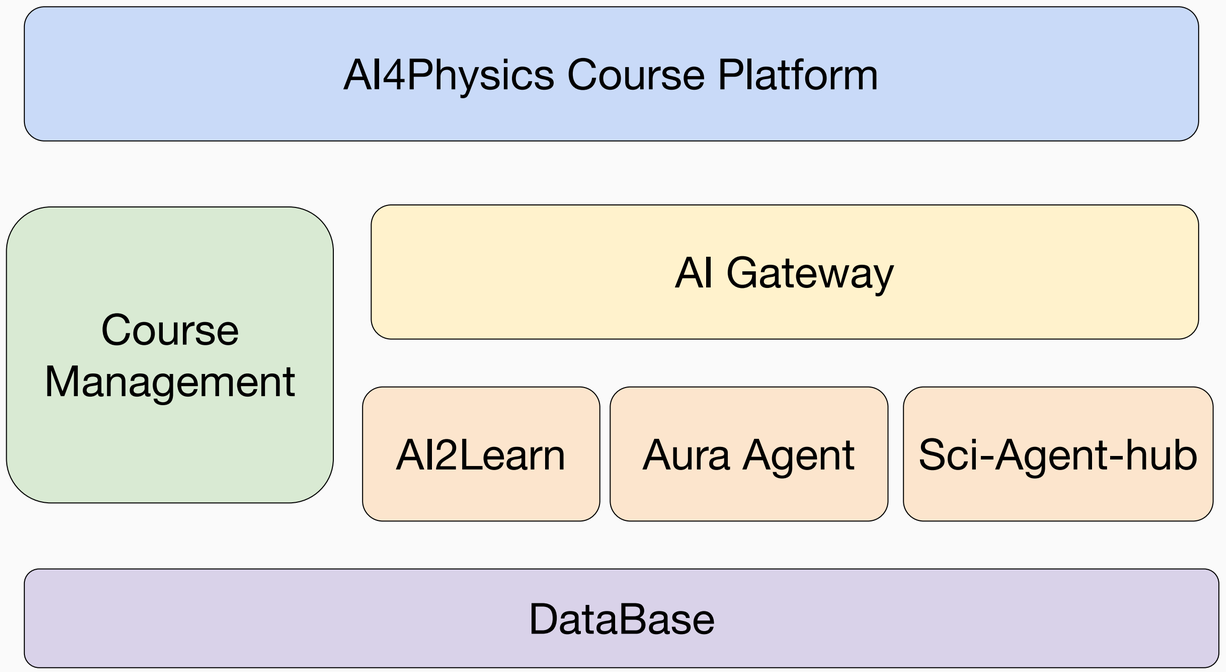
An AI Agent Platform for Teaching Assistance and Research Training in the AI4Physics Innovation Laboratory

Zhu Chen

2026.5.27

An AI4Physics Platform Integrated with AI Services




```
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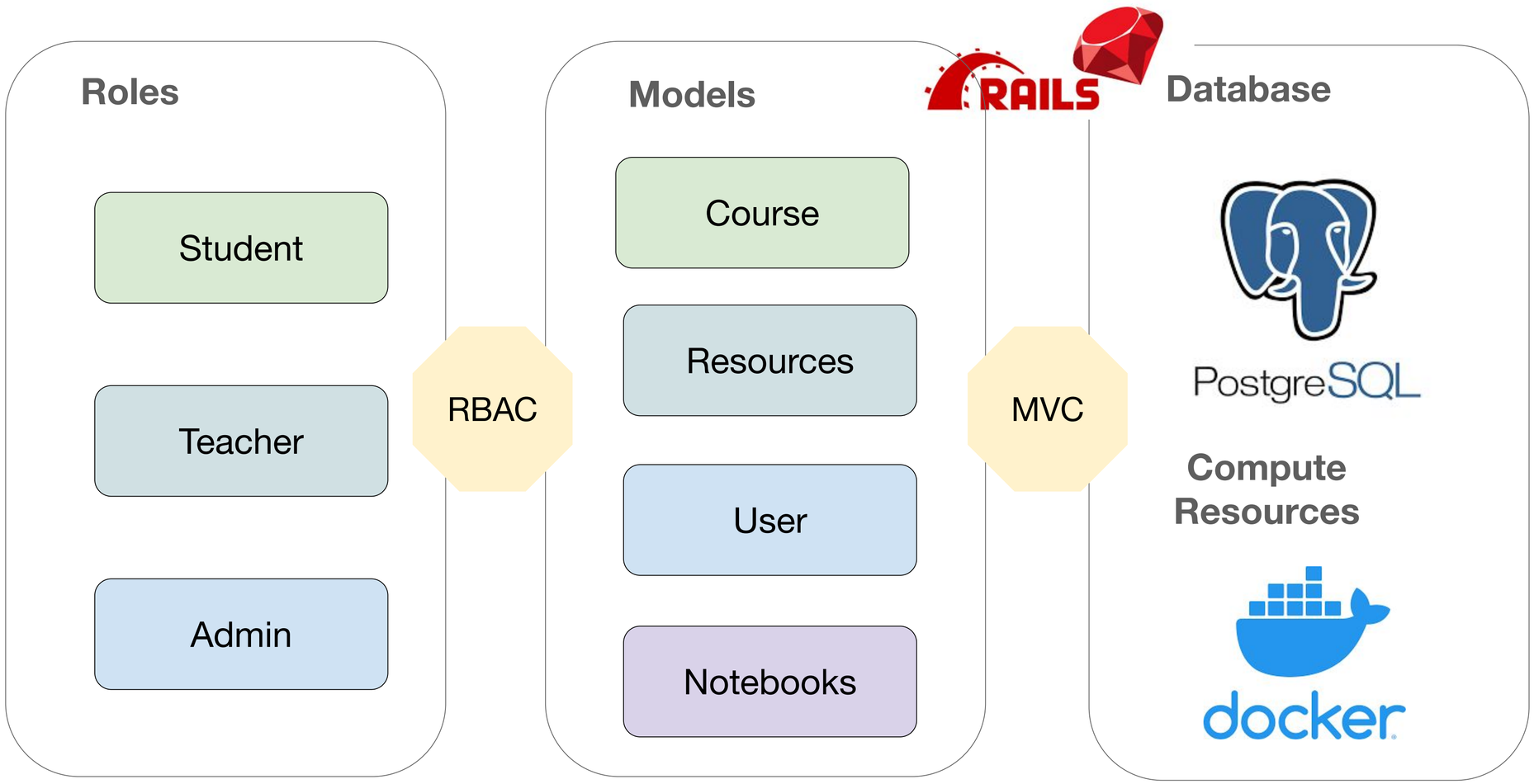
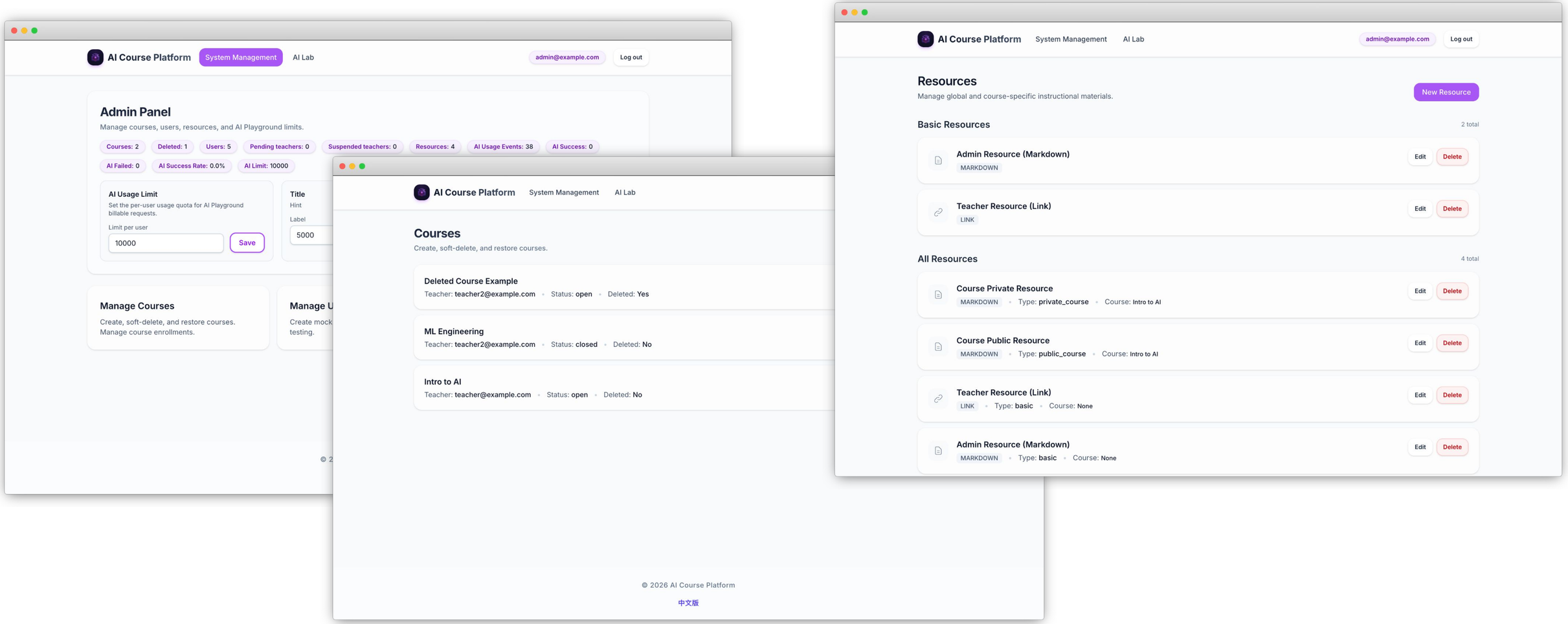
bin/routes_demonstrate
/admin
/admin/courses
/admin/resources
/admin/users
/ai_playground
/ai_playground/aura_agent
/ai_playground/chat
/ai_playground/history
/ai_playground/ideation
/ai_playground/library
/ai_playground/literature_review
/ai_playground/paper_qa
/ai_playground/paper_review
/ai_playground/resources2UI
/dashboard
/dashboard/student
/dashboard/student/courses
/dashboard/student/notebooks
/dashboard/student/resources
/dashboard/teacher
/dashboard/teacher/courses
/dashboard/teacher/resources
/login
/presentation
/register
```

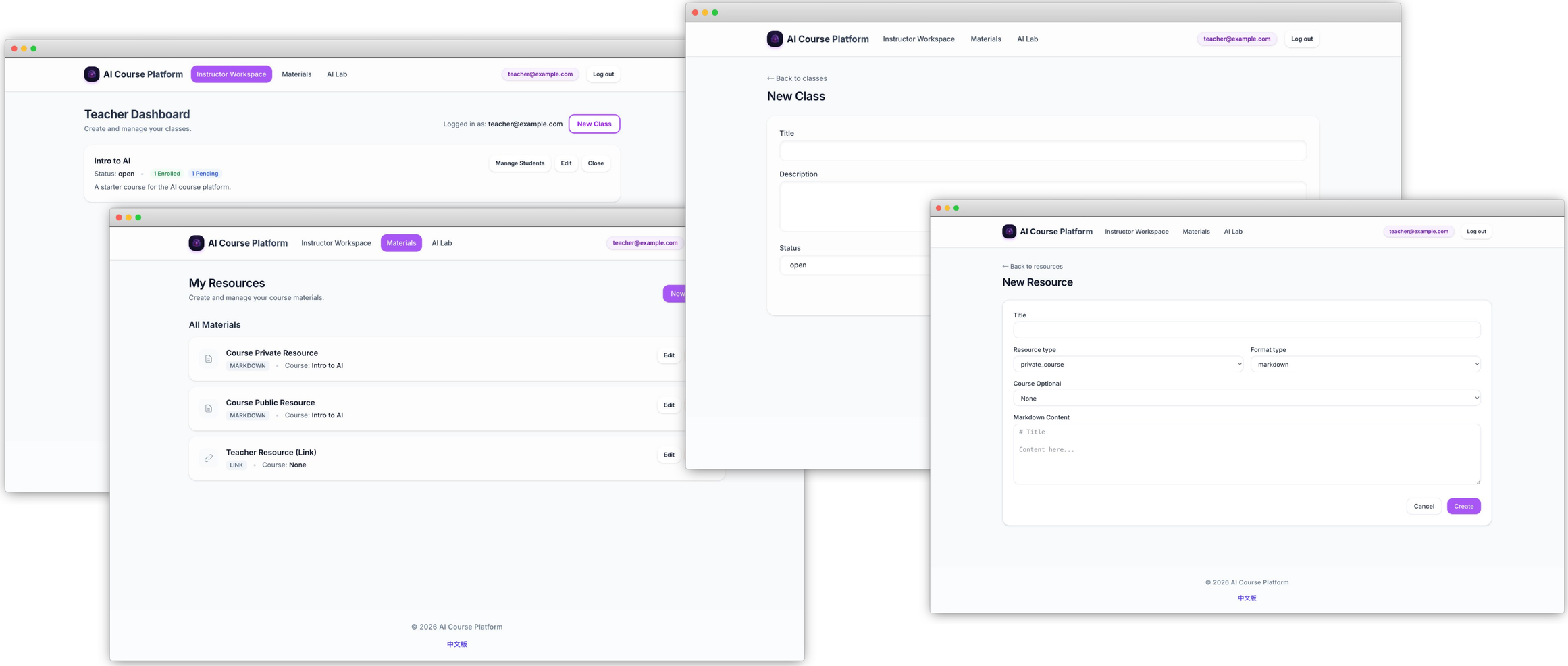
LCMS: Learning Content Management System



