USE CASES
Coding Learning Platform
Group-17

Use Case: Register New Account

Primary Actor: User

Pre-conditions

- ❖ User is not logged in.
- ❖ User has access to a valid email.

Post-conditions

User account is created.
System sends a verification email.
User can proceed after verifying their email.

Basic Flow

1) User clicks “Sign Up”.
2) The user enters their name, email, and password.
3) System validates the inputs.
4) The system creates the account with "unverified" status.
5) The system sends a verification email to the user.

Alternate Flows

Email already registered

- The system detects an existing account with the same email.
- The system shows “Email already in use”.

Weak password

- System checks password strength and rejects weak passwords.
- User is prompted to choose a stronger one.

Email service issue

- System fails to send verification email.
- System shows “Unable to send verification email. Try again”.

Use Case: Regular Email/Password Authentication

Primary Actor: User

Pre-conditions

- The user has a registered account with an email and a password.
- The user has access to the correct email if a verification link is required.
- The user is not already logged in.

Post-conditions

- The user is logged in, and a session/token is created.
- If the email was unverified, verification is completed after the link is clicked.
- On failure, the user remains unauthenticated.

Basic Flow

1) The user enters their email and password and clicks "Login."
2) The system validates the credentials.
3) If the user's email is verified, the system logs the user in and redirects to the dashboard.
4) If the email is not verified:
   a. The system sends a verification link to the user's email.
   b. The user clicks the link.
   c. The system marks the email as verified and logs the user in.

Alternate Flows

1) Incorrect email or password

- The system detects invalid credentials.
- The system shows an error message and stays on the login page.

2) Email not verified & user does not click the link

- The system sends a verification link.
- User ignores or fails to click the link.
- The system does not authenticate the user.

3) The verification link has expired or is invalid

- User clicks an invalid/expired link.
- The system shows "Link expired/invalid" and offers to resend the verification email.
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Use Case: Forgot Password

Primary Actor: User

Pre-conditions

- ❖ User has an existing registered account.
- ❖ User knows their registered email.

Post-conditions

- ❖ System sends a password reset link to the user's email.
- ❖ User can reset their password using the link.
- ❖ On failure, no reset action is performed.

Basic Flow

1) User clicks "Forgot Password" on the login page.
2) User enters their registered email.
3) System sends a password reset link to that email.
4) User opens the link and sets a new password.
5) System confirms password reset and allows login with the new password.

Alternate Flows

Email not registered

- System checks email, finds no matching account.
- System shows "No account found with this email."

Email service failure

- System fails to send the reset email.
- System displays "Unable to send reset link. Try again later."

Reset link expired/invalid

- User clicks expired or invalid reset link.
- System shows "Link expired" and offers to resend.

Use Case: Verify Account via Email

Primary Actor: User

Pre-conditions

- ❖ User has created an account but is not yet verified.
- ❖ User has received the verification email.

Post-conditions

- ❖ User's account is marked as verified.
- ❖ User can log in normally after verification.
- ❖ On failure, account remains unverified.

Basic Flow

1) User opens their email and clicks the verification link.
2) System validates the verification token.
3) System marks the user's account as verified.
4) System redirects the user to login page with a success message.

Alternate Flows

Verification link expired or invalid

- System rejects the token.
- System shows "Verification failed" and offers to resend.

User already verified

- System sees the account is already verified.
- System redirects to login with a message "Account already verified".

Email not received

- User cannot find the verification email.
- User clicks "Resend verification email" on signup/login page.

Use Case: Authenticate with Google OAuth

Primary Actor: User

Pre-conditions

- ❖ User has a Google account.
- ❖ The platform has Google OAuth configured (client ID, secret, redirect URI).
- ❖ User is not already logged in.

Post-conditions

- ❖ User is logged in, and a session/token is created.
- ❖ If first-time login, a new user account is created.
- ❖ On failure, user remains unauthenticated.

- ❖ Basic Flow

1) User clicks "Sign in with Google".
2) The system redirects user to Google's OAuth consent page.
3) User selects their Google account and grants permission.
4) Google redirects back with an authorization code.
5) The system exchanges the code for tokens and verifies user identity.
6) The system creates (or finds) the user account.
7) the system logs the user in and redirects to the dashboard.

Alternate Flows

1) User cancels Google sign-in

- Google returns an error.
- the system shows “Sign-in cancelled” and returns to login page.

2) Token exchange/verification fails

- the system cannot validate Google tokens.
- the system shows an error message and rejects login.

3) Existing email with another auth method

- the system detects an account with same email but different login method.
- the system asks user toThe useruser in using the original method or link accounts.

Use Case: Generate Personalized Learning Roadmap

Primary Actor: User

Pre-conditions

- User provides a topic or prompt (e.g., “Frontend Development”, “DSA”, “ML”).
- User selects their skill level (Beginner / Intermediate / Advanced).

Post-conditions

- the system generates a structured roadmap with modules and chapters.
- Roadmap is displayed to the user or saved to their profile.
- On failure, no roadmap is created.

Basic Flow

1) User enters a prompt/topic for which they want a roadmap.
2) User selects their current skill level.
3) the system processes the input and prepares a tailored learning structure.
4) The system generates module-wise and chapter-wise breakdowns.
5) The system displays the final roadmap to the user.

Alternate Flows

1) No prompt entered

- User submits empty or invalid input.
- the system shows “Please enter a topic” and asks user to try again.

2) Internal generation error

- the system fails to generate roadmap due to server/AI failure.

- the system displays an error and suggests retrying.

Use Case: Summarize Chapter & Generate Quiz

Primary Actor: User

Pre-conditions

- ❖ A roadmap with modules and chapters has already been generated.
- ❖ User is viewing a specific module or chapter.

