go to x: -120 y: -173
go to mouse-pointer
glide 1 secs to x: -120 y: -173
change x by 10
set x to 0
change y by 10
set y to 0
if on edge, bounce
x: 240 y: -180
Stage
1 backdrop
New backdrop:
Giga
Muur
Ladybug2
GAME OVER
Game Over
when clicked
forever
if key right arrow pressed? then
if touching Muur ? and y position < -120 then
play sound pop
else
if x position > 0 then
broadcast schuiven maar
else
change x by 3
point in direction 90
when I receive
stop all
Programs are simple
Backpack

But....

Smells are common

Now what?

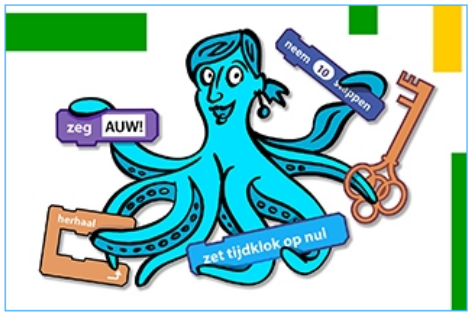

Educate!

Scratch: Programmer

https://www.edx.org/course/scratch-programmeren-voor-kinderen-8-delftx-scratchx-0

edX Courses Programs Schools & Partners About Search: Sign In Register

Home > All Subjects > Computer Science > Scratch: Programmeren voor kinderen (8+)



Scratch: Programmeren voor kinderen (8+)

In deze gratis cursus leer je spelenderwijs programmeren. Maak je eigen games met Scratch, terwijl je leert hoe je op een nette manier programmeert

TU Delft

Self-Paced

Enroll Now

I would like to receive email from Delft University of Technology (TU Delft) and learn about other offerings related to Scratch: Programmeren voor kinderen (8+).

About this course

1 Reviews 4.5/5

Programmeren is steeds belangrijker in onze wereld. En jong geleerd is oud gedaan. Deze MOOC bevat filmpjes en opdrachten waarmee kinderen zelf kunnen leren programmeren.

Iedere week maken we samen een game: een doolhof, een aquarium, een Flappy Bird spel en een soort Super Mario

