Hexaware CODE&RISE PROGRAM

TECH TRAIL

"Spark curiosity with every questions."

Phase 1 - Judging Criteria

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- Solution Approach
- Usage of Gen AI tools
- Solution Feasibility
- Technical Approach/Architecture Design
- Innovation and Creativity
- User Experience
- Documentation and Presentation
- Console Output

Team Details

Tech Trial

Automated Question Builder Application

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Impact/Potential Value of the Application

1.**Enhanced Learning Experience** : Personalized question generation and self-assessment tools enable employees to learn at their own pace, deepening their understanding of new topics.

2.Efficient Assessment Process: Trainers can generate diverse question sets automatically, reducing manual effort and ensuring consistency in evaluations.

3.Real-Time Monitoring and Feedback: AI-driven monitoring of student behavior during tests provides real-time insights into focus and engagement, allowing for immediate corrective actions if needed.

4.Comprehensive Progress Tracking: The application tracks employee progress
across assessments, giving a clear overview of their development and learning effectiveness.

5.Streamlined Oversight: Administrators can effectively monitor both trainers and employees, ensuring accountability and optimizing the learning environment for continuous improvement.

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The Solution Proposed by your Team

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Solution Highlights

- Automated Question Generation: AI creates question banks based on curriculum.
- Tailored Learning Plans: Employees receive personalized learning paths for skill development
- Efficient User Management: Administrators control access, roles, and permissions.
- Real time Monitoring: Administrators track system performance and activity.
- AI-Assisted Assessments: Dynamic question difficulty adapts to employee progress.
- Comprehensive Reporting: Administrators generate performance and usage reports

Key Features / Approach

- Automated question bank creation.
- Admins manage user roles and permissions.
- Tailored learning paths for employees.
- Integrate course content easily with CSV or Excel files.
- Save question banks in Excel or PDF formats.
- Easy upload and organization of course content.
- Dynamic question difficulty adjustment.
- Performance and activity tracking.
- Detailed analytics and reports.
- Problem investigation and troubleshooting.
- Ensures data privacy and session security.

Technologies Used

1.Front End:

- HTML
- CSS
- Java Script
- React js Framework

2.Back End:

- Python
- Django Framework

3.Database:

- MySQL
- MongoDB
- J query

4.Cloud Computing.

- Multer (Node JS)
- AWS S3.

5.API Keys.

- JWT

6.Secrity Protocols.

- SSL/TLS
- Role based Access control
- Data Encryption
- OAuth2.0

7.Data Analytics Tools.

- Numpy

Gen AI Tool Utilization

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1.Automated Question Generation:

- Uses AI to create diverse and relevant question sets.

2.Adaptive Learning:

- Adjusts question difficulty based on learner performance.

3.Intelligent Assessments:

- Generates customized assessments dynamically.

4.AI-Driven Monitoring:

- Tracks student engagement and behavior during tests.

5.Personalized Learning Plans:

- Tailors learning paths based on AI analysis.

6.Continuous Improvement:

- AI refines questions and assessments over time for better outcomes.

System Architecture, Functionalities and Design Diagram

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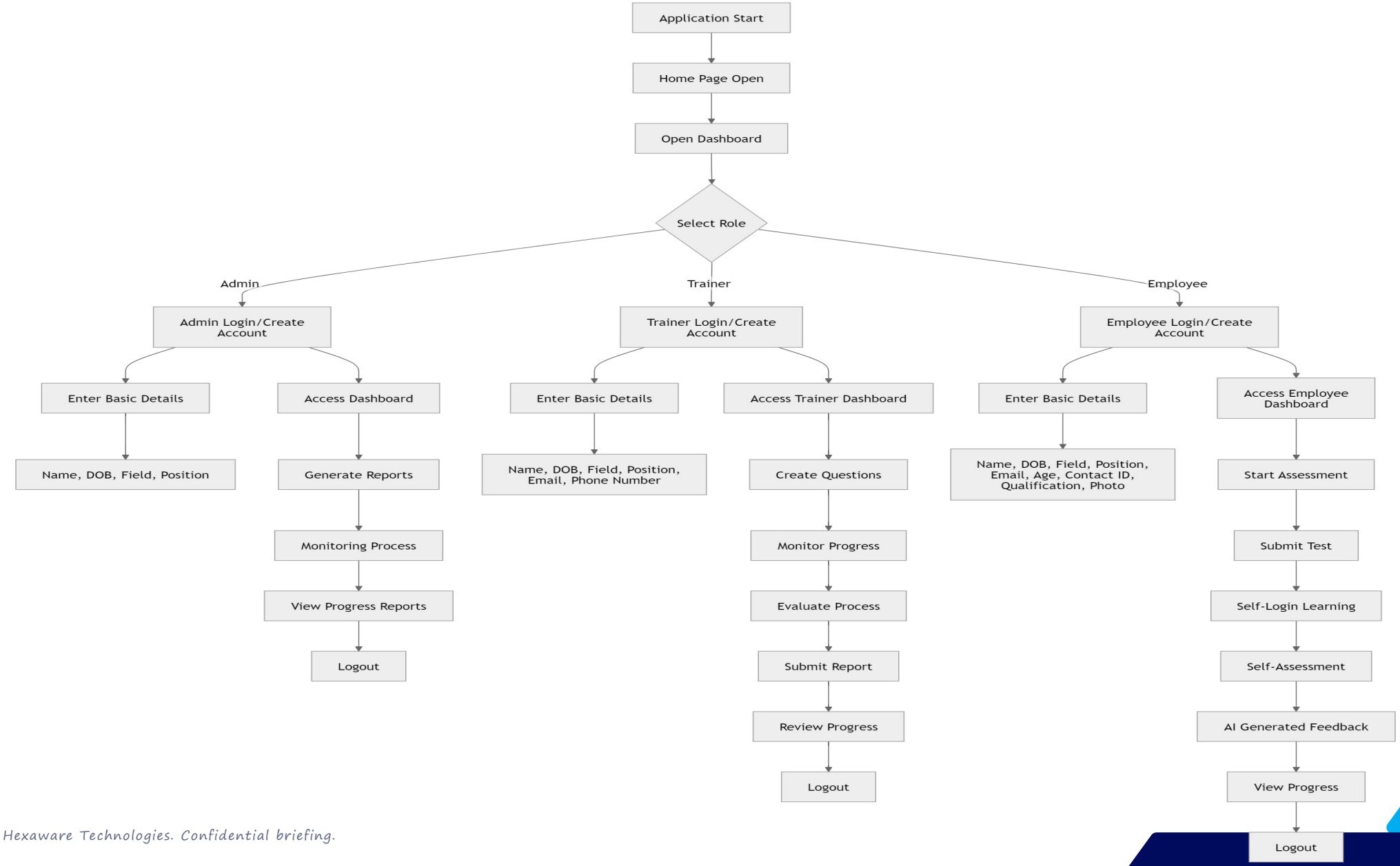

