React and the Art of Gamification

Courtney Yatteau

START

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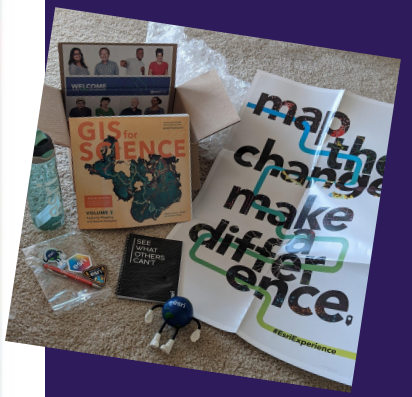
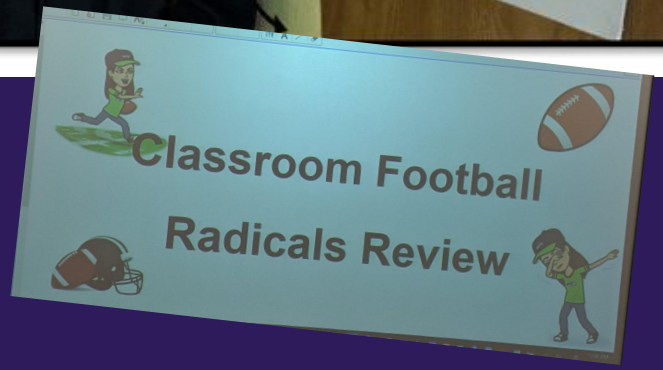
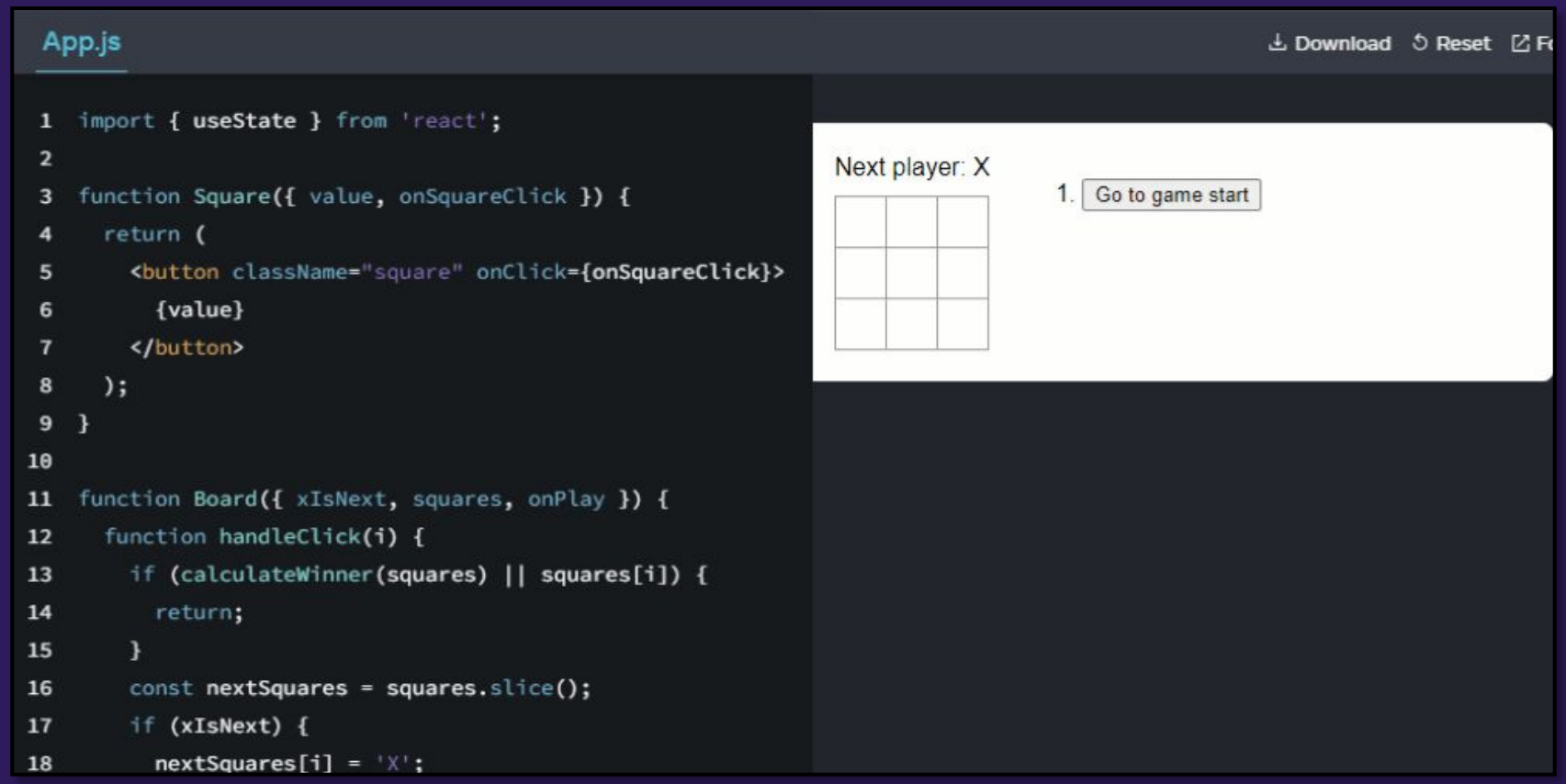
Developer Advocate, Esri





