សាកលវិទ្យាល័យភូមិន្ទភ្នំពេញ
ROYAL UNIVERSITY OF PHNOM PENH

Library Management System

Software Engineering
Professor: Lim Lyheng
Class: M1
Group: 8

Group Member

Name	Name in khmer	Role
Sou Chanrojame	ស៊ូ ចាន់រ៉ូជែម	Leader
Orn Pheakdey	អន ភក្តី	Follower
Long Neron	ឡុង និរន្ត	Follower
Sokkong Somnang	សុខគង់ សំណាង	Follower

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Why did we choose that topic?

- Libraries play an important role in education and knowledge sharing.
- Traditional library are often time-consuming and error-prone.
- Library Management System helps both librarians and students by making book records easier to maintain, search, and update.

Project Goals

- To develop a software solution that automates library operations (borrowing, returning, cataloging).
- To provide students and librarians with an easy-to-use, intuitive system for managing books, customers and members.
- Enhanced Security and Access Control to library
- To minimize manual errors and improve efficiency.

Software Features

- User Login and Authentication
- Roles and permissions (admin, librarian, borrower)
- Manage librarians, staff, students, and members.
- Add, update, delete, and categorize books.
- Track available, borrowed, reserved, and lost books.
- Search books by title, author, subject, or category.
- Online e-book reading.
- E-book reader can like and comment online book
- Generate reports
- Multi-language support. (Khmer, English, Chinese, Japanese, Korea,etc.)
- AI Assistant (summary book, ask AI)

Why we use Scrum instead of Waterfall?

- Teams are self-organizing and take ownership of their work.
- Increases motivation, creativity, and accountability in team
- New features or changes can be added easily
- Testing and reviews are part of each sprint, not left until the end
- Daily standups, sprint reviews, and retrospectives keep everyone updated