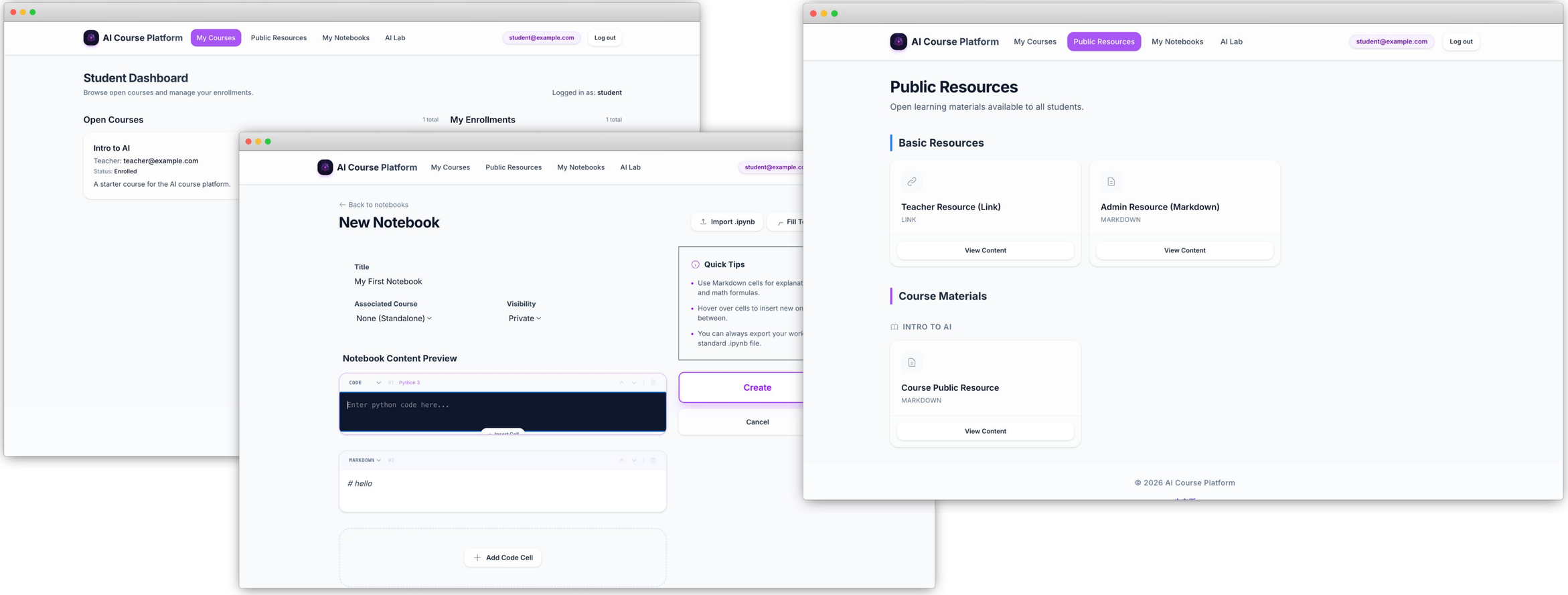
RBAC: Admin


AI Course Platform
System Management
AI Lab
admin@example.com
Log out
Admin Panel
Manage courses, users, resources, and AI Playground limits.
Courses: 2
Deleted: 1
Users: 5
Pending teachers: 0
Suspended teachers: 0
Resources: 4
AI Usage Events: 38
AI Success: 0
AI Failed: 0
AI Success Rate: 0.0%
AI Limit: 10000
AI Usage Limit
Set the per-user usage quota for AI Playground billable requests.
Limit per user
10000
Save
Manage Courses
Create, soft-delete, and restore courses.
Manage course enrollments.
Courses
Create, soft-delete, and restore courses.
Deleted Course Example
Teacher: teacher2@example.com • Status: open • Deleted: Yes
ML Engineering
Teacher: teacher2@example.com • Status: closed • Deleted: No
Intro to AI
Teacher: teacher@example.com • Status: open • Deleted: No
© 2026 AI Course Platform
中文版
Resources
Manage global and course-specific instructional materials.
New Resource
Basic Resources
2 total
Admin Resource (Markdown)
MARKDOWN
Edit
Delete
Teacher Resource (Link)
LINK
Edit
Delete
All Resources
4 total
Course Private Resource
MARKDOWN • Type: private_course • Course: Intro to AI
Edit
Delete
Course Public Resource
MARKDOWN • Type: public_course • Course: Intro to AI
Edit
Delete
Teacher Resource (Link)
LINK • Type: basic • Course: None
Edit
Delete
Admin Resource (Markdown)
MARKDOWN • Type: basic • Course: None
Edit
Delete

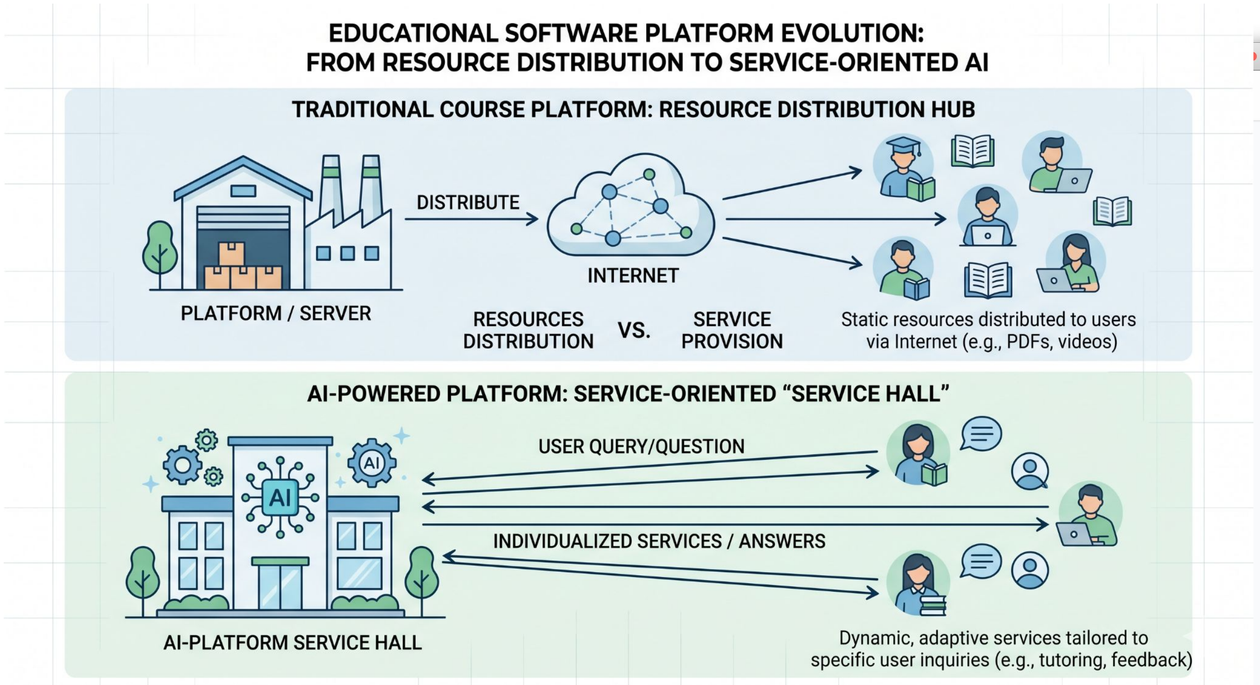
RBAC: Teacher

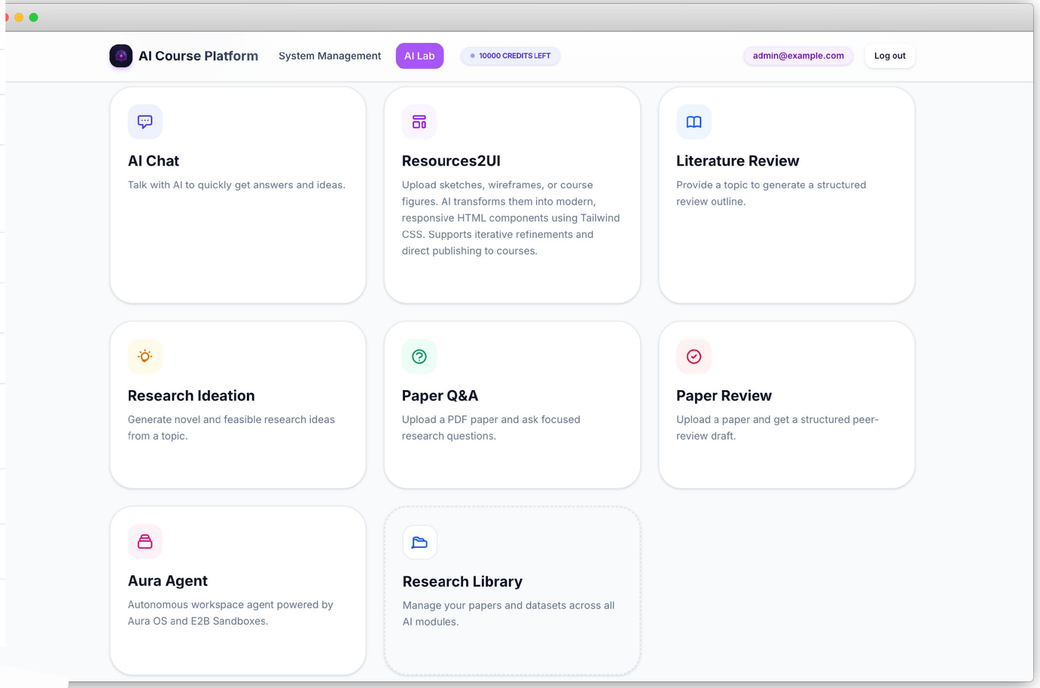


RBAC: Student



LSMS: Learning Service Management System





NotebookLM

Course Platform | Sci-Agent-hub | A2learn | Aura OS

Customize toolkits for Scientific Research

Tool layer

- ShellCommand
- FileSystemTool
- UnpallwallTool
- SemanticTool

LLM layer

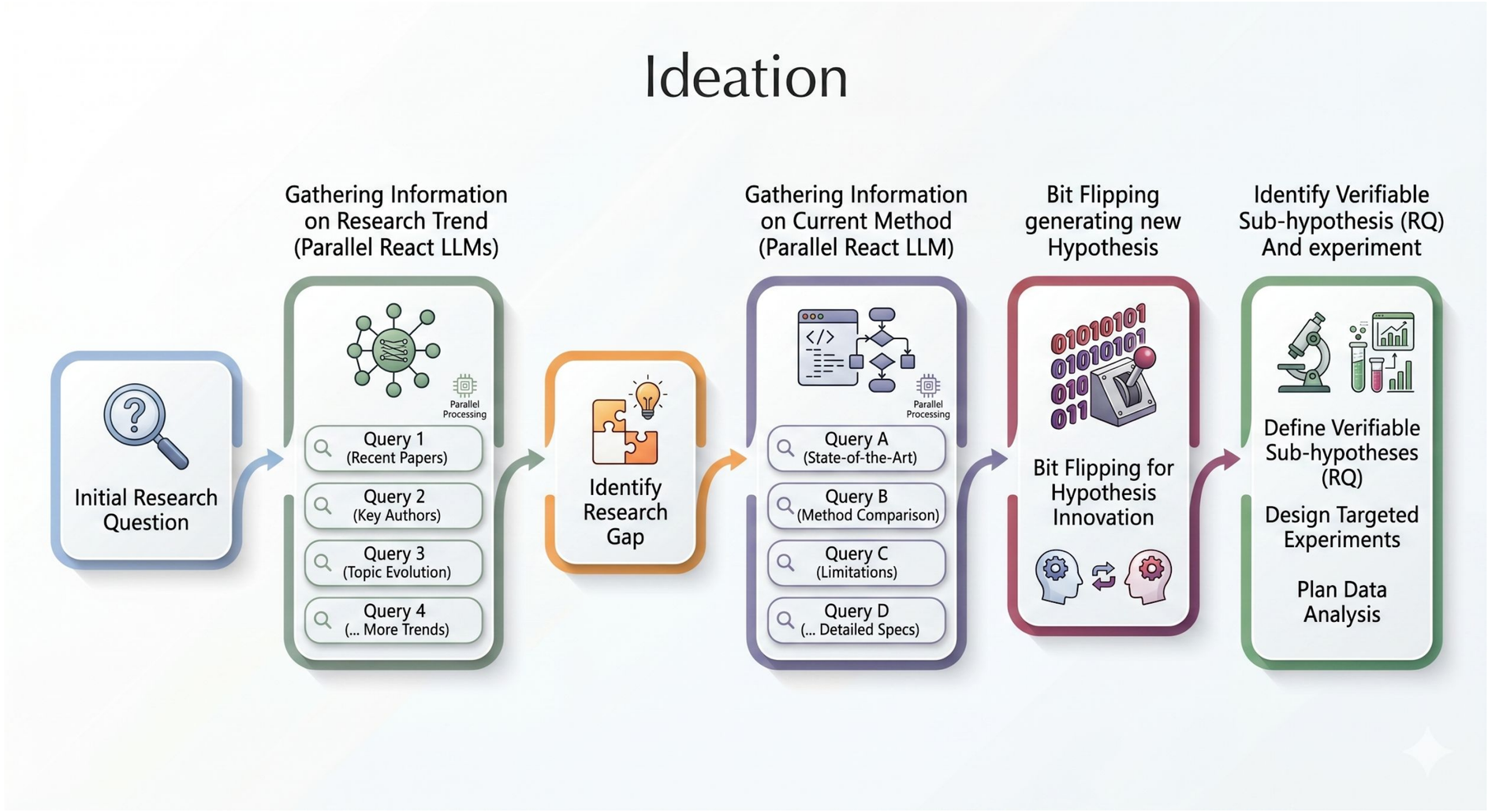
- call_llm
- call_agent
- call_parrallel_agent
- call_parrellel_search

Multi-agent Layer

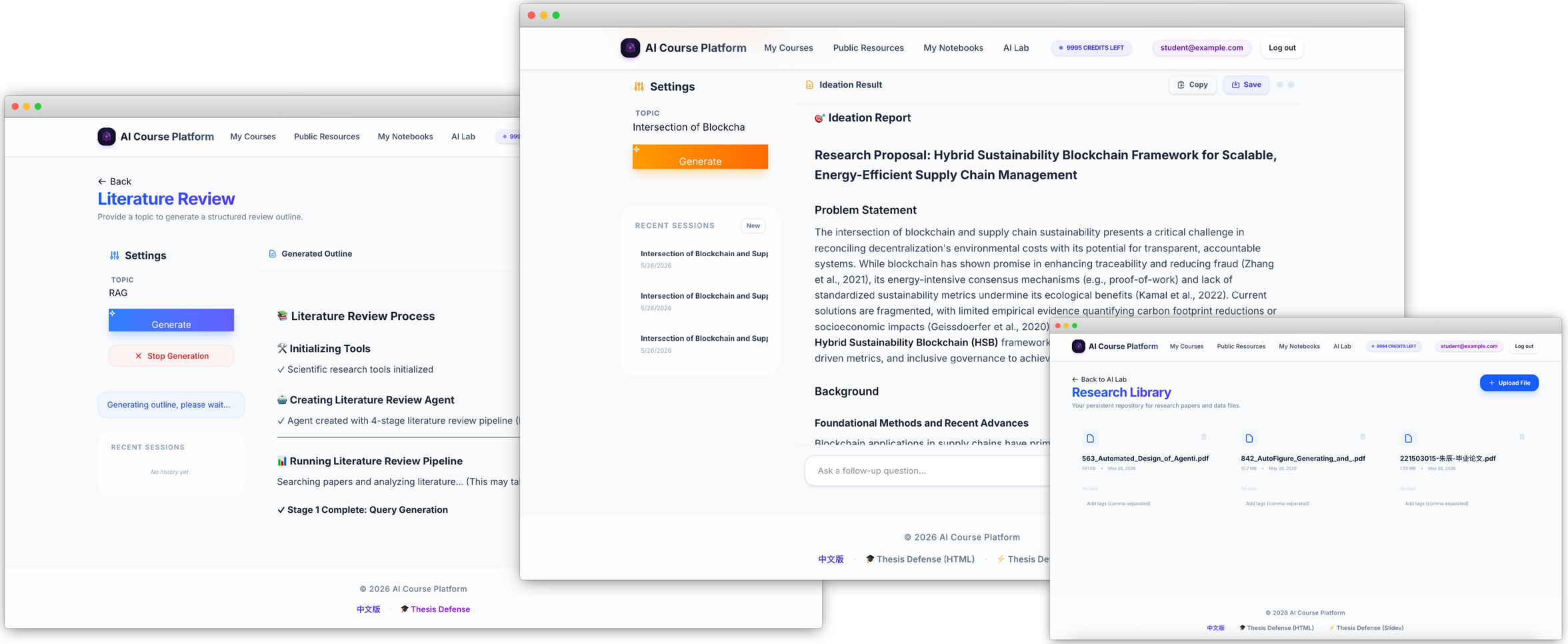
- Ideation
- Literature_review
- Paper_review
- PaperQA