Post-conditions

- ❖ the system displays a chapter summary OR generates a quiz based on the chapter's content.
- ❖ On failure, no summary/quiz is produced.

Basic Flow

1) user selects a chapter from the generated roadmap.
2) The user clicks either "Summarize Chapter" or "Generate Quiz."
3) The the system processes the chapter content.
4) the system returns:
5) a. A concise summary of the selected chapter, OR
6) b. A quiz (MCQs) derived from the chapter.
7) The the system displays the result to the user.

Alternate Flows

Quiz generation failure

- the system fails to generate quiz (model error).
- The the system shows an error and suggests retrying.

Summary generation failure

- The the system cannot produce a summary due to an internal error.
- The the system displays an error message.

Use Case: Take & Download Notes

Primary Actor: User

Pre-conditions

- ❖ The user is viewing a generated roadmap or chapter.
- ❖ The notes feature is available.

Post-conditions

- ❖ Notes are saved and stored for the selected chapter.
- ❖ The user can download the notes as a file.
- ❖ On failure, notes are not saved or exported.

Basic Flow

1) The user selects a chapter.
2) The user types notes in the notes editor.
3) The the system autosaves or saves notes when requested.
4) The user clicks “Download Notes.”
5) The system generates a downloadable notes file and provides it to the user.

Alternate Flows

1) Notes save error

- The the system fails to save notes.
- the system shows an error and prompts retry.

2) Empty notes on download

- User clicks “Download Notes” with no content.
- the system shows “No notes to download”.

Use Case: Fetch Relevant Videos & Articles

Primary Actor: User

Pre-conditions

- ❖ The user is viewing a generated roadmap or chapter.
- ❖ The the system has access to YouTube/article APIs or internal search tools.

Post-conditions

- ❖ The the system displays a list of relevant videos and articles.
- ❖ On failure, resources are not shown.

1) Basic Flow
2) The user selects a chapter.
3) The user clicks “Fetch videos” or “Fetch articles.”
4) The the system extracts keywords from the chapter/topic.
5) The the system fetches relevant YouTube videos and articles.
6) The the system displays the list of resources to the user.

Alternate Flows

no results found

- External APIs return empty results.

- The the system shows “No resources found.”

API failure or network error
- The the system cannot fetch results due to an error.
- The the system shows “Unable to fetch resources. Try again later.”

Use Case: Code in Built-in IDE & Analyze Complexity

Primary Actor: User

Pre-conditions
- ❖ User is on the coding practice page.
- ❖ IDE is loaded and ready.
- ❖ Auto language detection is functional.

Post-conditions
- ❖ User can run code in the IDE.
- ❖ the system detects the language automatically.
- ❖ the system generates time and space complexity analysis when requested.
- ❖ On failure, code or analysis is not executed.

Basic Flow
1) User opens the built-in IDE.
2) User writes or pastes code.
3) the system auto-detects the programming language.
4) User clicks “Run”.
5) the system executes the code and displays output/errors.
6) User clicks “Analyze Time Complexity” or “Analyze Space Complexity”.
7) the system analyzes the code and displays complexity results.

Alternate Flows

Language detection fails
- the system cannot identify the language.
- the system shows “Unable to detect language”.

Code compilation/runtime error
- the system encounters an error during execution.
- Error is displayed in the output panel.

Complexity analysis fails
- the system cannot analyze the code (unsupported language, malformed code).
- the system shows “Analysis unavailable for this code”.

Empty editor

- User tries to run or analyze without entering code.
- the system shows “Please enter code first”.

Use Case: Ask Questions via AI Chatbot

Primary Actor: User

Pre-conditions

- ❖ User is on the roadmap/chapter display page.
- ❖ AI chatbot service is available and running.

Post-conditions

- ❖ the system provides answers or guidance based on the user’s questions.
- ❖ Chat history may be saved depending on platform rules.
- ❖ On failure, no response is provided.

Basic Flow

1) User opens a chapter from the generated roadmap.
2) User clicks the “Ask AI” or “Chat with Assistant” button.
3) Chatbot interface opens on the same page.
4) User types a question related to the topic, chapter, or learning path.
5) the system processes the question using the AI model.
6) the system returns a helpful response or explanation.
7) User continues chatting or closes the chatbot window.

Alternate Flows

AI service unavailable

- the system cannot reach the AI model.
- The system shows “Chatbot currently unavailable. Try again later.”

User sends an empty question

- User submits an empty input.
- The system prompts, “Please enter a question.”

Irrelevant or unsupported query

- AI cannot provide an answer (out-of-scope request).
- The system replies with a fallback message or guidance.

Use Case: View Dashboard & Track Roadmap Progress

Primary Actor: User

Pre-conditions

- ❖ User is logged in.
- ❖ The user has generated at least one roadmap in the past.

Post-conditions

- ❖ The system displays all previously generated roadmaps.
- ❖ The system shows progress tracking for each roadmap.
- ❖ On failure, dashboard data is not displayed.

Basic Flow

1. User navigates to the Dashboard.
2. The system fetches all roadmaps previously generated by the user.
3. The system displays each roadmap with progress indicators (modules/chapters completed).
4. User selects a roadmap to view details or continue learning.
5. The system opens the selected roadmap at the appropriate module/chapter.

Alternate Flows

User has no previous roadmaps

- Dashboard loads with an empty state.
- The system shows “No roadmaps created yet” and offers a button to generate one.

Data fetch error

- The system fails to fetch stored roadmaps.
- The system shows “Unable to load dashboard” and suggests retrying.

Progress data corrupted or incomplete

- The system detects missing/invalid progress data.
- The system shows partial data or prompts the user to regenerate progress.

User not logged in

- User attempts to access the dashboard while logged out.
- The system redirects to the login page.