

INPUT | OUTPUT



Industry versus academia?

Learning and teaching programming

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Teaching in the
Industry in the
90s....

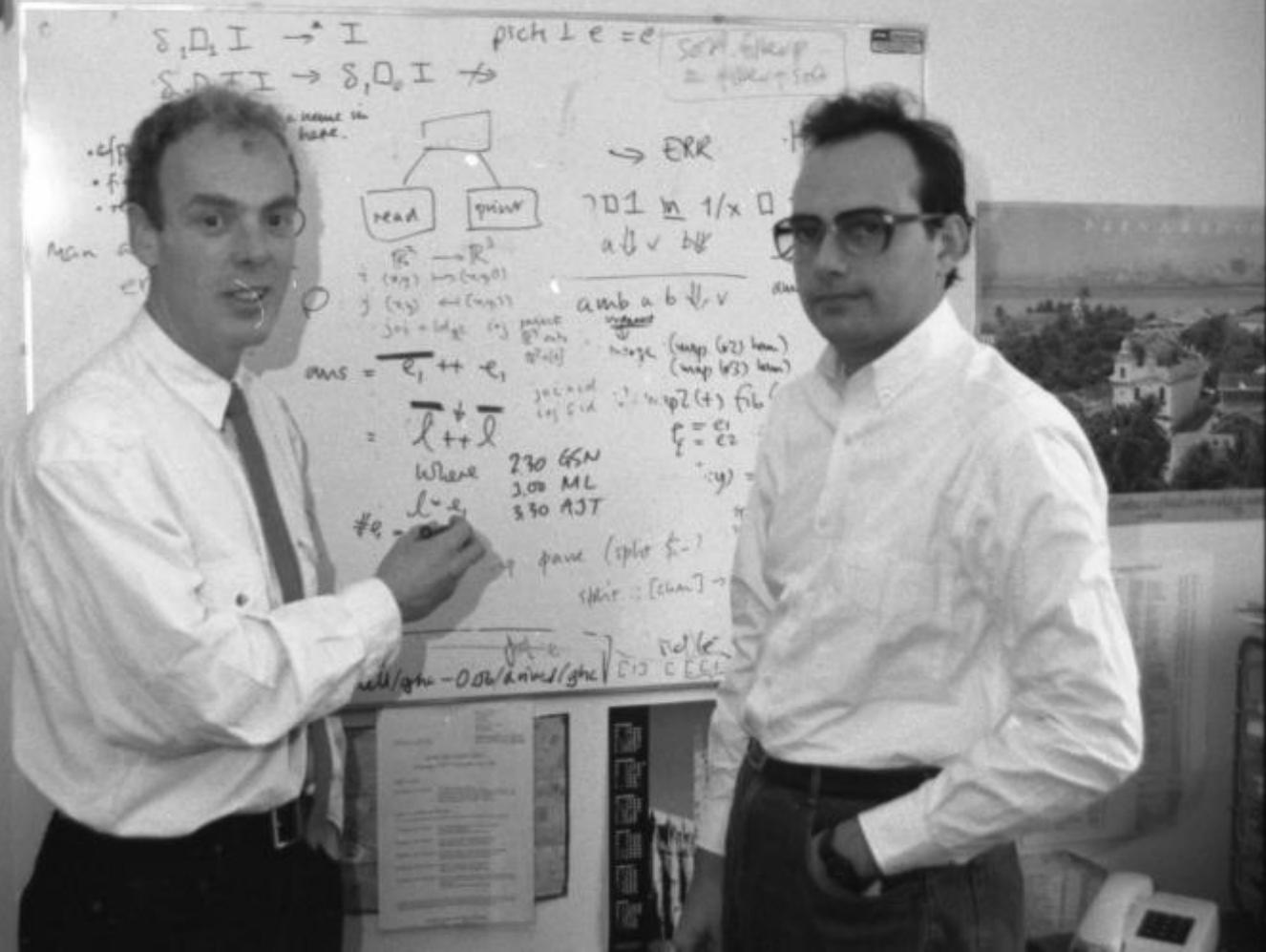


ERICSSON

UFPE, Recife,
Brazil. 1988

Functional
programming
in SML ... on a
mainframe.

