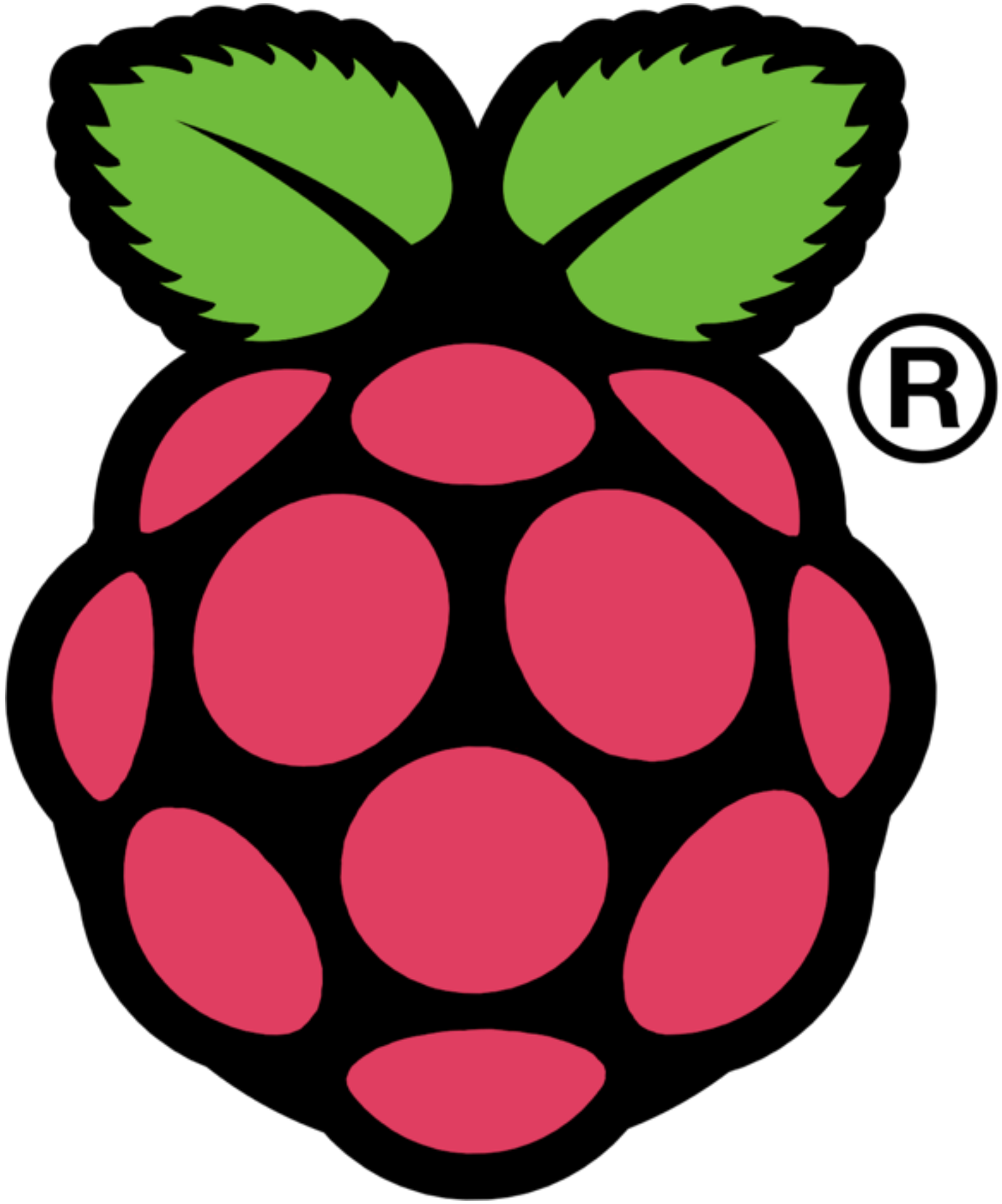
The Programming Language as a Musical Instrument

Sam Aaron



Clojure Training

&

Consultancy

http://lambdanext.eu

http://overtone.github.io

@overtone

"The laser beams sliced through the wafts of smoke as the subwoofer pumped bass deep into the bodies of the crowd..."