Stream Output

Ideation Pipeline



AI Service Layer



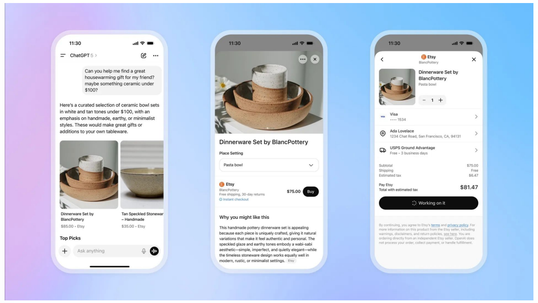
Three Ways for Generative UI with ai agent

Controlled GenUI

- useComponent as a tool

1. Pre-built Components
2. High Predictability

Openai Shopping
ACP
MCP Apps



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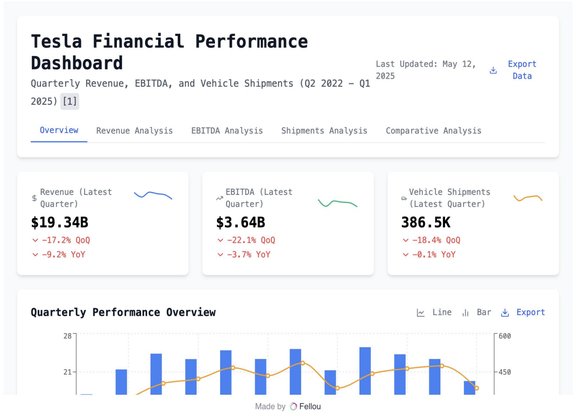
Declarative GenUI

- Agent - DOM - UI

1. Schema-Driven
2. Balanced Flexibility
3. Dynamic Adaptation

Fellow.ai



Open GenUI

- AI agent Generate html and run in sandbox

1. Code-on-the-Fly
2. Ultimate Flexibility
3. Design & Security Risks

Generate UI for application

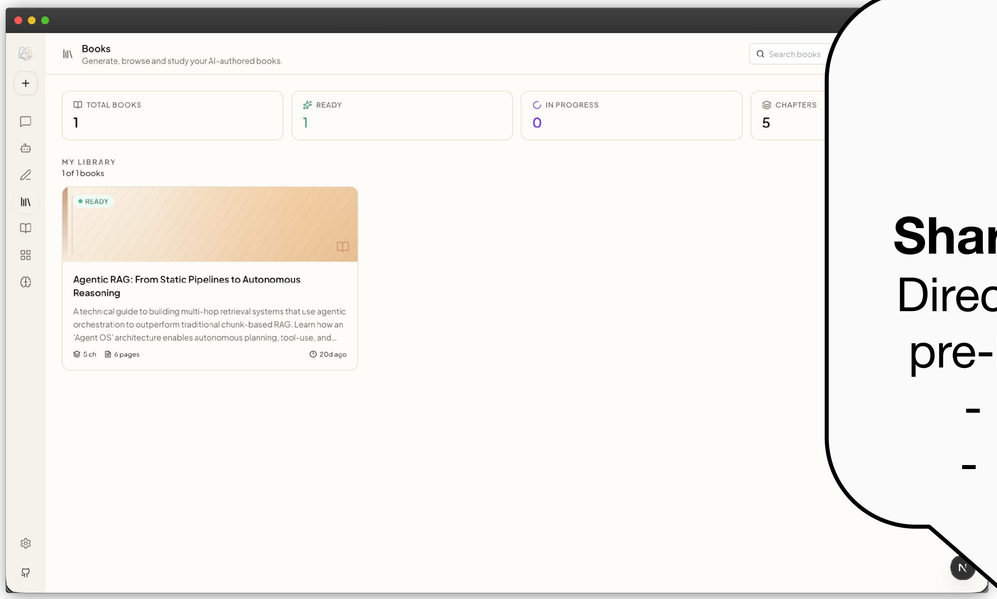
Lovable

Vercel

Current Method in Interactive Learning Material Generation— Open GenUI

DeepTutor

Interactive Book Mode



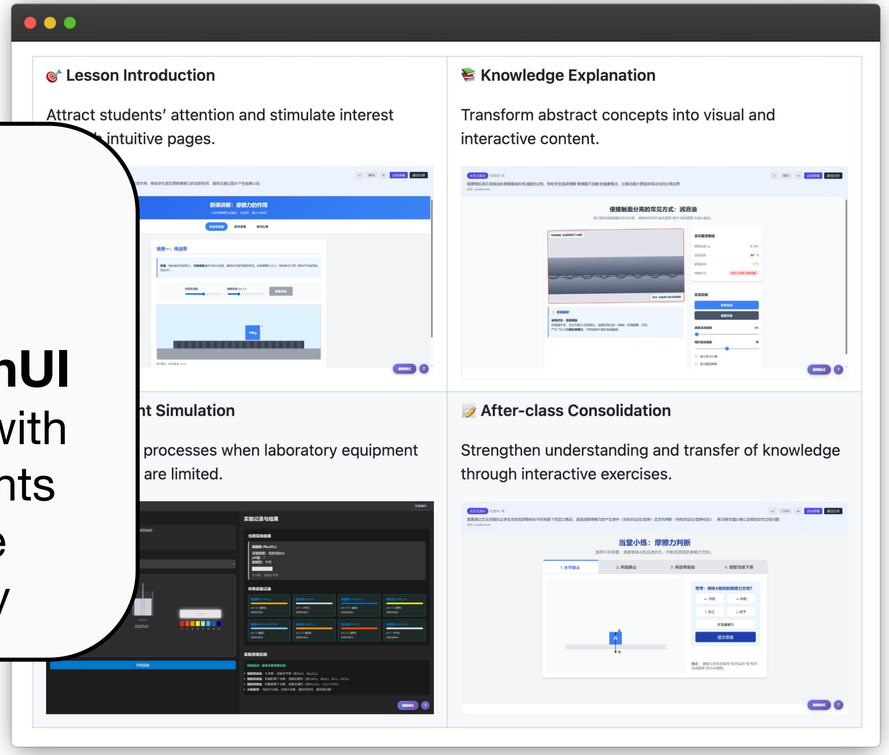
HTML

Shared Open GenUI

Directly write html with pre-built components

- Uncontrollable
- Hard to Modify

OpenMAIC

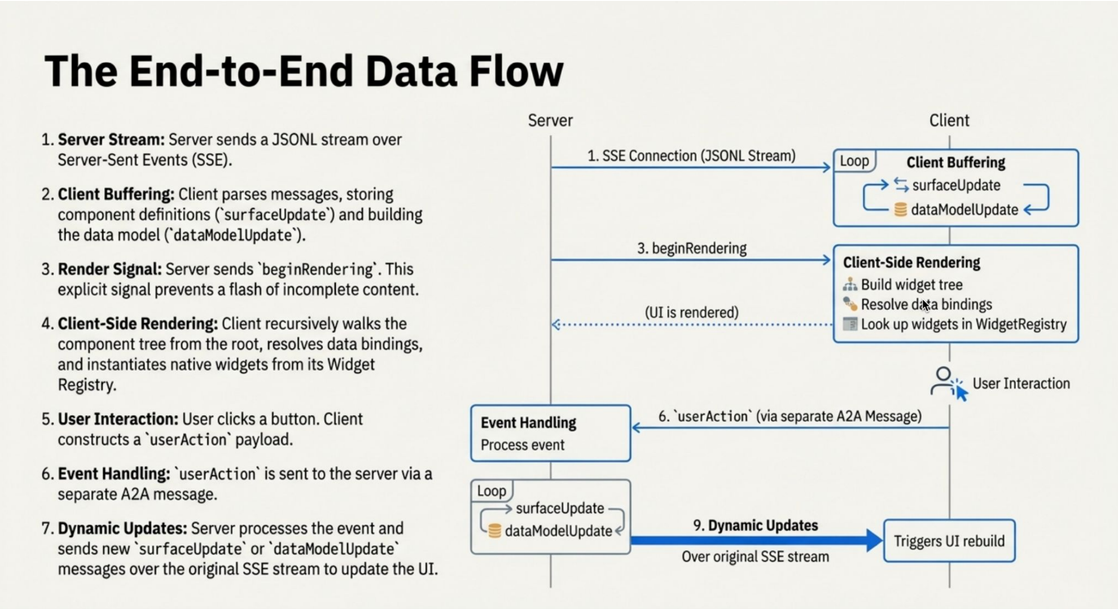


Zhao, B., et al. (2026). DeepTutor: Towards agentic personalized tutoring. *arXiv:2604.26962*.

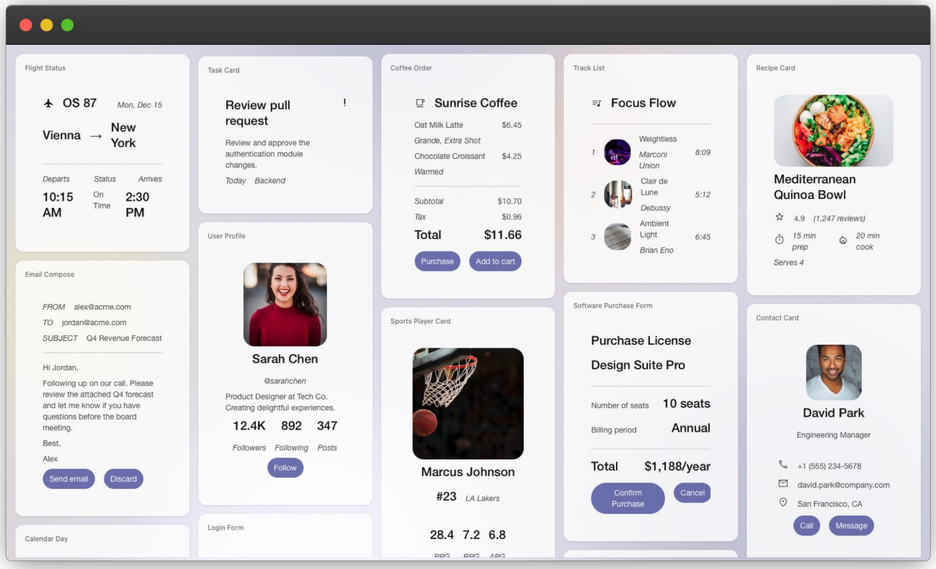
Tu, S., et al. (2026). MAIC-UI: Making interactive courseware with generative UI. *arXiv:2604.25806*.

Google's A2UI Protocol

1. **A2UI** uses a declarative JSON format with a flat adjacency list structure, making it highly optimized for LLMs to generate UI components incrementally without error-prone tree nesting.
2. The protocol strictly decouples UI components from application data, enabling efficient, real-time data binding and streaming progressive rendering via JSONL or SSE.
3. By restricting AI agents to a pre-approved native widget catalog instead of executable code, **A2UI** ensures cross-platform look-and-feel while eliminating the security risks of arbitrary code execution.

