**Project planning:**

**Project Planning Phase**

The Project Planning Phase is one of the most important stages of project management and the software development life cycle (SDLC). In this phase, the project team prepares a complete roadmap of the project. This includes defining the project goals, identifying deliverables, estimating resources, creating a schedule, and assessing risks. Proper planning ensures that the project is executed smoothly, within time and budget.

**1. Objectives**

The first step in project planning is to set clear and measurable objectives. Objectives define what the project intends to achieve and how success will be measured. Well-defined objectives provide direction to the team and reduce confusion.

Example: In an educational AI tutor project, the main objective could be to develop an AI-powered platform that explains academic concepts and generates quizzes for students.

**2. Scope**

Project scope explains what is included and excluded in the project. A clear scope prevents unnecessary work and keeps the team focused.

Example: For the AI tutor project, the scope may include text-based explanations and quiz generation features, while advanced features like video tutorials or voice interactions are excluded in the first phase.

**3. Work Breakdown Structure (WBS)**

WBS involves breaking the entire project into smaller, manageable tasks. It helps distribute work effectively and track progress.

Example tasks for the AI tutor project:

Requirement analysis

UI/UX design

Model integration (using Hugging Face transformers)

Testing and debugging

Deployment

**4. Scheduling and Timeline**

A schedule defines when tasks should be completed. Timelines can be visualized using Gantt charts or Agile sprint boards. Scheduling ensures that the project finishes within deadlines.

Example:

Week 1–2 → Requirement analysis

Week 3–5 → Development (Frontend + Backend)

Week 6 → Testing and bug fixing

Week 7 → Deployment and documentation

**5. Resource Allocation**

Resources include people, technology, and tools needed for the project. Allocating resources properly ensures that the team can perform tasks effectively.

Example:

Developers → Python, PyTorch, Gradio for UI

Tools → GitHub for version control, Docker for deployment

Hardware → Cloud hosting for running models

**6. Budget Estimation**

Budgeting is essential to ensure financial control. It involves estimating costs for manpower, technology, software licenses, infrastructure, and testing. A well-planned budget avoids overspending and resource shortages.

Example: Hosting large models on cloud may cost more, so lightweight models can be chosen to reduce cost.

**7. Risk Management**

Every project has risks that can cause delays or failures. Risk management involves identifying, analyzing, and preparing solutions for such risks.

Example:

Risk: Model takes too much time to respond.

Solution: Optimize the model or use a smaller version.

Risk: Team members unavailable.

Solution: Prepare backup resource

**8. Communication Plan**

A communication plan ensures that all team members are informed about progress. It defines how meetings, updates, and reports will be shared.

Example: Daily stand-up meetings for quick updates, weekly review meetings for progress tracking, and using tools like Slack or Teams for communication.

**9. Quality Assurance Plan**

Quality assurance ensures that the final product meets requirements and performs reliably. A QA plan defines testing methods such as unit testing, integration testing, and user acceptance testing.

Example: In the AI tutor project, QA involves checking accuracy of generated quizzes, response time of the model, and usability of the interface.

Example: AI Tutor Project Planning Summary

Objective: Create AI tutor with text-based explanation and quiz generation.

Scope: Limited to text-based features, no multimedia in Phase 1.

Timeline: 2 months divided into 4 sprints.

Resources: Developers, Python, PyTorch, Gradio, GitHub, Cloud.

Budget: Based on manpower and hosting costs.

Risks: Model latency, server downtime, cost overruns.