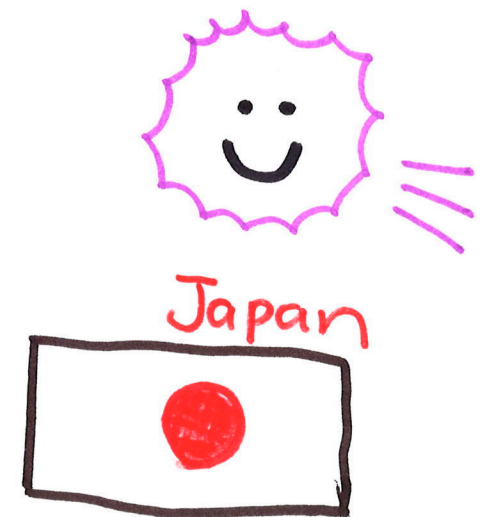
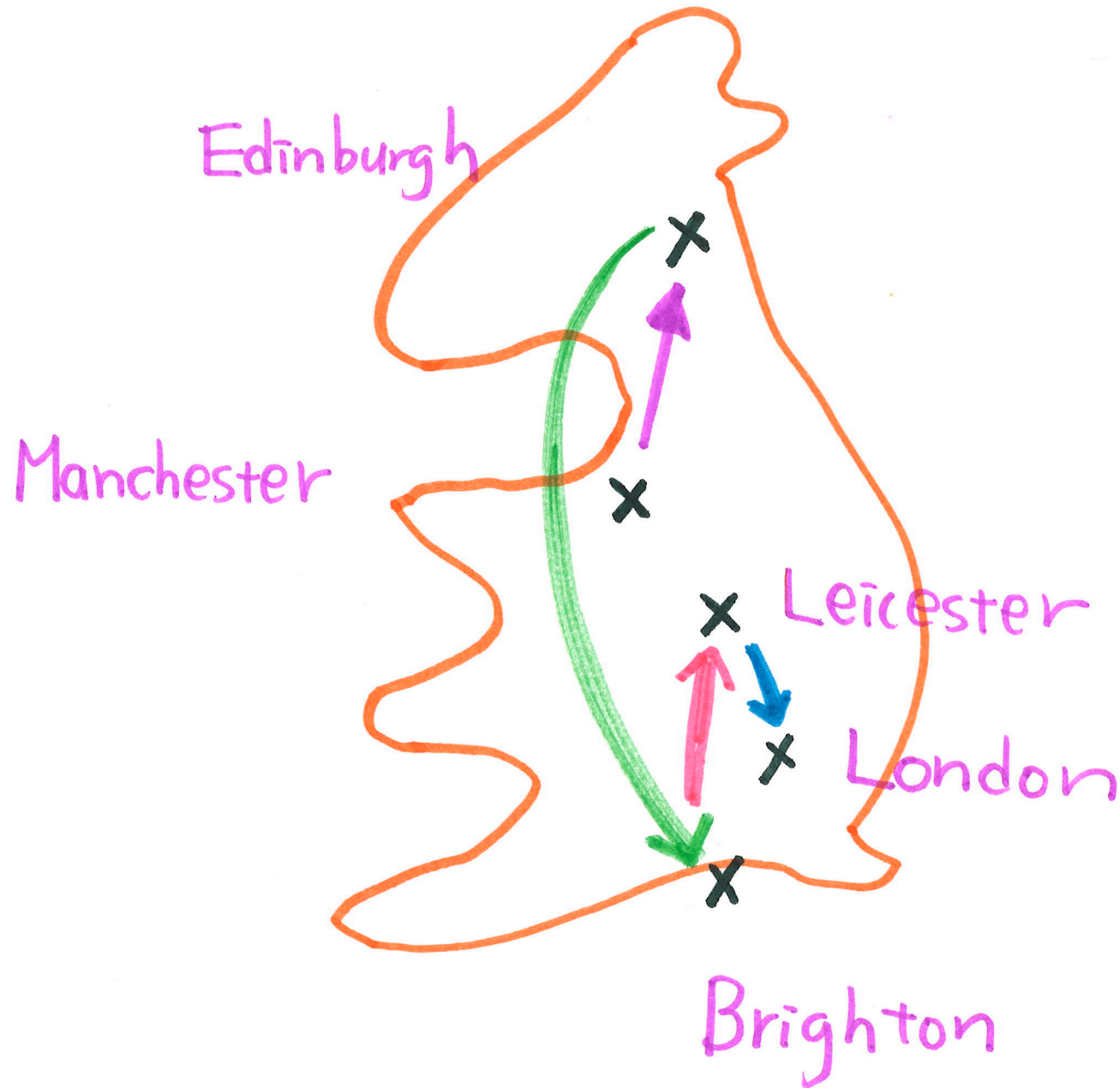
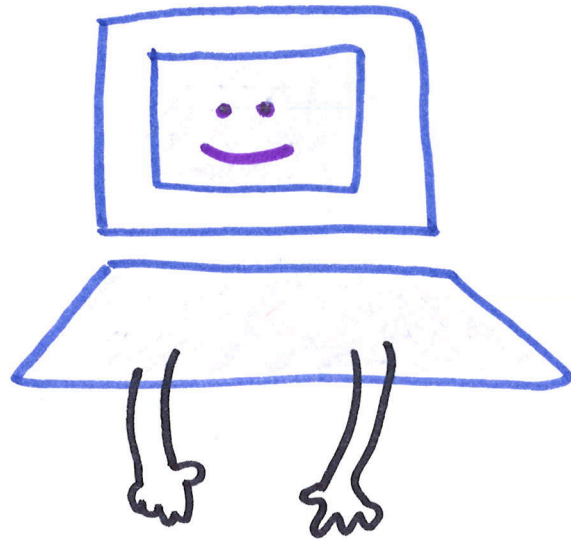