See more

Over 3000 kids enrolled

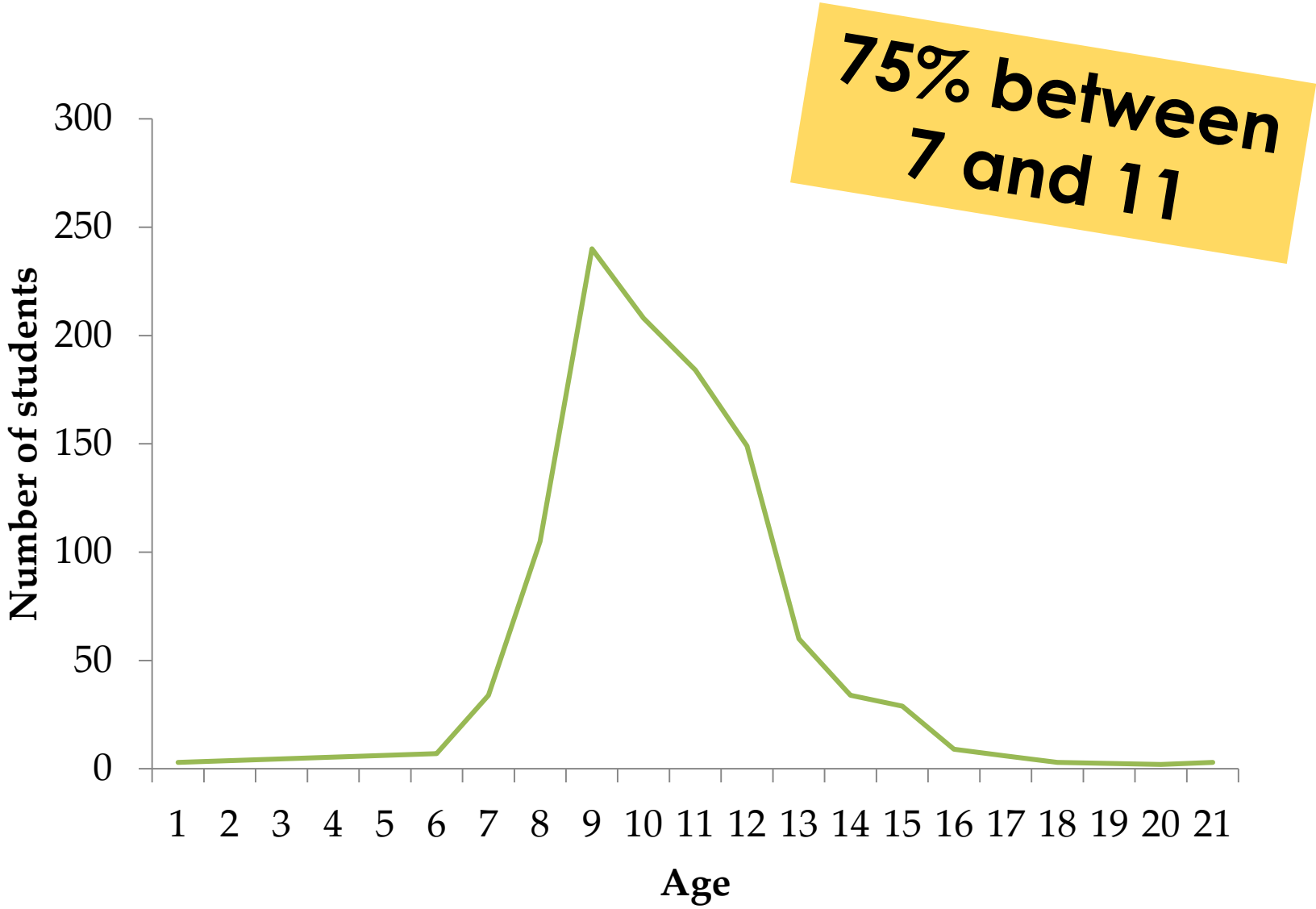
What you'll learn

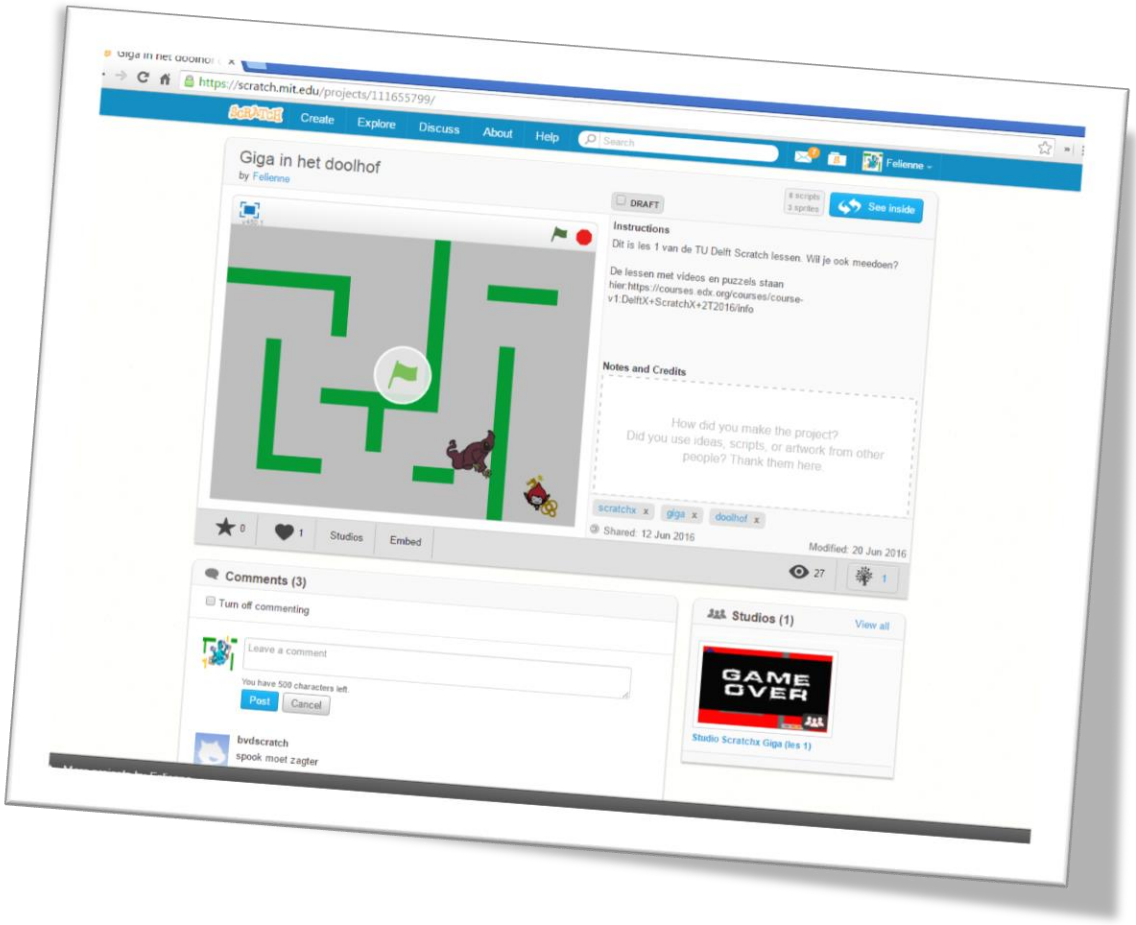
- Programmeren in Scratch
- Algemene programmeerconcepten (lussen, variabelen, datastructuren)

Meet the instructor

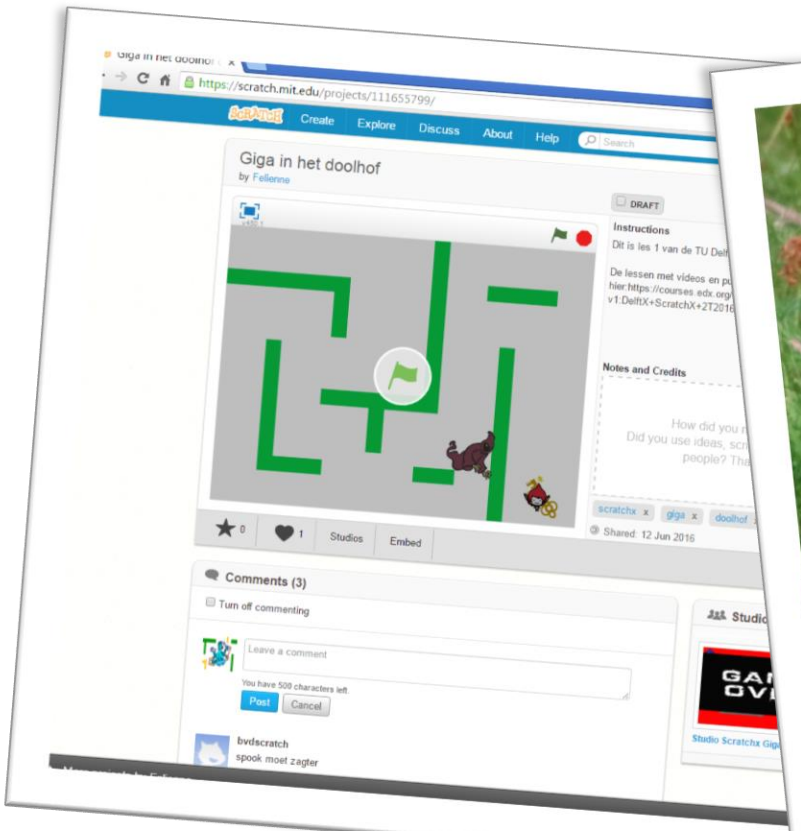
Length:	6 weken
Effort:	2-6 uur per week
Institution:	DelftX
Subject:	Computer Science
Level:	Introductory
Languages:	Nederlands
Video Transcripts:	Nederlands

