Visual Programming with Scratch

UON CS4PS

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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

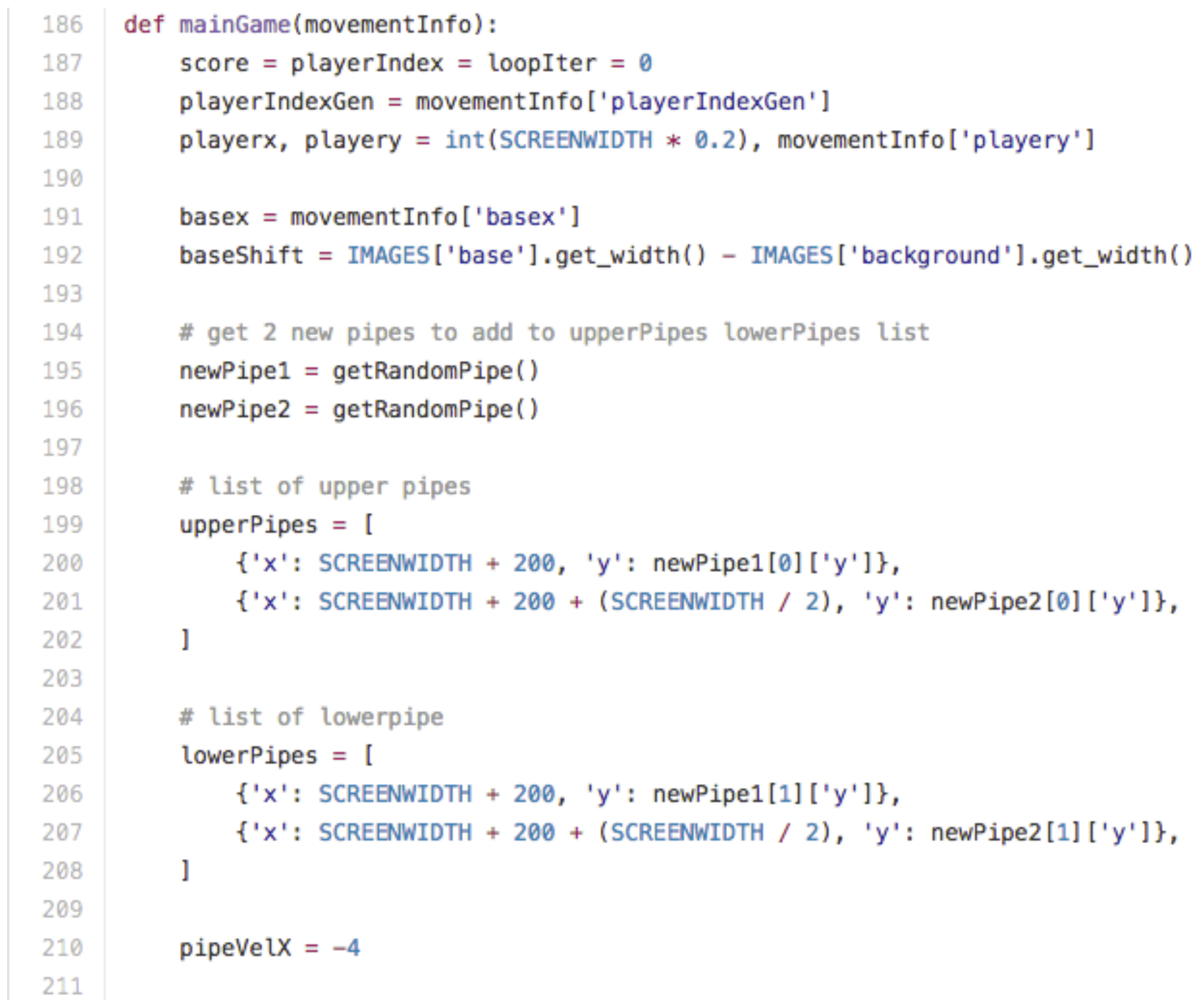
Visual Programming in ACARA DT

- 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

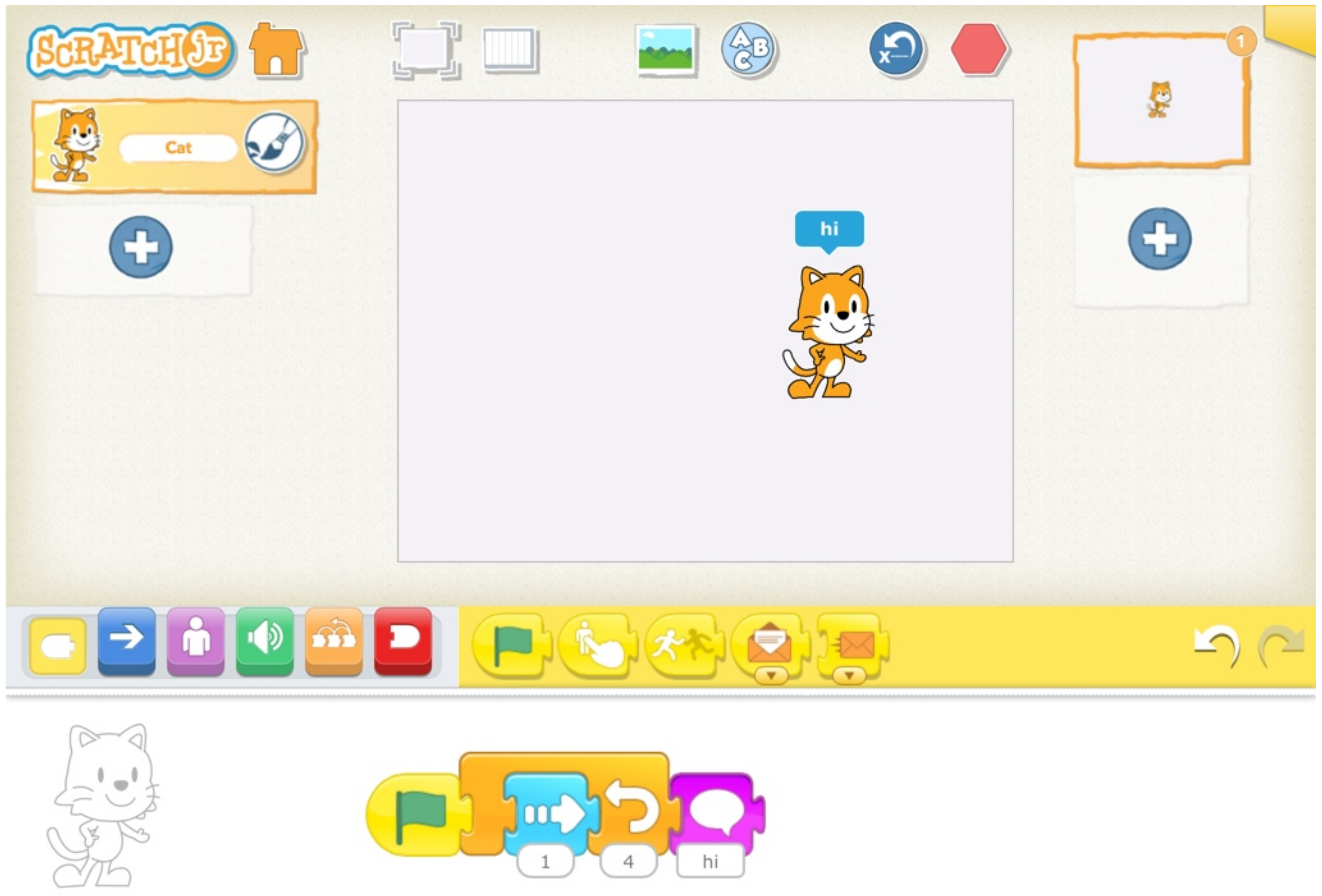


```python
def mainGame(movementInfo):
    score = playerIndex = loopIter = 0
    playerIndexGen = movementInfo['playerIndexGen']
    playerx, playery = int(SCREENWIDTH * 0.2), movementInfo['playery']

    basex = movementInfo['basex']
    baseShift = IMAGES['base'].get_width() - IMAGES['background'].get_width()

    # get 2 new pipes to add to upperPipes lowerPipes list
    newPipe1 = getRandomPipe()
    newPipe2 = getRandomPipe()

    # list of upper pipes
    upperPipes = [
        {'x': SCREENWIDTH + 200, 'y': newPipe1[0]['y']},
        {'x': SCREENWIDTH + 200 + (SCREENWIDTH / 2), 'y': newPipe2[0]['y']},
    ]

    # list of lowerpipe
    lowerPipes = [
        {'x': SCREENWIDTH + 200, 'y': newPipe1[1]['y']},
        {'x': SCREENWIDTH + 200 + (SCREENWIDTH / 2), 'y': newPipe2[1]['y']},
    ]

    pipeVelX = -4

