

# Raspberry Pi Hacking; Families of Children with Autism

*IncludeMe project, Imagination, Lancaster University*



The logo consists of four concentric circles. The outermost circle is a vibrant red. The next circle inward is a slightly lighter shade of red. The third circle is a bright orange. The innermost circle is a solid black. Overlaid on these circles is the text "Designing Behaviours" in a white, elegant, cursive script. The word "Designing" is positioned above "Behaviours", and both words are slightly arched to follow the curve of the circles. The text is centered horizontally and partially overlaps the black central circle.

*Designing  
Behaviours*

# The Story so Far



# Theme

## Other Bother

The feeling that the people around you, interacting with you or expecting things from you are just too much to bear





Name your invention!

Conversation Timer



What miracle fixes does it use?

giving time to process conversation and time to respond



When...

in a large group or 1-1 conversation



Then...

visible timer to show speaker when to stop. Timer then shows processing time, timer then shows responding time.



Name your invention!

Pop up Personal space.



What miracle fixes does it use?

if there a too many people, an on the go personal space to retreat to.



When...

when 3 crowds are getting too much and you need a quiet calm space



Then...

if crowds become too much you press a button, your personal space pops up.

# Inventions

Choose an existing device behaviour

- Silencer
- Traffic light
- On off button
- Attention getter
- Conversation timer
- Personal space

Develop a new device behaviour





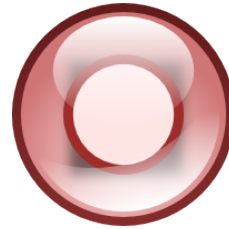
# Audio-centred device





# Chameleon Technology

- \* Dictaphone
- \* MP3 Player
- \* Noise canceller
- \* Hearing aid
- \* Alarm clock
- \* Kitchen timer
- \* Time travel recording
- \* Remote control
- \* Traffic light



# Wearable Affordances

Audio In (recording, speech, ambient noise)

Audio Out (playback, amplification, cancelling)

- headphone jack

Lights

Buttons

Wireless connectivity (to other devices)

Vibration

Sensors

Logic

# Device Technology

## Raspberry Pi

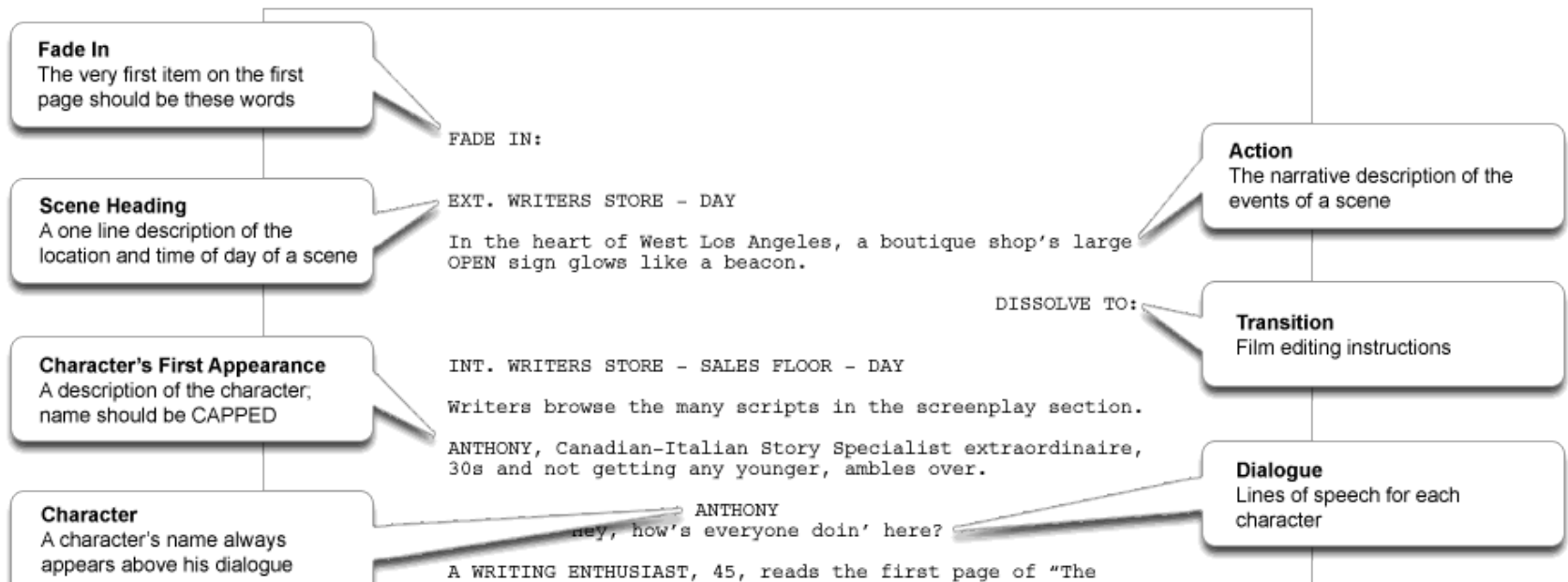
- low-power
- media-oriented (audio manipulation)
- file-oriented
- general purpose IO (sensors, buttons, lights)
- easy to code

