

Visual Programming with Scratch

UON Computer Science 4 Schools

Primary Workshop

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Session Plan

- Presentation: Overview of Visual Programming & Scratch (~15 minutes)
- Hands-On Activities (~1 hour)

Presentation Contents

- Visual Programming & the DT curriculum
- What is Visual Programming?
- Examples of Visual Programming languages
- Scratch in K - 12
- Scratch Activity

Visual Programming in ACARA DT

- Years 3 & 4: "Implement simple digital solutions as **visual programs** with algorithms involving branching (decisions) and user input (ACTDIP011)"
- Years 5 & 6: "Implement digital solutions as simple **visual programs** involving branching, iteration (repetition), and user input (ACTDIP020)"

What is Visual Programming?

- Programming and Coding *usually* mean the same thing
- Coding is the act of writing instructions that a computer can understand and follow in some programming language
- Visual programs are those written in a *visual programming language*, e.g. *Scratch* or *AppInventor*
- Different to *general-purpose languages*, e.g. *JavaScript*, *Python*, *Java*

General-Purpose Languages

```
186 def mainGame(movementInfo):
187     score = playerIndex = loopIter = 0
188     playerIndexGen = movementInfo['playerIndexGen']
189     playerx, playery = int(SCREENWIDTH * 0.2), movementInfo['playery']
190
191     basex = movementInfo['basex']
192     baseShift = IMAGES['base'].get_width() - IMAGES['background'].get_width()
193
194     # get 2 new pipes to add to upperPipes lowerPipes list
195     newPipe1 = getRandomPipe()
196     newPipe2 = getRandomPipe()
197
198     # list of upper pipes
199     upperPipes = [
200         {'x': SCREENWIDTH + 200, 'y': newPipe1[0]['y']},
201         {'x': SCREENWIDTH + 200 + (SCREENWIDTH / 2), 'y': newPipe2[0]['y']},
202     ]
203
204     # list of lowerpipe
205     lowerPipes = [
206         {'x': SCREENWIDTH + 200, 'y': newPipe1[1]['y']},
207         {'x': SCREENWIDTH + 200 + (SCREENWIDTH / 2), 'y': newPipe2[1]['y']},
208     ]
209
210     pipeVelX = -4
211
```

Visual Programming Languages

- Languages that allow you to code by using visual elements
- Great for Coding beginners
- Students can concentrate on *Computational Thinking*, instead of a language's *syntax* and *semantics*
- Some examples of different *visual programming languages* are shown on the next slides