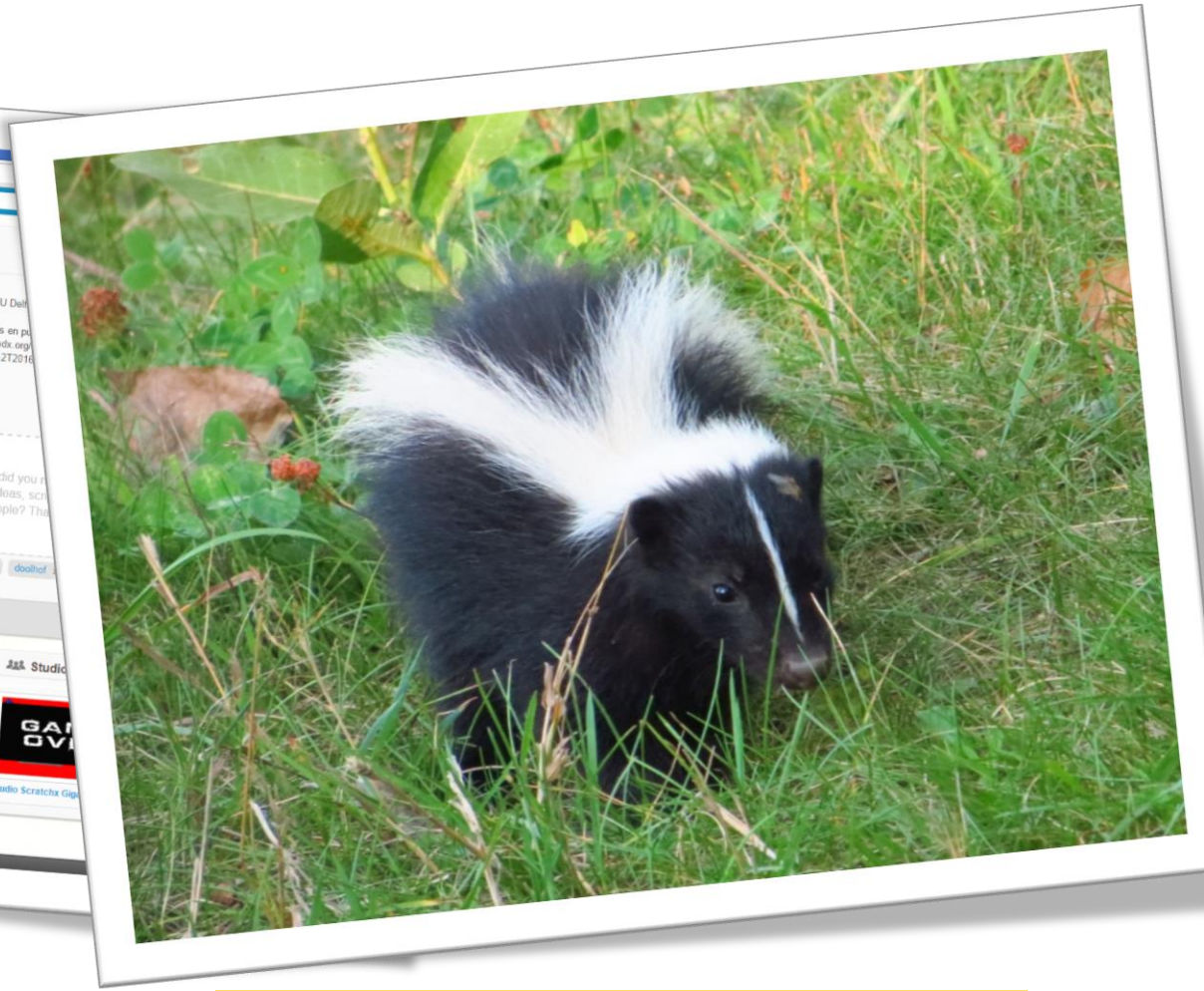
Share this course with a friend


75% between 7 and 11
Number of students
300
250
200
150
100
50
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21
Age



What kids thought they learned





What they really learned

The course includes tests

About programming and smells!

Previous | Next

Deel 4

VIEW UNIT IN STUDIO

Bookmark this page

Vraag 20

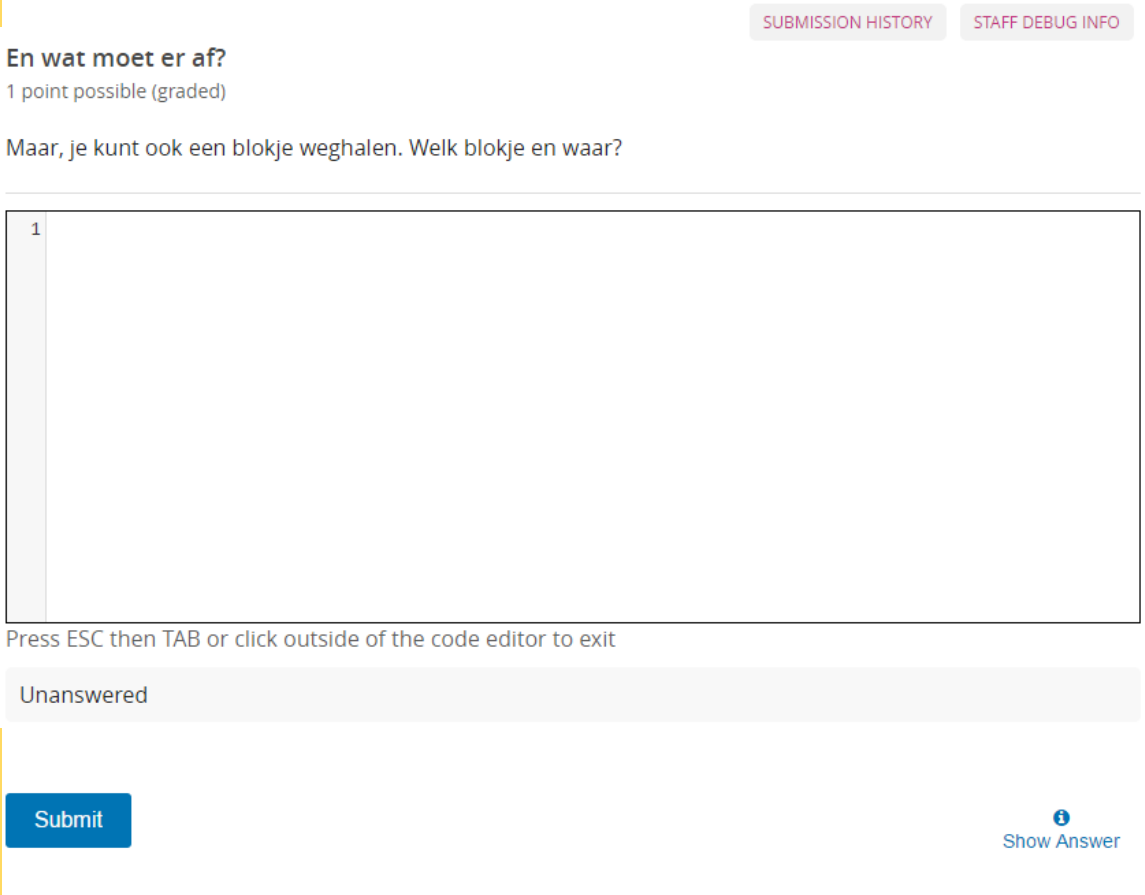
1/1 point (graded)

Kijk naar dit programma:

Je duwt op de groene vlag. Wat is de x op het einde van het programma?

- 10
- 100
- 110 ✔

The course includes tests



About programming *and smells!*

Are smells harder
to learn?

Are smells harder to learn?
Nope!

Smells are not harder than Coding!