How it works

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Functional Architecture

1.User Interface Layer (Front End):
Technologies: HTML, CSS, React.js
Function: Provides user interface for administrators, trainers, and employees to interact with the system.

2.Application Logic Layer (Back End):
Technologies: Python, Django Framework
Function: Handles business logic, user management, question generation, and assessments Automated Question Generation. Uses AI to create diverse and relevant question sets.

3.Data Layer (Databases):
Technologies: MySQL, MongoDB, jQuery
Function: Stores user data, question banks, and performance metrics.

4.Cloud and Infrastructure Layer:
Technologies: Cloud Computing
Function: Manages scalable hosting, storage, and computational resources.

5.Security Layer:
Technologies: Security Protocols (e.g., OAuth, SSL/TLS)
Function: Ensures secure data transmission, authentication, and user privacy

7.Analytics and Reporting Layer:
Technologies: Data Analytics Tools.
Function: Tracks and reports on performance, usage, and system health

How It Works

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Technical Architecture

- Users access the app through a web-based interface built with React.js.
- The front end handles user inputs and communicates with the backend via API calls.
- Python with Django processes requests and manages business logic.
- Generative AI automates question generation and adapts assessments.
- MySQL and MongoDB store user data, question banks, and logs.
- APIs enable seamless interaction between front end, back end, and external services.
- Cloud computing hosts the application, providing scalable resources.
- Security protocols ensure safe data transmission and user authentication.
- Data analytics tools analyze performance and user activity for reporting.
- System monitoring tools track performance and log user activities.

Innovation and Creativity

- Automating question creation with generative AI to produce diverse and relevant questions.
- Customizing learning paths based on individual user performance and needs.
- Adjusting question difficulty dynamically during assessments according to learner progress.
- Using AI to monitor and analyze user behavior during tests for better engagement.
- Streamlining user management with an intuitive interface for roles and permissions.
- Facilitating easy integration of curriculum materials through automated uploads.
- Providing real-time insights and feedback on system performance and user activity.
- Ensuring secure data transmission and user authentication with advanced security protocols.
- Leveraging cloud computing for scalable resources and reliable application hosting.
- Utilizing comprehensive data analytics to generate detailed performance and usage reports.

Scalability, Performance and Security

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Scalability:

- Cloud Computing: Utilizes cloud services to handle increasing user loads and storage needs.
- Modular Architecture: Components are designed to scale independently, allowing for efficient resource allocation.
- Load Balancing: Distributes traffic evenly across servers to prevent overload and maintain performance.
- Database Scalability: Employs scalable databases (e.g., MySQL, MongoDB) to manage large volumes of

Performance:

- Efficient Backend Processing: Python with Django ensures fast data processing and response times.
- Optimized Front End: React.js delivers a responsive and smooth user interface with quick interaction.
- Real-Time Analytics: Provides immediate insights into system performance and user activity to optimize operations.
- Asynchronous Operations: Implements asynchronous

Security:

- Data Encryption: Uses SSL/TLS protocols to encrypt data during transmission and protect sensitive information.
- Secure Authentication: Uses robust authentication methods like OAuth to verify user identities.
- Activity Monitoring: Monitors system activity and logs to detect and respond to suspicious behavior or potential threats.
- Regular Security Audits: Conducts periodic security

Best practices and industry standards followed

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- Implementing SSL/TLS for data encryption and OAuth for secure authentication.
- Utilizing React.js for a responsive and accessible user interface.
- Following a modular approach with Python and Django for scalable code.
- Enforcing role-based access control (RBAC) for managing user permissions.
- Applying routine updates and patches to address security vulnerabilities.
- Ensuring compliance with data protection regulations like GDPR or CCPA.
- Leveraging caching mechanisms and asynchronous processing for optimized performance.

User Experience

- Provides a user-friendly design with easy navigation.
- Ensures accessibility across various devices and screen sizes.
- Offers customized learning paths based on individual progress.
- Automates and streamlines the creation of diverse question sets
- .Delivers immediate insights and feedback during assessments.
- Facilitates simple integration of course materials by trainers.
- Adjusts question difficulty in real-time based on user performance.
- Implements robust authentication methods for safe login and data protection.
- Provides clear visibility into user progress and performance metrics.
- Ensures smooth communication between front end and back end for quick data retrieval and updates.

Console Output Details

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Visily prototype link :

https://app.visily.ai/projects/607a5132-2403-4618-9564-b5a635d32587/boards/1210870/presenter?play-mode=Prototype

Github link :

https://github.com/Yadesh-A/Hexaware-TECH-TRAIL.git

Thank You....

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