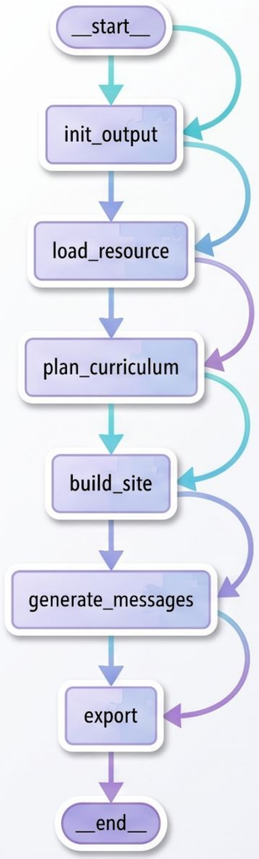


A2UI Framework

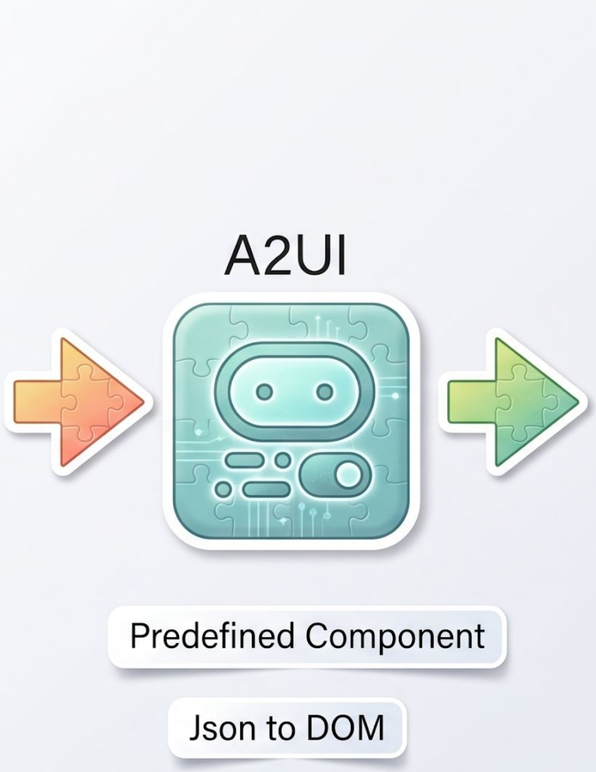


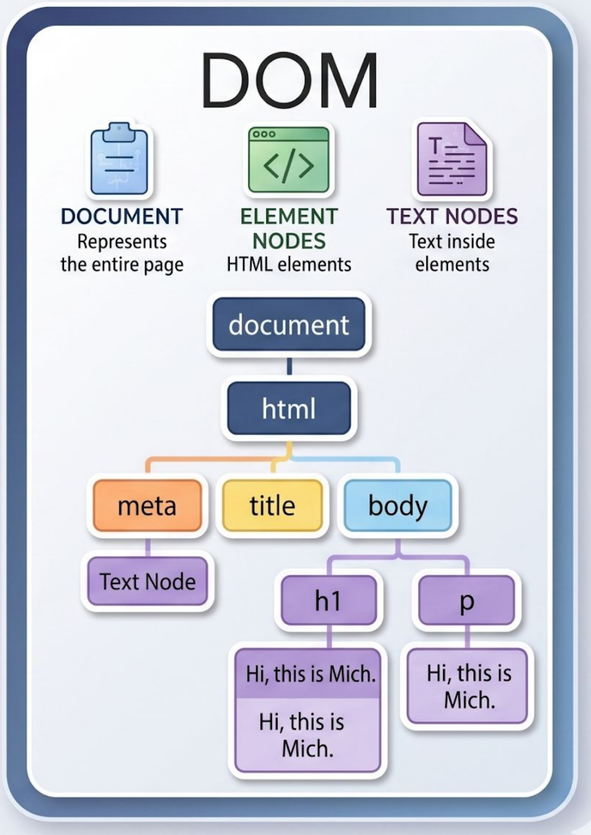
Predefined Component Gallery

A2Learn Pipeline



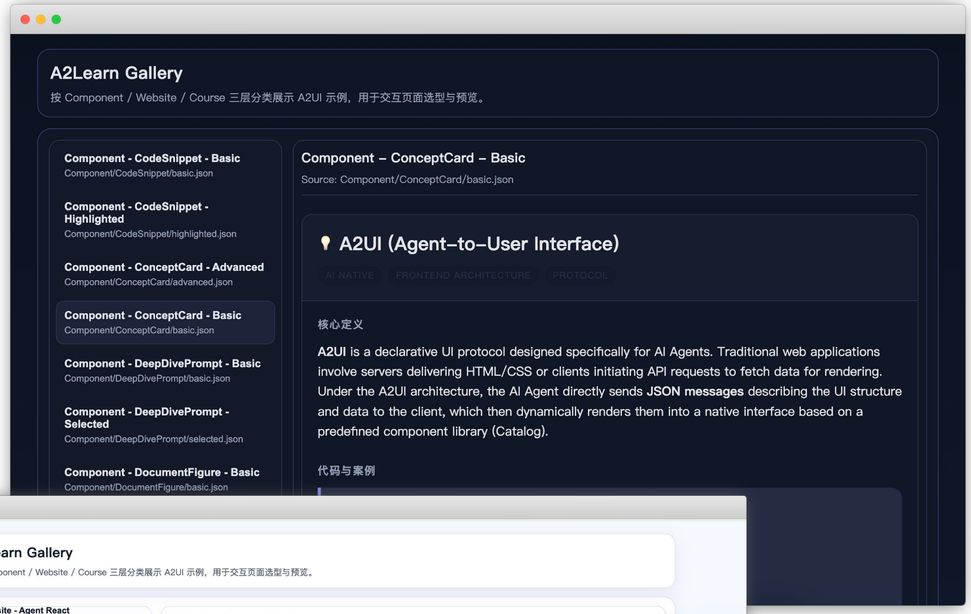
Just in time(JIT): UpdateComponent

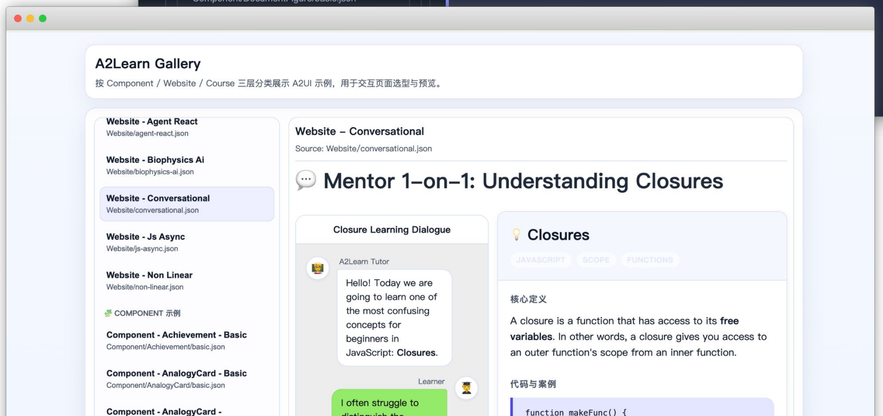




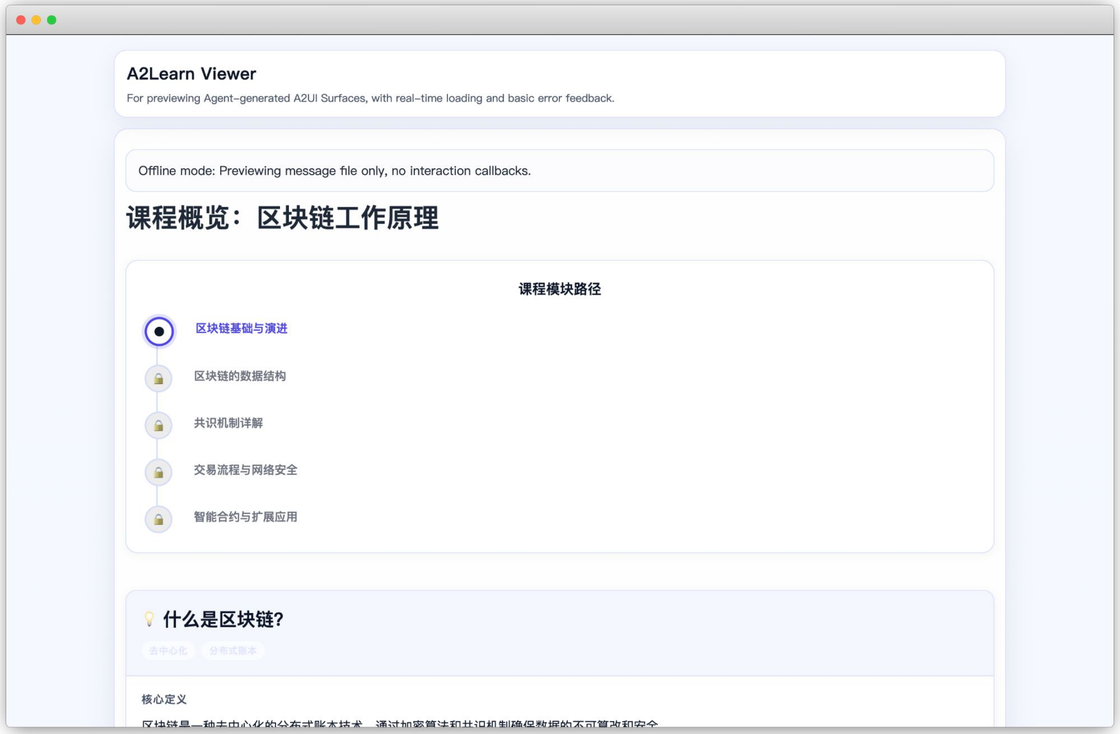
A2Learn Pipeline

Gallery for Component






```
(base) frank@zhuchens-MacBook-Pro A2Learn % bash start.sh --text "Explain how blockchain works"
```



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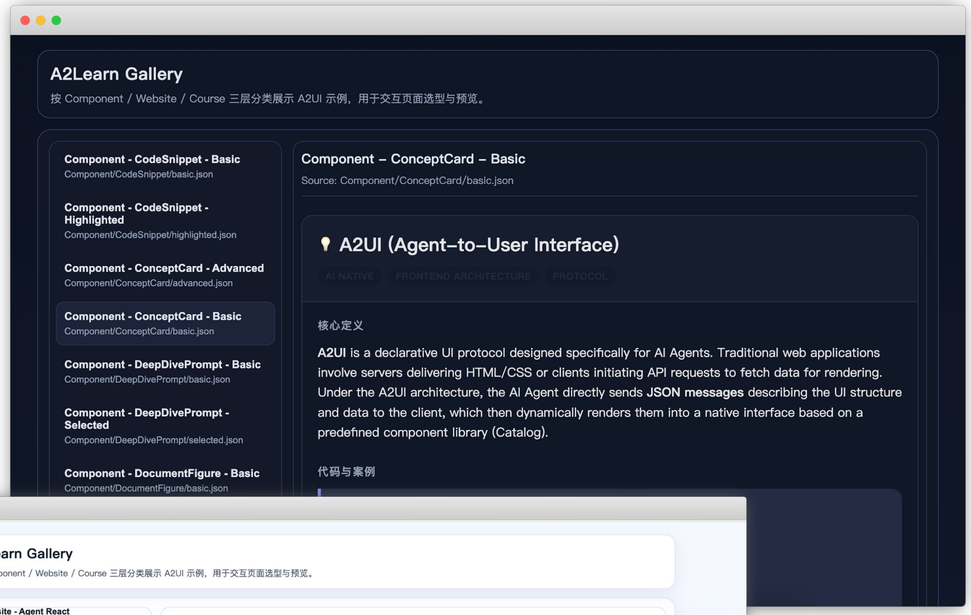

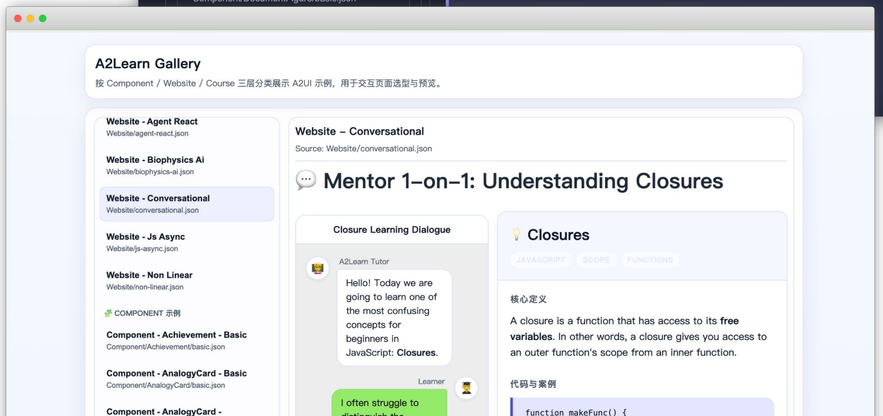


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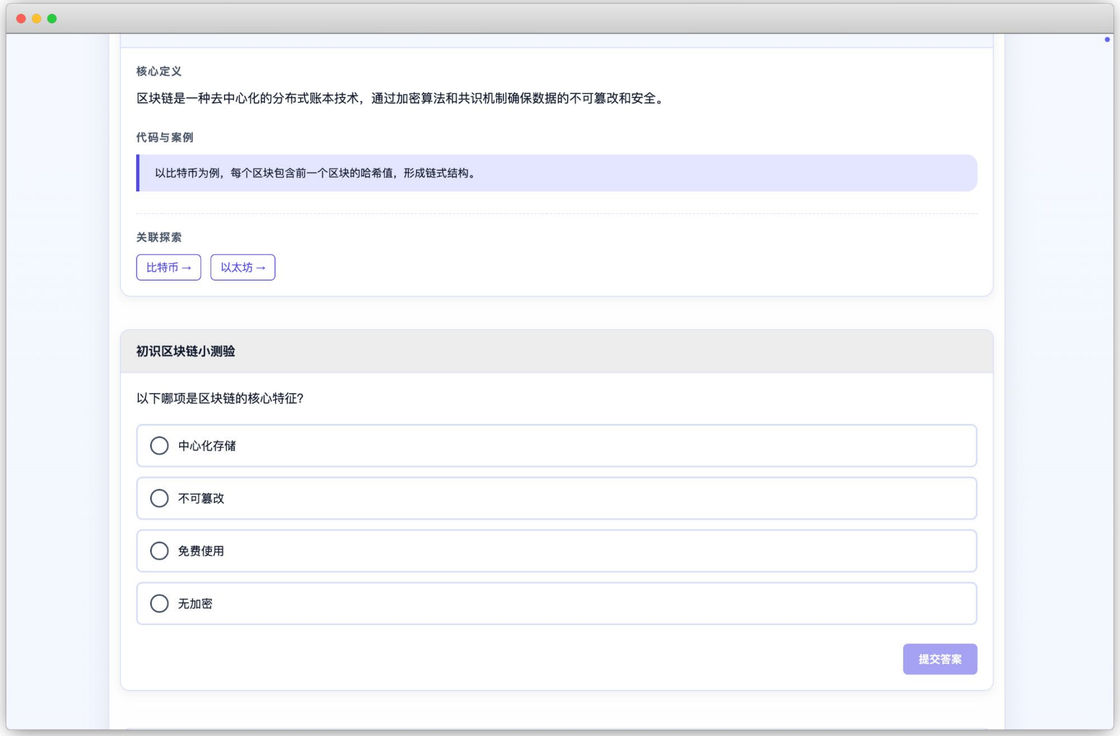
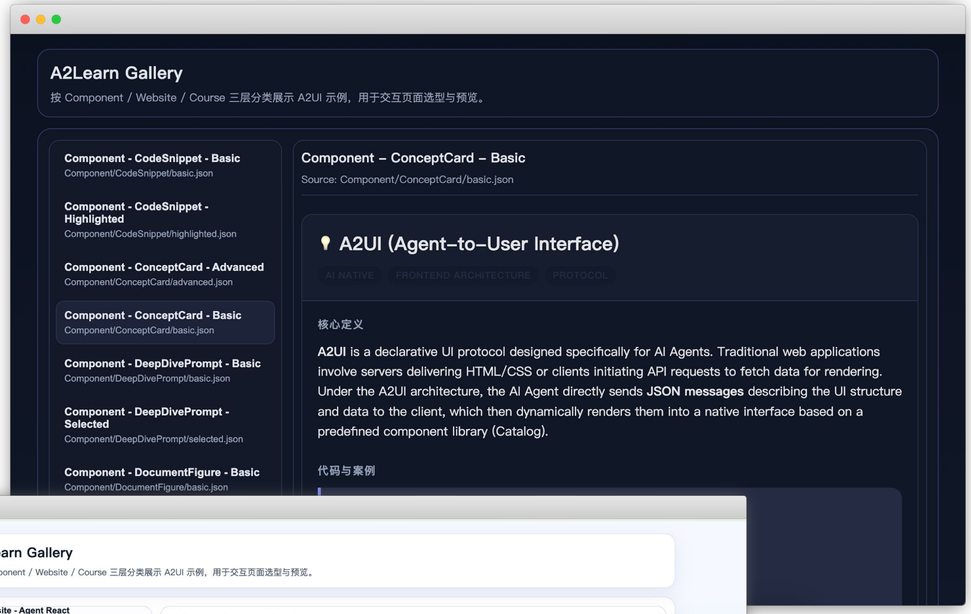
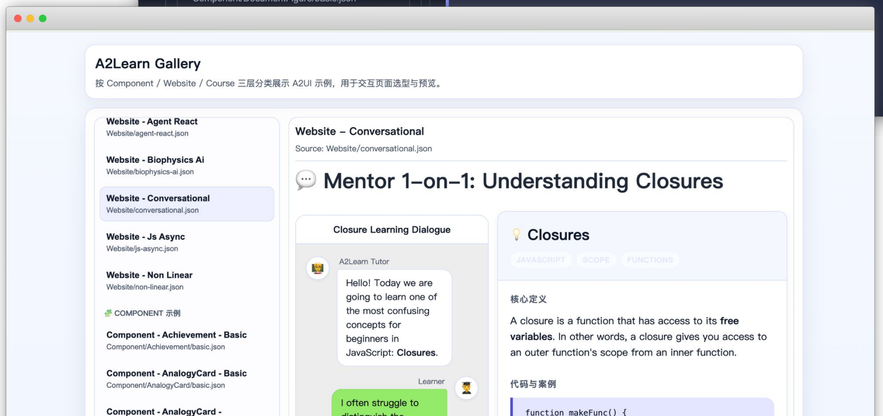