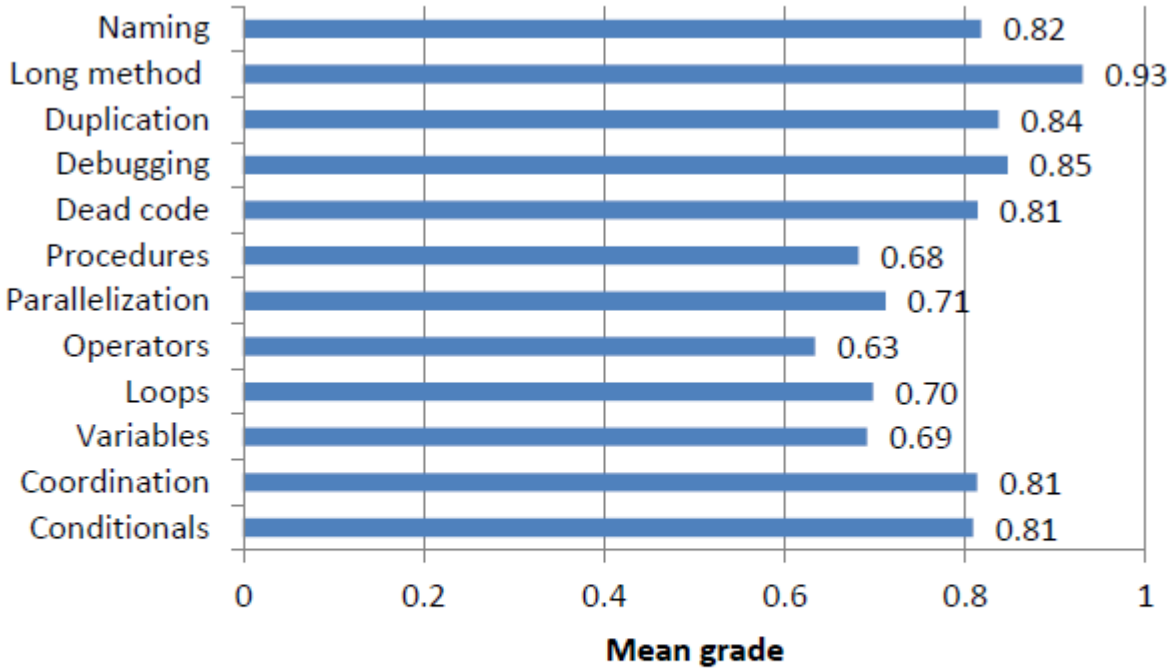
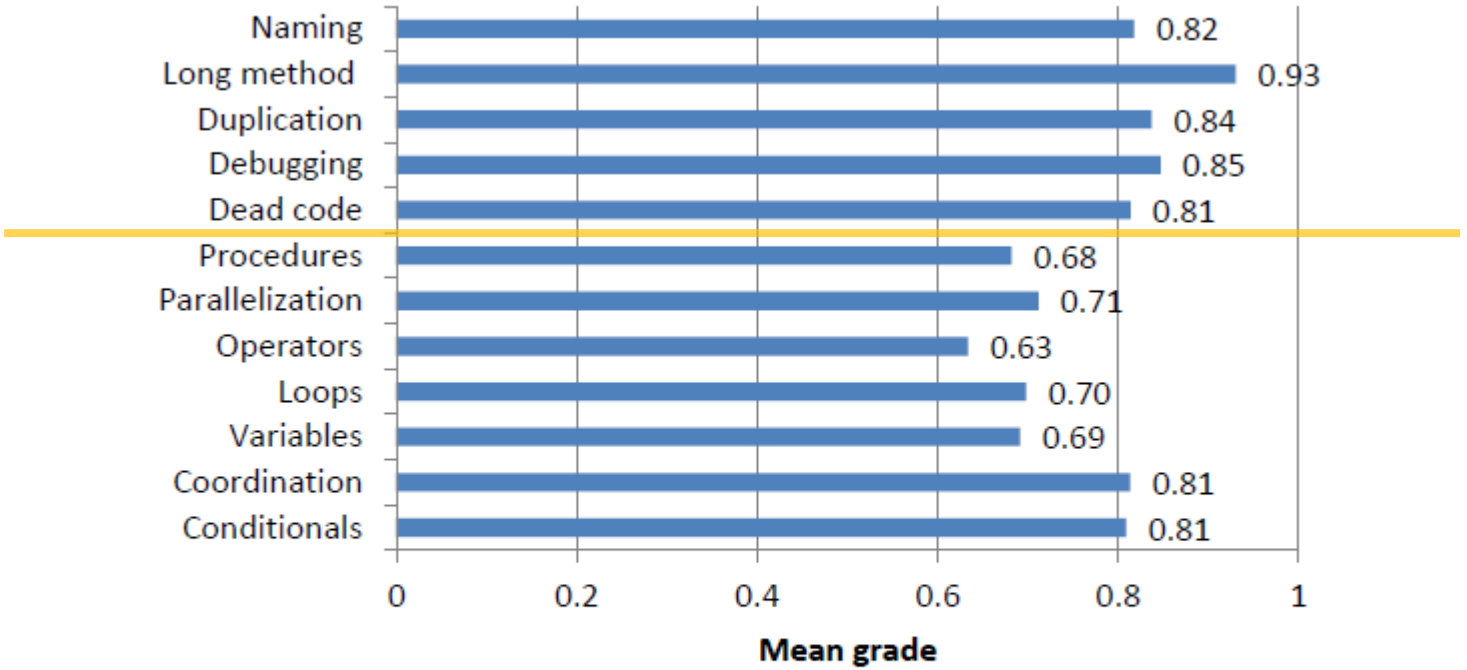


Fig. 4. Mean grade of all student answers (first attempts) to all questions corresponding to different programming and software engineering concepts

*Paper Under Review

Smells are not harder than Coding!