# My Mobile Research Life in UK

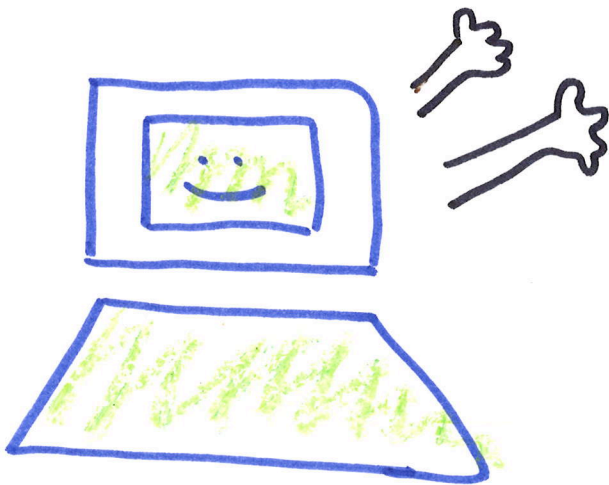
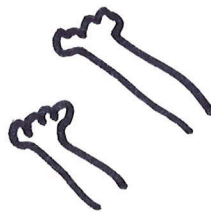


Interactive  
Computing is

Ubiquitous

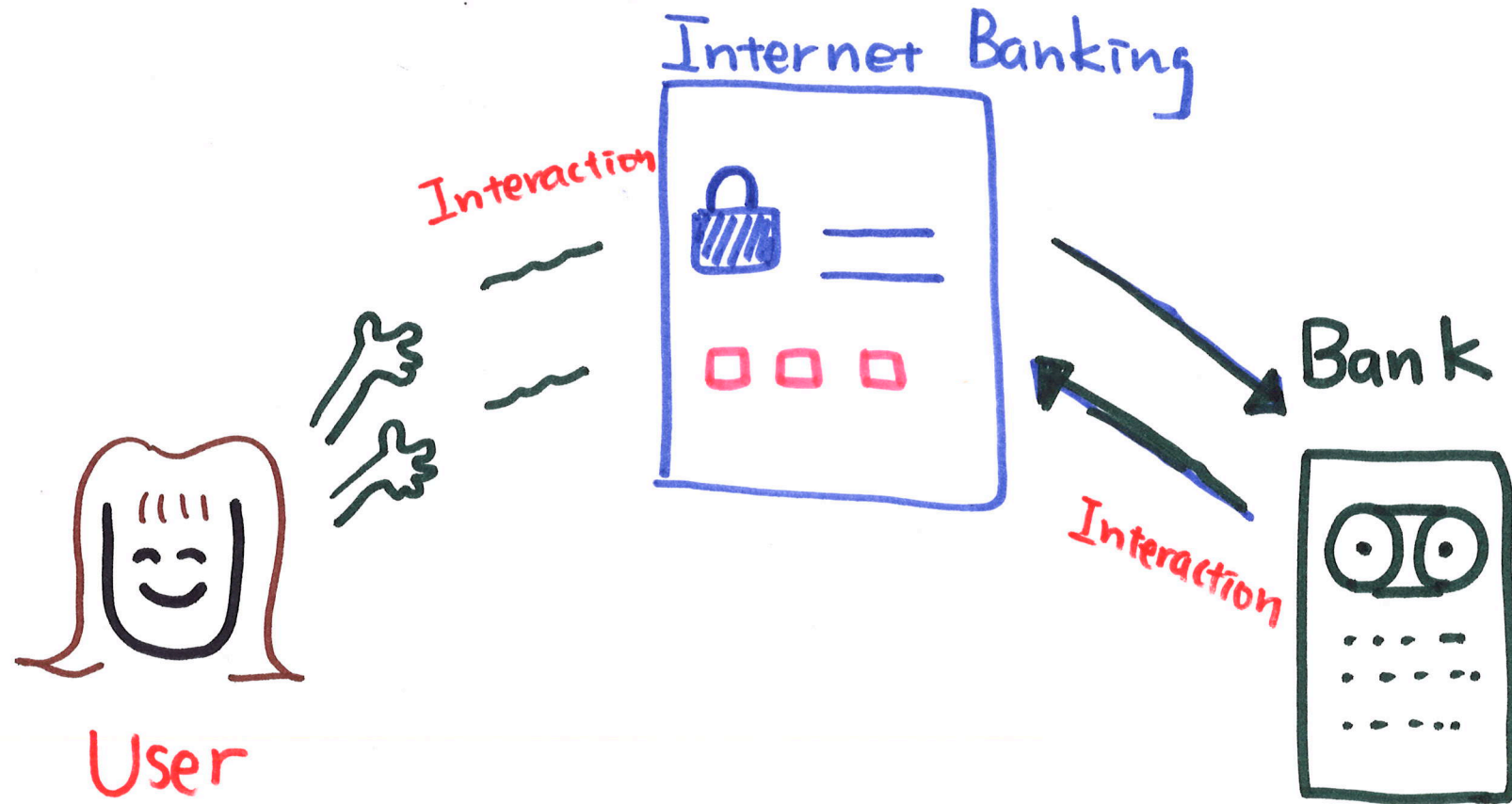