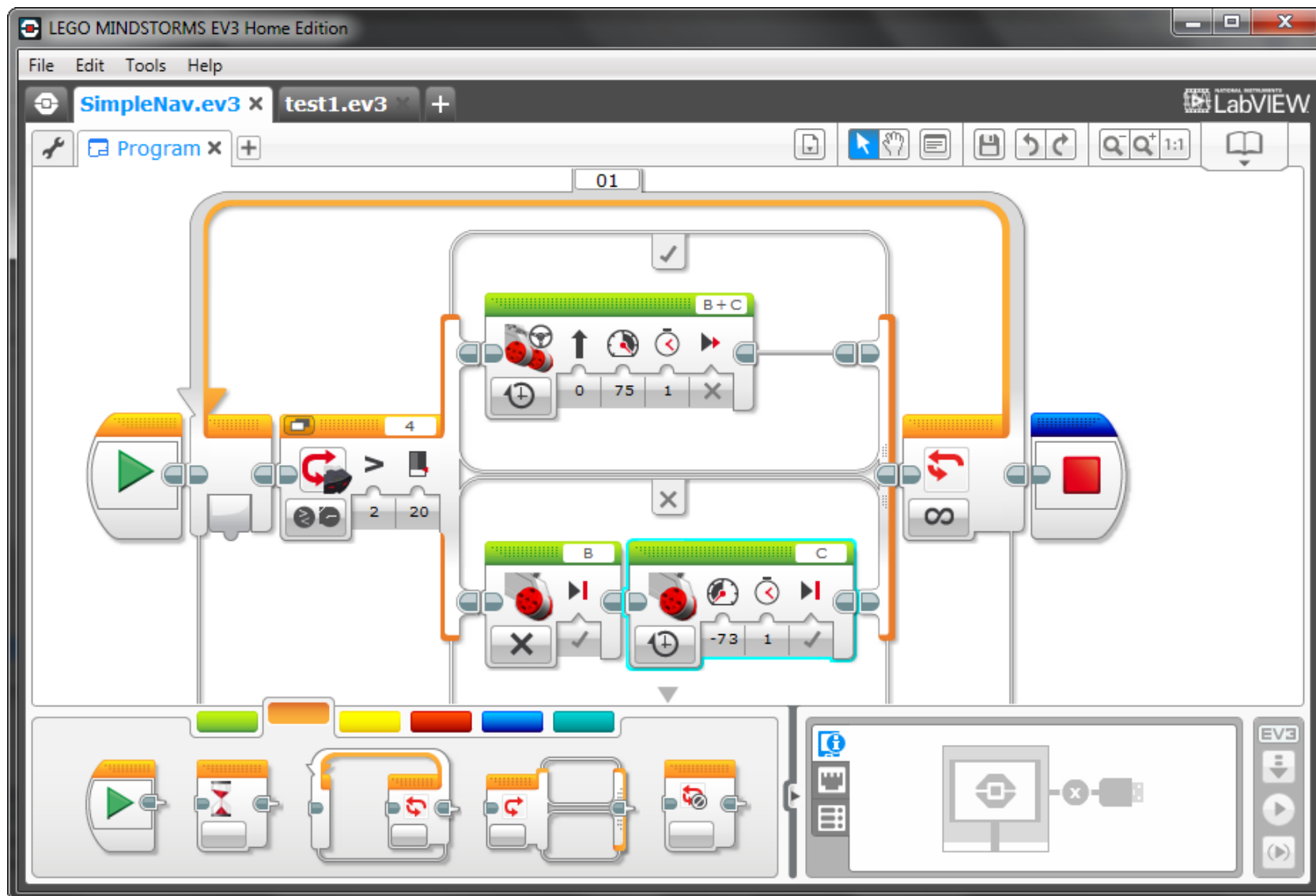
ScratchJr

- Commands are symbols rather than text
- Target age is 5 - 7 year olds
- Free app available for Android and iOS
- Suitable for early years or before introducing Scratch