Scrum Demo

Product Owner &
Scrum Master

Daily Stand Up

24 H

Dev Team

Sprint
1-2 Weeks

Sprint Review + Sprint Retrospective

Product
Backlog

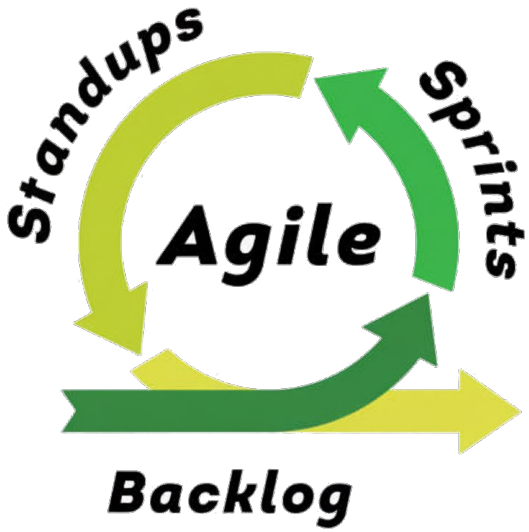
Sprint Planning
Meeting

Sprint
Backlog

Finished
Work

Iterative Software Development

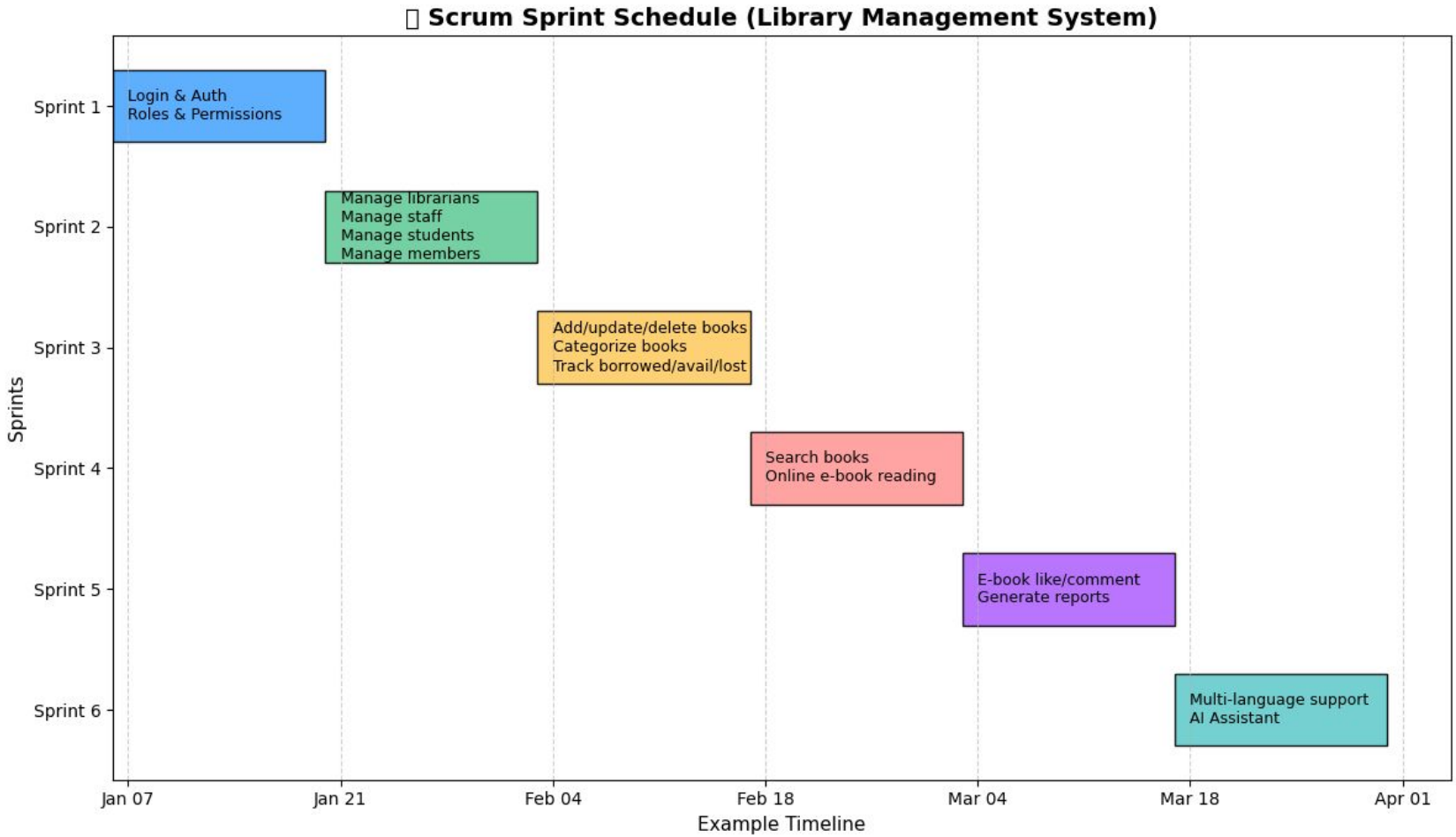
- Planning
- Database design & Analysis
- UI/UX design & Analysis
- Implementation
- Testing
- Documentation



Software Development Risk

- Some features are difficult to implement
- Unskilled, inexperience developer
- Schedule delays due to unexpected condition
- Hardwares doesn’t meet requirement for development
- Low budget
- Software bug

Schedule


Scrum Sprint Schedule (Library Management System)
Sprint 1
Sprint 2
Sprint 3
Sprint 4
Sprint 5
Sprint 6
Sprints
Login & Auth
Roles & Permissions
Manage librarians
Manage staff
Manage students
Manage members
Add/update/delete books
Categorize books
Track borrowed/avail/lost
Search books
Online e-book reading
E-book like/comment
Generate reports
Multi-language support
AI Assistant
Jan 07
Jan 21
Feb 04
Feb 18
Mar 04
Mar 18
Apr 01
Example Timeline

Resource Management

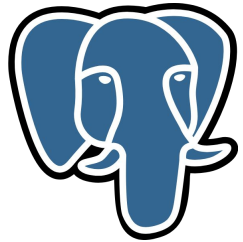
- 3 developers
- 4 Laptops
- 1 Server with GPU to run AI model

Collaboration Methods

- Daily team meetings.
- GitHub for version control.
- Telegram for daily communication
- RustDesk for remote desktop.