Task

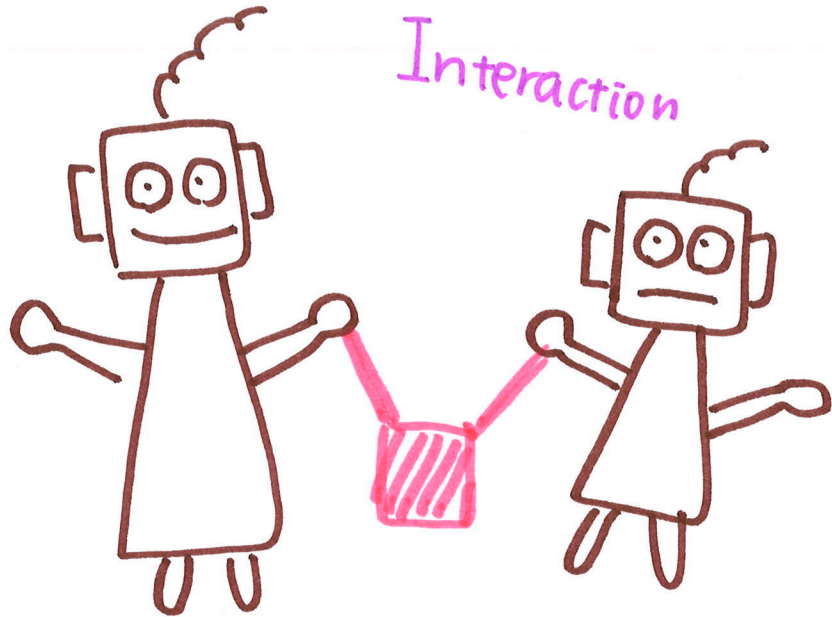


Computing Machines in Network

# Global Banking System

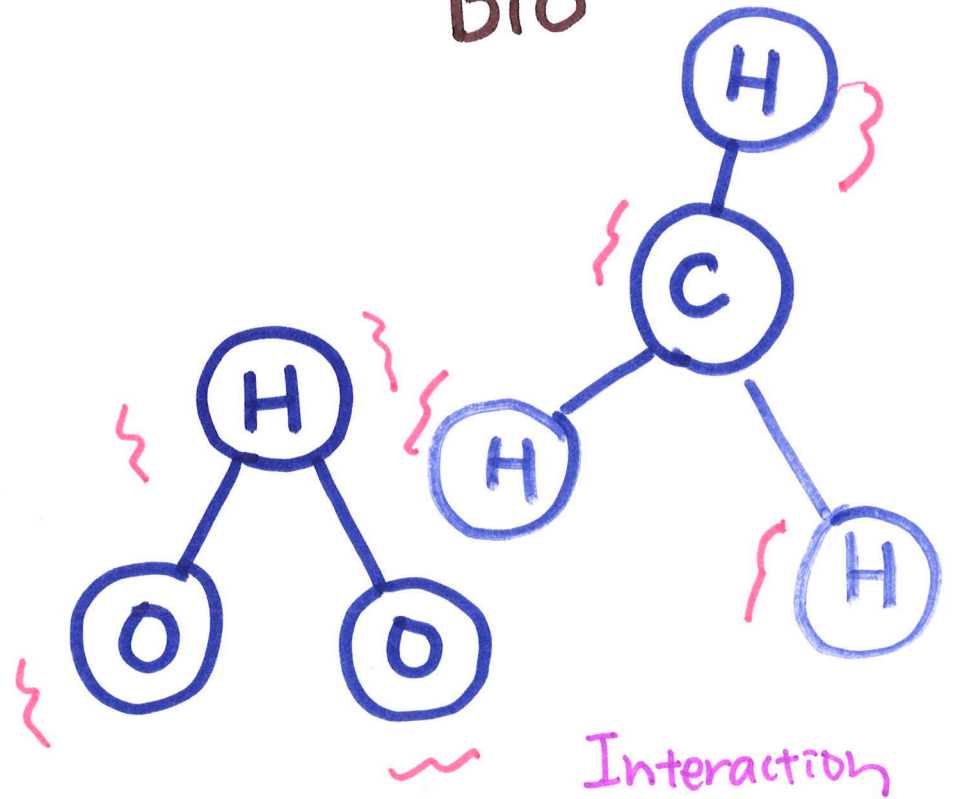


Interaction



Mobile Robots

Bio



Interaction

# Interactive Computing is Ubiquitous

- Computing Machines, Network Infrastructure, Global Banking System, Applications in Internet, Mobile Robots, Man-machine Interface, ...