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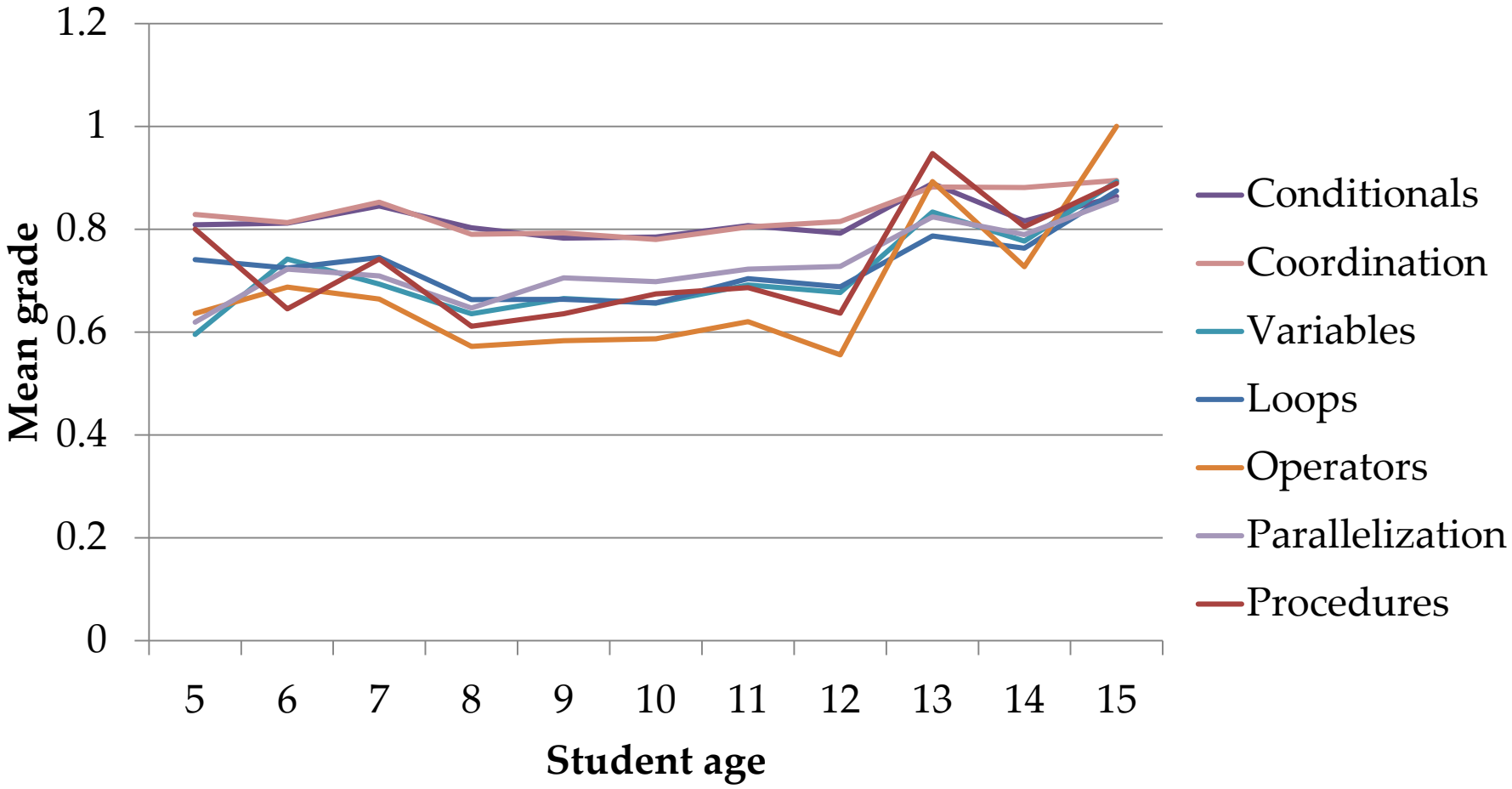
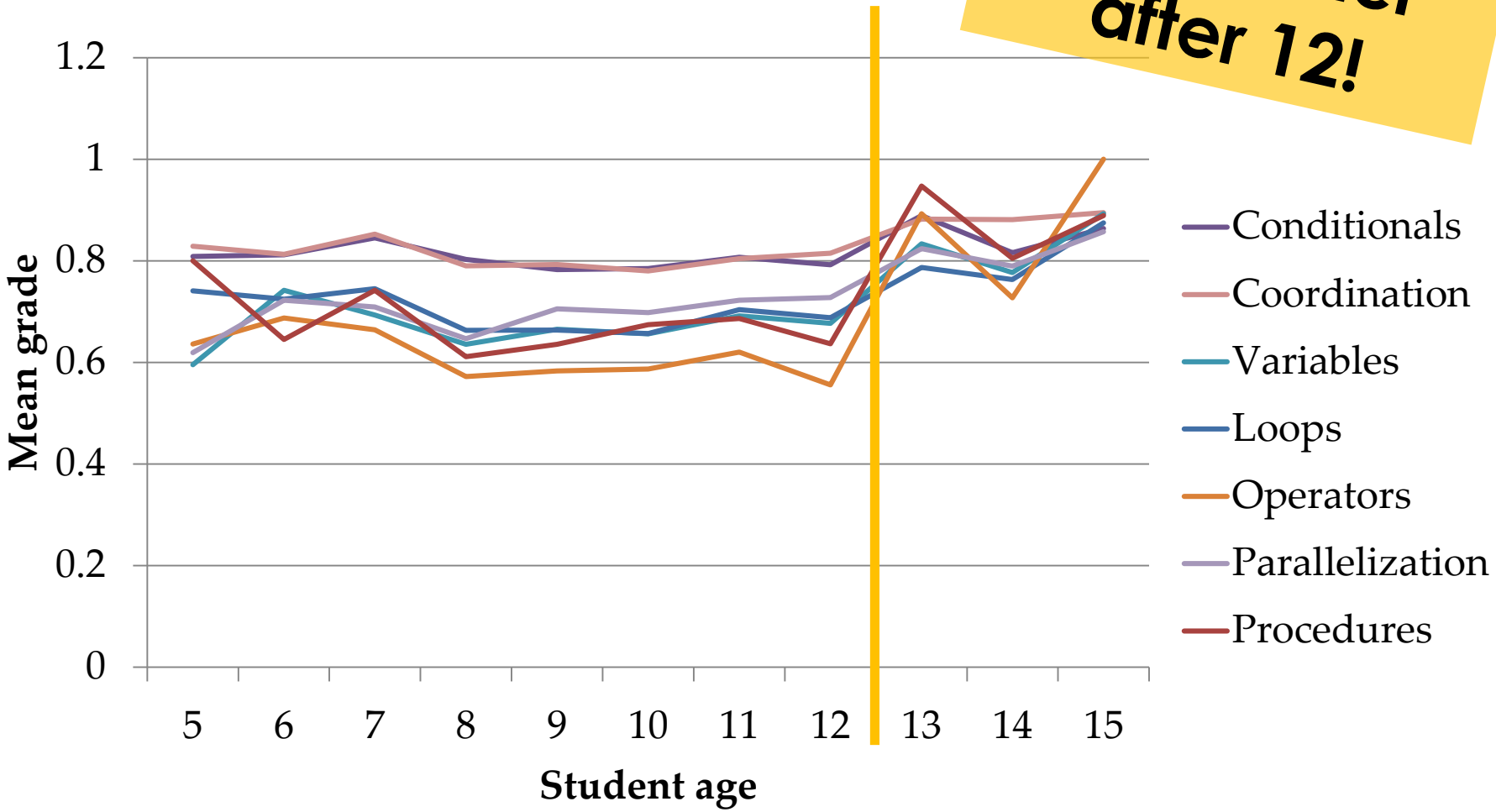
*Paper Under Review