```

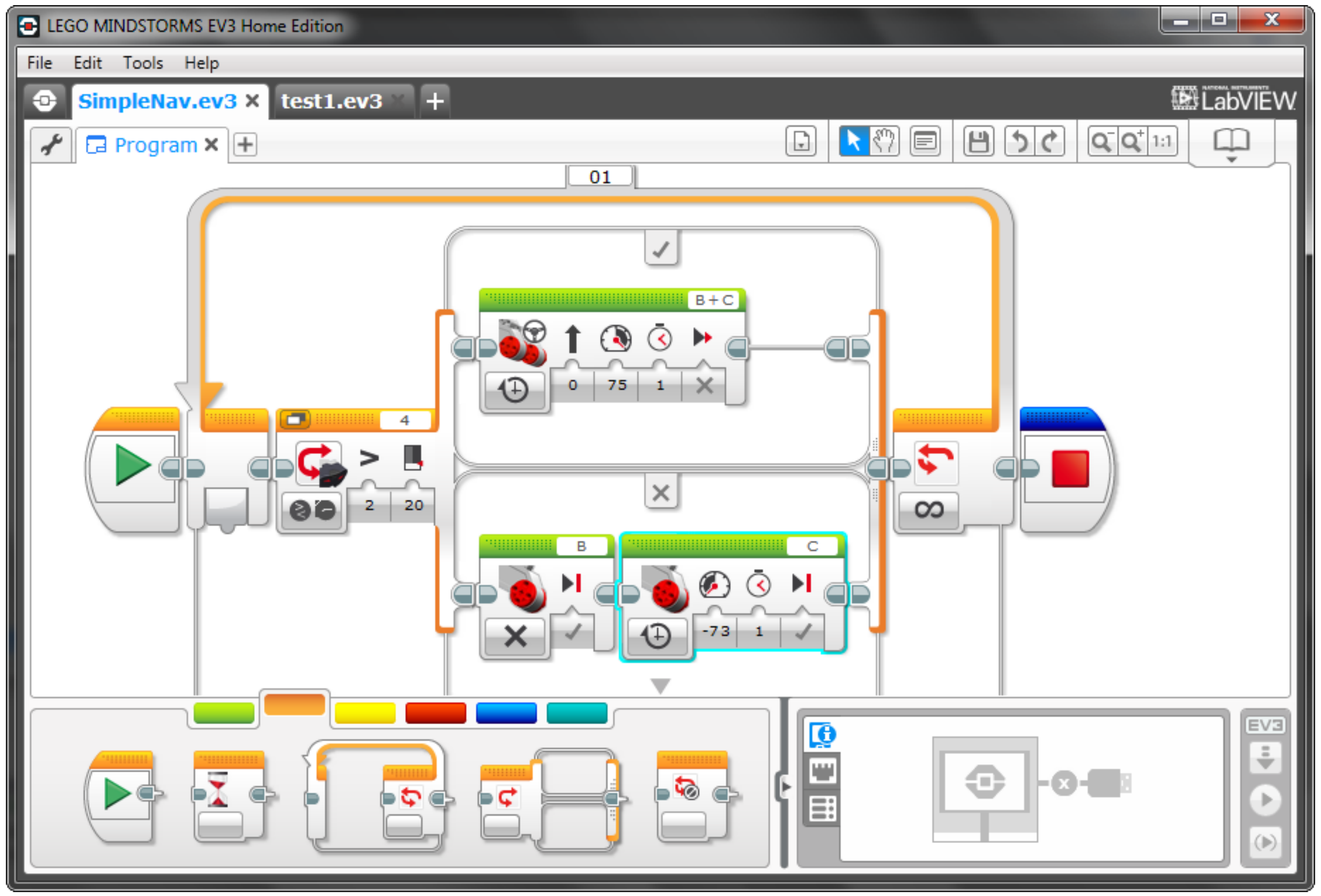
Visual Programming Languages

- 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 are shown on the next slides