- **Basic Questions**

- How to understand interactive behaviour **systematically**?
- What is this **abstract (mathematical) entity** called interactive behaviour?
- Given some system/software, how can we **formally** specify/describe/control its behaviour?



# Interactive Computing is Ubiquitous

- Computing Machines, Network Infrastructure, Global Banking System, Applications in Internet, Mobile Robots, Man-machine Interface, ...

➤ **Basic Questions**  $\implies$  **Model/Calculus**

➤ How to understand interactive behaviour **systematically**?

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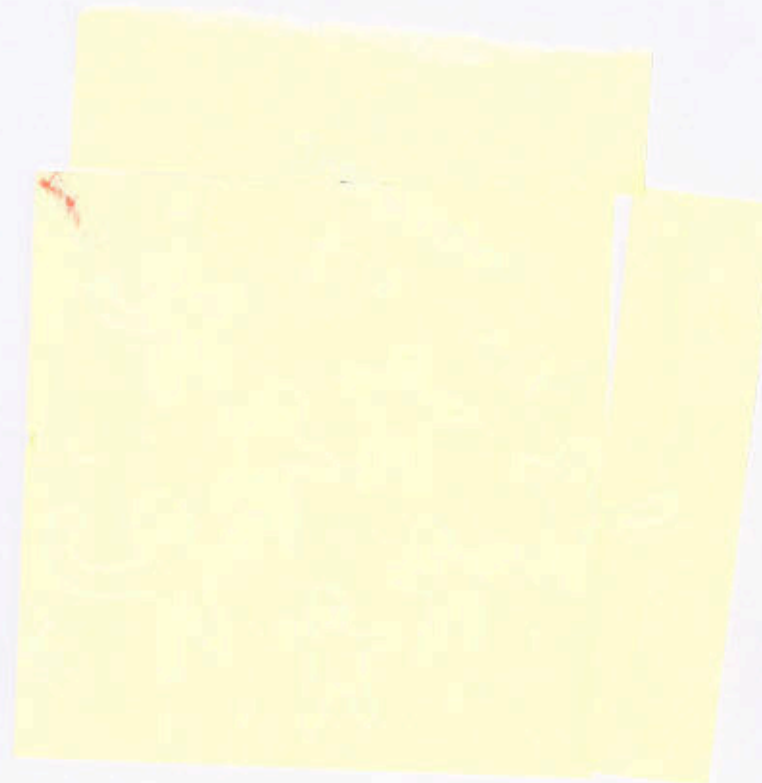
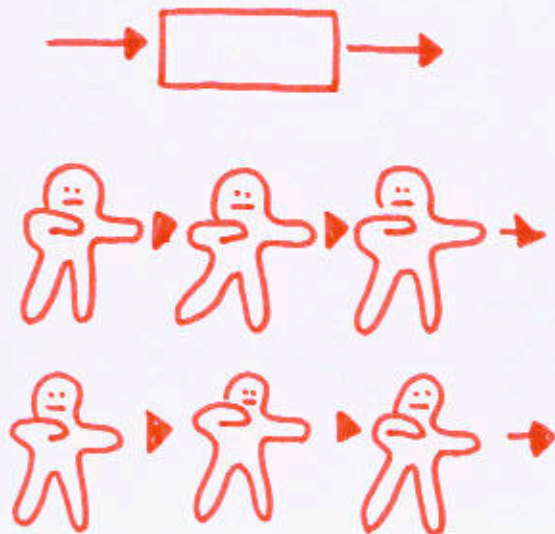
# Sequential vs Interactive Computation

## $\lambda$ -calculus

$M ::= x \mid \lambda x.M \mid MN$

Logic/Category Theory

Lisp, ML, Haskell,...