A type theory
course that
became my first
book.



Is Erlang any good
for ASCII art?

```
.. . . . . ## . . . . . ## . . .
.. . . . ## . # . . . . ## . # . .
.. . ## . . . # . . . ## . . . # .
. # . . . . # . . # . . . . # .
. # . . # . . # . . # . . # . . # .
. # . . ### . # . . # . . ### . # .
# . . . # . ## . # . . . # . ## .
. # . . # . . . . # . . # . . . .
. . # . . # . . . . . # . . # . . .
. . . # . # . . . . . # . # . . .
. . . . # # . . . . . # # . . . .
. . . . . ## . . . . . ## . . . .
. . . . . ## . . . . . ## . . . .
```

In Universities,
students are there
to learn how to learn!

In Universities,
students are there
to learn how to learn!

In Industry,
students are there
to learn how to do stuff!



VS



Follow through

*Programming Language
Technology.*

Projects, reading,
extending, embedding.

Confer like it's 1999 ...



Proof?





elixir



Top Down
Vs
Bottom Up



elixir



Erlang or Haskell or ...

Unexpected “;” on line 4

Real or “teaching” language?

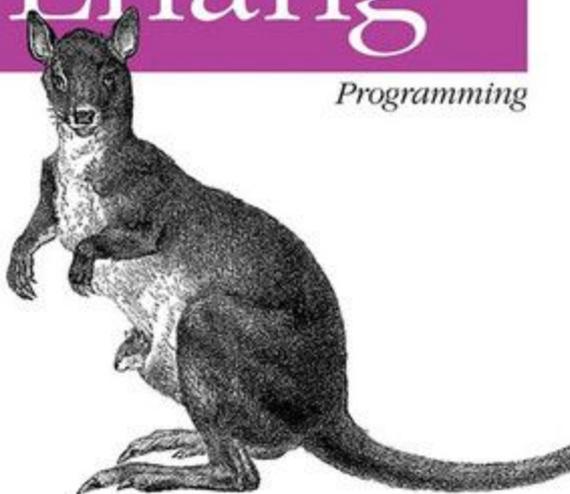
Oh for subsets!



A Concurrent Approach to Software Development

Erlang

Programming



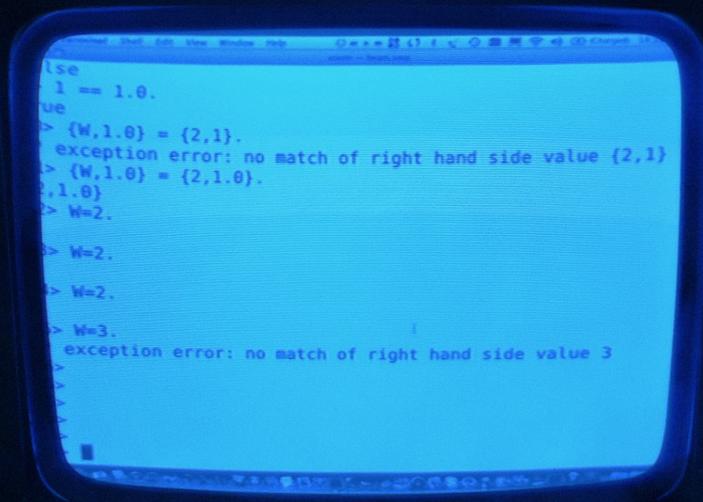
O'REILLY*

*Francesco Cesarini
& Simon Thompson*

'Autocue'

Knowledge
Transfer
Partnership

Erlang Solutions,
University of
Kent, 2011.

A computer monitor is shown, displaying a terminal window with Erlang code and error messages. The text on the screen is as follows:

```
(se  
1 == 1.0.  
ue  
> {W,1.0} = {2,1}.  
exception error: no match of right hand side value (2,1)  
> {W,1.0} = {2,1.0}.  
,1.0}  
> W=2.  
> W=2.  
> W=2.  
> W=2.  
> W=3.  
exception error: no match of right hand side value 3
```

“Beacon Project”

University of
Kent’s fiftieth
anniversary 2015.