A2Learn Pipeline

Gallery for Component



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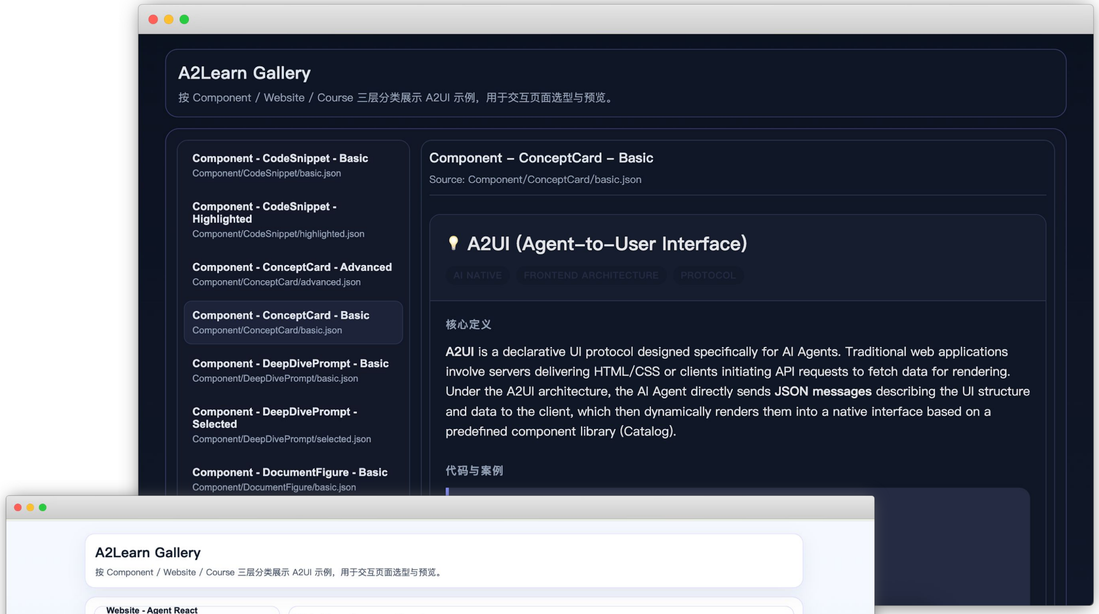

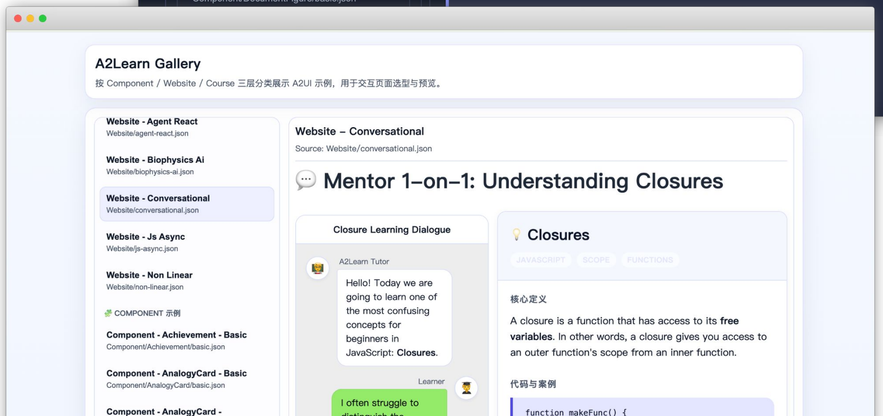


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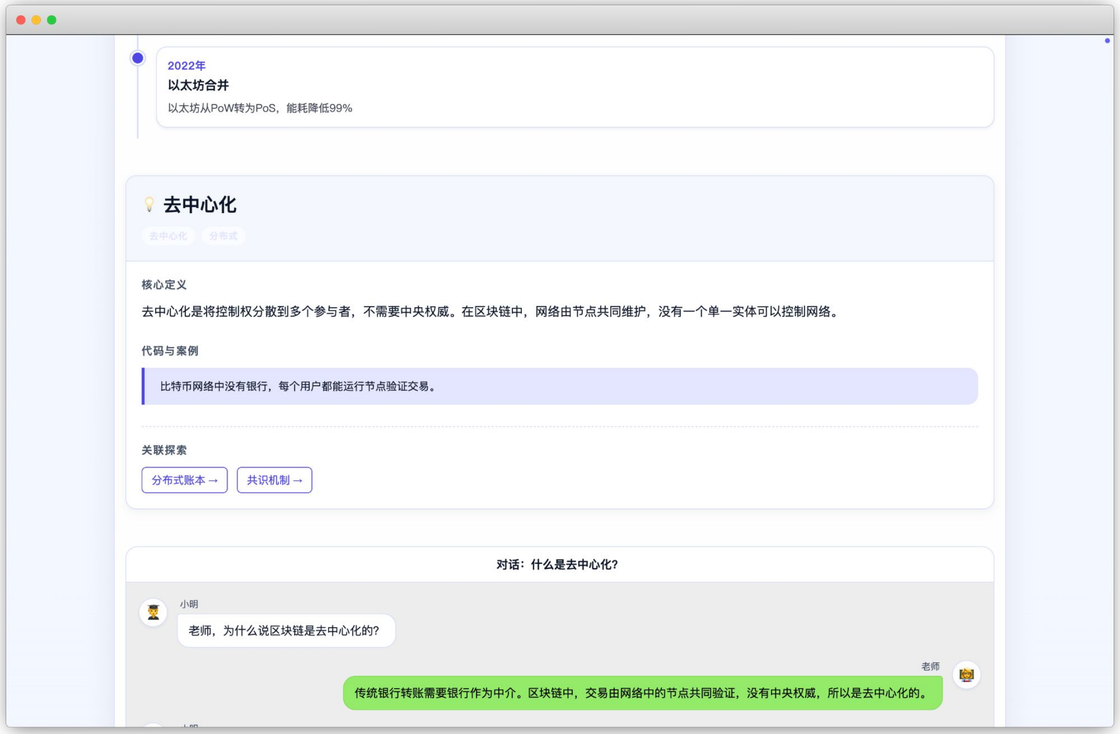
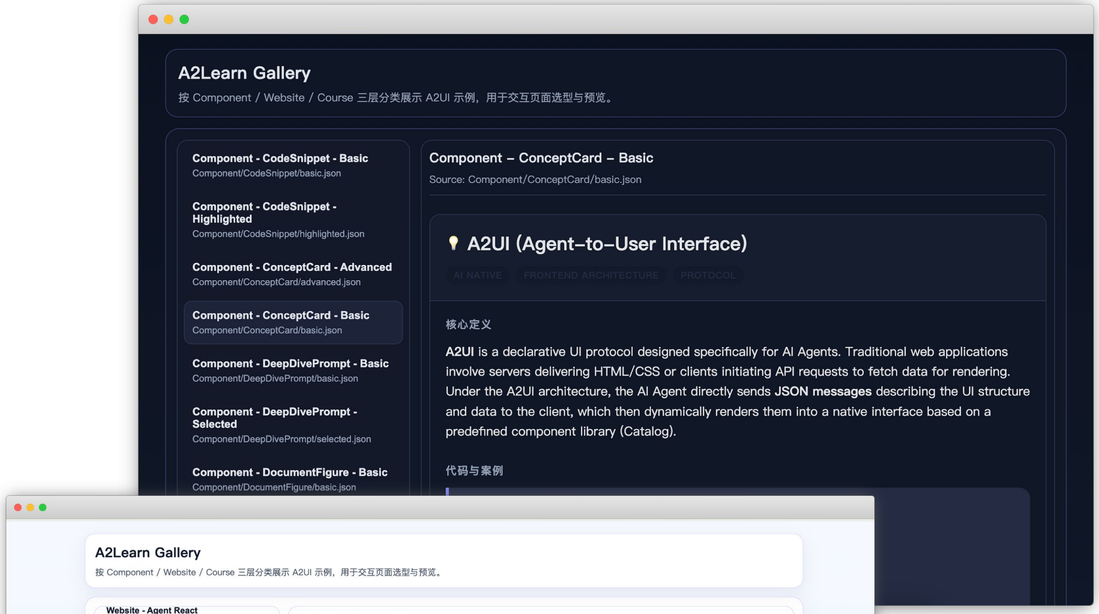
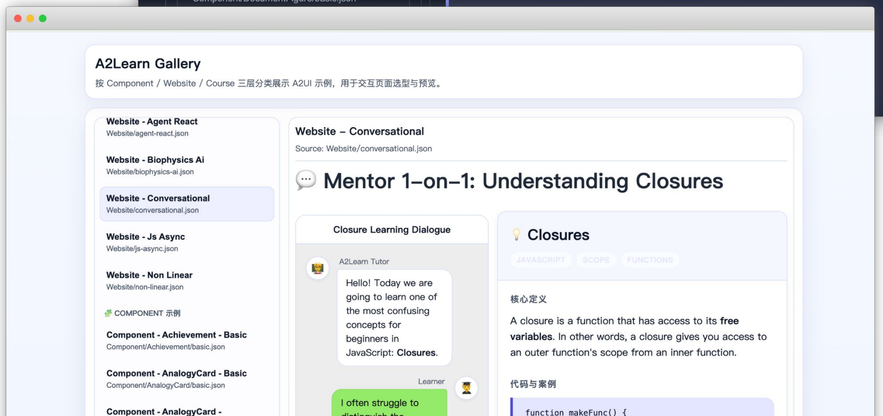


A2Learn Pipeline

Gallery for Component



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A2Learn Pipeline

Gallery for Component

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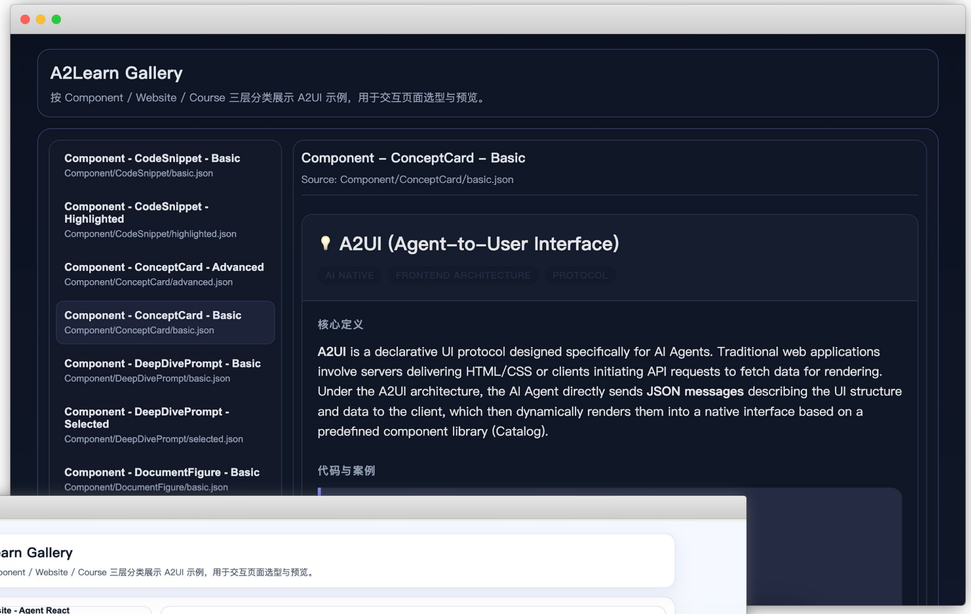