Technology Stack

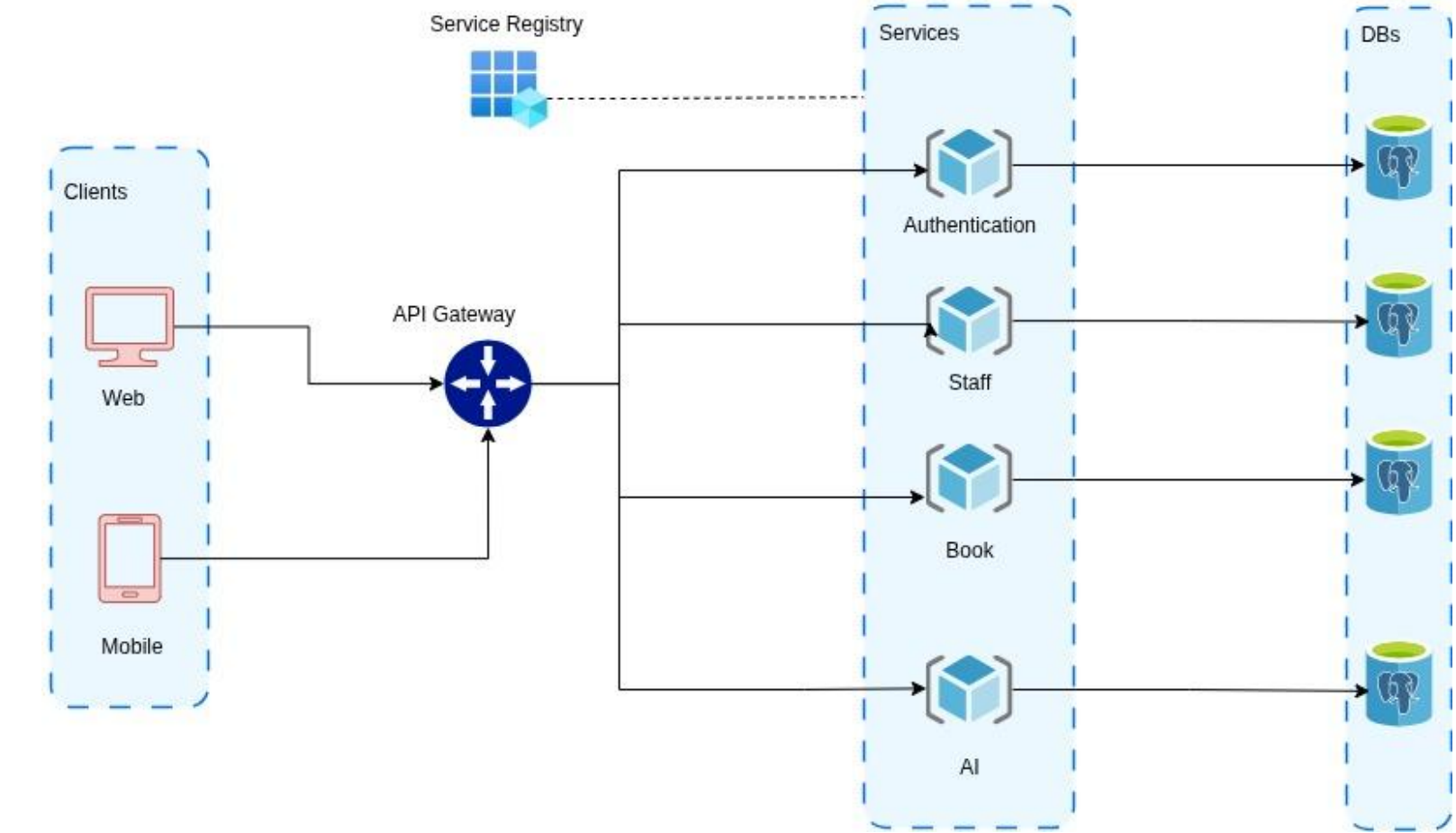
- Java (Spring boot) for back-end
- Typescript (next.js) for Web UI
- Python for AI integrated
- RDBMS (PostgreSQL)
- Web Server (NGINX)
- Docker for containerized
- Figma & Excalidraw for UI design
- AI coding assistant

Why we use Microservice instead of Monolithic?

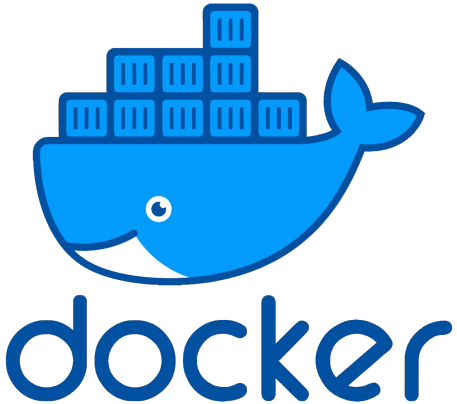
- Increased scalability and fault tolerance
- Enabling independent scaling of individual services rather than the entire application.
- Allows for faster development and deployment cycles
- Greater technological flexibility with different technology stacks for different services
- Improved fault isolation, where a failure in one service doesn't bring down the whole system
- Easier onboarding of new developers

