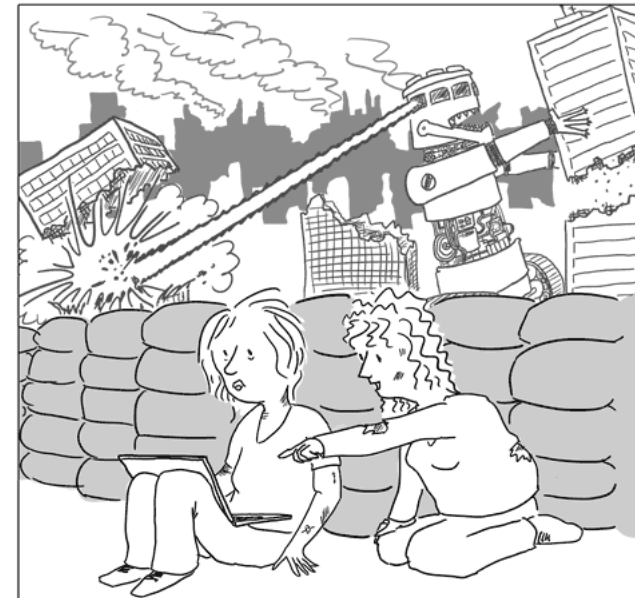


Origins of live coding

Nick Collins
Durham University

NOISE TO SIGNAL
RobCottingham.ca



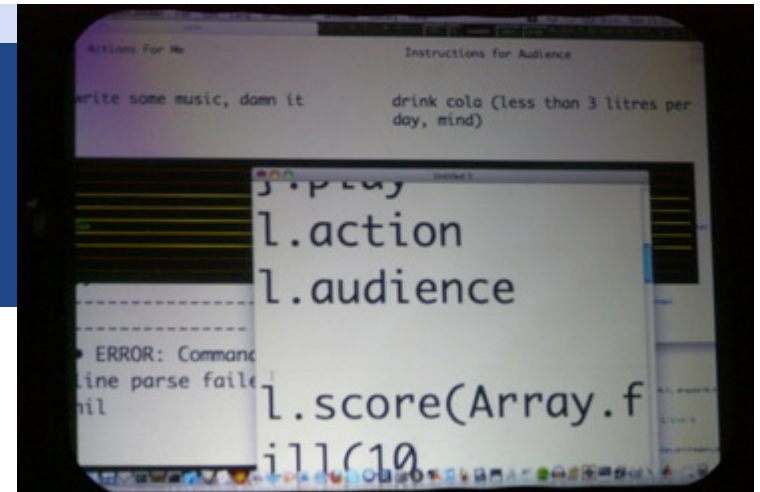
See? You forgot to close a parenthesis in its master control program.

Live coding

<INSERT DEFINITION HERE>



Live coding



- Art of re-programming; changing your mind about a process once established
- For artistic purposes, often live performance; possible aspects of theatre, meta-composition
- Venues including studios, concert halls, planetariums...
- Used to be a bit controversial, now institutionalised?

Other terms...

- ▣ Live programming
- ▣ Interactive programming
- ▣ On-the-fly programming
- ▣ Performative programming
- ▣ ascii music...

Or...

- Live coding is the realtime collection and coding of interview data, e.g. in qualitative medical research?

Ancient live coding history



- Greek debates?
- Ancient algorithmic composition: Guido d'Arezzo c. 1026
- Fior vs Tartaglia, 1535

Precedents: improvisation

- Music's natural state?
- Generativity of language itself



A literary precedent

- Hermann Hesse *The Glass Bead Game* (1943)
- 'the players, mutually elaborating these processes, threw these abstract formulas at one another, displaying the sequences and possibilities of their science.' (pp. 23-4, Vintage: London 2000 translated by Richard and Clara Winston.)

Text pieces

- Primarily 1960s
- 'verbal notations' (Lely and Saunders 2012) 'word events' George Brecht
- An example of maximal freedom: LaMonte Young *Composition 1960 #3* 'Announce to the audience when the piece will begin and end if there is a limit on duration. It may be of any duration. Then announce that everyone may do whatever he wishes for the duration of the composition.'



Text pieces 2: live coding?