"The atmosphere was ripe with a heady mix of synths and dancing. However something wasn't quite right in this nightclub..."

"Projected in bright colours above the DJ booth was futuristic text: moving, dancing, flashing..."

"This wasn't fancy visuals, it was merely a projection of a terminal containing Emacs..."

"The occupants of the DJ booth weren't spinning disks, they were writing, editing, and evaluating code..."

"This was a Meta-eX gig. The code was their musical interface and they were playing it live."

Making Music with Clojure

Live Coding is all the Rage at Raves

by Sam Aaron

Admit it: your real mission in life is to modify code in real time and have it projected on screens in a nightclub. Welcome to the wild world of Livecoding.

The laser beams sliced through the wafts of smoke as the subwoofer pumped bass deep into the bodies of the crowd. The atmosphere was ripe with a heady mix of synths and dancing. However something wasn't quite right in this nightclub. Projected in bright colors above the DJ booth was futuristic text: moving, dancing, flashing. This wasn't fancy visuals, it was merely a projection of a terminal containing Emacs. The occupants of the DJ booth weren't spinning disks, they were writing, editing, and evaluating code. This was a Meta-eX [U1] gig. The code was their musical interface and they were playing it live.

And this wasn't a scene from a cheesy sci-fi film. Coding music like this is a growing trend and is often described as Live Coding [U2]. One of the recent directions this approach to music-making has taken is the Algorave [U3] — events where artists code music for people to dance to.

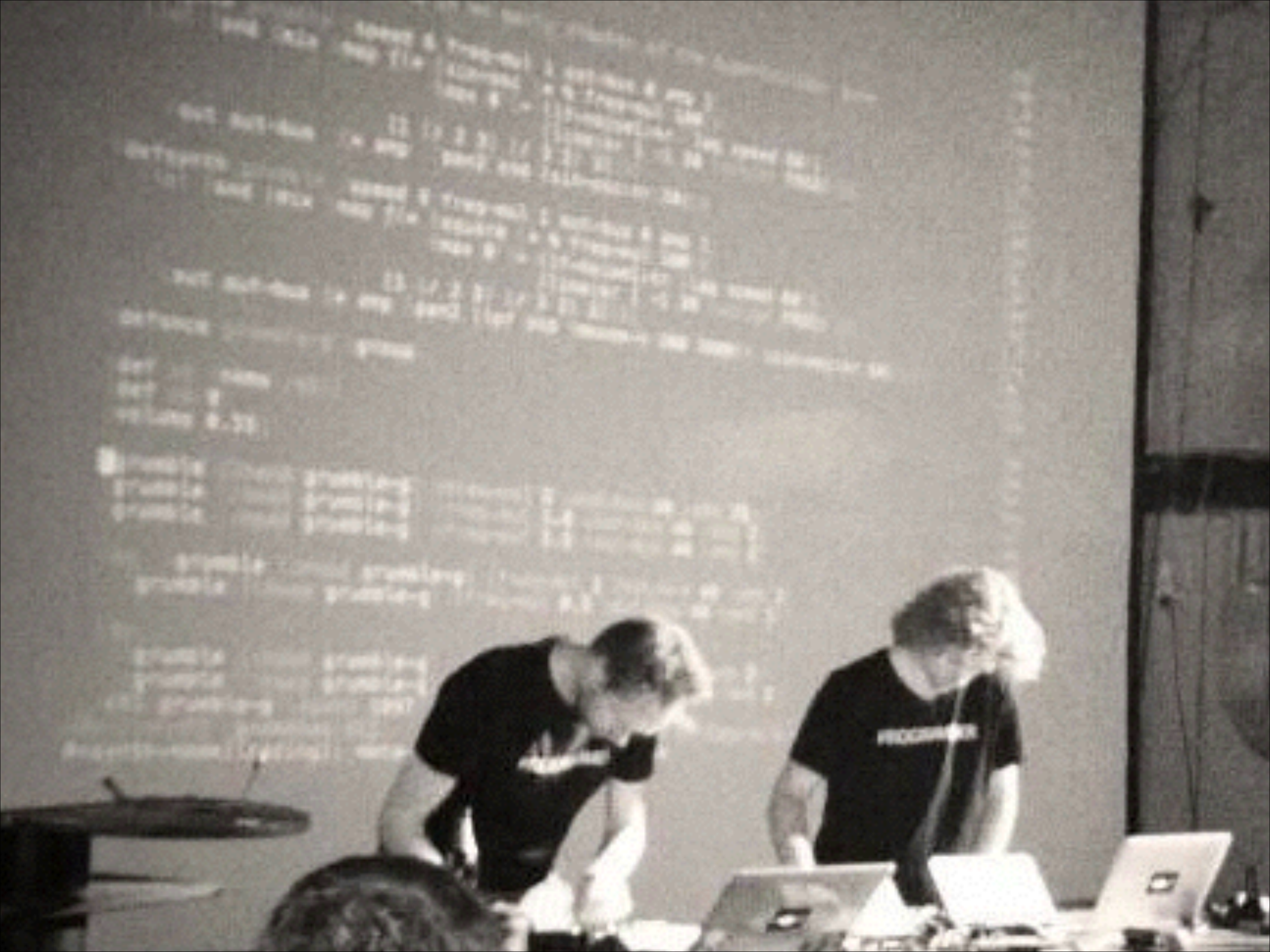
However, you don't need to be in a nightclub to Live Code music — you can

