

9/24 CS240 - Eraser

Announcements

For next class (Tuesday 9/29)

1. Read: [Experience with Processes and Monitors in Mesa](#)
2. Submit answers to reading questions (see course schedule) before class

When saying something in class, please state your first name the first time you say something.

Paper Background

- Authors
 - DEC SRC - Digital Equipment Corporation (DEC) System Research Center (SRC)
 - Xerox PARC defections in 1984
 - Internships: Stefan Savage
 - Mike Burrows
- Paper Venue
 - SOSP'97 & ACM Transaction of Computer Systems
- Enable technology from DEC Western Research Lab (WRL)
 - ATOM - A System for Building Customized Program Analysis Tools
- DEC CEO Ken Olsen: “There is no reason for any individual to have a computer in his home.”

Race Condition Discussion

- What is a race condition? Why is it bad?
- How is it defined in the paper?
 - Does their definition include all races?
- Does this have a data race?

```
int foo;
```

```
// Run on many threads simultaneously  
foo++;
```

State Action Table - Fill in shadow memory and state change

State (v)	Read(v)	Write(v)	Race?
Virgin (v)			
Exclusive (v)			
Shared (v)			
Share-Modified (v)			

What are the parameters to the function call inserted by ATOM?

Convincing Evidence

- How good of job did they do convincing you Eraser is good idea?
 - What more would you have liked to see?

Resource consumption

- What kind of slow down?
- Increases memory usage?
- Could you write a program that blew up Eraser's state storage?

What is happens before?

What does this mean?

```
Combine::XorFPTag::FPVal( ) {  
    if (!this→validFP) {  
        NamesFP(fps, bv, this→fp, imap);  
        this→validFP = true;  
    }  
    return this→fp;  
}
```

*// is fingerprint marked valid?
// no? calculate fingerprint
// (NamesFP changes this→fp)
// and mark it as valid*

This is a serious data race, since in the absence of memory barriers the Alpha semantics does not guarantee that the contents of the **validFP** field are consistent with the **fp** field.

Some more questions

- Why did they special case index off register R30?
- What does the following sentence mean:

Eraser also caches the result of each intersection, so that the fast case for set intersection is simply a table lookup.

What's the deal with annotations?

Reading Question

1. An intuitive sketch of a class of race conditions it will miss,
2. An example of a race condition in that class, and
3. An explanation of how Eraser could be extended to catch such race conditions.

What did you think of this paper?

Next class

Read: [Experience with Processes and Monitors in Mesa](#)

Do reading questions