- Are there any early self-rewriting text scores?
- *Schoolltime Special* Cornelius Cardew 1968 contains possibility to extend itself via new questions
- Click Nilson's precedents (1975, 2012)
- Honourable mention though a late arrival:
<https://twitter.com/textscoreaday> 11 Dec 2012 “#60: Take an existing text score and profoundly alter its meaning by changing only one word.”

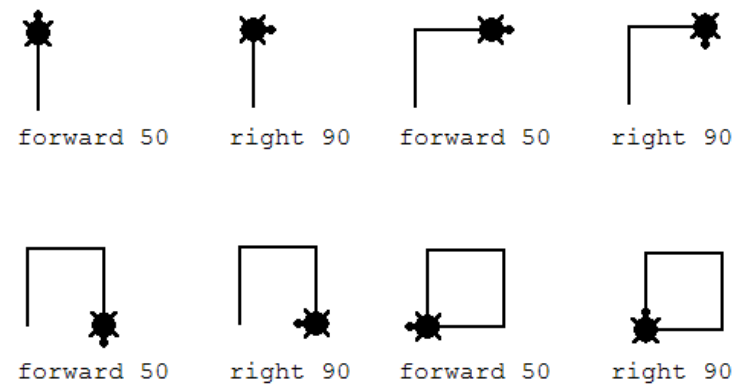
Games

- *Nomic*, 1982, Peter Suber
- *Fluxx*, *Calvinball* etc...



Computer science precedents

- LISP, c. 1962 implementation as first interpreted programming language
- Use in education via LOGO from 1968 to control virtual turtles
- Smalltalk 1980, FORTH



Live coding history: 1980s

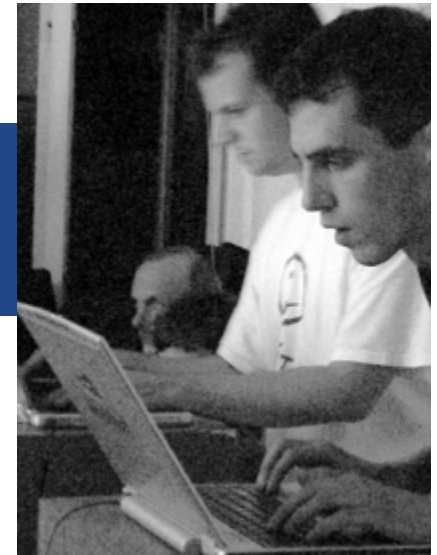
- 1980s Forth and HMSL. Computer musicians' frantic preparations up to performance time (the audience wander around The Hub)

- Ron Kuivila, *Water Surface* (1985)

```
:ap asynch-scale  
  ::ap  
    c d e f g 5$  
  ;;ap  
;ap
```



Live coding history: c2000



- 2000, slub start to play in London projecting their screens
- Julian Rohrer exploits SuperCollider 2 to allow hot-swapping code in performance

The Tspawn trick (SuperCollider 2)

```
//run me first
({
    a = Tspawn.ar({arg ts,ec,syn, func; func.value},2,inf, 0.0);

    b = a.source;

    a
}.play;)

//now
b.trigger({Pan2.ar(SinOsc.ar(exprand(220,440),0,0.1), 1.0.rand2)})}
```

(Selected) Chronology 1

- 2000: ICMC Berlin, networked code passing McCartney/Rohrhuber
- 2002: First live coding albums (unreleased)
- 2003: Chuck
- 2004: TOPLAP