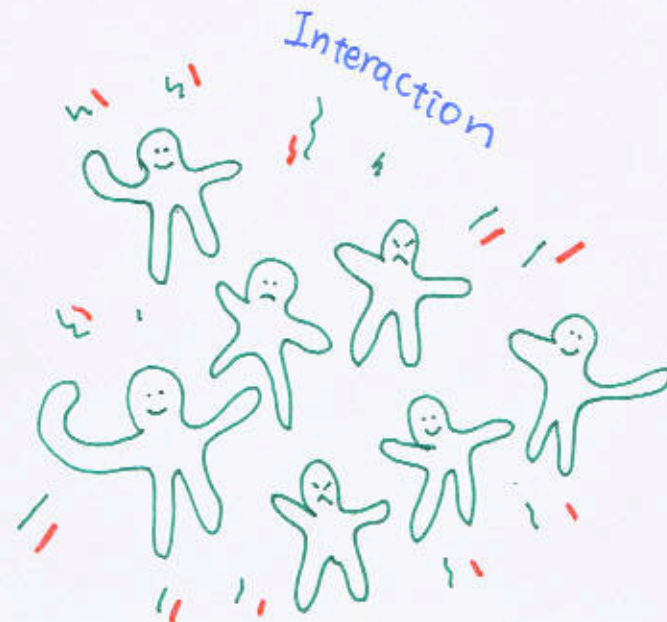
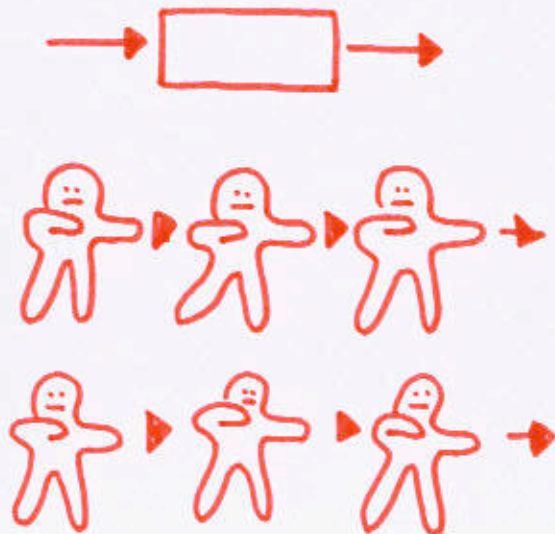
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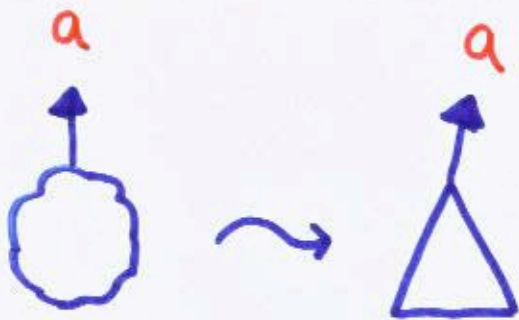