LEGO Mindstorms

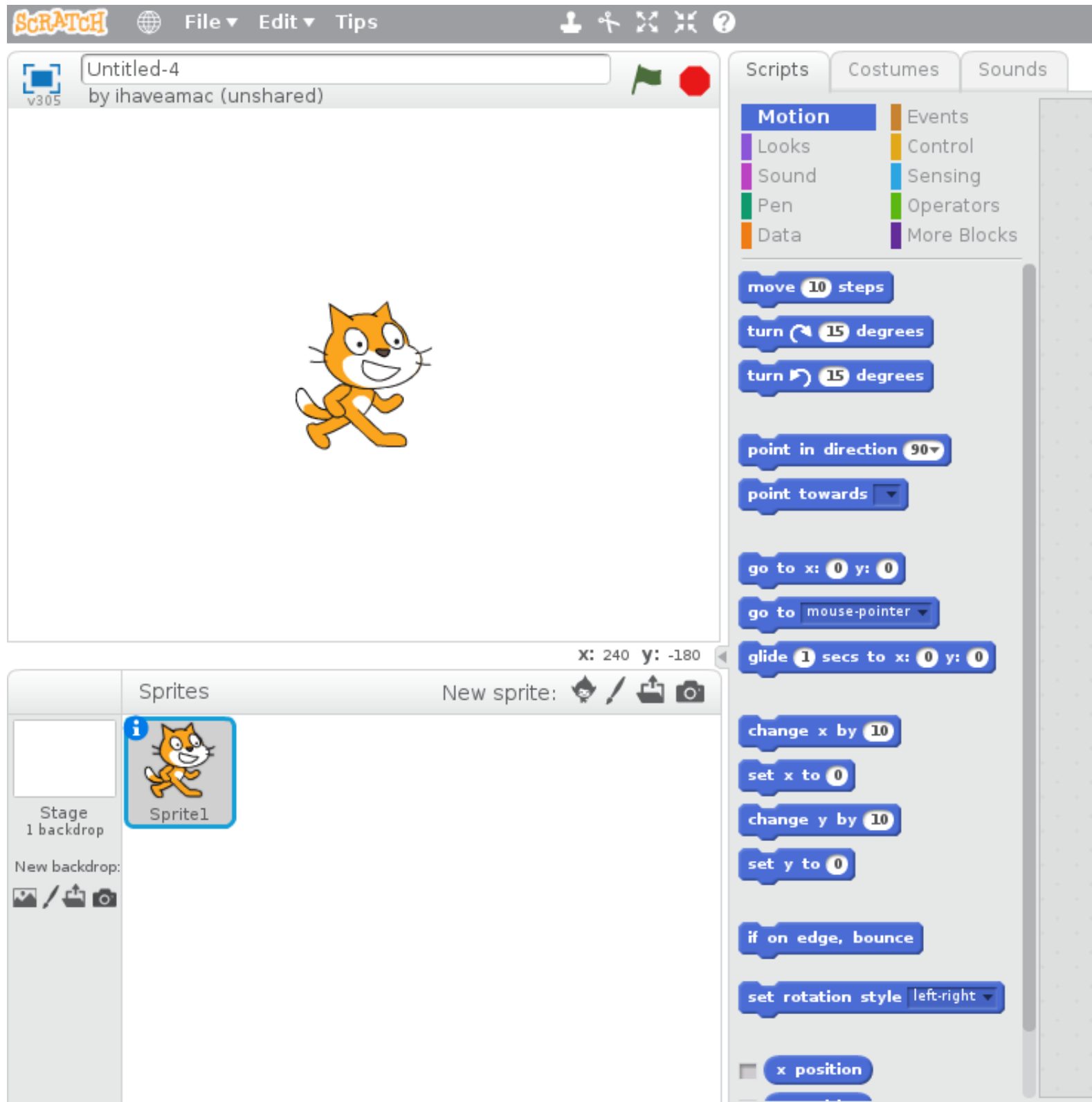
- Interacts with LEGO Mindstorms robots
- Write code to move a robot or collect data from its sensors
- Used in previous session (*Writing Algorithms*)



AppInventor

- Allows you to create apps that run on Android phones and tablets
- Can use features of phones, e.g. vibration or maps
- Not used in this workshop (but resources for this are available on the *Extras* page on the CS4PS website)