Meta-ex

Line


STUBNITZ


PROGRAMMER



What is Programming?

What can programming be?

How far dare we push programming into new territory?

Thought Experiment:

What if programming
was not
engineering?

Programming as Expression


KASPAROV vs DEEP BLUE
the rematch
1:57
1:58


DELL
DELL
SENNHEISER


Max File Edit View Object Arrange Options Debug Window Extras Help

Better Science Through Art

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Abstract

How do artists and scientists work? The same.

Categories and Subject Descriptors A.0 [General]

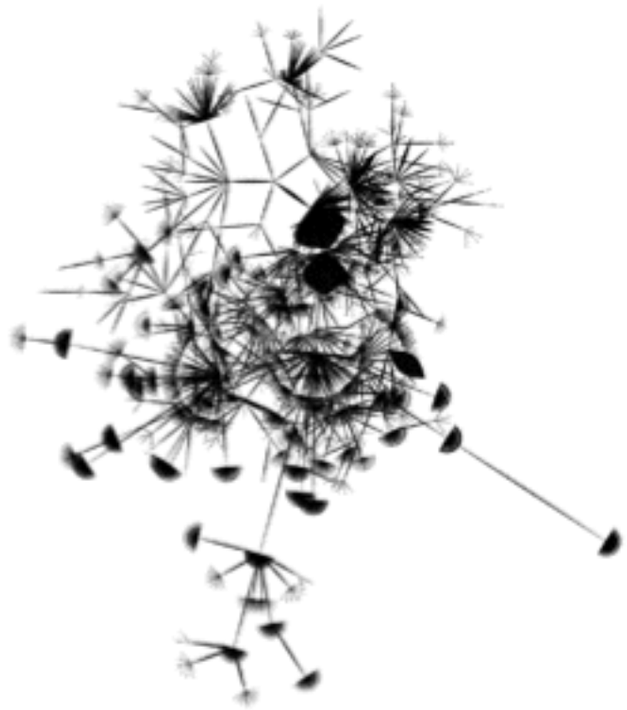
General Terms Design

Keywords Design, art, science, software engineering

Prefrontal lightningbolt too lazy to chew the sphinx's loudest eyelash
Not even if it shushes you with a mast of sneers
Down which grateful bankvault-doors scamper
Because of a doublejointedness that glows in the dark
Like a soliloquy of walnuts
Numbed by beaks of headless measuringtape
So the lubriciousness can tower in peace
Like a buzzsaw trapped in a perfumery of shrugs
Lemon
Or lime
Only a maze can remember your hair of buttered blowguns

From *Nights of Naomi* by Bill Knott [1]

Art is strange. Art cannot be understood. The poet Robert Browning is reported to have said of a passage he wrote:



This is a sort of contemporary science which is more easily understood than the nonsensical poem.

