🏗️ Session 01 — Dev Environment Architecture

A visual diagram showing relationships between GitHub Codespaces, OS, runtimes, dev tools, and the browser preview.

Mermaid diagram (preferred)

```
flowchart TB
  %% Actors
  Dev["Developer\n(Browser or VS Code Desktop)"]
  Browser(("Browser Preview"))

  %% Codespace container (contains OS + DevTools + editor config)
  subgraph Codespace["GitHub Codespace 🕐"]
    direction TB
    DevContainer[".devcontainer\n(config)"]
    subgraph OS["Ubuntu (container OS) 🐧"]
      direction TB
      Node["Node.js\n(runtime) ⚙️"]
      NPM["npm / package manager 📦"]
    end
    subgraph DevTools["Dev tools & App"]
      direction TB
      Vite["Vite\n(dev server) ⚡"]
      HMR["HMR\n(Hot Module Replacement) 🔁"]
      React["React App\n(src/*.jsx / components) ⚛️"]
      Files["Project files\n(src/, public/) 📁"]
    end
    VSCode["VS Code\n(remote editor) 🖥️"]
  end

  %% Relationships
  Dev ⟶|opens remote session| VSCode
  VSCode ⟶|remote connection| Codespace
  Dev ⟶|open preview| Browser

  DevContainer ⟶ OS
  OS ⟶ Node
  Node ⟶ NPM
  NPM ⟶ Vite
  NPM ⟶ React
  Files ⟶ React
  React ⟶|built / served by| Vite
  Vite ⟶ HMR
  HMR ⟶ Browser
  Vite ⟶|serves on localhost| Browser

  %% Classes (styling)
  class Dev,Browser actorClass
  class Node,NPM osClass
  class Vite,HMR,React devtoolsClass
  class VSCode codespaceToolClass
  class DevContainer,Files diagNotes
```

```
    %% Visual style definitions
    classDef actorClass fill:#ffffff,stroke:#94a3b8,stroke-width:1px,color:#0f172a;
    classDef osClass fill:#ecfdf5,stroke:#34d399,stroke-width:1px,color:#065f46;
    classDef devtoolsClass fill:#fff7ed,stroke:#fb923c,stroke-width:1px,color:#92400e;
    classDef codespaceToolClass fill:#eef2ff,stroke:#7c3aed,stroke-width:1px,color:#3730a3;
    classDef diagNotes fill:#f8fafc,stroke:#e2e8f0,stroke-width:1px,color:#0f172a;

    %% Optional styling for clarity (some renderers support 'style' for nodes)
    style Codespace fill:#f0f9ff,stroke:#60a5fa,stroke-width:2px
```

Legend / Notes

- Codespace = remote container running Ubuntu with your project's config (.devcontainer).
- Node + npm = runtime + package manager used to install/run Vite and the React app.
- Vite = dev server with HMR; serves the app on localhost to the Browser preview.
- VS Code (remote) = editor connected to the Codespace for live editing.

ASCII fallback (for plaintext renderers)

```
Developer (Browser / VS Code)
        |
   ------------------
   |                |
 VS Code (remote)  Browser (preview)
   |                 ^
   |                 |
   |     ---------- GitHub Codespace ----------
   |    |  .devcontainer  (config)         |
   |    |       |                          |
   |    |    Ubuntu (container OS)         |
   |    |       |                          |
   |    |    Node.js (runtime)            |
   |    |       |                          |
   |    |    npm (package manager)        |
   |    |      /      \                    |
   |    |     /        \                   |
   |    | Vite (dev server)  React (source)  |
   |    |  |  \         /   ^              |
   |    |  |   \       /    |              |
   |    |  |      HMR updates/patches      |
   |    |  |             |                 |
   |    |  |             v                 |
   |    |  |         Browser <--- serves on localhost
   |    |_____|
   |
```