
Project 1 - BLR : Advanced Task Management with Team Collaboration

Description

Build a sophisticated project and task management system that handles multiple teams, project timelines, resource allocation, and provides comprehensive analytics on productivity and project health.

Core Requirements

- Multi-project task organization
- Team member assignment and workload balancing
- Gantt chart functionality with dependency tracking
- Time tracking and productivity analysis
- Milestone and deadline management
- Resource allocation optimization
- Progress reporting and analytics dashboard

Technical Specifications

```
# Expected functions (minimum):
def create_project(project_id, name, start_date, end_date, priority)
def add_team_member(member_id, name, role, skill_set, hourly_rate)
def create_task(task_id, project_id, title, description, estimated_hours)
def assign_task(task_id, member_id, priority_level)
def set_task_dependency(task_id, depends_on_task_id)
def log_time(member_id, task_id, hours_worked, date)
def update_task_progress(task_id, completion_percentage)
def calculate_project_health(project_id)
def optimize_resource_allocation(project_id)
def generate_gantt_data(project_id)
def analyze_team_productivity(time_period)
def forecast_project_completion(project_id)
```

Edge Cases to Handle

- Circular task dependencies
- Team member unavailability and replacement scenarios
- Project scope changes affecting timeline
- Resource conflicts across multiple projects
- Task estimation vs actual time variance
- Critical path changes due to delays
- Budget overruns and cost tracking

Expected Output Examples

```
=== PROJECT DASHBOARD ===
Active Projects: 5
Team Members: 12
Total Tasks: 89 (32 completed, 41 in progress, 16 pending)
```

Project Health Scores:

- ▯ E-commerce Platform: 92% (On track)
- ▯ Mobile App v2.0: 74% (Minor delays)
- ▯ Data Migration: 45% (Critical issues)

=== TEAM PRODUCTIVITY ===

March 2025 Performance:

Avg. Hours/Week: 38.5

Productivity Score: 87%

On-time Delivery: 76%

Top Performers:

1. Sarah Johnson: 94% task completion rate
2. Mike Chen: 40.2 hours logged, 12 tasks completed

=== RESOURCE ALLOCATION ===

Overallocated Members:

- John Smith: 125% capacity (50h/40h week)
- Lisa Wong: 110% capacity (44h/40h week)

Available Capacity:

- David Kumar: 65% utilized (26h available)
- Emma Wilson: 70% utilized (12h available)

Recommendations:

- Redistribute 2 tasks from John to David
 - Consider hiring additional frontend developer
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