FutureLearn MOOCs

Functional and Concurrent Programming in Erlang

Reach and volume

The screenshot shows the FutureLearn website interface. At the top, there is a navigation bar with the FutureLearn logo, menu items for 'Subjects', 'Courses', and 'Using FutureLearn', a search bar with the text 'Search online courses', a notification bell icon with '50+', and a profile picture. The main content area features the University of Kent logo and the course title 'Functional Programming in Erlang'. Below the title is a star rating of 4.6 based on 8 reviews. A description states: 'Learn the theory and practice of functional programming in Erlang, through practical exercises and suggested projects.' A pink 'Go to course' button is present. Below the button, it says '8,500 enrolled on this course'. To the right of the text is a large image of a crowd of people with glowing green numbers and binary code overlaid. At the bottom, there are two icons: an hourglass for 'Duration 4 weeks' and a clock for 'Weekly study 5 hours'. The footer contains navigation links: 'Overview', 'Topics', 'Start dates', 'Requirements', 'Educators', 'Learner reviews', 'More courses', and a 'Support' button.

FutureLearn

Subjects ▾ Courses ▾ Using FutureLearn ▾

Search online courses

50+

Online Courses / IT & Computer Science

University of
Kent

Functional Programming in Erlang

★★★★★ 4.6 (8 reviews)

Learn the theory and practice of functional programming in Erlang, through practical exercises and suggested projects.

[Go to course](#)

8,500 enrolled on this course

Duration
4 weeks

Weekly study
5 hours

[Overview](#) [Topics](#) [Start dates](#) [Requirements](#) [Educators](#) [Learner reviews](#) [More courses](#) [Support](#)

Planning

Georgia Tech
Mike McCracken

Software
Engineering MSc
programmes
... academic vs
industry cohorts.

Week	2	
Section	2.1	Getting started with lists
Component	2.1.5	Defining functions over lists
LOs	To deploy the recursion template of the previous section to make recursive definitions. To modify the template in appropriate ways to define particular functions.	
Type	homework	
Time	20 minutes	
Content	<p>Exercises to reinforce ...</p> <ul style="list-style-type: none">• product of a list of numbers• maximum of a list ... start at <code>[X]</code>; remember can use <code>max</code> as well as computing the maximum of two values “by hand”. <p>Exercises to stretch ...</p> <ul style="list-style-type: none">• defining the list <code>span/2</code> giving <code>[M,M+1, ..., N]</code>.• picking out the even numbers in a list	
Additional material	Could have an optional exercise sheet and video about list comprehensions ... not essential but a nice piece of notation which is useful in some examples like quicksort. Hmm ...	
Notes		
Transition	Let's see how the solutions to this work out.	

Media tech

“Good enough”
is good enough.

Lights!

Microphone?



Social learning

FL approach.

Huge potential
beyond
programming 101



Interaction
tech

Multiple
modalities

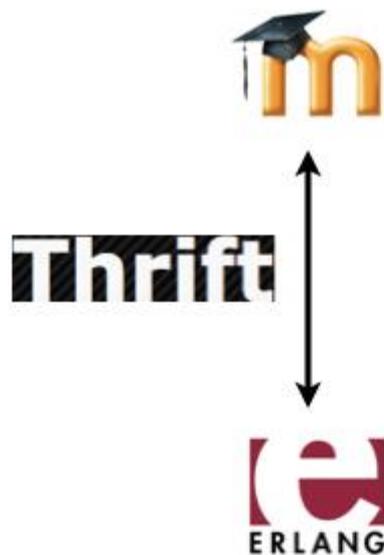
Let's not re-invent the wheel!