https://github.com/cyatteau/gamification-reactjsday-2025

Gamifying React Education



What is gamification?

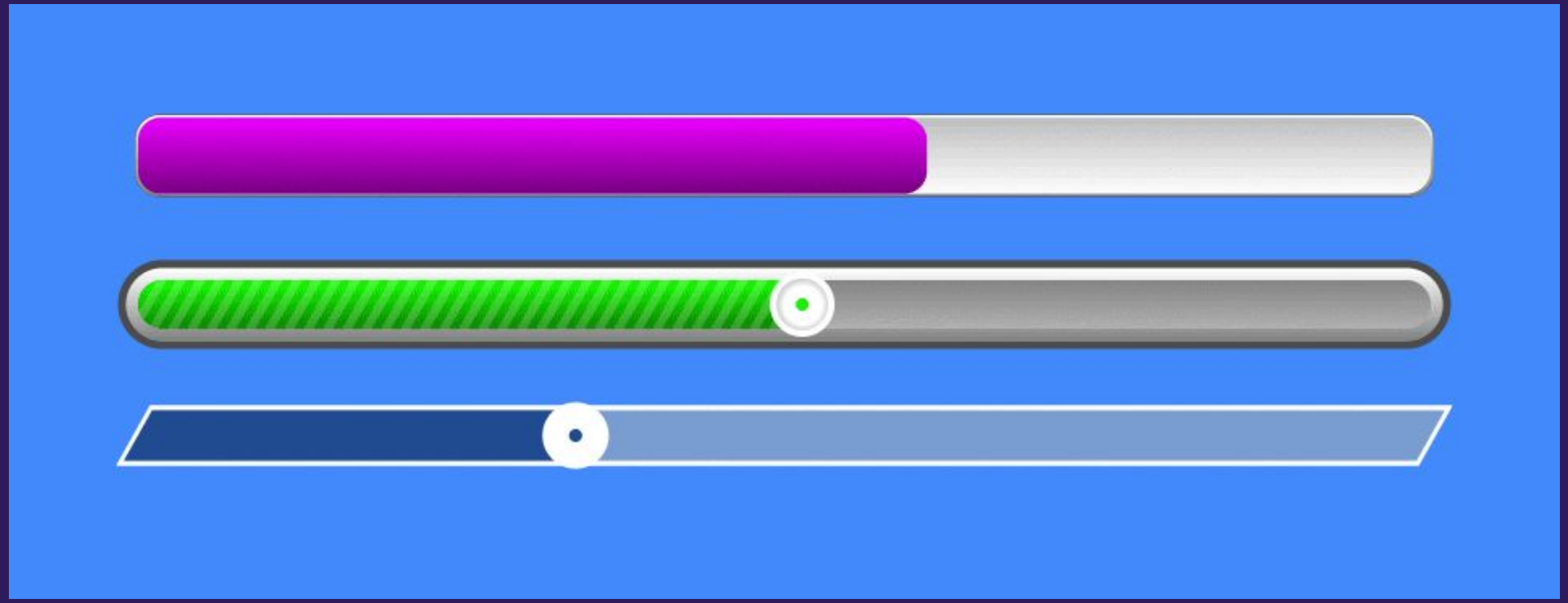
🎯 Game mechanics in real life

⚡ Motivates action

🏅 Rewards progress

🎉 Makes it fun

Why Gamify?