## Bluetooth

- local wireless communication

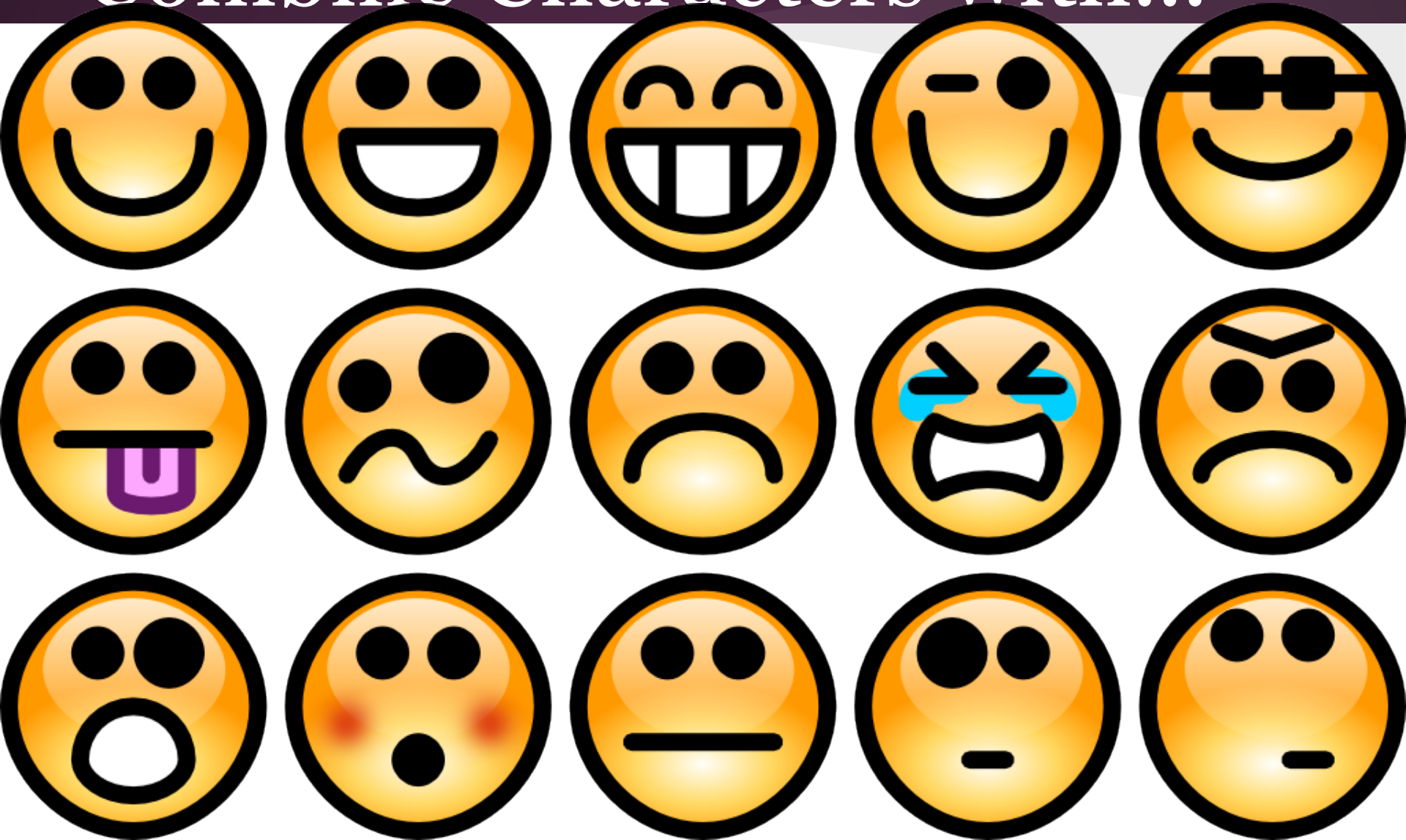
# Elicitation: Screenplays

We put together screenplays, got into the prop department and encountered some paper storyboarding materials.