Don't you think? Ah, but with training this is quite easily understood. The poem, however—obviously no amount of training, teaching, or learning will bring you to understand it.

Some other examples: a visual representation of a source code `svn` log shows, clearly, the history of the program, whereas the Jackson Pollock painting is clearly less understandable

Programming is a way of thinking

"A programming language is a tool that has profound influence on our thinking habits."

Edsger Dijkstra

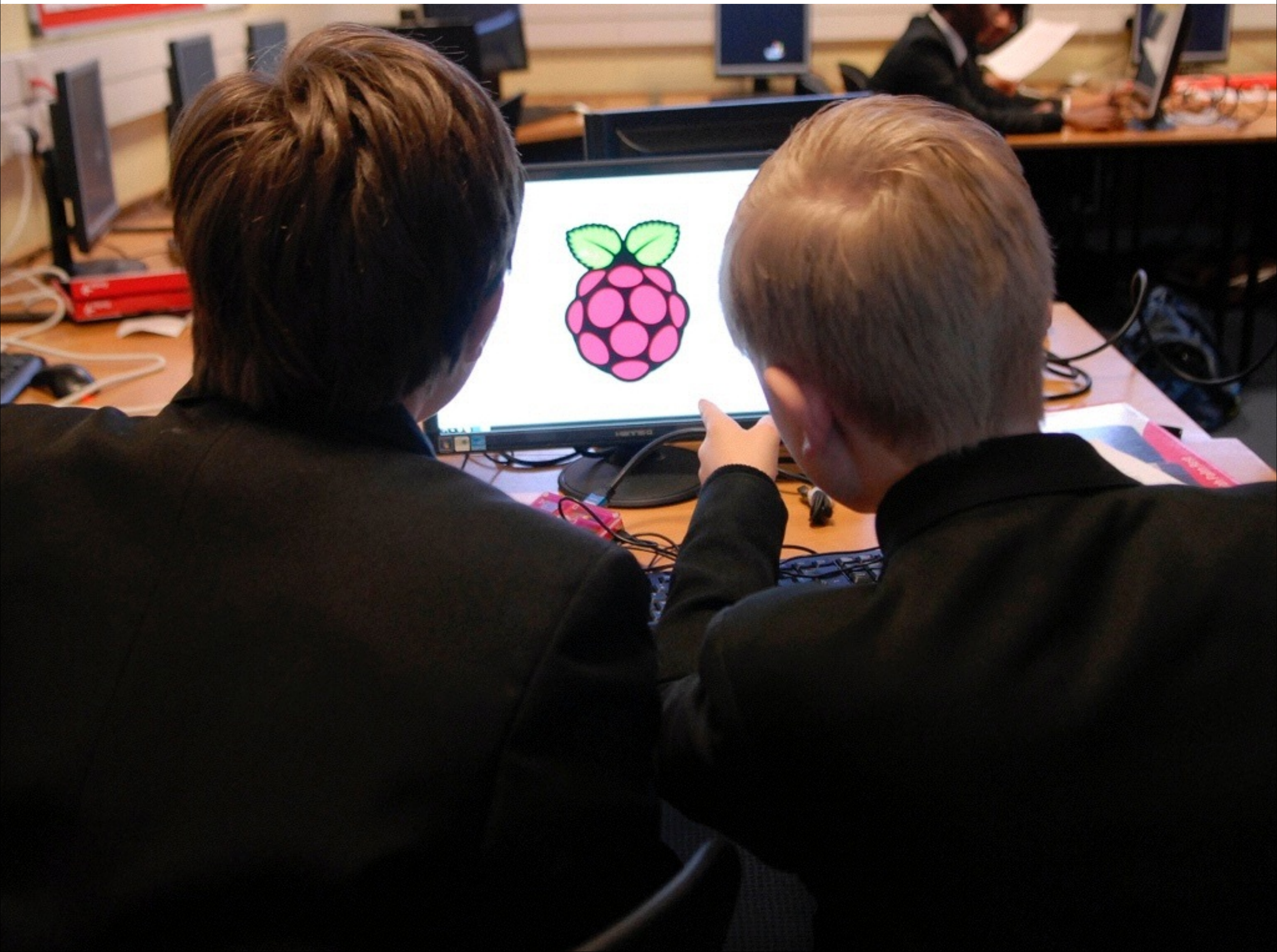
"Programmers spend so much of their time in their own heads that trying to look at the world from someone else's viewpoint is a big shift"