Effective gamification creates an ecosystem where users are constantly motivated to engage, improve, and achieve. It's about harnessing the power of game mechanics to drive real-world results.
- Sebastian Deterding

How React Powers-Up Gamification

Server Components	Stream UI gradually; ship **zero client JS** for non-interactive parts
Server Actions	Mutate state on the **server**; keep progress **authoritative**.
React Compiler	Fewer manual memos; smoother updates in real trees.
Client Islands	Hydrate **only** truly interactive surfaces (buttons, editors, canvases).

Demo Time

Core loop: Click → Quest → XP

Built in tiny steps

Principles:

- stream early
- server-true progress
- one small client island

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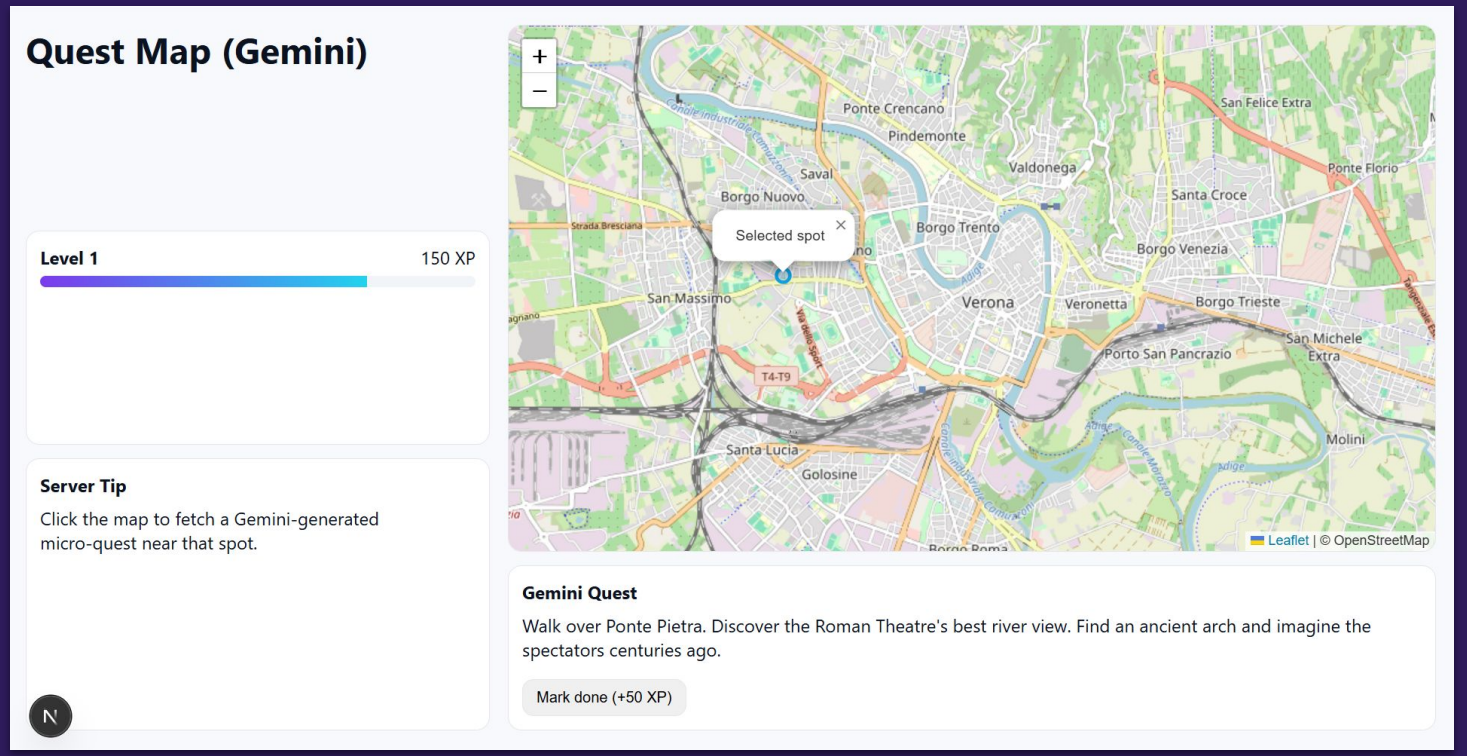
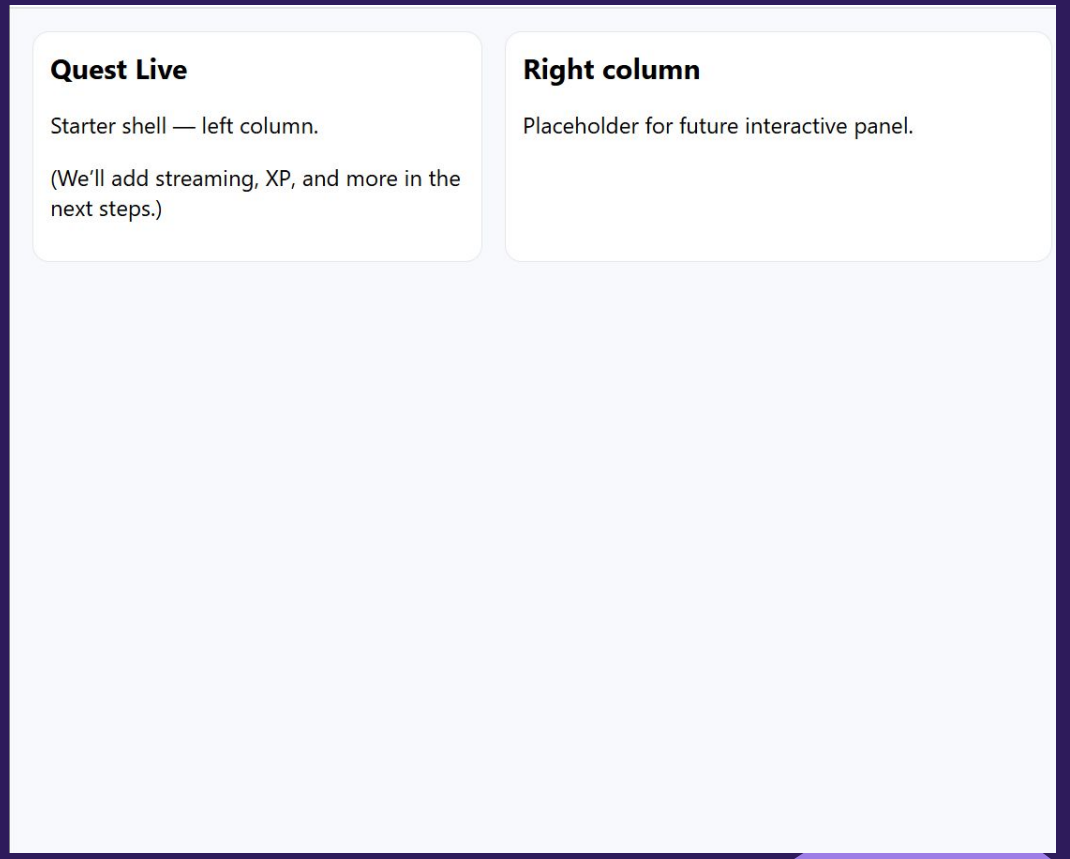
Full Demo


Quest Map (Gemini)
Level 1
150 XP
Server Tip
Click the map to fetch a Gemini-generated micro-quest near that spot.
Selected spot
Ponte Crencano
Pindemonte
Saval
Valdonega
San Felice Extra
Ponte Florio
Borgo Nuovo
Santa Croce
Strada Bresciana
Borgo Trento
Borgo Venezia
San Massimo
Verona
Veronetta
Borgo Trieste
Porto San Pancrazio
San Michele Extra
T4-T9
Santa Lucia
Golosine
Molini
Leaflet | © OpenStreetMap
Gemini Quest
Walk over Ponte Pietra. Discover the Roman Theatre's best river view. Find an ancient arch and imagine the spectators centuries ago.
Mark done (+50 XP)

