Plan

Intro: Consistency
Recitation Questions
Types of Consistency
Consistency Game

Logistics
*Welcome back!
*Amir leading recitation on Thursday
*Hands-on due tomorrow
*Design project report due in two weeks
In simpler times...

```
seat_3a = Alice
seat_3b = Bob
```

![Diagram showing the interactions between Alice, Bob, and their seats, with checks and crosses indicating the correctness of certain conditions.]

- E, E: ✅
- E, Alice: ✗
- E, Bob: ✅
- Alice, Empty: ✅
- Alice, Bob: ✅
Recitation Questions

1. What is a consistency guarantee? What aspect of system does it affect?
   - R/W distributed ... who sees which writes
   - S applies to multicore CPUs

2. How does a system design choose a "good" guarantee?
   - Tradeoffs: Perf, avail, flexibility, cost
   - Min guarantees necessary

3. Why does the choice matter?
   - Apps have different needs
1. Why does Amazon only offer 2 options?

   - Simplicity
   - Eventual strength

2. Why is that good enough?

   - Some delay is okay
Consistency Game

1) Eventual

2) Strong

write $\rightarrow$

$s3 = 7$

$s5 = 2$

"Sharding"
Plan

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In simpler times...

- seat_3a = Alice
- seat_3b = Bob

- (empty, empty) → (empty, Bob) → (Alice, empty) → (Alice, Bob)

<table>
<thead>
<tr>
<th>W₁</th>
<th>W₂</th>
<th>W₃</th>
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Recitation Questions

1. What is a consistency guarantee?  
   ⊥ promise about how up-to-date data will be  
   ⊥ distributed system

2. How does a system designer choose a consistency guarantee?  
   ⊥ app need vs. cost  
   ⊥ DynamoDB ⊥ app need vs. cost  
   ⊥ Strong $$$$  
   ⊥ Eventual $$

3. Why does the choice of a consistency guarantee matter?  
   ⊥ correctness vs cost/perf
Why does Amazon only offer 2 guarantees?

- complicated for Amazon
- complicated for app developers

Why is eventual consistency enough ever?

- "less than 1 second"
Consistency Game

\[
\text{SEND} \rightarrow \text{PRIVATE EOM}
\]

\[
\text{MAIN (Amir)}
\]

\[
\text{REPLICAS}
\]

\[
\text{READERS}
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