#### Design and Implementation of Concurrent C0

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Carnegie Mellon University School of Computer Science Senior Honors Thesis

May 4, 2016

#### CC0 in 1 Sentence

Concurrent C0 uses session types to make concurrent message passing safer and more efficient than in other programming languages.

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      Provider:
protocol $c even() {
  int x = recv(\c);
  send($c, x%2==0);
  close($c);
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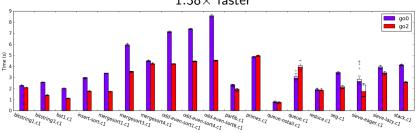
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Provider: Client:
protocol $c even() {
    int x = recv($c);
    send($c, x%2==0);
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}
Client:
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protocol $c = even();
send($c, 4);
assert(recv($c));
wait($c);
}
```

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#### $1.38 \times \text{faster}$

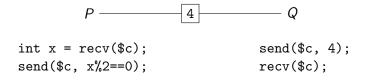
Synchronization Points



Synchronization Points



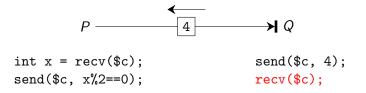
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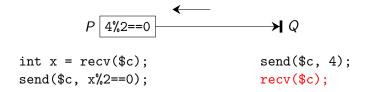
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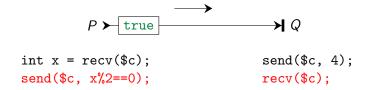
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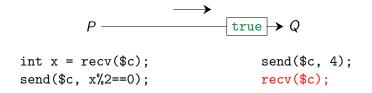
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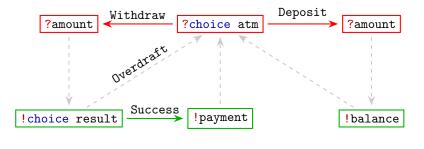
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typedef <?choice request> atm;
choice request {
        <?amount; !balance; atm> Deposit;
        <?amount; !choice result> Withdraw;
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choice result {
        <!payment; atm> Success;
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Type Width

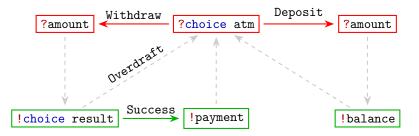
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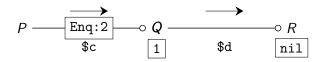


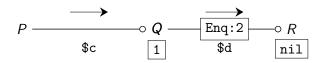


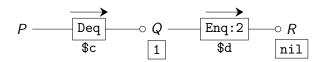




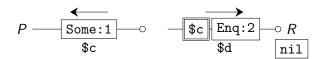


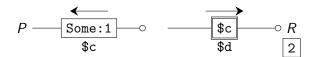


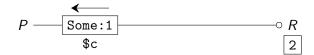














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Questions?