Server Shell

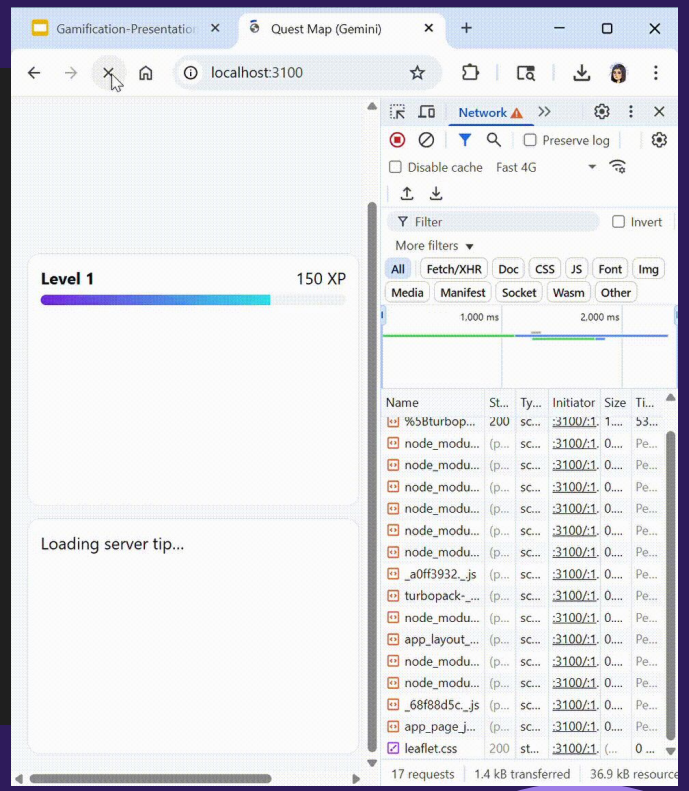
```jsx
// app/page.jsx (Server Component)
export default async function Page() {
  return <main>…left card…right card…</main>
}
```



Streaming via Suspense

```jsx
// app/page.jsx
<Suspense fallback={<div>Loading server tip…</div>}>
  <ServerTip />
</Suspense>

// app/(rsc)/ServerTip.jsx
await new Promise(r => setTimeout(r, 700))
```

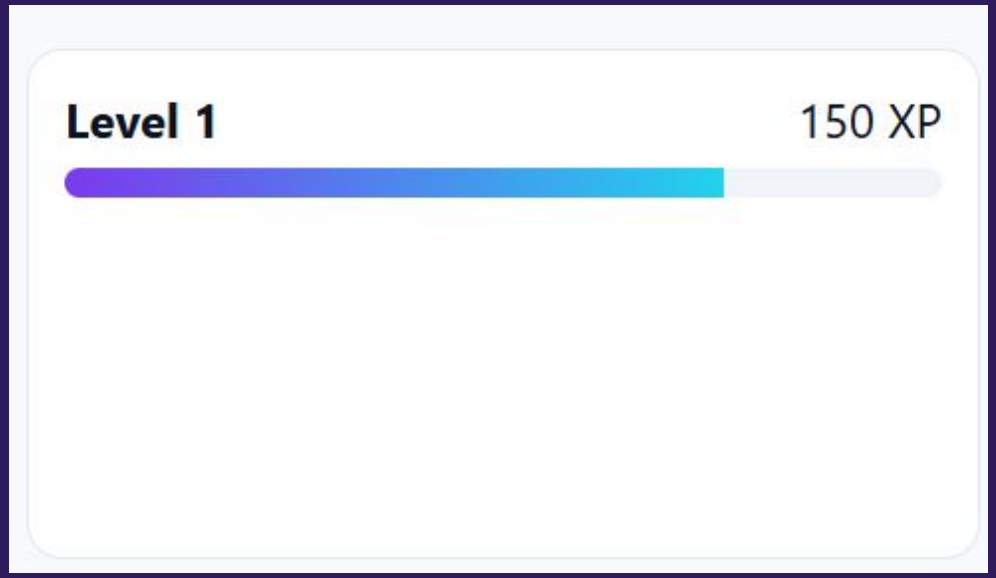


Add server XP

```
// lib/db.js
let state = { xp: 0 }
export async function addXP(n=0) {
  state.xp = Math.max(0, state.xp + n)
}
```