# Storyboards:

## Combine Characters with...





# Events:

## Moments in Time



RECORD



PLAY



TAG



TRANSFORM



PUSH



FLASH



CHANGE  
COLOR



SET  
MODE



SEND



RECEIVE



SET  
MODE



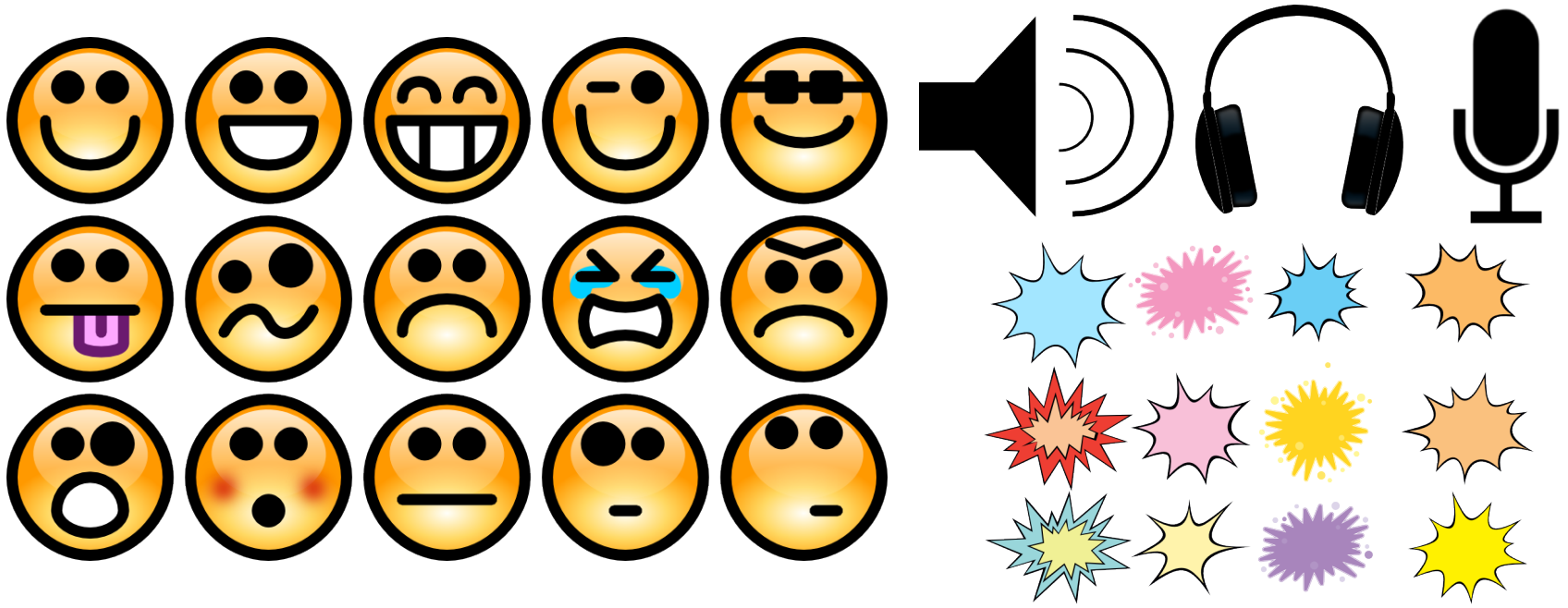
VIBRATE

# Affordances: The Devices POV



# Elicitation: Storyboards

- Identify characters, device elements
- Add corresponding titles to Rows
- Construct 'sequences' within rows

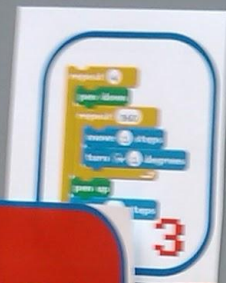
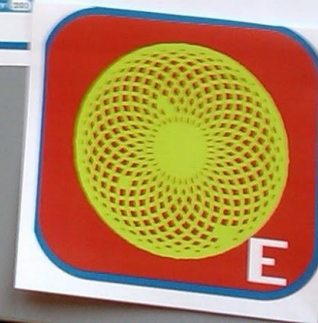
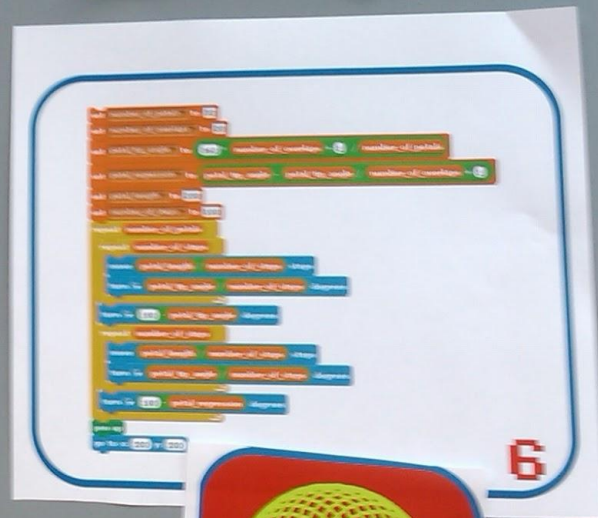


# Quiz

```
set stepsize to 50
move stepsize steps
turn 90 degrees
move stepsize steps
turn 90 degrees
move stepsize * 0.5 steps
turn 90 degrees
move stepsize steps
turn 90 degrees
move stepsize steps
turn 90 degrees
move stepsize * 0.5 steps
turn 90 degrees
move stepsize steps
turn 90 degrees
move stepsize * 2 steps
turn 90 degrees
move stepsize * 0.5 steps
turn 90 degrees
move stepsize * 2 steps
turn 90 degrees
move stepsize steps
turn 90 degrees
move stepsize * 0.5 steps
```









# Elicitation

- No right way
- Purpose is to
  - represent choices
  - communicate to/constrain 'downstream' engineer

