Take-Home Exercise: Multiplayer Game

# Timeframe: 1-2 evenings (4-8 hours)

### Objective

Build a web-based version of *Codenames: Pictures* where frontend engineers can showcase UI/UX and real-time interactions, while backend engineers focus on game logic, databases, and performance.

### Core Requirements

**Game Setup:** Full instructions of this board game can be found [here](https://czechgames.com/files/rules/codenames-pictures-rules-en.pdf)**.**

1. Generate a 5x4 grid of random images (use placeholders or a predefined set).
2. Assign roles**:** Two spymasters (Red/Blue) and operatives.
3. Randomly generate a key card (assigning Red, Blue, Bystander, and Assassin to grid positions).
4. Keycard is only visible to spymasters.
5. Starting team (Red) has 8 agents, the other team (Blue) has 7.

**Game play:**

* Spymasters: Submit one-word clues + number (e.g., "Ocean: 2") via a restricted UI (hidden from operatives).
* Operatives: Guess cards by clicking them.
* Real-time updates for revealed cards (agent, bystander, assassin).
* Turn flow on card reveal:
  + Correct guess → Continue guessing (up to clue number + 1).
  + Incorrect guess (bystander/enemy agent) → End turn.
  + Assassin → Immediate game loss.
* Real-Time Sync - All players see the same game state (revealed cards, scores, turn status).
* Winning Conditions - A team wins by revealing all their agents. Immediate loss if the assassin is revealed.

### Frontend Focus (Optional Ideas)

Clean grid layout, role-specific views (spymasters see the key card, operatives don’t). Responsive Design.

### Backend Focus (Optional Ideas)

Game State Management.

Database: Store game history, track win rates or optimize key card generation.

Bonus: Implement an AI spymaster.

### Tech Stack Suggestions

Frontend: React + TypeScript, CSS-in-JS, Socket.io client.

Backend: Node.js/Python, Socket.io/WebSockets, PostgreSQL/Redis.

Images: Use Unsplash API, predefined SVGs, or emojis.

### Submission Guidelines

Host code on GitHub / Replit / etc with a README explaining:

How to run the project.  
Key design choices

Optional: A 2-minute demo video or hosted prototype link.