# The $\pi$ -Calculus [1989–]

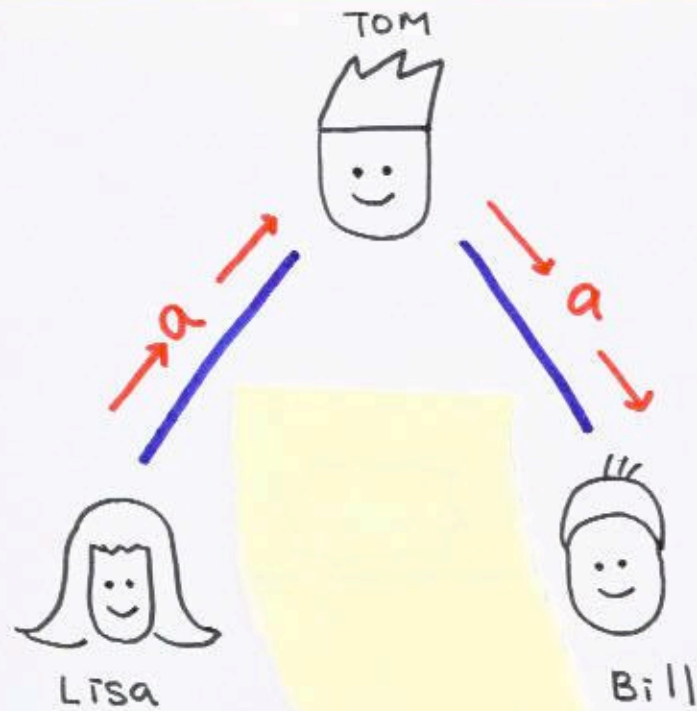
Shared Point



Identity of Agent

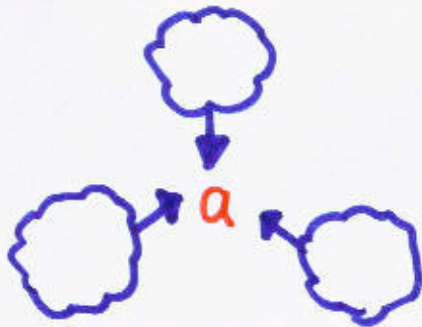


Name Passing as Pointer Passing

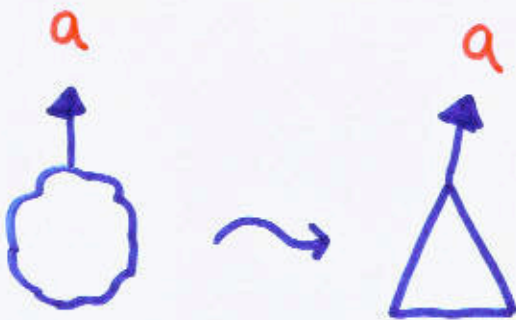


# The $\pi$ -Calculus [1989–]

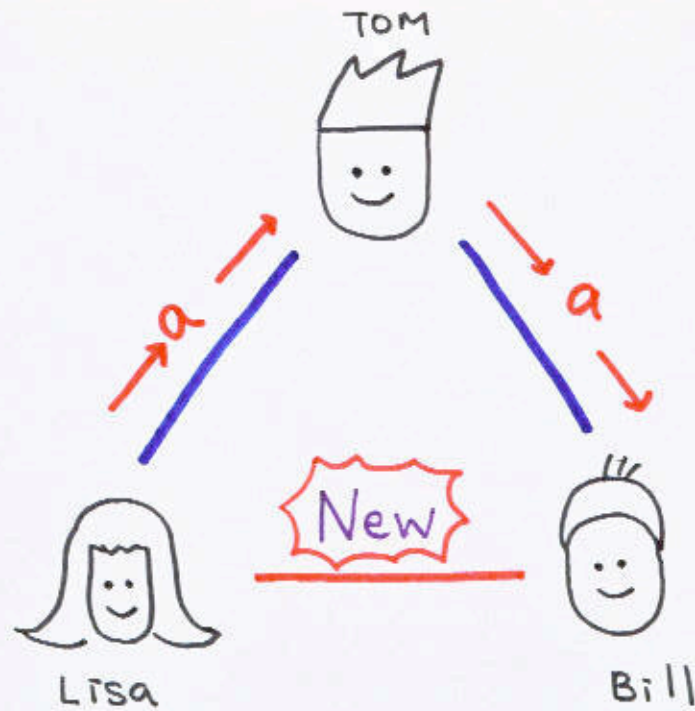
Shared Point