ScratchJr



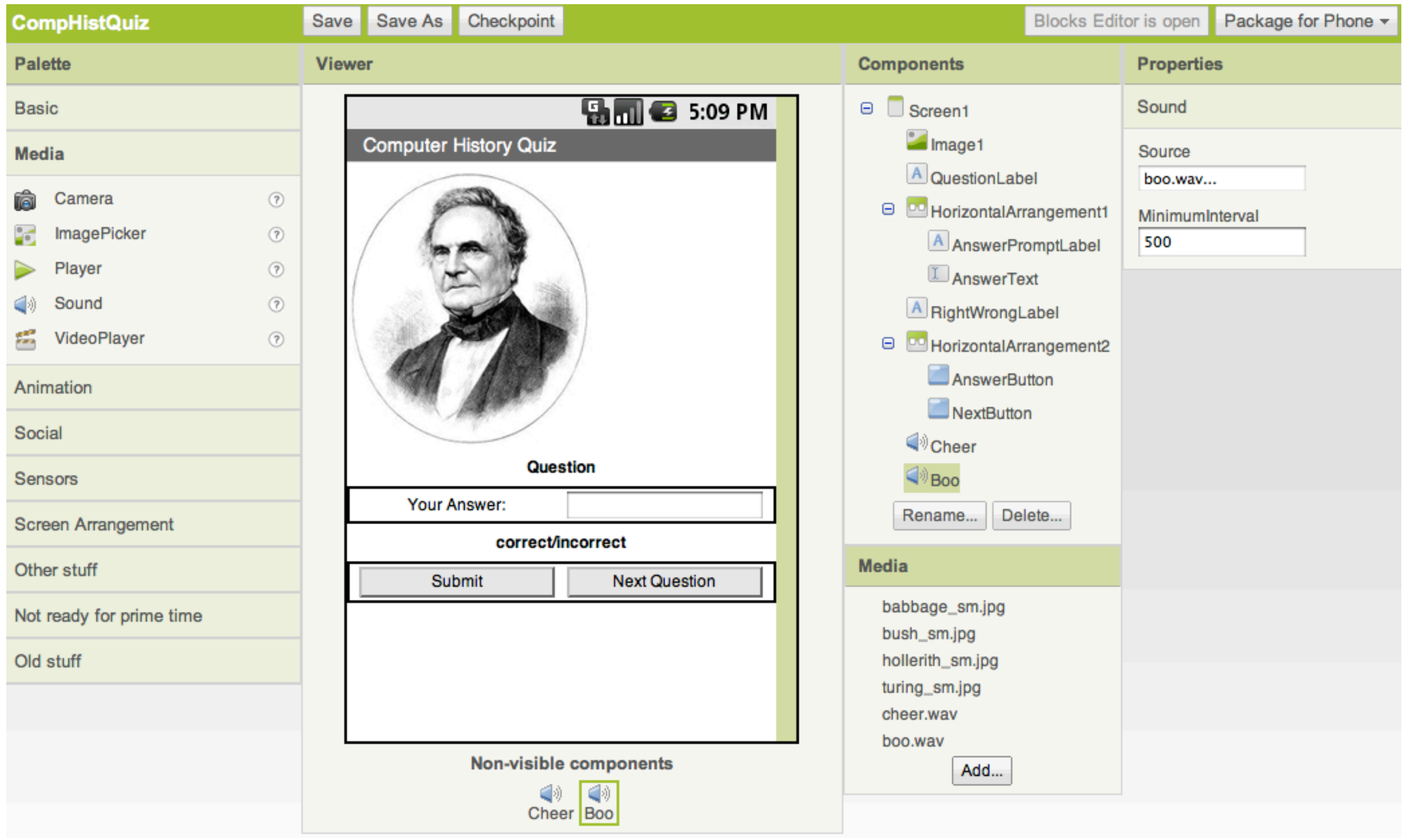
- Commands are symbols rather than text
- Target age is 5 - 7 year olds
- Free app available for Android and iOS



LEGO Mindstorms

- Interacts with LEGO Mindstorms robots
- Write code to move a robot or collect data from its sensors
- We will use this in a session tomorrow