Some coding concepts are harder though



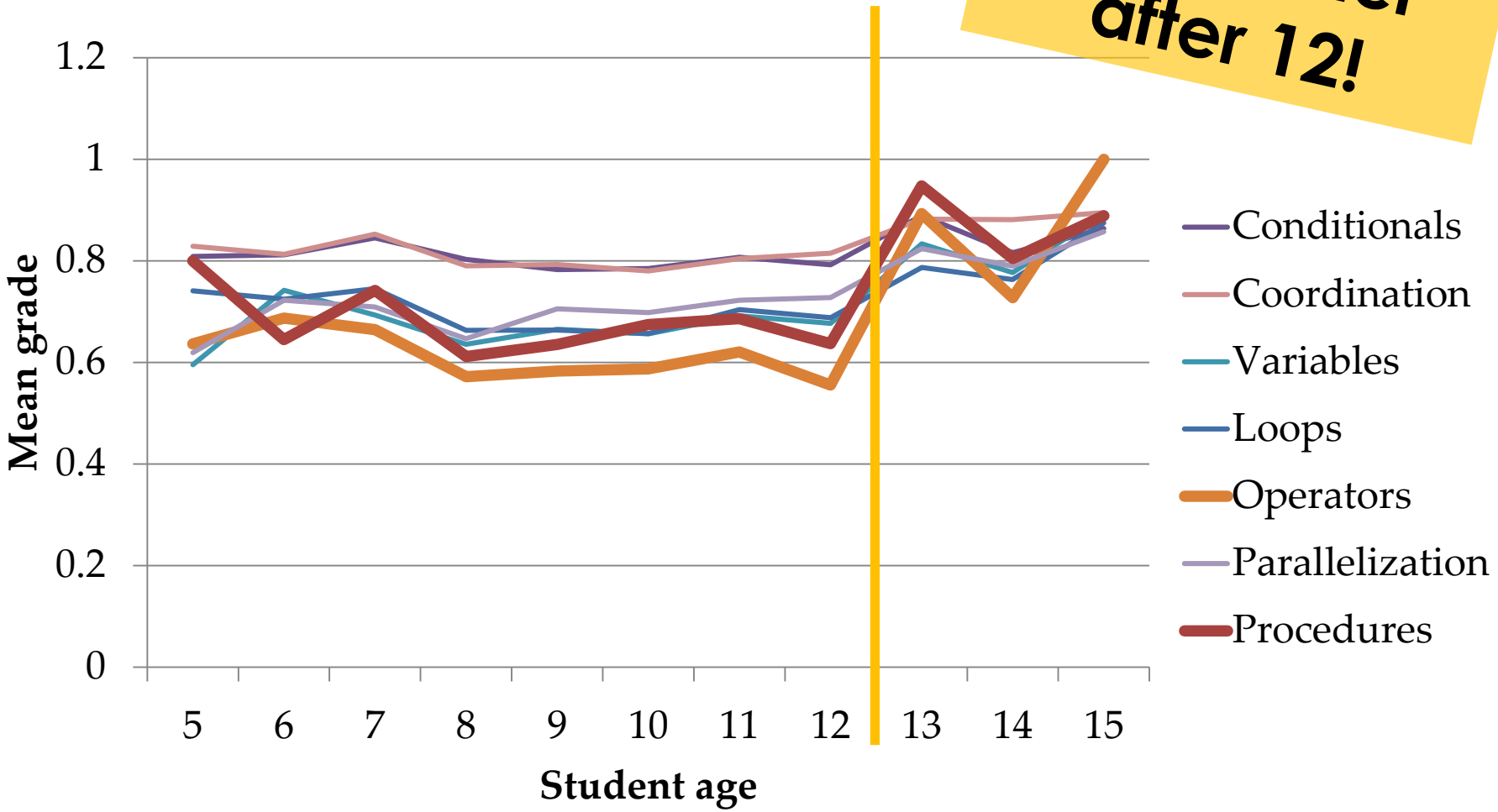
Some coding concepts are harder though

Get easier after 12!



Some coding concepts are harder though

Get easier after 12!