- Compiler
- Dialyzer
- Wrangler
- EUnit
- QuickCheck / PropEr
- Tracer

Behind the Scenes

Interaction
tech

Multiple
modalities



```
$ft = new Feedbacktool();  
$job = new FTJob();  
[...]  
$job_id = $ft->compute($job);
```

```
compute(Job) ->  
[...]  
JobId.
```

Things fail... ... so do automatic tools

Interaction
tech

Multiple
modalities

- Manually monitor selection of solutions
 - Identify common error patterns
 - Incrementally improve automatic feedback
- “Ask the teacher” button
- Traditional forums

Interaction
tech

Multiple
modalities

The Teacher's Perspective

- Invent an exercise (or use an existing one)
- Write a solution for it
- Write tests for your solution
- Plug it into the Feedback Tool
- Configure

Motivation



If MOOCs cost so much more than a normal course, why do it?

Economics

[slide courtesy
of Mike
McCracken]

- Economic benefits
- Branding benefits
- An approach to getting faculty truly interested in improving their teaching and trying new technologies and methods in a “controlled” environment with measurable outcomes
- Do you trust others to tell you how, what, why?

Fun!





/Fay-lee-nuh/

@Feliene

Just did the first online live session for Psychology of Programming and you know what? It was actually kind of fun and nice! Discussed homework and used breakout rooms for deeper conversations in smaller groups. Not the same as a real lecture, of course, but not bad!