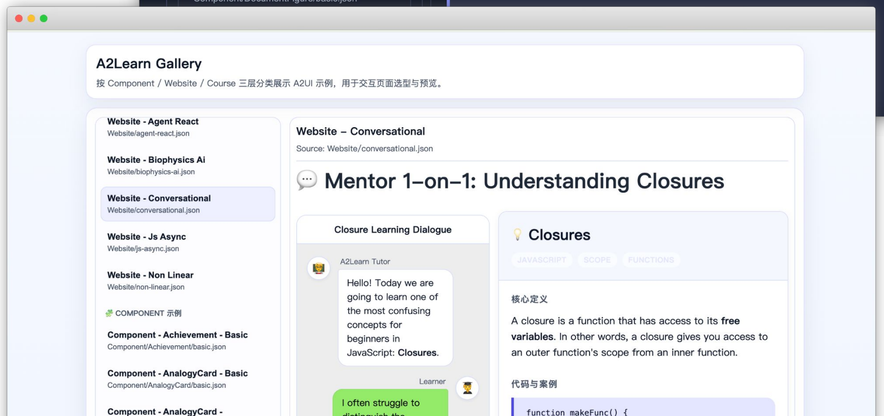

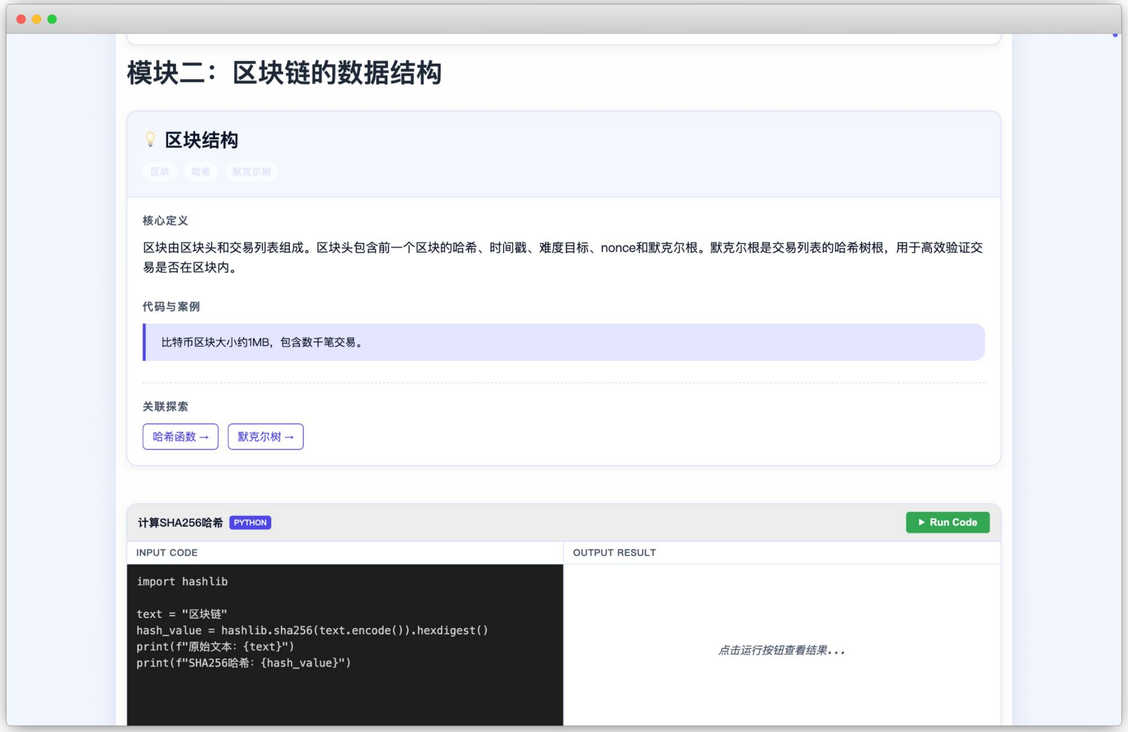

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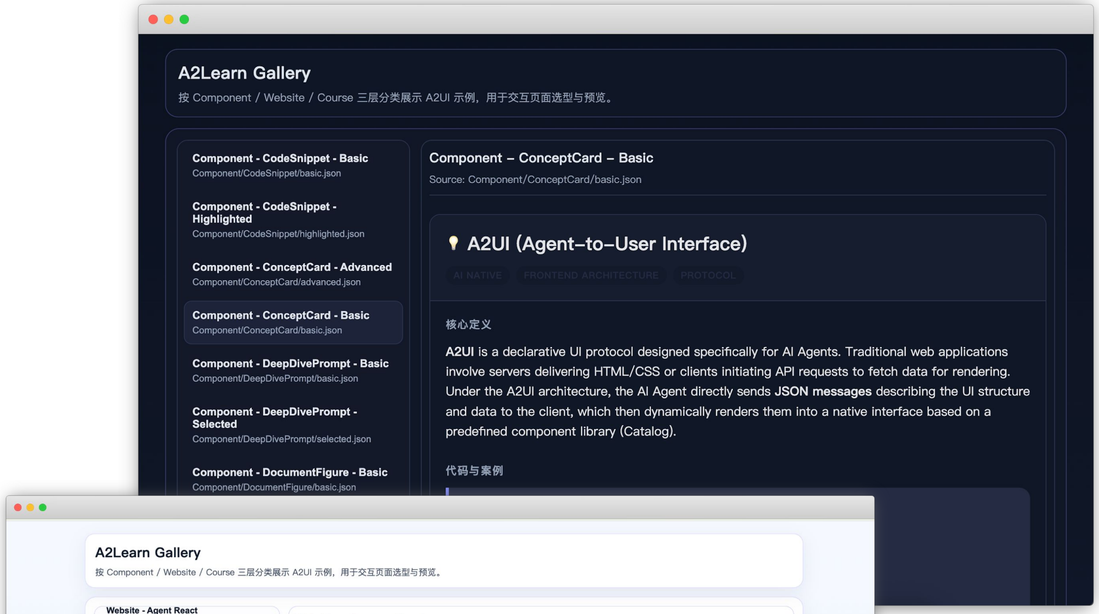
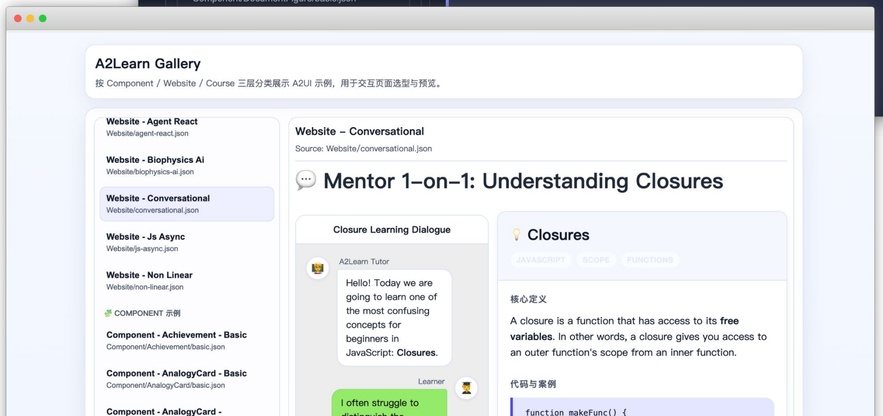
Gallery for Component



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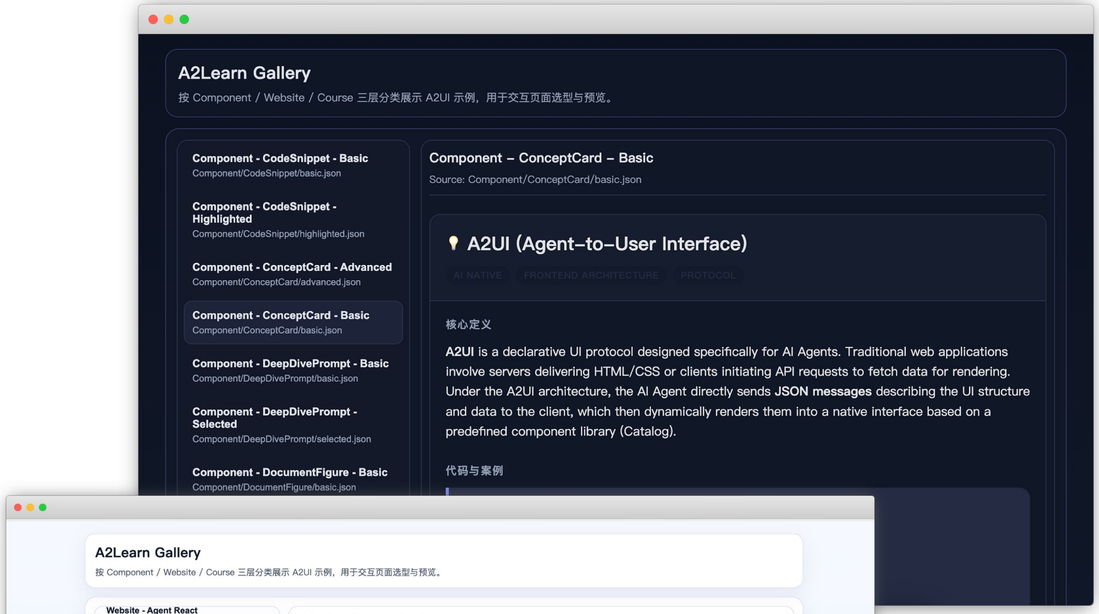
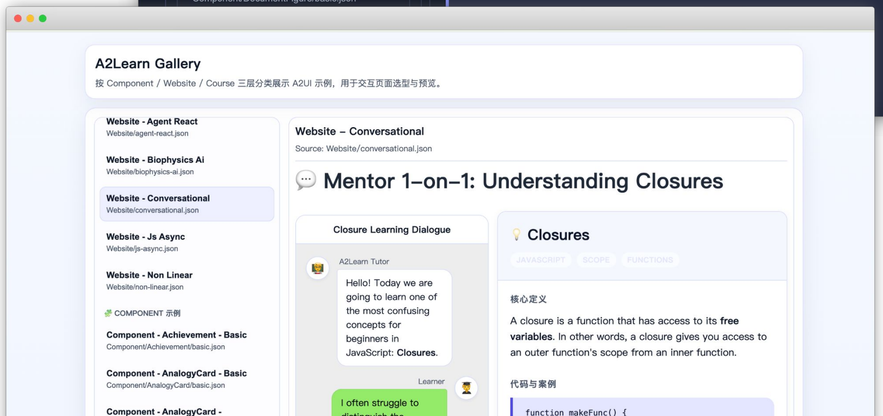
A2Learn Pipeline

Gallery for Component



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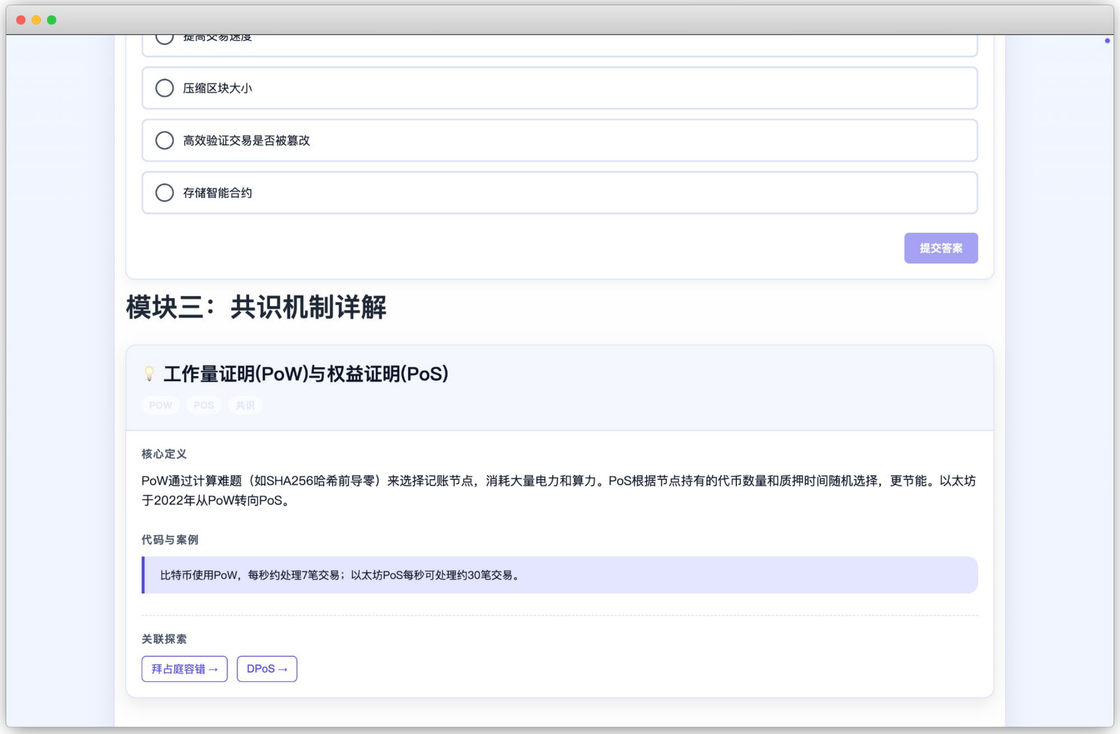
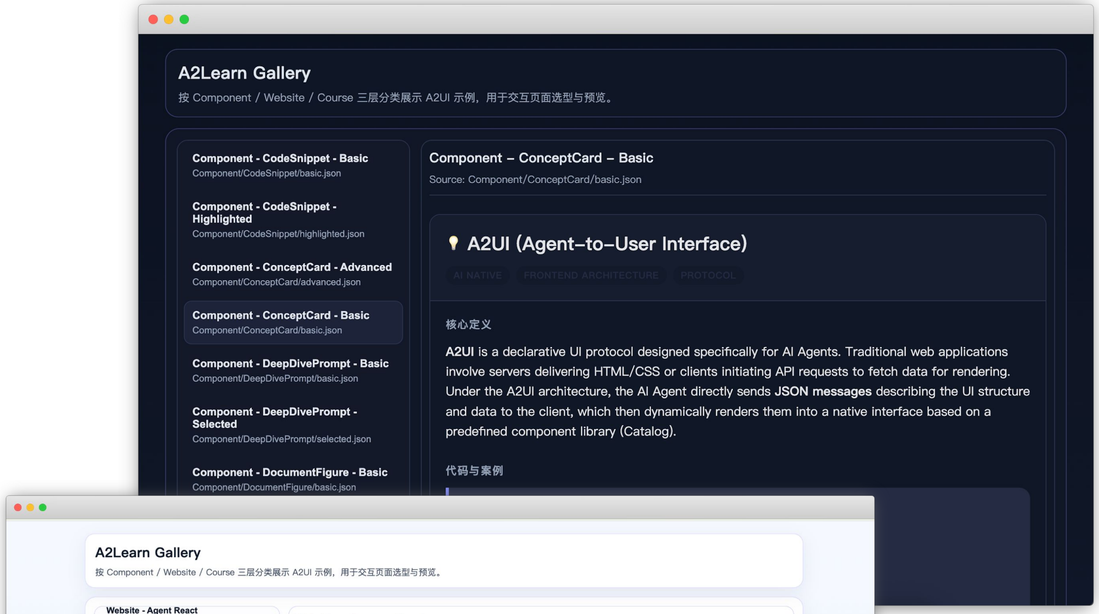
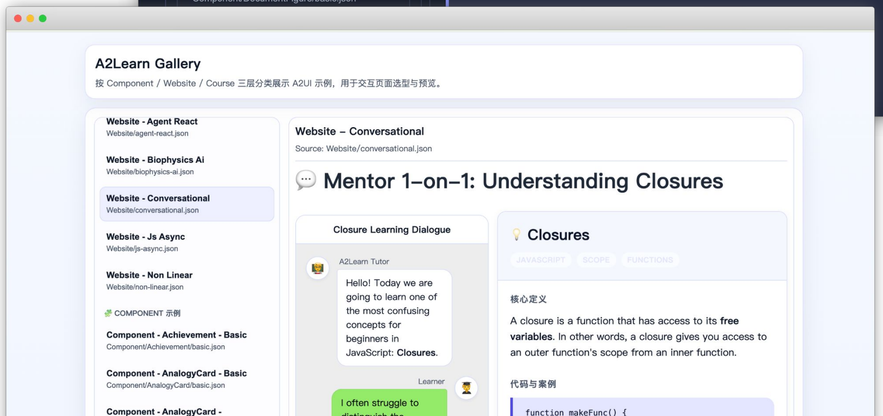