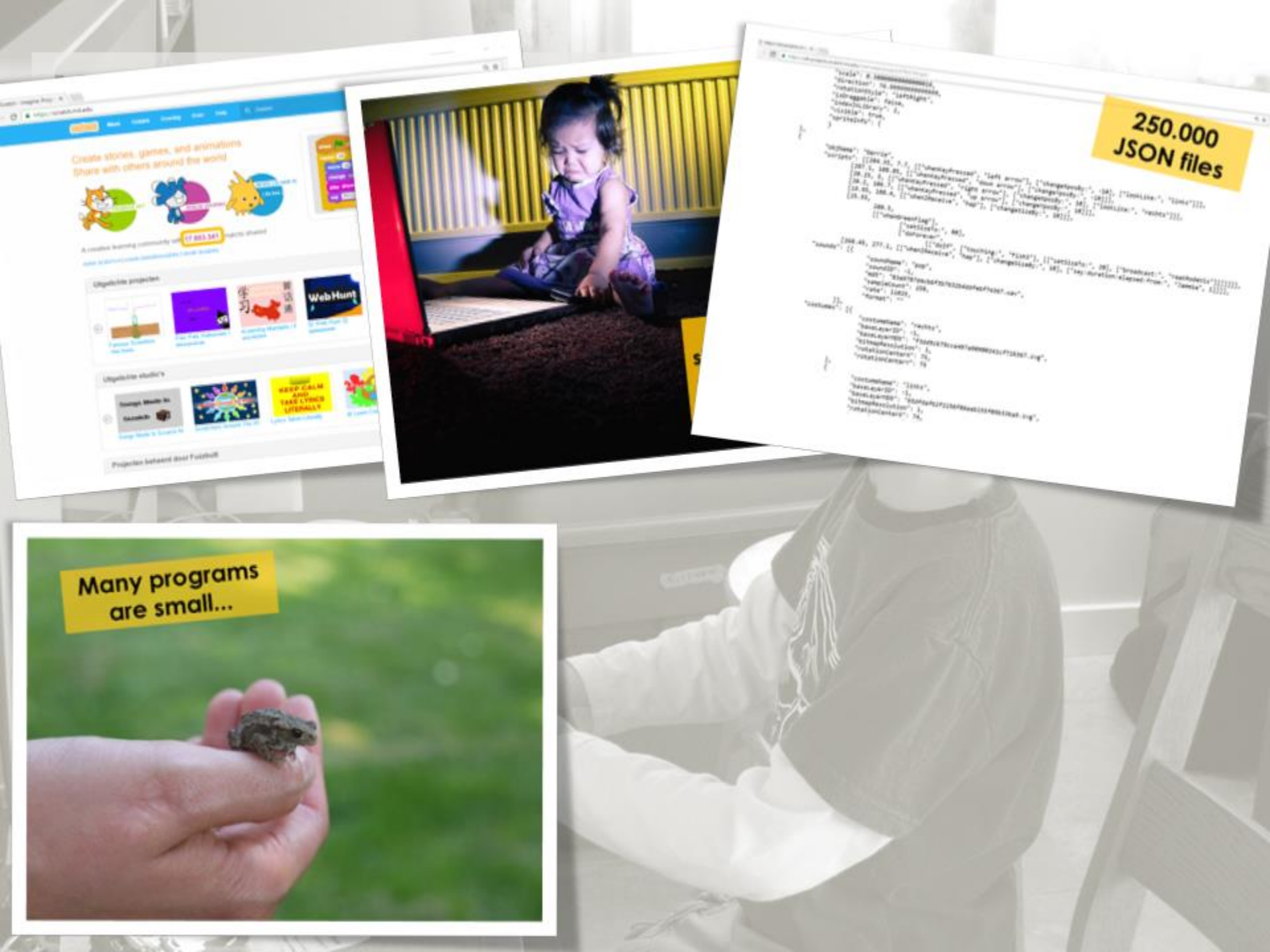


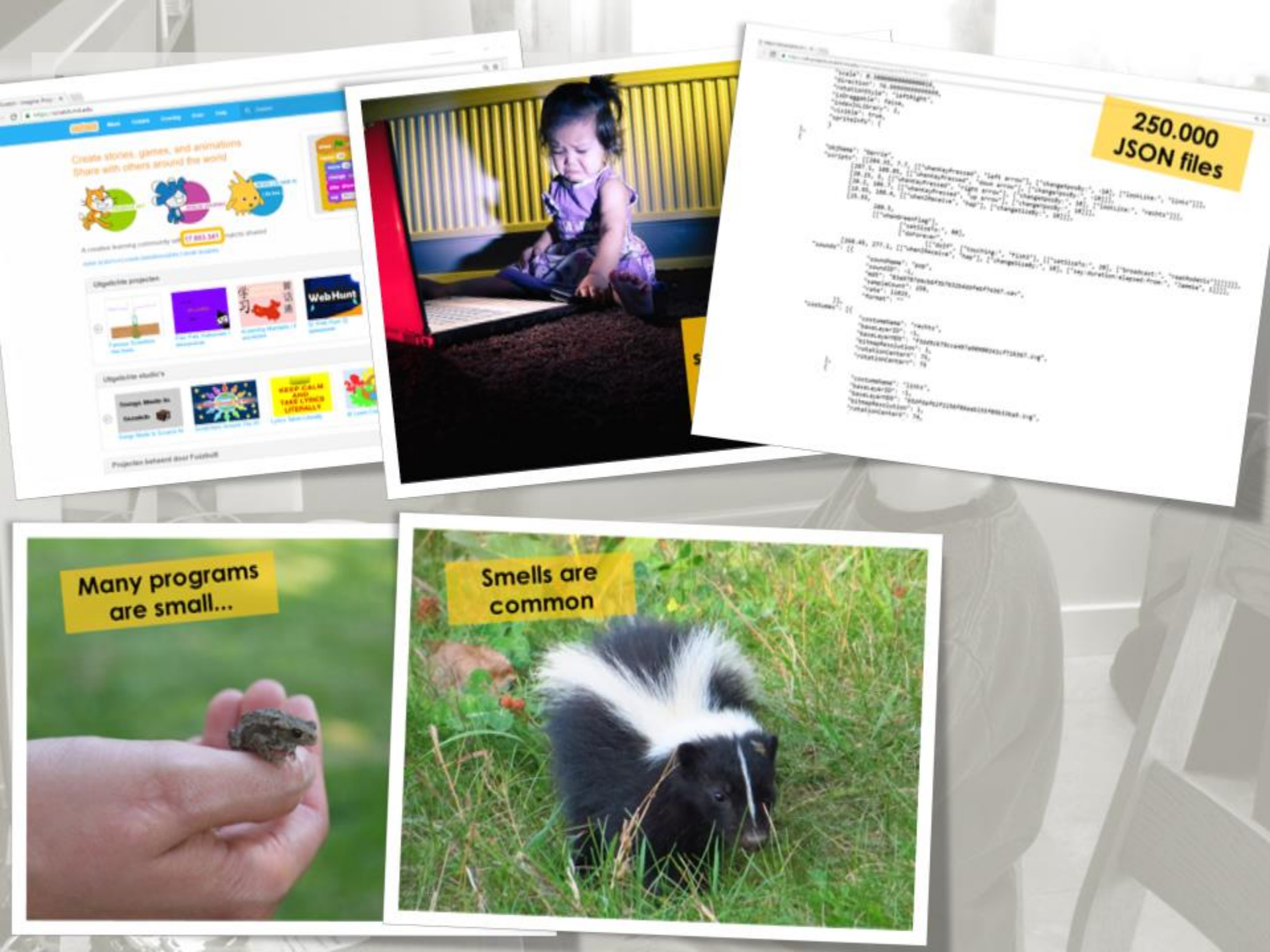
How Do Kids Program in the Wild?
@Felienne

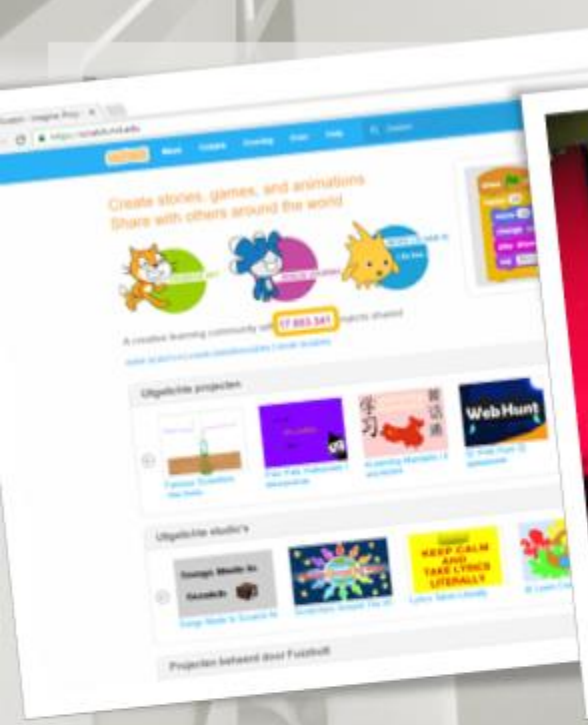
Create stories, games, and animations
Share with others around the world
Uitgelichte projecten
Uitgelichte studio's
Projecten behaard door Fuzzbolt

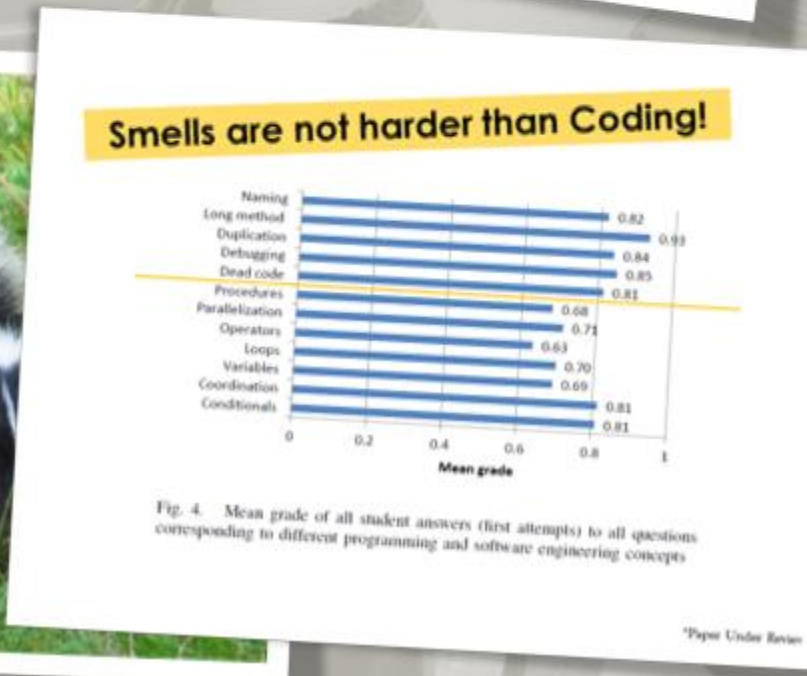
Create stories, games, and animations
Share with others around the world
WebHunt
tl;dr
Yes
Kids performed significantly better on the non-smelly program

Create stories, games, and animations
Share with others around the world
WebHunt
250.000
JSON files


Create stories, games, and animations
Share with others around the world
250.000
JSON files
Many programs
are small...