Kent Beck

"A good programmer in these times does not just write programs, a good programmer builds a working vocabulary, in other words, a good programmer does language design though not from scratch but building from a frame of a base language."

Guy Steele

Programming as a learning tool



(((Sonic π)))

Making Computer Science Audible

Sonic Pi is an open source programming environment designed to explore and teach new *programming concepts* through the process of creating new sounds. Sonic Pi comes with an associated scheme of work which emphasises the importance of *creativity* in the learning process and gives users *control* over what they want to do.

Make the music you want and have fun learning programming while you play.

Classroom Ready

Sonic Pi comes with an associated scheme of work targetted for KS3 introductory Computer Science. This has been developed in harmony with the new curriculum proposed by the CAS working group.

Designed for Raspberry Pi™

Sonic Pi has been designed from the ground up to work with the Raspberry Pi™. All you need to convert your RPi into a music environment is some headphones or a speaker.

```
10.times do
  if rand < 0.5
    play 37
  else
    play 49
  end
  sleep 2
end
```

Simple and Fun to Program

Sonic Pi has been designed to be as simple as possible to get started coding sounds and rhythms. Simply type your program, press play and hear results.

X11 Applications Edit Window Help

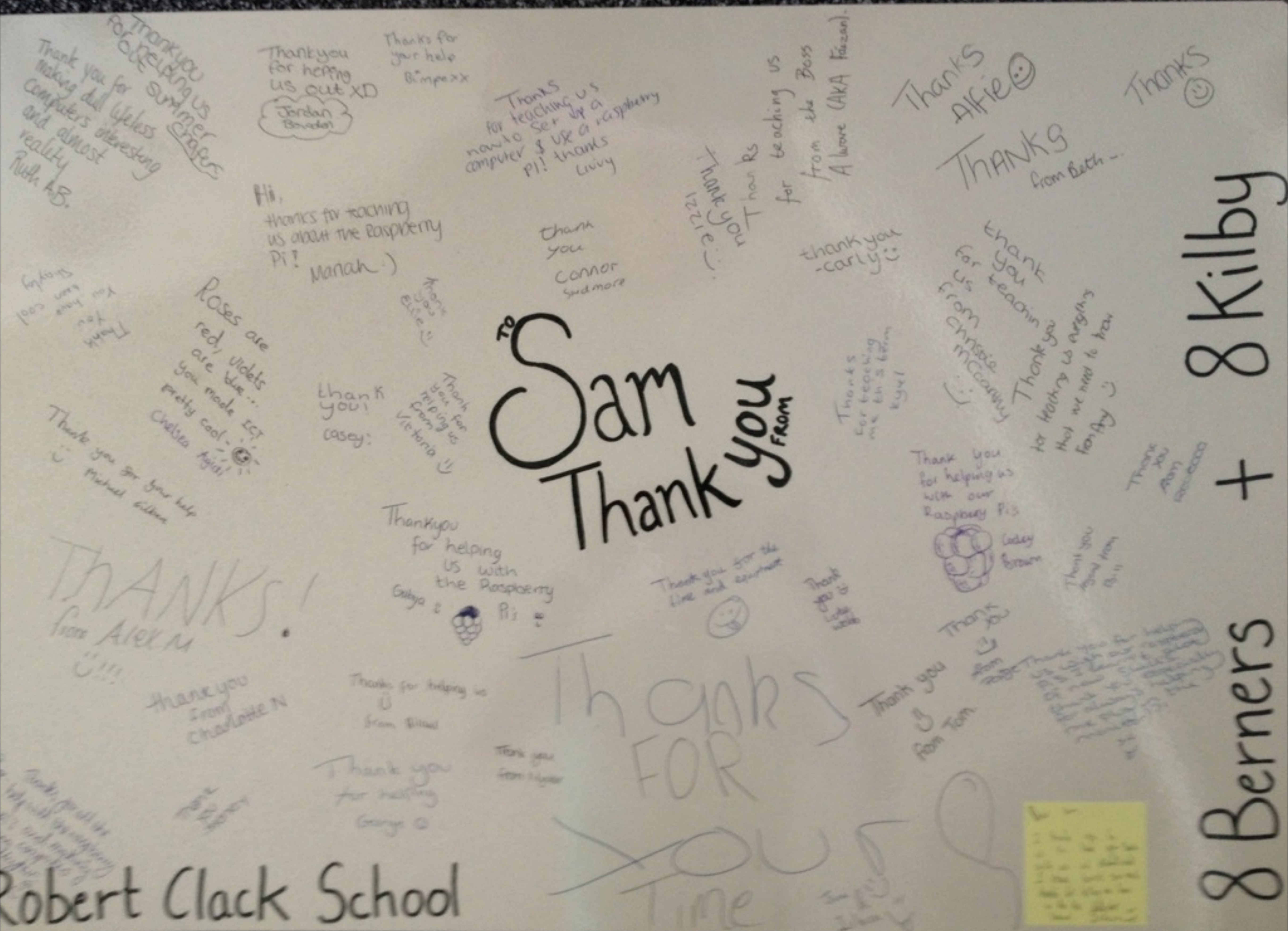
Sonic Pi – Kraft