A2Learn Pipeline

Gallery for Component



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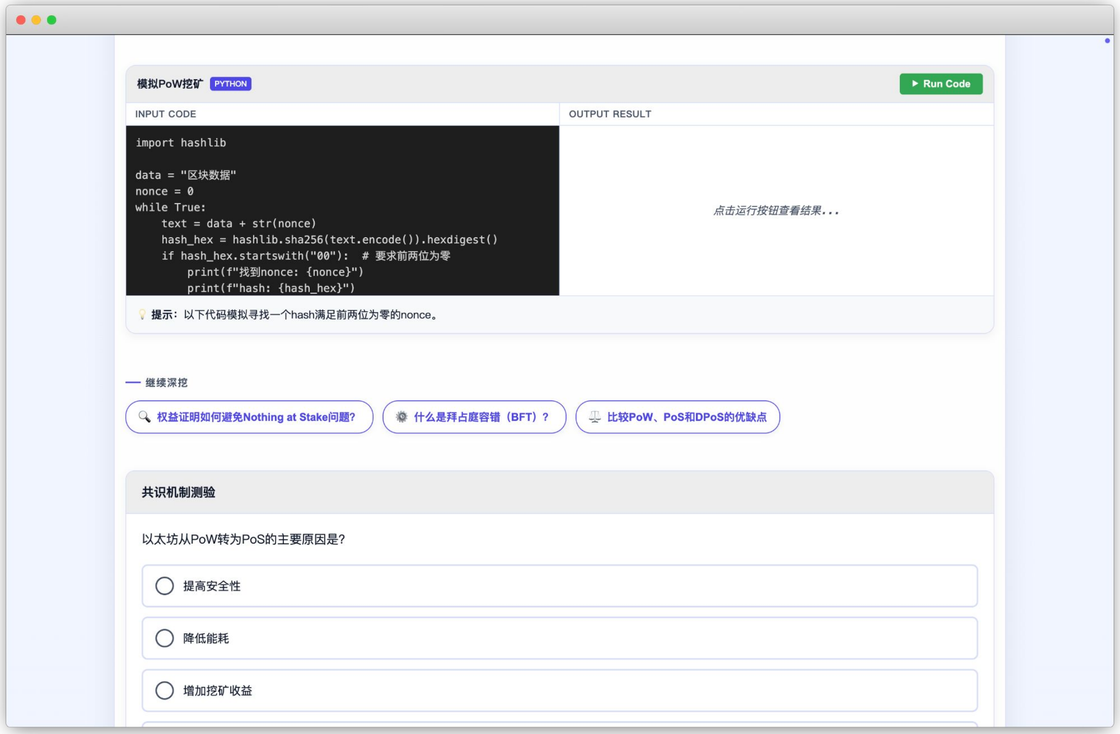

A2Learn Pipeline

Gallery for Component

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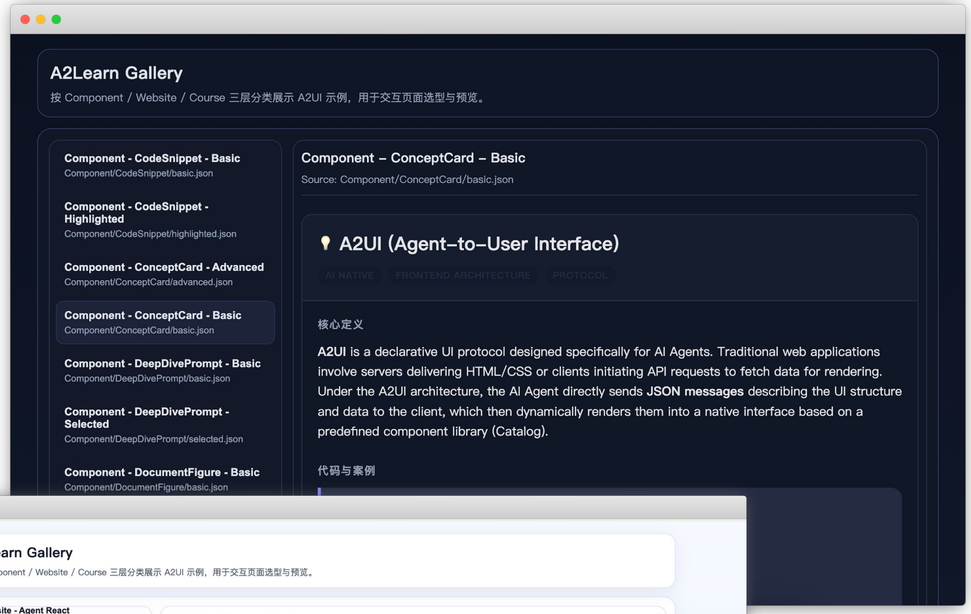

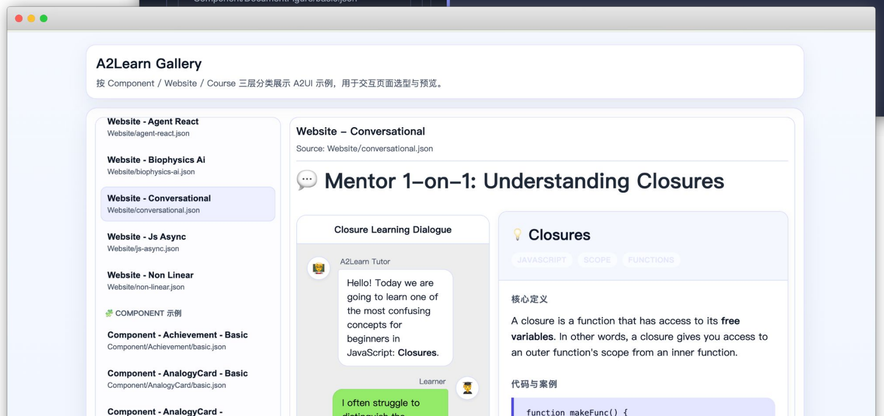

A2Learn Pipeline

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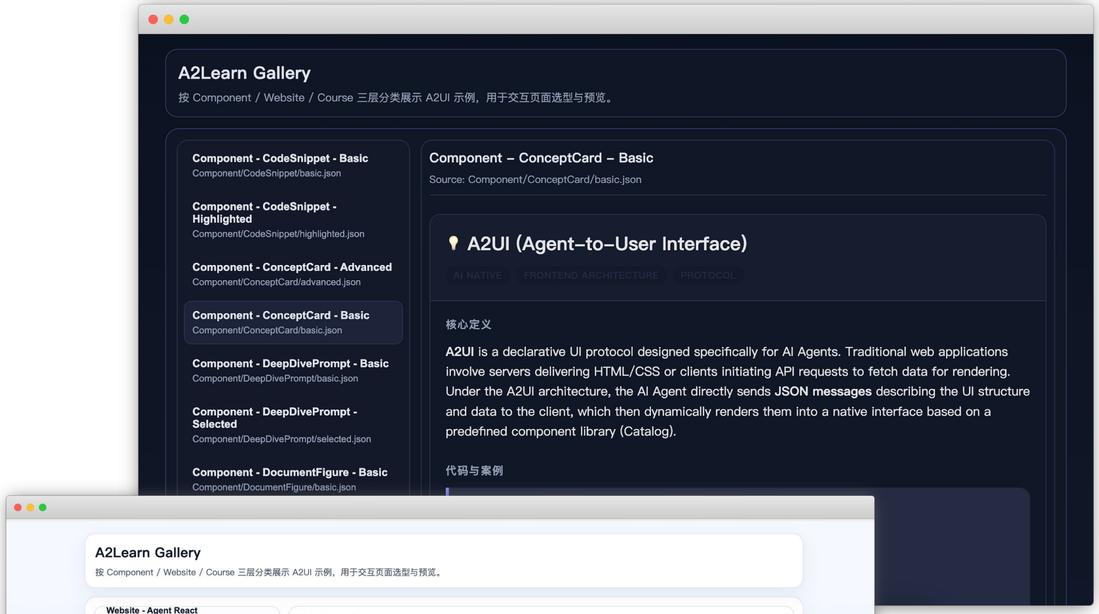

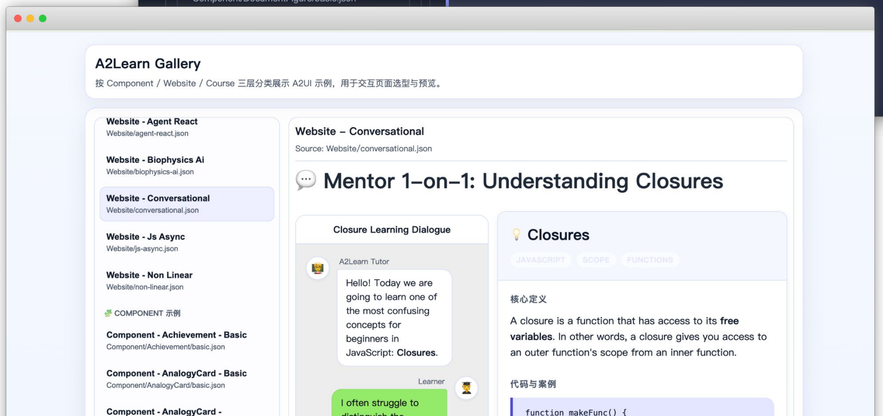


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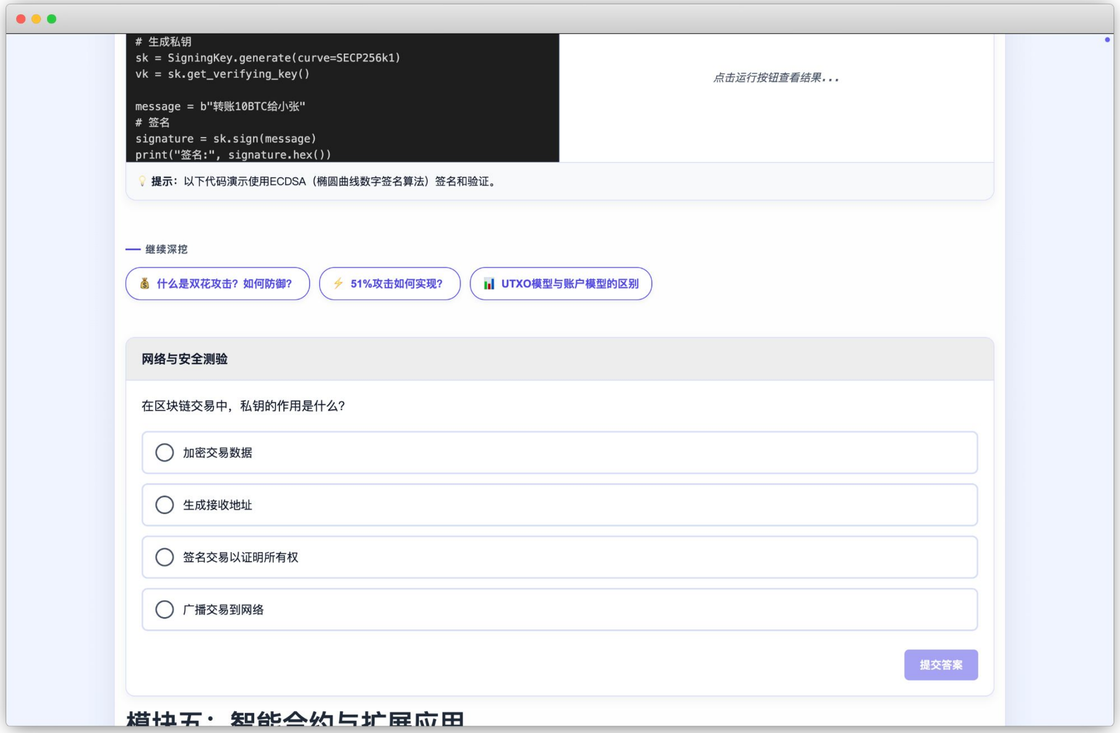

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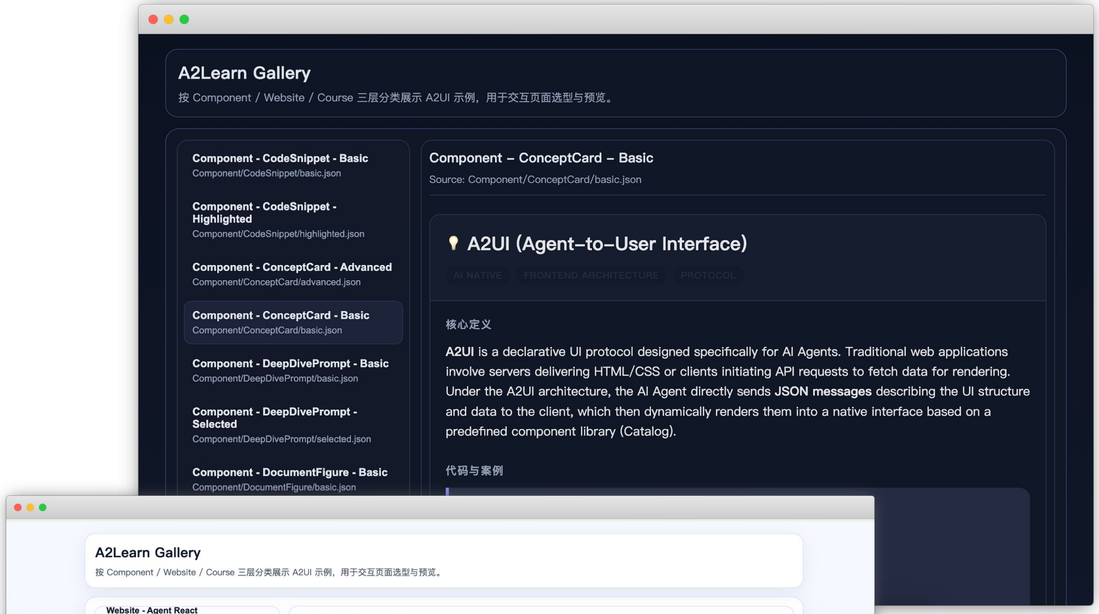
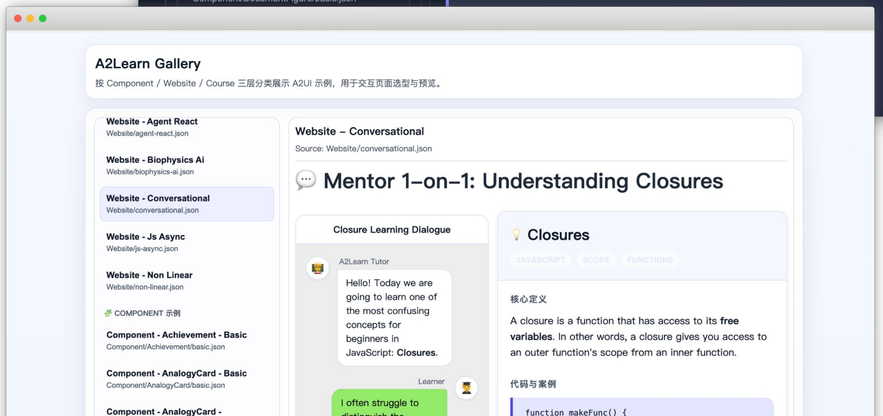
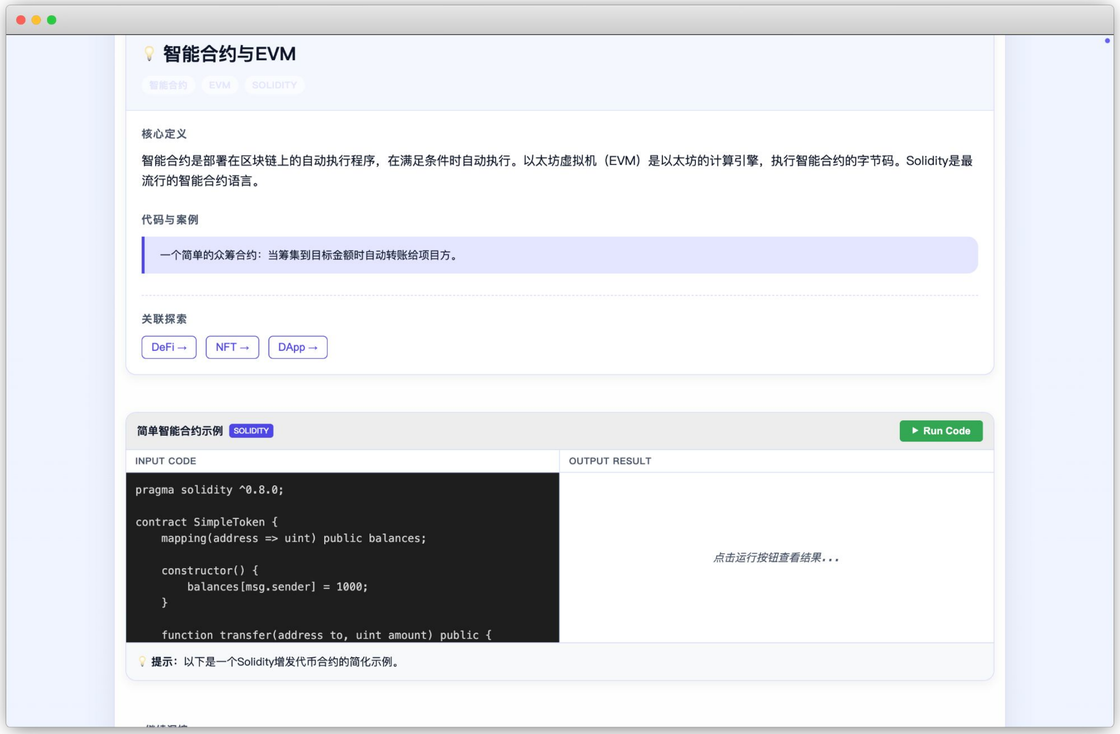
Gallery for Component