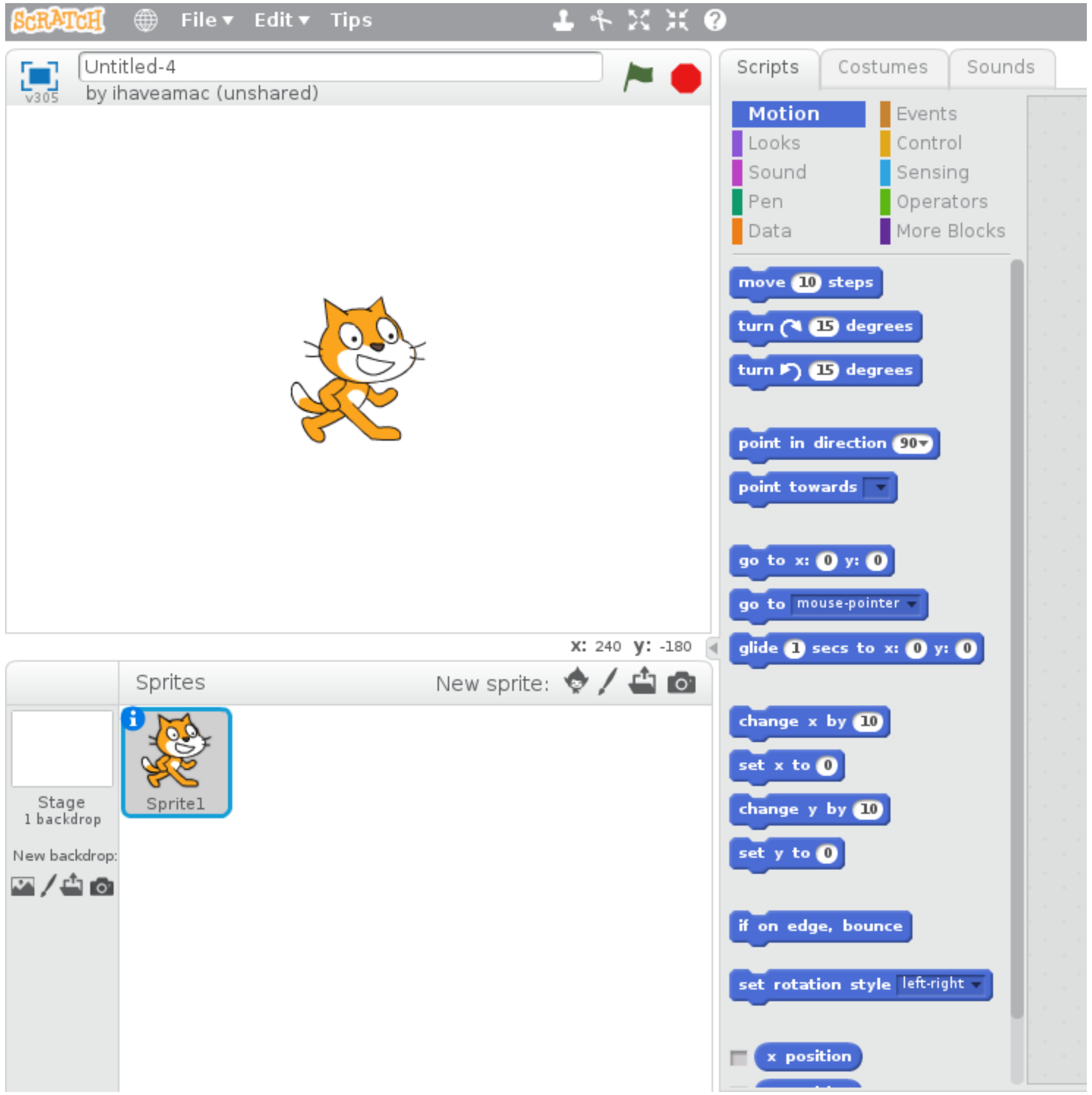
AppInventor



Source: boo.wav...

MinimumInterval: 500

- Allows you to create apps that run on Android phones and tablets
- Can use features of phones, e.g. vibration or maps
- We will use this in a session tomorrow



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)

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 tutorials for you:
  - An Introduction to Scratch
  - Making Cookie Bird
- Let us know if you have any questions about Scratch