State Management and Synchronization Requirements

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1 Client actions

- Multiple clients connect to a local server
  - Server logs show client connected
- Multiple clients connect to the remote test server
  - Server logs show client connected
- Client inputs are sent to the server
  - When input events that affect the game state are triggered, the input is sent to the server
  - Server logs show data transferred by each client
- Client predicts game state based on user input
  - When input events that affect the game state are triggered, the client uses the input to predict the game state
  - Without server responses, the game's movement functions properly
- Client reconciles predicted state with authoritative server state
  - Client receives server game state on server tick
  - Client compares client game state to server game state for time stamp in past
  - If not matching, client game state gets overridden to match server game state
- Client interpolates entity positions given the game states provided by the server
  - Client receives server game state on server tick
  - Client interpolates from client game state to server game state to reduce jitter

2 Server actions

- When a client connects, a player is spawned for the corresponding client

  - Server receives client connection
  - Server spawns client object into server game state

- Server determines game state based on clients' inputs

  - Server receives client input event
  - Server determines game state based on input and timestamps it

- Server sends updated game state to all clients at regular intervals

- When a client disconnects, their player is removed

  - Server receives client disconnection
  - Server removes client object from server game state

- Server compensates authoritative state for client latency

  - Server receives client input
  - Server compares input to server game state when client input was performed
  - Server updates game state to match client's expected results of game state based on inputs

3 Environment

- Set up a local test server
- Set up a persistent remote test server