CS766: Analysis of concurrent programs (first half) 2021

Lecture 7: How to think concurrency

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Compile date: 2021-02-07

Memory operation relation

The read write operations create the following relations $\subseteq E \times E$.

- ▶ po : events in a thread are ordered.
- ▶ rf : every read reads from exactly one write
- ▶ ws : all writes on a global are totally ordered
- ▶ fr : no other write comes between the read write pairs in rf

Analyzing alice and bob flag

pre: aF := bF := 0

thread Alice:
```
a1: aF = 1
a2: while(bF == 1);     ||
a3: .... // critical
a4: aF := 0
```

thread Bob:
```
b1: bF := 1
b2: while( aF == 1) {
b3:   bF := 0
b4:   while(aF == 1);
b5:   bF := 1
b6: }
b7: ... //critical
b8: bF := 0
```
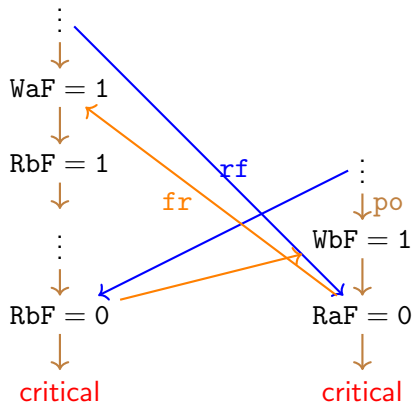
Violating execution:
Assume threads reached critical
section at the same time.

End of Lecture 7