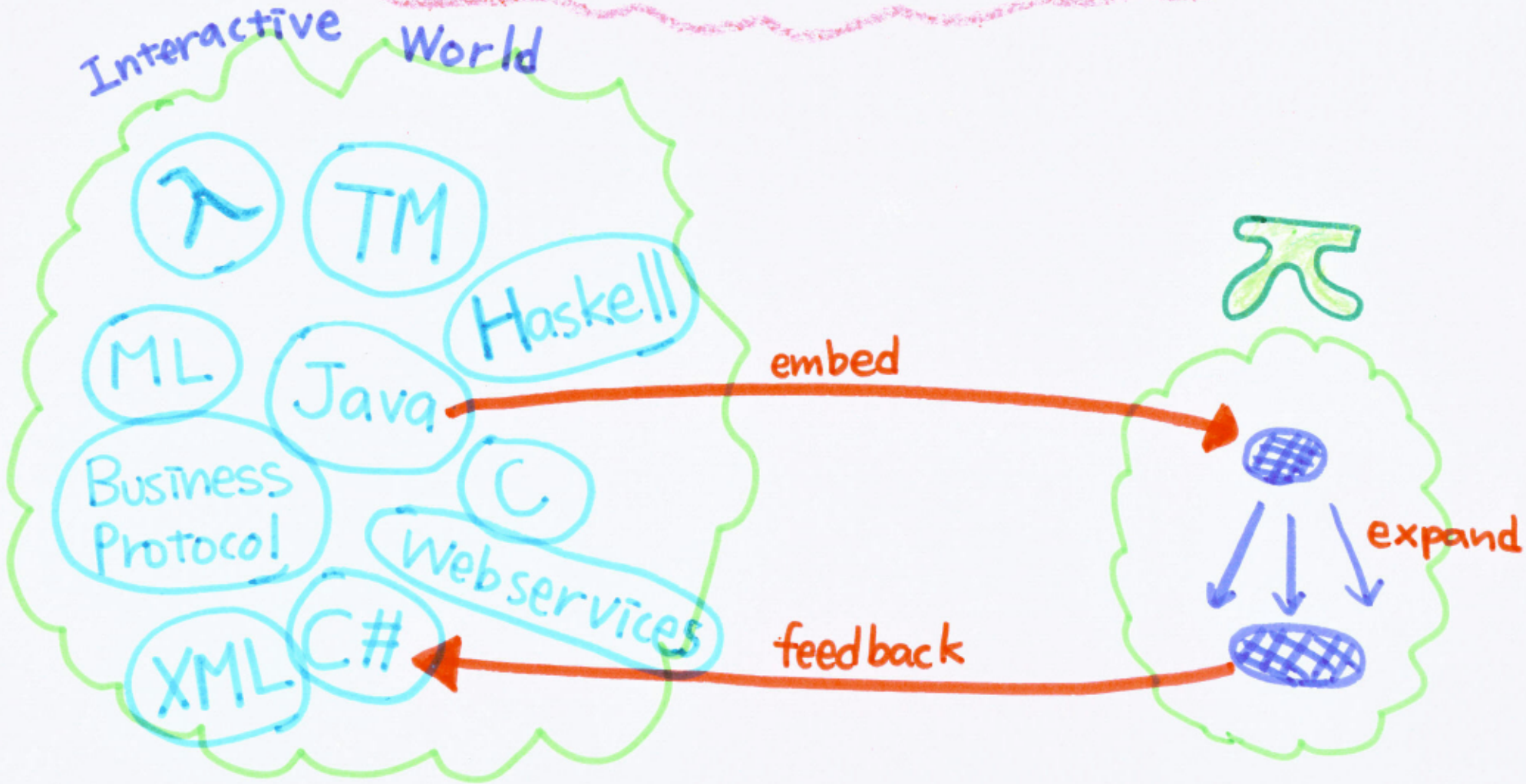
Identity of Agent



Name Passing as Pointer Passing



$$\underline{a}(x).P \mid \underline{\bar{a}}\langle v \rangle \rightarrow P[v/x]$$



$$P \approx Q$$

$\Leftrightarrow$   
Full Abstraction

$$\llbracket P \rrbracket_u \approx \llbracket Q \rrbracket_u$$