

98-023A : Concurrent and Distributed Programming w/ Inferno and Limbo

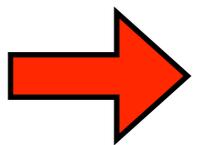
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Lecture Outline

- More CSP examples

Syllabus

- **Week 1:** Introduction to Inferno
- **Week 2:** Overview of the Limbo programming language
- **Week 3:** Types in Limbo
- **Week 4:** Inferno Kernel Overview
- **Week 5:** Inferno Kernel Device Drivers
- **Week 6:** NO CLASS
- **Week 7:** C applications as resource servers: Built-in modules and device drivers
- **Week 8:** Case study I — building a distributed multi-processor simulator
- **Week 9:** Platform independent Interfaces: Limbo GUIs; Project Update
- **Week 10:** Programming with threads, CSP
- **Week 11:** Debugging concurrent programs; Promela and SPIN
- **Week 12:** Factotum, Secstore and Inferno's security architecture
- **Week 13:** Case study II — Edisong, a distributed audio synthesis and sequencing engine

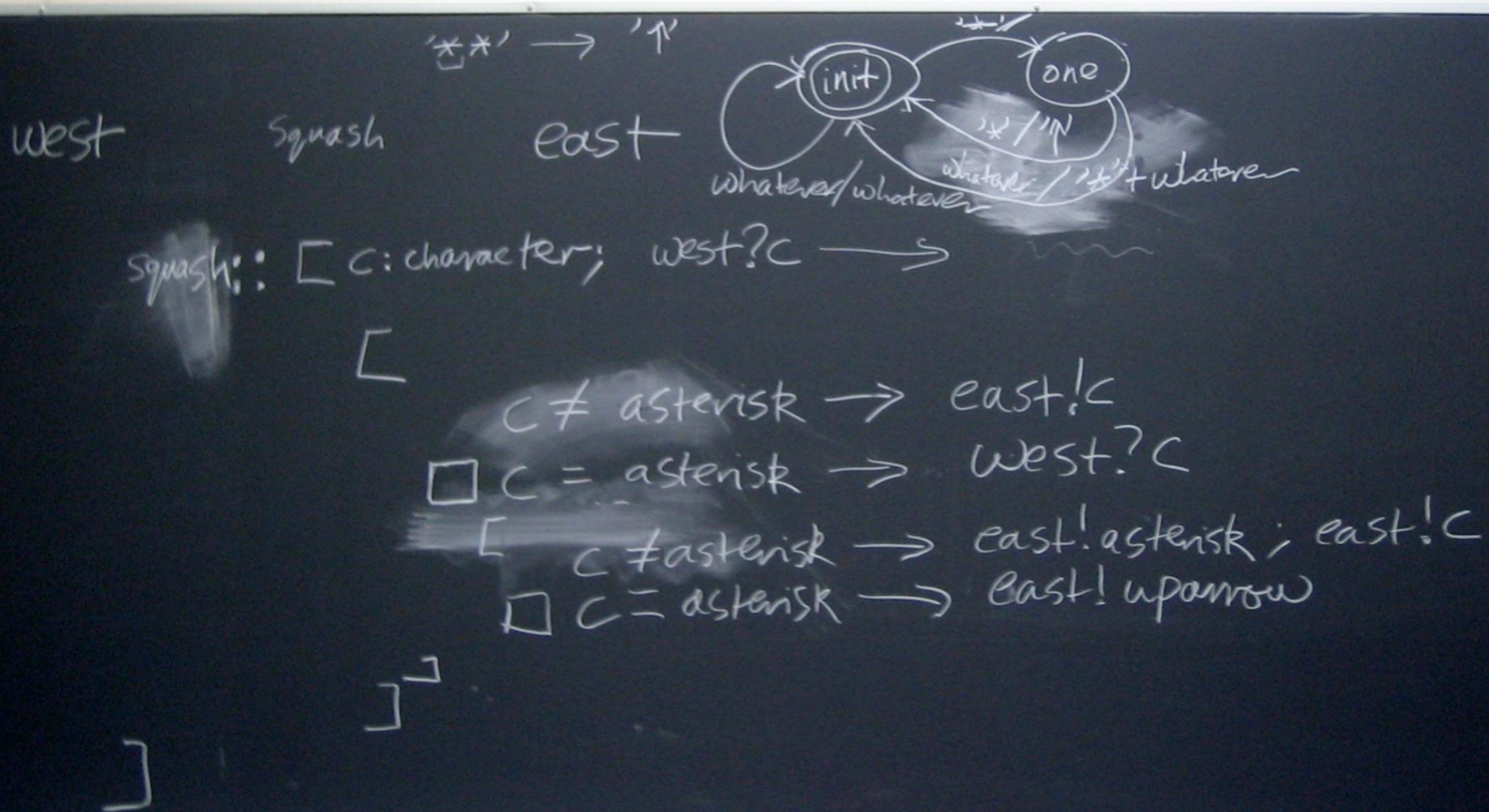


Example: Coroutines

- Squash in CSP

```
X ::= *[c: character; west?c →  
  [c ≠ asterisk → east!c □ c = asterisk → west?c;  
  [c ≠ asterisk → east!asterisk; east!c  
  □ c = asterisk → east!uparrow]  
  ]  
]
```

Example: Coroutines



Example: Coroutines

- Squash in Limbo
for (;;)

```
{  
  c :=<- west;  
  case c  
  {  
    asterisk =>  
      c =<- west;  
      case c  
      {  
        asterisk =>  
          east <-= uparrow;  
        * =>  
          east <-= asterisk;  
          east <-= c;  
      }  
    * =>  
      east <-= c;  
  }  
}
```

Squash in CSP (again)

X ::* [

c: character; west?c →

[c = asterisk →
west?c;

[

c = asterisk →
east!uparrow

c ≠ asterisk →
east!asterisk;
east!c

]

c ≠ asterisk → east!c

]]

case, alt and

- **case** in Limbo is just a special form of  (alt in CSP)
- **alt** in Limbo is a weak form of  (alt in CSP)
- Take a look at what Occam, Newsqueak and Alef (other CSP-derived languages) do

Handouts

- “Communicating Sequential Processes”; C.A.R. Hoare, *Communications of the ACM*, Volume 21, Number 8, 1978
- “Using SPIN”; Gerard J. Holzmann, *Plan 9 Documents*, Volume 2, available on the web at <http://plan9.bell-labs.com/sys/doc/index.html>

No Class for the next 2 weeks

- No class until Monday April 12th
- Spend the time reading the 2 handouts, working on your project, or both

Fin.