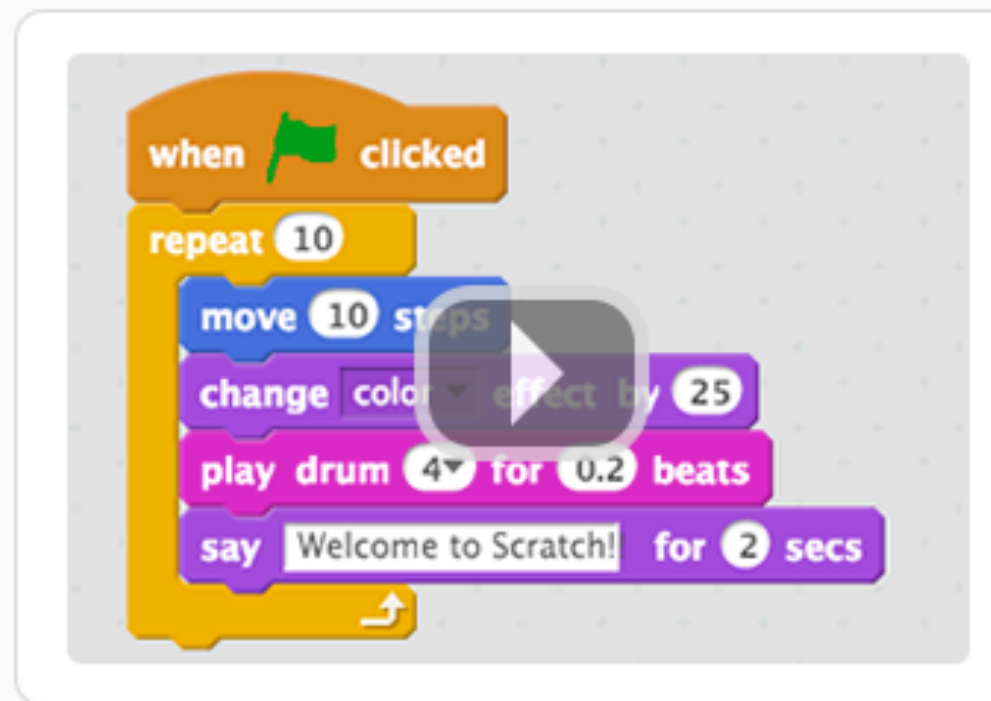
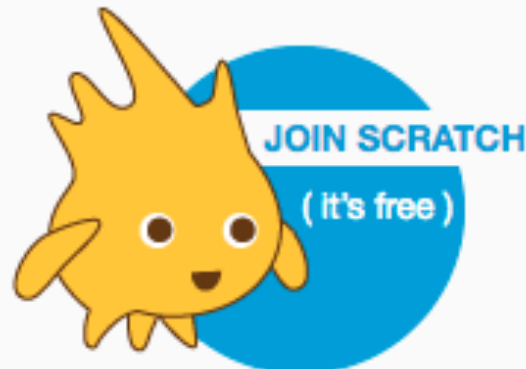




Scratch

- Commonly used to introduce K - 12 students to *Coding* and *Computational Thinking*
- Students can create games, animations and interactive stories
- Many high quality resources and lessons available online (see CS4PS website)

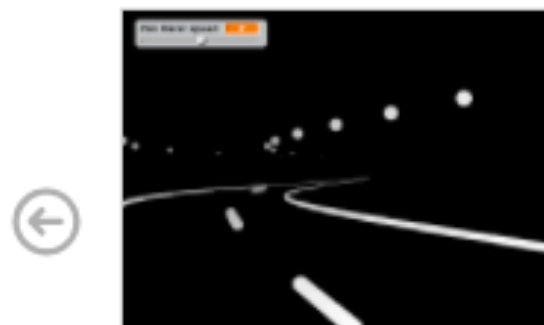
Create stories, games, and animations
Share with others around the world



A creative learning community with **23,013,805** projects shared

[ABOUT SCRATCH](#) | [FOR EDUCATORS](#) | [FOR PARENTS](#)

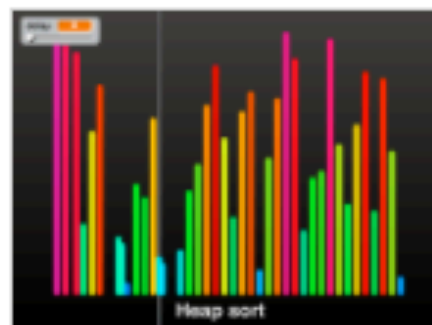
Featured Projects



Road Model [100% p
Catoblepas



Weasel Theater Act 1
FUZZIE-WEASEL



The Sound of Sorting
MathMathMath



*** Scratch Journey Th**
coms94595



Castle Designer!
NervousPebble

Scratch

- Who has heard of Scratch?
- The Philosophy behind Scratch
 - Designed for *tinkerability*
 - Encourages collaboration and sharing
- Low floor, wide walls and high ceiling
- Who is already using it in their classrooms?

Visual Programming Activity

- Go to the Scratch website: www.scratch.mit.edu
- We have two step-by-step tutorials for you:
 - An Introduction to Scratch
 - Making Cookie Bird
- Let us know if you have any questions about Scratch