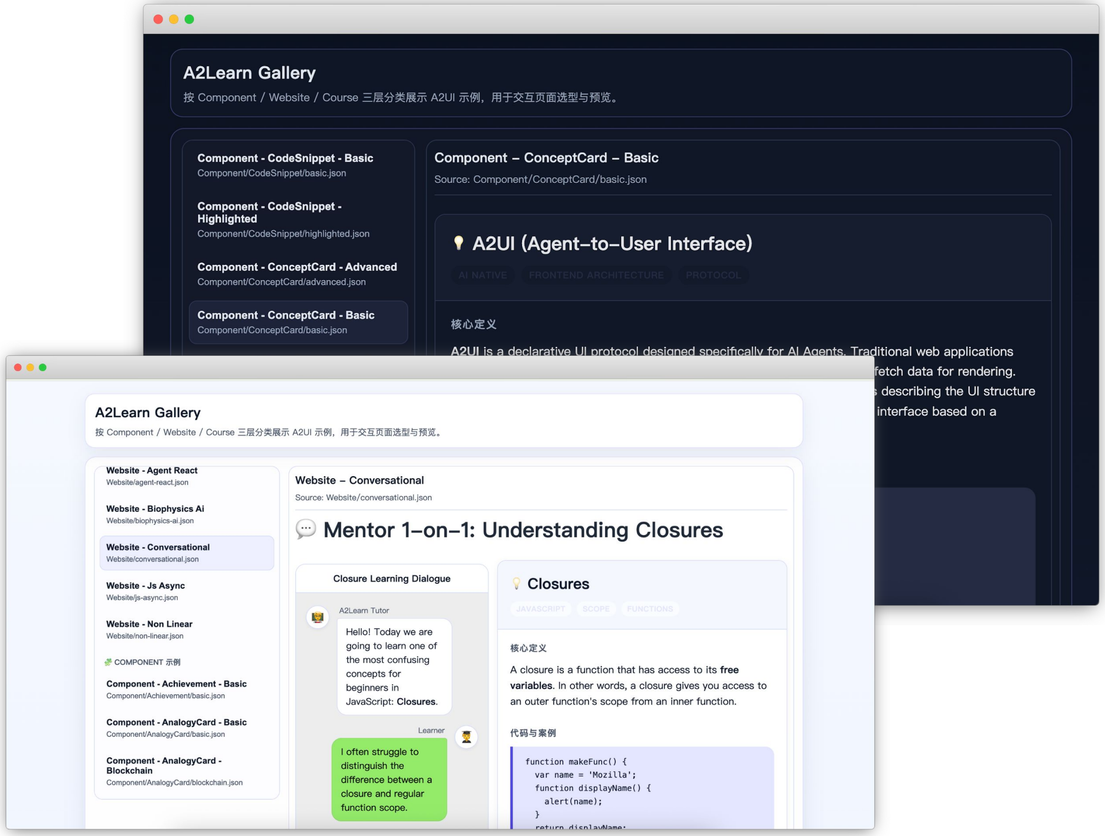



```
(base) frank@zhuchens-MacBook-Pro A2Learn % bash start.sh --text "Explain how blockchain works"
```



A2Learn Pipeline

Gallery for Component

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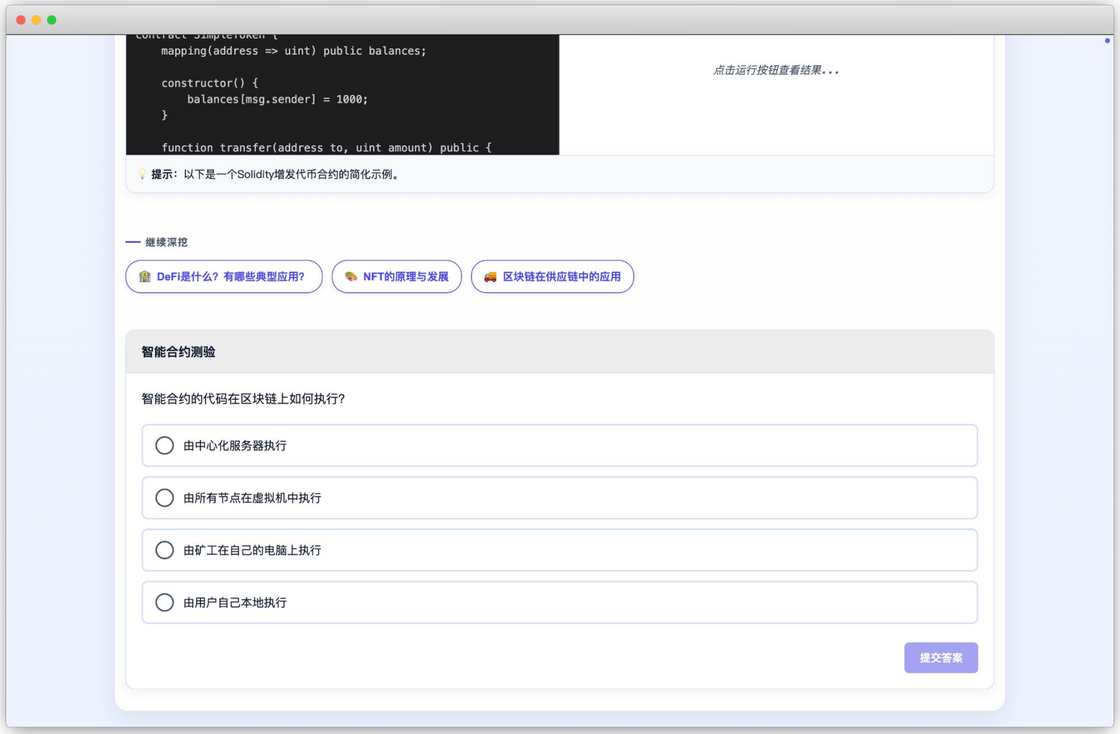
(base) frank@zhuchens-MacBook-Pro A2Learn % bash start.sh --text "Explain how blockchain works"
```



Aura is a customizable agent living in your terminal

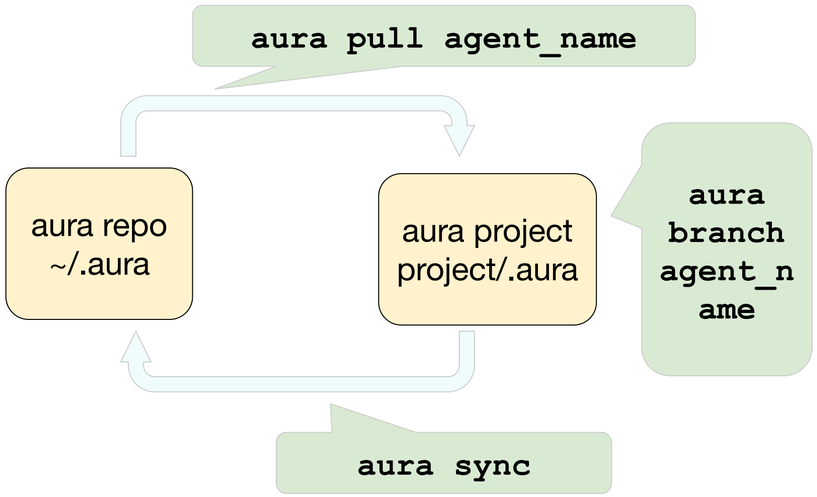
Everything is a file

1. keep kernel thin while filesystem fat
2. declarative tools and customizable prompt
3. .hint system for context injunction
4. state.db for auditing
5. .aura living in your workspace

```
.aura
├── config.yml
├── instructions
│   ├── AGENTS.md
│   ├── SOUL.md
│   ├── TOOLS.md
│   └── USER.md
├── skills
│   ├── skill-creator
│   ├── skills.md
│   └── system.md
├── state
│   ├── ask_sessions
│   ├── commands
│   ├── personas
│   └── sessions
├── task.md
└── tools
    ├── bash_command
    ├── mcp
    └── read_file
```

Version Control System(VCS)

1. Git based VCS
2. Pull or Push customizable agent
3. .shadow for in-project version control



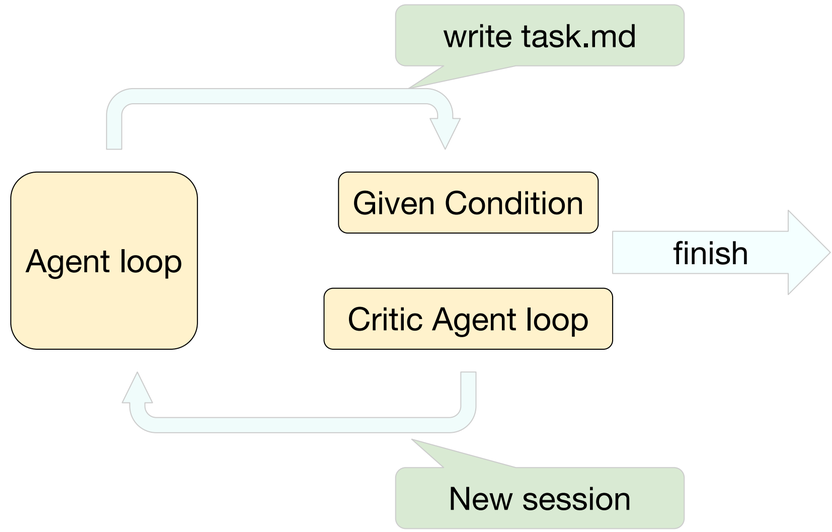
Ralph Loop

1.autonomous agent with long term task

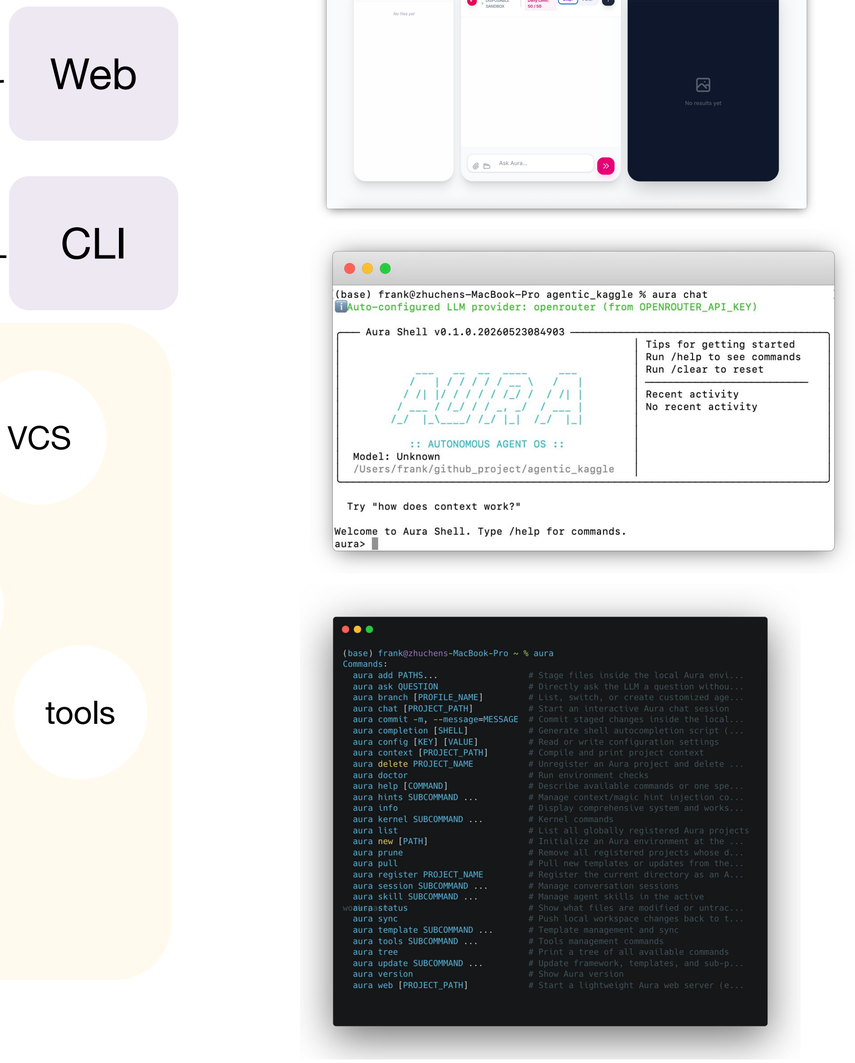
2. Stop when

1) satisfy a certain condition
2) a critic agent pass

3. Refreshing new agent avoiding anchor effect



Aura is a customizable agent living in your terminal



Thank you!

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zc18202534657@gmail.com

Reference

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