Create stories, games, and animations
Share with others around the world
250.000
JSON files
Many programs
are small...
Smells are
common





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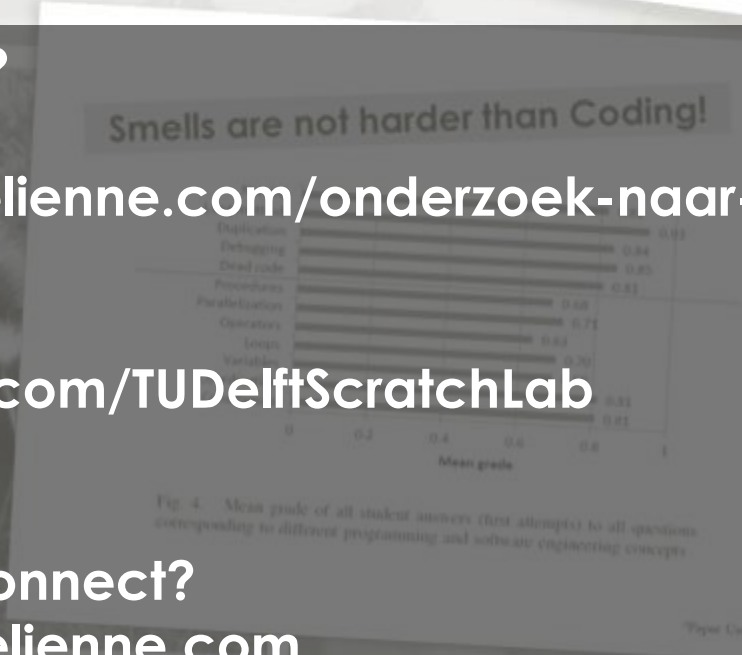
*Paper Under Review

How do kids program in the wild?

@Felienne

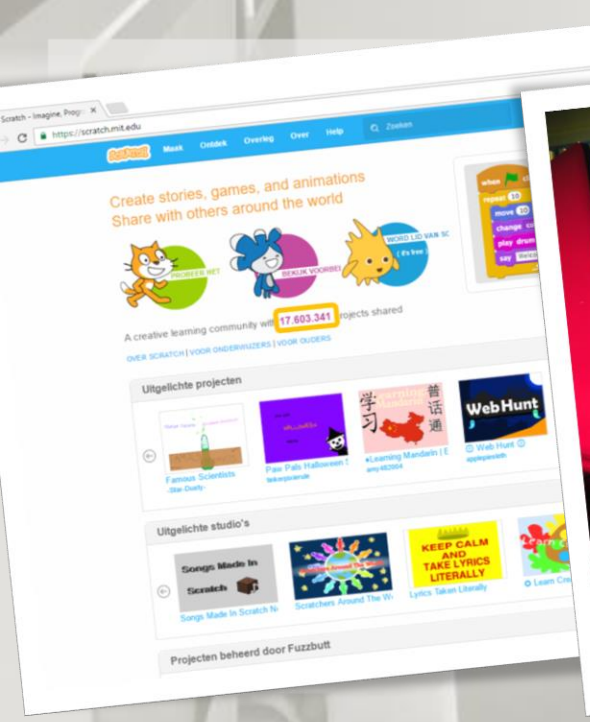


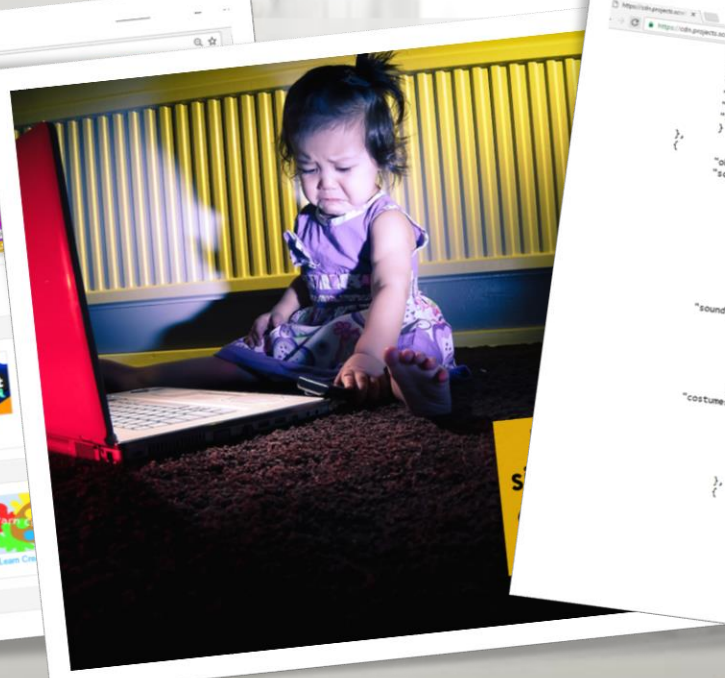
More info?

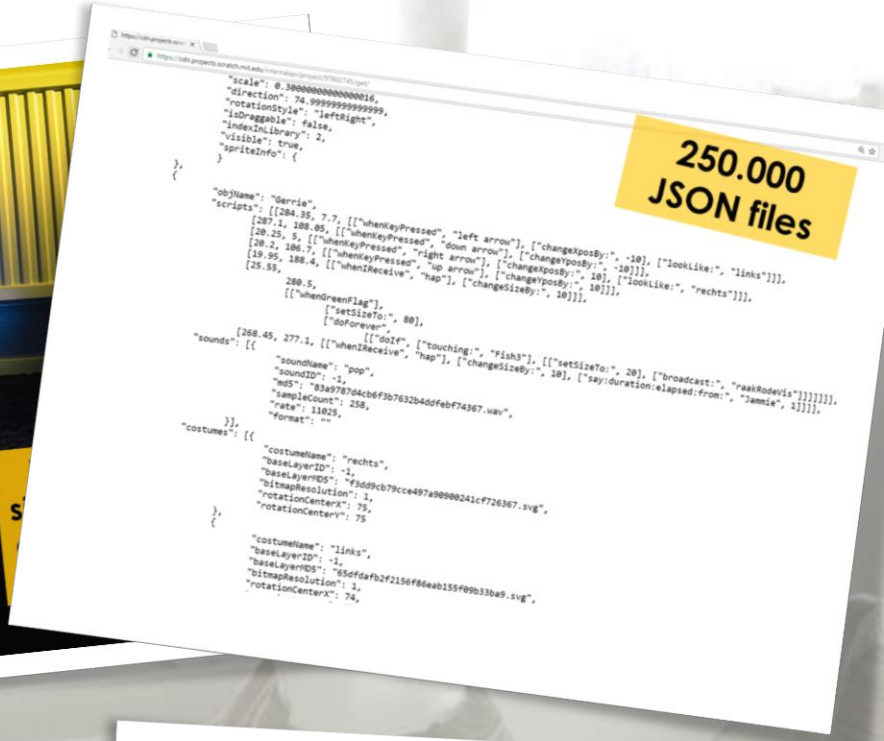
- www.felienne.com/onderzoek-naar-scratch
- github.com/TUDelftScratchLab

Want to connect?

- mail@felienne.com







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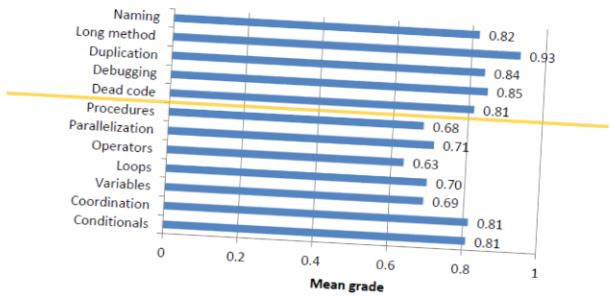

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