Show XP as a bar

```
// components/XPBar.jsx
const level = useMemo(()=>
  Math.floor((xp||0)/200)+1,[xp]
)
```



Add a Server Action

```
// app/actions.js
'use server'
export async function grantXP(n=50){
  await addXP(n)
}
```

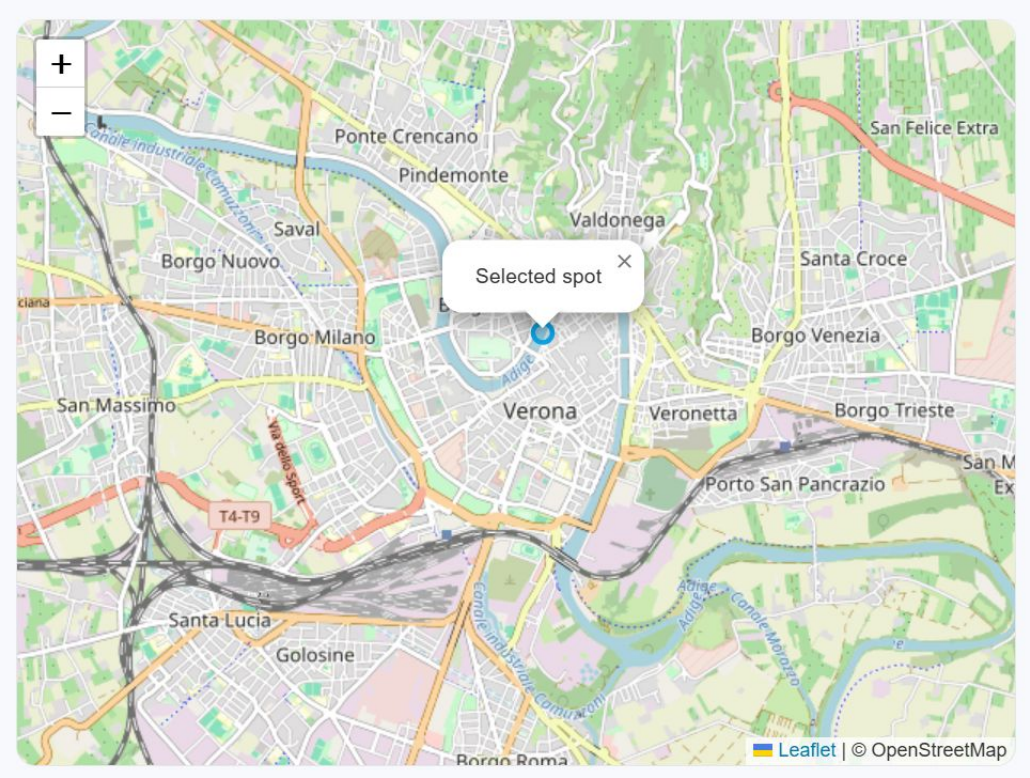
AI route

```
// app/api/ai/route.js
const url = `…/gemini-2.5-flash:generateContent?key=${GEMINI_API_KEY}`

// ask for strict JSON
generationConfig:{ responseMimeType: "application/json" }
```

Map island

```
// components/Map.jsx
const L = await import('leaflet')
```



Wire click → AI quest

```
// components/MapQuest.jsx
const res = await fetch('/api/ai',{
  method:'POST', body: JSON.stringify({ lat, lng })
})

setMsg((await res.json()).quest)
```

Mark done → Server Action → Refresh

```
// components/MapQuest.jsx
await grantXP(50); router.refresh()
```

G

Gamified UI

A

Advanced State

M

Memoization

E

Efficient Rendering

Possible Extensions

1. **Social**: server-rendered leaderboard
2. Copy to share" button in quest panel
3. Streaks / achievements
4. Persist XP to DB

