Linda (or, "Spaces") K. V. S. Prasad Dept of Computer Science Chalmers University TDA384/DIT391 - 22 Sep 2017

Questions?

- Anything you want to say
- Comments, questions, stray thoughts, etc.
- Are we too fast/slow?
- Reminder talk to your rep!
 - Feedback meeting after class
- Practical problems?
 - Don't miss deadlines! (you're not Douglas Adams)
 - Registration and other formalities

Comments on message passing

- Inter-process
- Communication
- Coordination
- CooperationContention
- Concurrency
- Synchronisation
- We mentioned simulation and examples such as pilots, athletes,
- dancers, musicians, ..

Loosely coupled systems

- Tightly coupled systems
- Shared memory
- Synchronous communication
 Whether one-to-one or broadcast
- Loosely coupled
- Asynchronous
- Persistent
- Linda is such a system • So are filing systems and databases?

Tuple space

• Large shared notice board

- Posted notes are in the form of tuples
- Can read notes matching any pattern
 - E.g., you look for a pair
 Only singletons and triples posted
 Block until someone posts a pair
- This blocking gives us synchronisation

Linda primitives

• Post(v1, v2, ..., vn)

- Put tuple of values out Release an arbitrary proc waiting on this pattern
- Remove(X1, x2, ..., Xn)
 - X's are variables and x's are constants
 - Remove an arbitrary matching note Block if none available
- Read(X1, x2, ..., Xn)
- Like remove, but leave note on board

Generalisation of read and remove

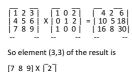
- Allow patterns such as (X, 4, Y) Matches only triples with middle element 4
- Allow patterns such as (X, c=, Y)
- Where c is a variable
- Matches only triples with middle element = c

Linda examples

- From the book
 - Slides 8.4 thru 8.7
 - Matrix multiplication using channels
 Slides 9.1 thru 9.8
 - CS, client-server, buffer, matrix in Linda
- Given a monotonically increasing function f
 - with f(0) < 0 and f(1) > 0
 find x where 0<x<1 such that f(x)=0.
 - Can be done by binary search
 How to use more than one process

 - Can use ability to interrupt

The matrix example



[7 8 9] X [2] | 2 | = 7*2 + 8*2 + 9*0 = 30 | 0 | -- ---

On Engineering

- When things go wrong
 Shinkansen fatalities
 Stability
 Old planes
 Why pull is stable and push is unstable
 New planes and proof
 One world and many departments
 Specifications, tolerances, etc.
 Elektronik är komponenter
 We don't even know what our nuts and bolts are
 New disciplines need patience (an diedsty)
 The limitations of formal proofs and model checking
 Build the right system, build it right.
- Build the right system, build it right.