9:20am · 8 Feb 2021 · Twitter Web App

1 Reply 1 Retweet 1 Like



Reply to @Feliene

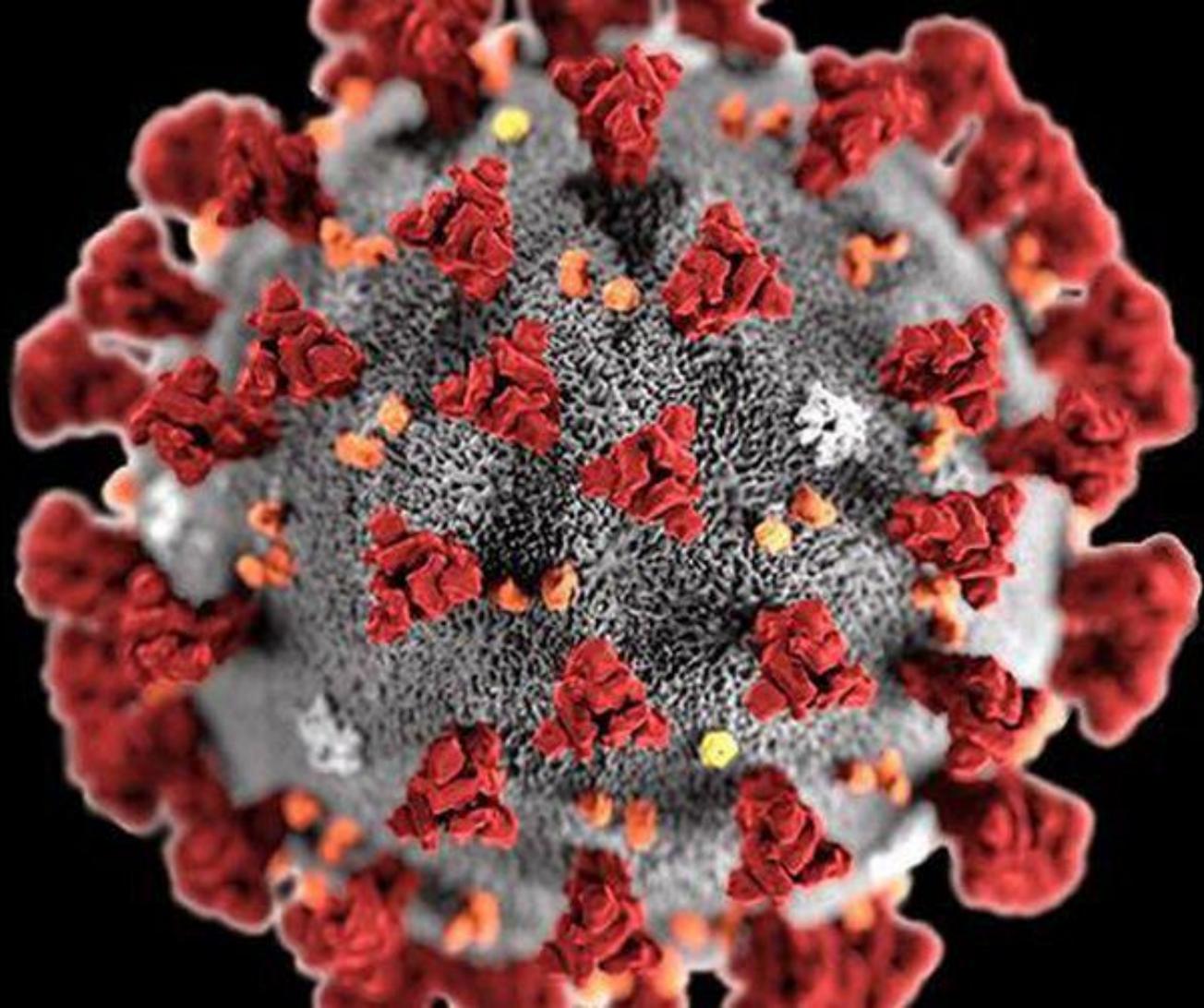


/Fay-lee-nuh/ @Feliene

1m

Not sure if I am getting better at moderating or students are getting more excited about participating online?



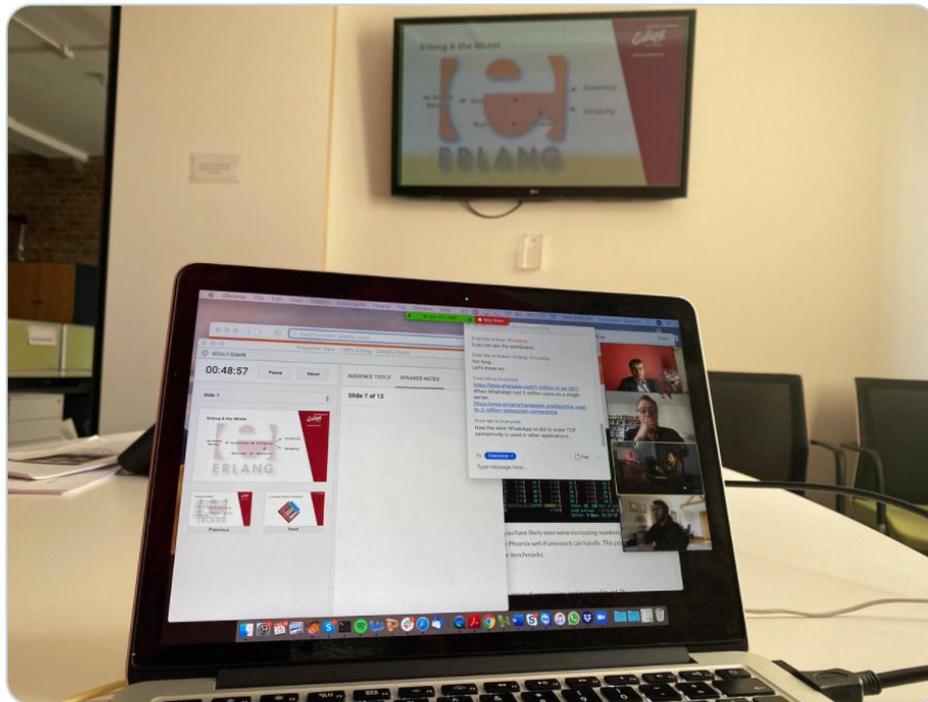




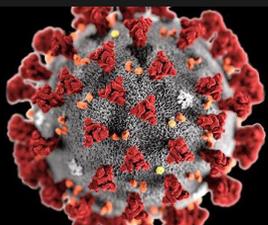
Francesco Cesarini
@FrancescoC



Day 1 of remote training. Why Erlang? Current view.
Chuffed to have the one and only @samaaron on the
course!



10:24 AM · Mar 25, 2020 · Twitter for iPhone



Top Down vs Bottom Up

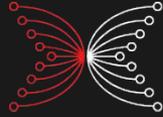
Interactive tech vs sociability

Synchronous vs asynchronous

Pure online vs blended

Shared resources vs “not invented here”

Textbooks as a community resource?



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