Origins of live coding



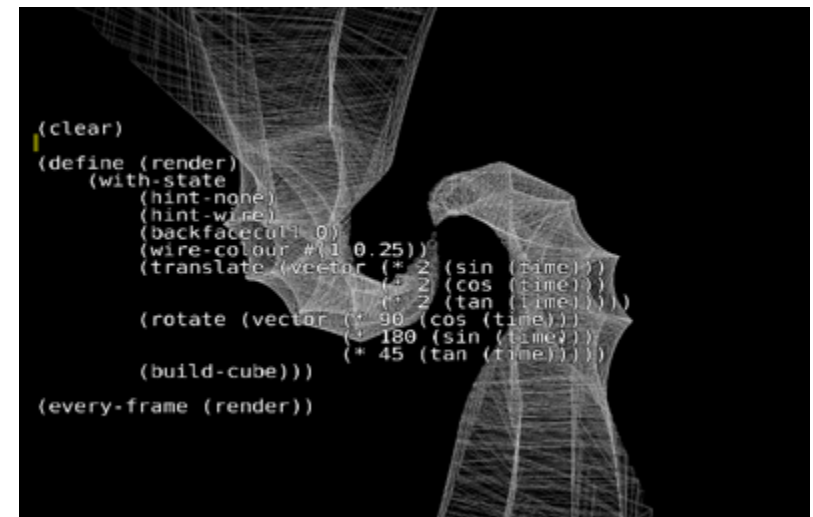
TOPLAP



- Multiple interpretations
- Scene: Feb 15th, 2004, 2am, a smoky bar, Hamburg. An anagram competition
- Livecode mailing list now has 100s of enthusiasts

(Selected) Chronology 2

- 2005 TOPLAP transmediale
- 2005: first live code battle
- 2005: fluxus
- 2006: aa cell practice
- 2007: LOSS live code festival





Fights



- The boxing analogy rears for the World Programming Federation Fingerweight Belt
- Ghent 2005: Coding Bull: McLean vs Collins (match rigging allegations)
- Barcelona 2005: Raging Code: Wang vs Collins (disaster!)

Challenges continue

- Nic vs Nick (2-1, New York/London/Mexico City) and The Ultimate Weapon
- Max/MSP in Belgium
- Mexican live coding



Practice

- The importance of ten years
- Practice pacts
- No guarantee of effective transference (e.g. ordinary coding to live coding)
- Danger of misplaced practice with new techniques

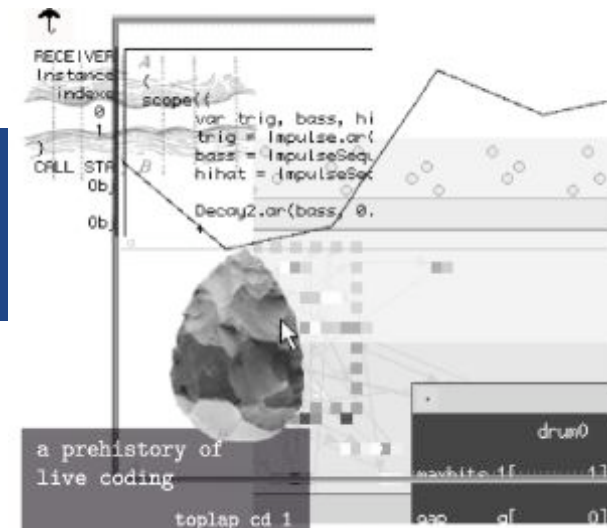
Selected Chronology (3)

- 2009: BBC documentary on pub code
- 2012: Live Notation AHRC: live arts and live coding
- 2013: Live Coding festival in Karlsruhe
- 1::year => now



Documentations

- 2007 A pre-history of live coding
- 2012 CMJ DVD
- 2014 Computer Music Journal special issue



Continuing live coding developments

- Live coding without computers, including choreography
- Live coding orchestras and ensembles
- New live coding environments, especially browser and mobile based
- Live coding in computer science education and HCI

Live coding collaborations

- Live coding solo is very stressful
- Experimentalism is easier with a community support group
- But you may need more data projectors

A historical example: Wrongheaded (2009-2013)



Wrongheaded (with Matthew Yee-King)

Chalk
explode



- Algorithmic choreography
- Laptopists caught between programming work and external human action
- Our lowest moment: Leonardo 44(3) cover stars

```
for while if else switch break goto  
continue default char signed unsigned  
int short long float double enum union
```

```
% * + - / \ ( ) { } [ ] ; ? : , | | & & ! & > < > < < . f
```

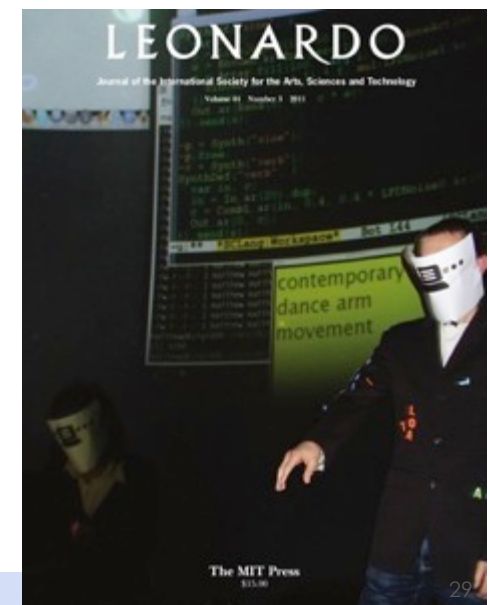
```
0 1 2 3 4 5 6 7 8 9
```

```
a b c d e f g h i j k l m n o p q r s t u v w x y z
```

```
true      Hello World      false
```

Ouija
code

Zombie
mode



Warning!