Microservice Demo

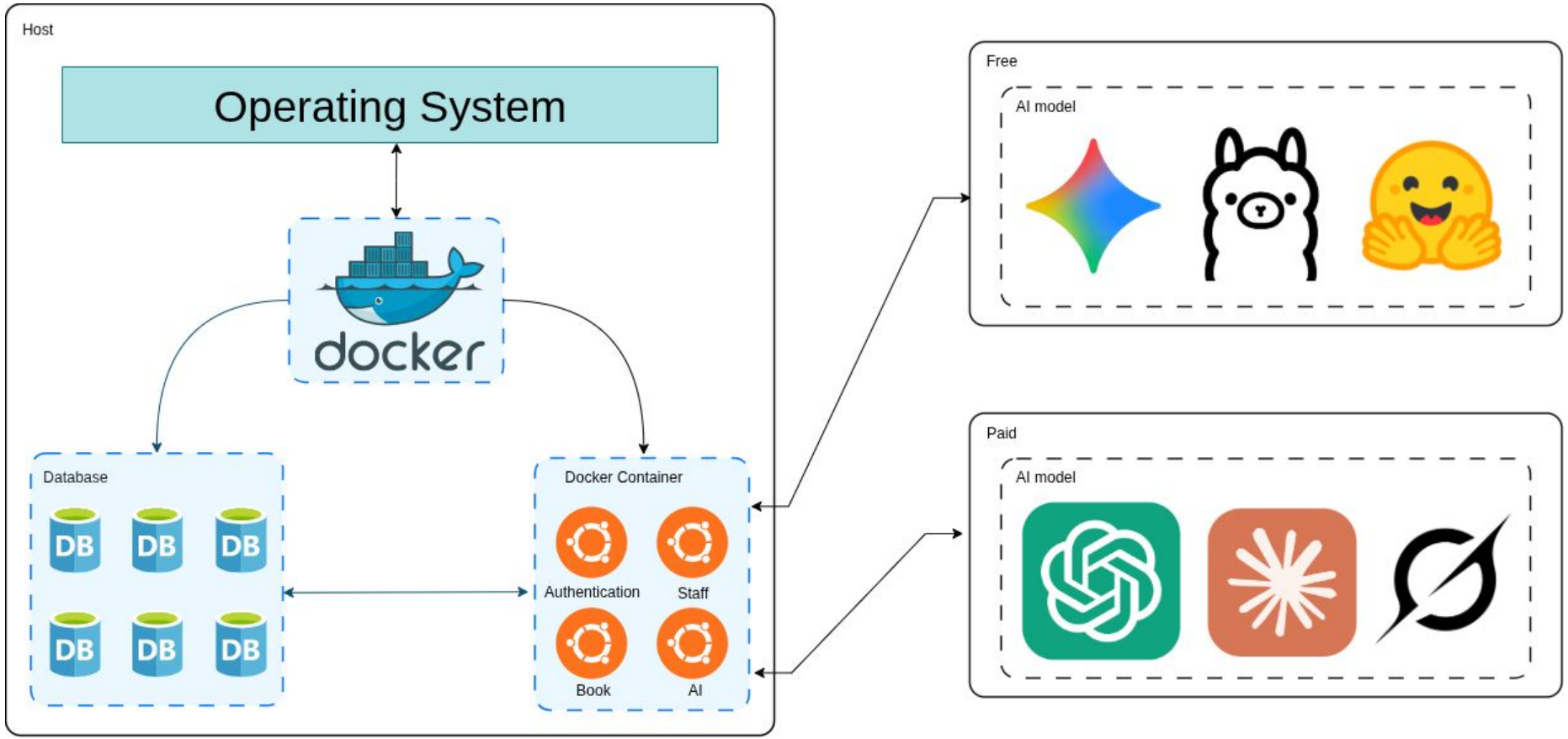


How do we deploy our software product?

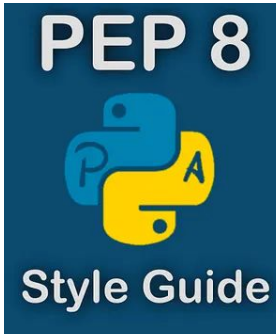
- Containerize the software product
- Containers are lightweight compared to virtual machines (VMs) as they share the host OS kernel
- Docker is the best choice
- Write Once, Run Anywhere, Portability
- Containerization make the ease of deployment



Software Deployment Demo



Coding Standard



- Improving code quality, readability, and maintainability
- Leading to reduced bugs and complexity
- Faster development cycles
- Enhanced team collaboration and onboarding

Programming Language	Style Guide
Java	Google java style guide
Typescript	Google typescript style guide
Python	Pep 8


THANK YOU