1. Data Collections – Sirf 3 Chizein Store Hongi

Hum MongoDB use karenge. Sirf **3 collections** rakhenge, jisse sab simple rahega.

Collection	Kya Store Hoga	Example Fields
users	User ki basic information	`name`, `email`, `password`, `age`, `city`, `interests`
roadmaps	Pura skill ka learning plan (JSON format mein)	`userId`, `skillName`, `roadmapJson`, `createdAt`
progress	User ki aaj tak ki progress	`userId`, `roadmapId`, `currentModule`, `currentWeek`, `currentDay`, `completedTasks[]`, `weakTopics[]`

Note:

- Har user ka ek roadmap hoga (ya multiple skills ke liye multiple roadmaps).
- `roadmapJson` mein hum poora structured plan store karenge (jisme modules, weeks, days, lessons, tasks sab kuch hoga).
- Progress alag collection mein rakhi hai taaki bar-bar update karna easy ho.

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2. Data Flow – Kaise Data Move Karega

Jab user kuch karta hai, to yeh steps hote hain:

🔷 Case 1: User Pehli Baar Skill Enter Karta Hai

1. **Frontend** → `POST /api/roadmap` (skill name bhejta hai).
2. **Backend** check karta hai: kya yeh skill valid hai?
3. **Backend** AI ko call karta hai: *"Is skill ke liye ek structured roadmap bana, with 4 modules, har module mein 1 week, har week mein Monday-Friday lessons, Saturday revision, Sunday exam."*
4. AI **roadmap JSON** return karta hai.
5. Backend us JSON ko **roadmaps** collection mein store karta hai.
6. Backend **progress** collection mein ek new document banata hai (currentModule = 1, currentWeek = 1, currentDay = "Monday").
7. Backend frontend ko roadmap JSON bhejta hai.

🔷 Case 2: User Roz Ka Task Complete Karta Hai

1. User task complete karta hai → frontend backend ko bhejta hai: `POST /api/progress` with `{ taskId: 'monday-task', status: 'done' }`.
2. Backend **progress** collection update karta hai: `completedTasks` mein add karo, aur agar aaj ka task ho gaya to `currentDay` agle din par set karo.
3. Agar user ne Sunday exam diya aur fail ho gaya, to backend `currentDay` ko wapas Saturday ya Monday par set kar sakta hai (rule ke hisaab se).
4. Backend sirf `{ success: true, newDay: 'Tuesday' }` return karta hai.

🔷 Case 3: User Feedback Maangta Hai

1. User kisi task ke liye "Feedback" button dabata hai.
2. Frontend backend ko bhejta hai: `POST /api/feedback` with `{ taskId, userAnswer }`.
3. Backend AI ko call karta hai: *“User ne yeh answer diya, is par feedback do.”*
4. AI feedback text return karta hai.
5. Backend woh feedback frontend ko bhejta hai (store nahi karta, sirf show karwana hai).

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3. Roadmap JSON – Simple Structure

Yeh hai ek example roadmap JSON jo MongoDB mein `roadmaps` collection mein store hoga:

```
{
  "_id": "roadmap_123",
  "userId": "user_456",
  "skillName": "Frontend Web Development",
  "roadmapJson": {
    "modules": [
      {
        "name": "HTML Basics",
        "weeks": [
          {
            "week": 1,
            "days": [
              {
                "day": "Monday",
                "type": "learning",
                "lesson": "AI-generated intro to HTML",
                "task": "Create a simple HTML page with heading and paragraph."
              },
              {
                "day": "Tuesday",
                "type": "learning",
                "lesson": "Tags and elements",
                "task": "Add lists and links to your page."
              },
              {
                "day": "Saturday",
                "type": "revision",
                "lesson": "AI-generated recap based on weak topics",
                "task": "Revise topics you struggled with."
              },
              {
                "day": "Sunday",
                "type": "exam",
                "exam": {
                  "questions": [
                    {
                      "question": "What does HTML stand for?",
                      "options": ["Hyper Text Markup Language", "Home Tool Markup Language"],
                      "correct": 0
                    }
                  ],
                  "passingScore": 80
                }
              }
            ]
          }
        ]
      }
    ]
  },
  "createdAt": "2025-04-01"
}
```

Note:

- `_id` MongoDB khud generate karega, humein tension nahi.
- `userId` se pata chalega yeh kis user ka roadmap hai.
- Saara structure ek JSON field mein hai – isse padhna aur update karna aasan hai.

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4. Progress Collection – Simple Tracker

Progress collection ka ek document kuch aisa hoga:

```
{
  "_id": "progress_789",
  "userId": "user_456",
  "roadmapId": "roadmap_123",
  "currentModule": 1,
  "currentWeek": 1,
  "currentDay": "Tuesday",
  "completedTasks": [
    { "day": "Monday", "status": "passed" }
  ],
  "weakTopics": ["HTML tags", "attributes"],
  "examScores": [
    { "week": 1, "score": 65, "passed": false }
  ]
}
```

Jab bhi user kuch complete karta hai, hum sirf is document ko update karte hain.
Isse roadmap JSON mein changes nahi karne padte.

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5. AI Calls – Kab Honge?

- **Sirf 3 jagah AI call hogi:**

1. Jab naya roadmap generate ho raha ho (ek baar).
2. Jab user feedback maange (har baar feedback ke liye AI call).
3. Jab Sunday exam fail ho aur AI ko naye questions generate karne hain (optional).

Baaki sab (jaise progress update, task complete) **direct database** se hote hain, AI ki zaroorat nahi.

Is tarah **database load kam** rahega, kyunki:

- Roadmap sirf ek baar generate hota hai, phir wahi JSON padhte raho.
- Progress update chhoti-chhoti writes hain, MongoDB handle kar lega.
- AI calls limited hain.

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6. Production Ke Liye Optimizations (Baad Mein Kar Sakte Ho)

- **Caching:** Frequently padhe jaane wala data (jaise roadmap) agar ek hi user baar-baar load kar raha hai, to use backend mein cache kar sakte ho (memory mein ya Redis mein). Lekin shuru mein zaroori nahi.
- **Indexing:** MongoDB mein `userId` aur `roadmapId` par index bana do – queries fast ho jayengi.
- **Background Jobs:** Agar AI call slow ho, to use background mein daal do aur user ko turant "Generating..." message de do. Lekin prototype mein synchronous bhi chalega.