- Look away if you're squeamish before the next slide

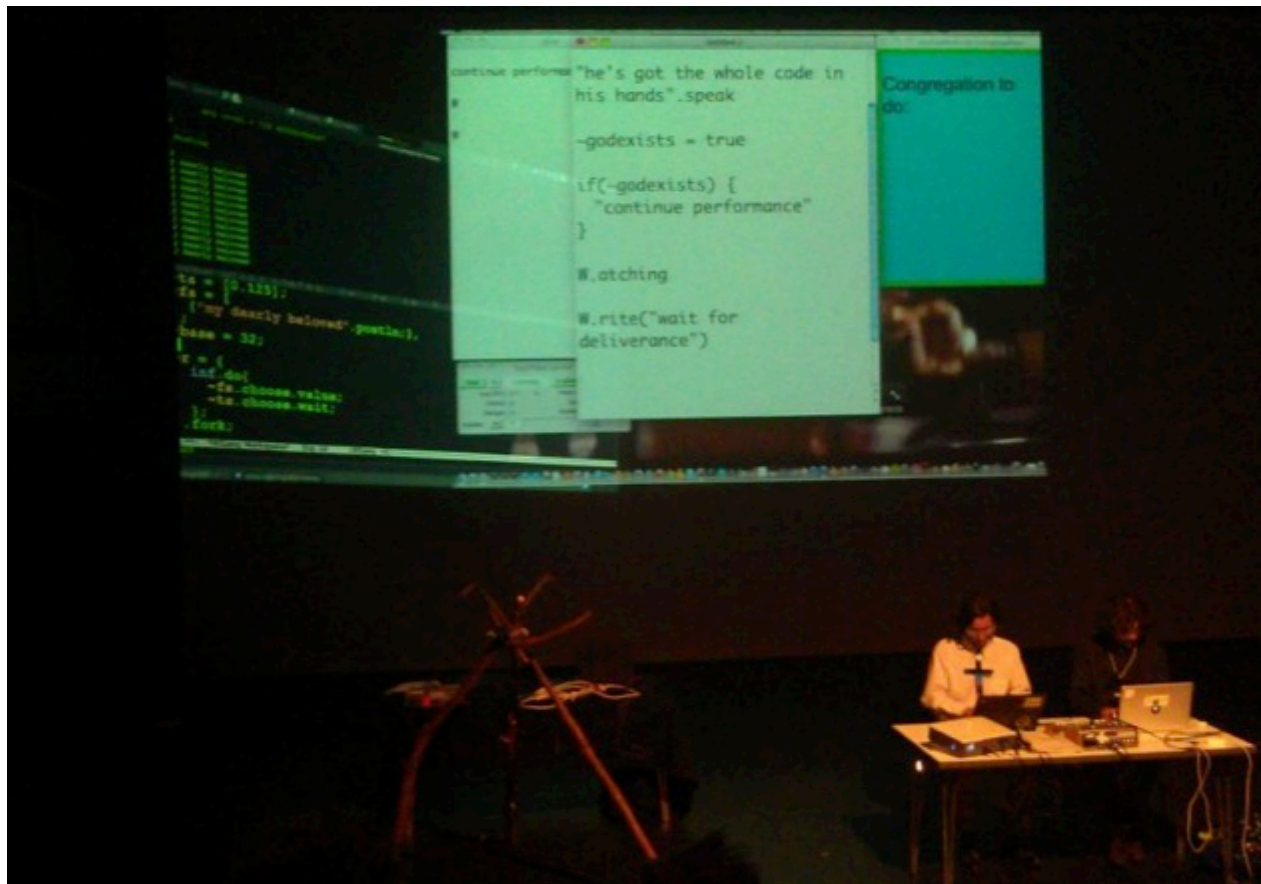


Origins of live coding

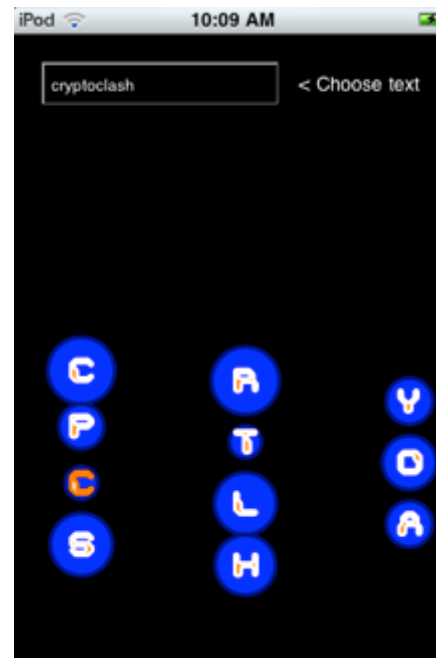
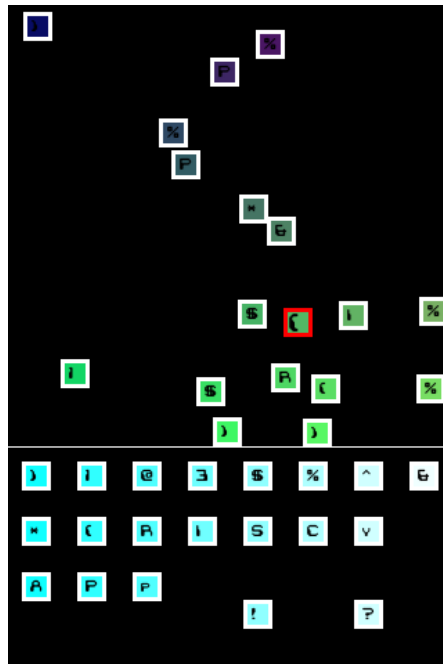
An anatomy theatre



The Gospel According to Wrongheaded



iPhone live coding

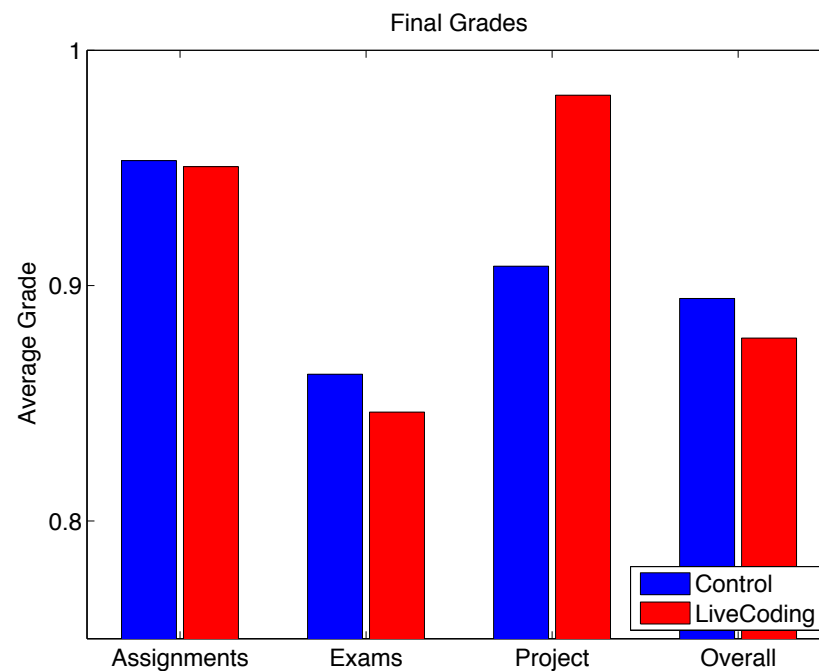


T O P L A p

T		T		T		T	
O		O		O		O	
P		P		P		P	
L		L		L		L	
A		A		A		A	
p		p		p		p	
A		p		P			

! ?

Live programming effectiveness



Marc J. Rubin (2012)
The Effectiveness of Live-Coding
to Teach Introductory Programming.
SIGCSE'13, March 6–9, 2012,
Denver, Colorado

Consequences



Conclusions

- Rewriting the rule book of rule-based art?
- So whatever I said, change it



Think you for lastening

