Full Stack
Data Analysis App

Instructions

Assignment

Wayne Enterprises is a fictional company appearing in American comic books published by DC Comics, commonly in association with the superhero Batman. Wayne Enterprises is a large, growing multinational company. Your role is to quickly develop a business intelligence dashboard that showcases key insights from company data through a FastAPI backend and Next.js frontend. This is a 5-hour challenge designed to demonstrate your ability to rapidly prototype full-stack applications while creating meaningful data visualizations and professional business presentations.

Your task is to build a single-page dashboard application with a FastAPI backend that processes 2-3 sample datasets (focusing on financial data, HR metrics, and basic operations) and a Next.js frontend that displays the insights through interactive charts and visualizations. The backend should provide essential API endpoints for dashboard data and perform basic analytics calculations, while the frontend should feature an executive summary section with key metrics cards, 4-6 essential charts showing revenue trends, department performance, and employee distribution, plus one compelling data narrative presented in newspaper style with a clear headline and supporting visualization. Use libraries like Chart.js or Recharts for rapid chart development and Tailwind CSS for clean, professional styling.

Focus on core functionality over advanced features, prioritizing clear data presentation and professional appearance suitable for executive use. The time allocation should be roughly 2 hours for backend development (project setup, data processing, and API endpoints) and 3 hours for frontend development (dashboard layout, chart implementation, and final styling). Use mock data if dataset processing becomes too complex, and leverage create-next-app and FastAPI's automatic documentation for rapid development setup.

The final deliverable should be a working proof-of-concept that demonstrates your full-stack development skills, data visualization capabilities, and ability to present business insights professionally under time constraints. Success will be measured by functionality (all components work correctly), visual appeal (professional appearance suitable for Wayne Enterprises' CEO), clear communication of business insights, and proper technical implementation with separated backend and frontend concerns. Remember to prioritize completion over perfection - a working simple dashboard that tells a clear business story is better than an incomplete complex system.

About the dataset

1. Financial Performance Dataset (40 records)

- **Coverage**: Quarterly data for 5 divisions across 2023-2024
- **Key Metrics**: Revenue, costs, profits, R&D investment, market share, customer satisfaction
- **Notable Trends**: Wayne Aerospace and Construction showing strong growth, Foundation operating at planned losses for social impact

2. Gotham Security Operations Dataset (72 records)

- **Coverage**: Monthly data across 6 Gotham districts for 2023-2024
- **Key Metrics**: Security incidents, response times, Wayne Tech deployments, public safety scores
- **Notable Trends**: Significant improvement in crime prevention, especially in Bristol and Park Row districts; The Narrows remains most challenging area

3. R&D Portfolio Dataset (75 records)

- **Coverage**: All active research projects across divisions from 2023-2024
- **Key Metrics**: Budget allocation vs. spending, commercialization potential, timeline adherence, security classifications
- **Notable Trends**: High-potential projects in neural interfaces, quantum computing, and fusion power; some theoretical physics projects showing delays

4. Supply Chain Dataset (90 records)

- **Coverage**: Monthly production data from 5 key facilities across different product lines
- **Key Metrics**: Production volumes, costs, quality scores, sustainability ratings, supply chain disruptions
- **Notable Trends**: Gotham Main (Aerospace) and Metropolis North (Biotech) showing best performance; sustainability improvements across all facilities

5. HR Analytics Dataset (96 records)

- **Coverage**: Monthly employee metrics across all divisions and hierarchy levels
- **Key Metrics**: Retention rates, training hours, performance ratings, diversity indices, satisfaction scores
- **Notable Trends**: Excellent retention at senior levels, improving diversity metrics, higher satisfaction correlating with security clearance levels

🎯 Data Analysis Opportunities

These datasets provide rich material for the board analysis assignment, including:

Cross-Dataset Correlations:

- R&D investment vs. revenue growth patterns
- Security performance vs. community engagement effectiveness
- Employee satisfaction vs. productivity metrics
- Supply chain efficiency vs. product quality scores

Predictive Analytics Potential:

- Security incident forecasting based on deployment patterns
- Project success prediction using budget adherence and team metrics
- Employee turnover risk assessment
- Supply chain disruption impact modeling

Strategic Insights Available:

- Division performance benchmarking
- Resource allocation optimization
- Risk mitigation prioritization
- Innovation pipeline evaluation

Contact

Host the finished assignment in a github repo share the the details with uk@othor.ai with subject line “Back end developer assignment - {yourname}”

Also include a screen recording of the app features and host the same in a google drive or youtube unlisted video.

Incase any doubt or any errors in the data, feel free to contact uk@othor.ai

Last date to submit: 12th July 2025 (Saturday)