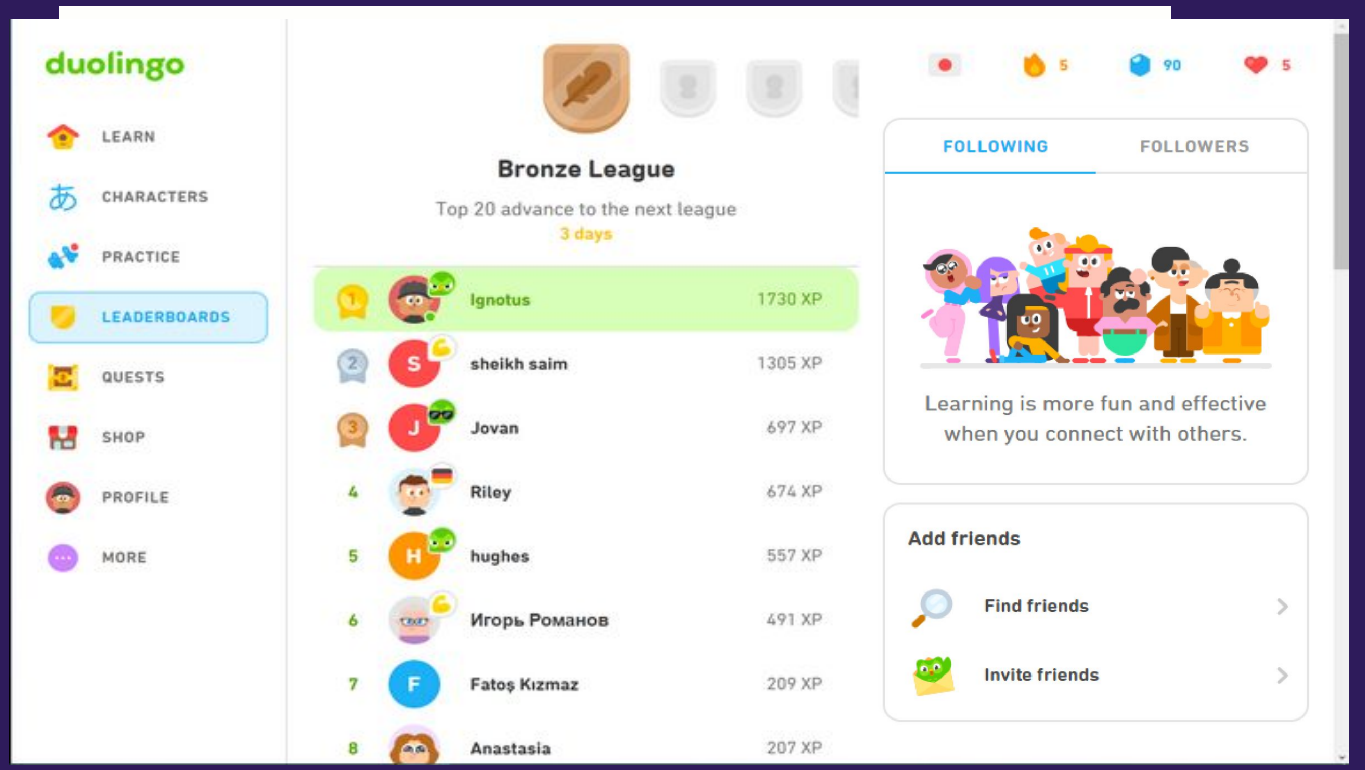
G Streak Counters & XP Bars

A Advanced State Control

M Optimized Lesson Rendering

E Efficient Component Rendering

S Leaderboards & Challenges



duolingo

Get Started Today!

Start server-first
RSC page + small Suspense fallback

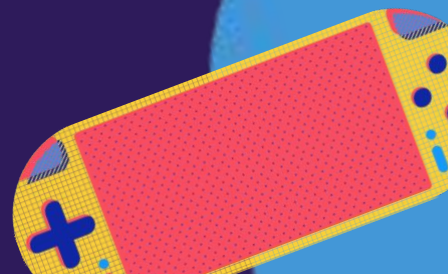
One measurable action
Pick a single number (XP/progress)

Server as authority
Mutate on the server (Server Action)

Make progress visible
A small, honest bar/counter

Hydrate one island
Only the real interaction surface

Guard the AI seam *(if using AI)*
Server-only key, **strict JSON**



Thank you, ReactJSDay!

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