Workspace 1 | Workspace 2 | Workspace 3 | Workspace 4 | Workspace 5 | Workspace

Output

Errors

Develop New Schemes of Work


To Sam
Thank you
from
8 Berners + 8 Kilby
Robert Clack School
Thank you for helping us out XD
Jordan Bowden
Thanks for your help
Thank you for helping us
Thank you for making dull lifeless computers interesting and almost reality
Ruth A.B.
Thanks for teaching us how to set up a computer & use a raspberry pi! thanks
Livy
Hi,
thanks for teaching us about the Raspberry Pi!
Mariah :)
thank you
connor
Thanks for teaching us
from the Boss
A.K.A Faizan
Thanks Alfie
Thanks
THANKS from Beth
thank you
-carly
Thank you for helping us with our Raspberry Pis
Roses are red, violets are blue.. you made ICT pretty cool
Chelsea
thank you!
casey
Thank you for helping with the Raspberry Pi
Thank you for helping us with our Raspberry Pis
Thank you for the time and equipment
THANKS!
from Alex M
thank you from Charlotte N
Thank you for helping
George
Thanks FOR your time
Thank you
from Tom
Thank you for your help

Thank you
for helping us
our summer
Cro

Thank you for
making dull lifeless
computers interesting
and almost
reality
Ruth A.B.


next


:polymorphism
:: multi-methods


PROGRAMMER
PROGRAMMER

Programming as a form of dialogue

Programming as an experience

Liveness

Feedback

Exploration

Fail Early

Failure is Positive

Failure to perceive failure is failure

Conceptual efficiency is as at least as important as computational efficiency

Thank you

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