Divisor AI

Divisor AI is transforming K-12 education with our cutting-edge, AI-powered learning platform that adapts to each student's unique needs, learning style, and pace. Our platform combines advanced educational content with gamification, competitive features, and detailed analytics to create an engaging, effective learning experience.

The Problem We're Solving

Traditional education follows a one-size-fits-all approach that fails to address individual learning needs:

- Struggling students fall behind without proper intervention
- Advanced students become bored with unchallenging content
- Teachers lack resources to provide personalized attention to every student
- Engagement and motivation decline with passive learning methods

Our Solution: The Divisor AI Platform

Core Features

1. Adaptive Learning Pathways

Our AI engine creates personalized learning journeys that:

- Analyze individual performance data in real-time
- Identify knowledge gaps and learning patterns
- Automatically adjust content difficulty and pacing
- Recommend optimal learning sequences

2. Interactive Learning Experiences

We transform passive learning into active engagement through:

- Interactive Labs: Virtual hands-on experiments for subjects like coding and science
- Battle Mode: Competitive learning against AI opponents or other students
- Practice Exercises: Tailored practice problems with instant feedback
- **Simulations: Real-world scenario-based learning**

3. Gamified Learning Environment

Divisor AI features an extensive library of 30+ interactive educational games carefully designed to reinforce key concepts while maximizing student engagement:

Game Library Highlights

- Math Arena: Speed-based computational challenges with multiplayer support
- Science Explorer: Interactive simulations of scientific concepts and experiments
- Code Quest: Programming puzzles that teach coding concepts through gameplay
- Word Wizards: Vocabulary building and language arts games
- History Timeline: Historical events sequencing challenge
- Logic Puzzles: Critical thinking and problem-solving games

Battle System Features

Our unique Battle System transforms learning into exciting competitions:

- AI Opponents: Students can challenge AI opponents with 4 difficulty levels
- Real-time PvP: Live competitions against peers with matchmaking
- Tournament Mode: Structured competitions with brackets and prizes
- Team Battles: Collaborative challenges that promote teamwork
- Power-Up System: Strategic power-ups that add gameplay depth:
  - Time Freeze: Pauses the timer for strategic advantage
  - Point Multiplier: Doubles points for correct answers
  - Hint System: Provides strategic clues when needed
  - Skip Question: Option to bypass particularly challenging questions

Progression & Rewards

- Skill Rating System: ELO-based rating that matches students with appropriate opponents
- Achievement Badges: Over 50 unlockable badges for various accomplishments
- Leaderboards: Weekly and all-time rankings to promote friendly competition
- Experience Points: Level-up system that unlocks new game features
- Virtual Rewards: Customizable avatars, profile themes, and celebration effects

4. AI-Powered Assessment

Our platform revolutionizes assessment with:

- Real-time analysis of student responses
- Detailed feedback on conceptual understanding
- Identification of specific strengths and weaknesses
- Continuous assessment integrated into learning activities

5. Comprehensive Analytics

Our platform provides actionable insights for:

- Students: Personalized progress tracking and achievement metrics
- Parents: Detailed understanding of their child's educational journey
- Educators: Class-wide performance data and intervention opportunities

6. Curriculum Coverage

Divisor AI covers core K-12 subjects:

- Mathematics
- Science
- Coding and Computer Science
- Language Arts
- Additional subjects being added regularly

How Divisor AI Works

1. Initial Assessment

New students complete diagnostic assessments to establish their baseline knowledge, learning preferences, and areas for improvement.

2. Personalized Learning Plan

Our AI generates a customized learning plan with:

- Specific topics and concepts to master
- Recommended learning activities
- Estimated timeframes for completion
- Initial difficulty settings

3. Adaptive Content Delivery

As students progress through the platform:

- Content difficulty adjusts automatically based on performance
- New concepts are introduced at the optimal pace
- Review materials appear when needed
- Learning modalities shift based on engagement patterns

4. Engagement Mechanics

Multiple features maintain high engagement:

- Battle Mode: Students compete against AI or peers in educational challenges
- Lab Simulations: Interactive experiments reinforce concepts through hands-on learning
- AI Chat Learning: Conversational AI tutors provide personalized assistance
- Achievements System: Rewards and recognition for progress milestones

5. Continuous Improvement

Our platform evolves with each student:

- Machine learning algorithms refine recommendations over time
- Regular content updates add new subjects and activities
- Feature enhancements based on usage patterns and feedback

Technical Architecture

1. Technology Stack

Core Framework

- Next.js 14: App Router for modern routing and server components
- TypeScript: Strong type safety throughout the application
- React 18: Component-based UI with latest features

State Management

- Redux Toolkit & Redux Persist: Primary global state management with persistence
  - Used for authentication (authSlice)
  - Learning state tracking (learningStateSlice)
- Zustand: Lightweight state management for specific features
- React Context: For component-scoped state

Styling

- Tailwind CSS: Utility-first styling with custom configuration
- Shadcn UI: Component library based on Radix UI primitives
- Framer Motion: Advanced animations and transitions
- GSAP: Complex animation sequences (used in landing page)

Data Fetching & API Integration

- Axios: Centralized HTTP client with custom interceptors
  - Token management
  - Error handling
  - Unauthorized response management
- Domain-based API Structure: Organized by functionality
  - content.api.ts: Content and curriculum management
  - learning.api.ts: Learning activities and assessments
  - user.api.ts: User management and authentication

Analytics & Monitoring

- PostHog: For user behavior tracking and analytics

2. Feature Modules

Learning Platform

- Adaptive Content Delivery: Personalized learning paths
- Interactive Assessments: Various question types and formats
- Progress Tracking: Detailed analytics on student performance
- AI-Powered Recommendations: Personalized learning suggestions

Interactive Features

- Exam System: Comprehensive assessment framework
  - Multiple question types (text, image-based)
  - Detailed analytics and feedback
  - Performance tracking and recommendations
- Battle Mode: Competitive learning
  - AI opponents with adjustable difficulty levels
  - Player vs Player competitions
  - Tournament system with rewards
  - Power-ups and game mechanics
- Laboratory Simulations: Interactive experimentation
  - Virtual labs for different subjects
  - Custom and predefined experiments
  - Analysis and feedback on lab results
- Chat-based Learning: AI-powered conversational learning
  - Natural language interactions with AI tutors
  - Real-time feedback and explanations
  - Multimedia support in conversations

Analytics & Performance

- Comprehensive Dashboards: Subject and topic performance tracking
- AI Analysis: Detailed assessment of student strengths and weaknesses
- Time Management: Tracking of study time and efficiency
- Learning Path Optimization: AI-adjusted content based on performance

User Experience

- Gamification: Points, badges, and rewards for motivation
- Celebration Effects: Confetti and visual rewards for achievements
- Responsive Design: Optimized for various devices
- Accessibility Features: Support for diverse learning needs

3. Component Architecture

Atomic Design Pattern

- UI Components: Primitive interface elements
  - Buttons, inputs, cards, etc.
- Layout Components: Structural UI elements
  - Headers, footers, navigation
- Feature Components: Domain-specific complex components
  - Learning modules, quiz interfaces, battle arenas
- Page Components: Complete pages composed of smaller components

Code Organization

- Feature-Based Structure: Components organized by domain/feature
- Shared Components: Reusable UI elements
- Core Services: Central business logic

4. Performance Optimization

- Image Optimization: Next.js Image component
- Code Splitting: Dynamic imports for reduced bundle size
- Lazy Loading: Components loaded on demand
- Memoization: Prevent unnecessary re-renders

5. Security & Authentication

- Token-Based Auth: JWT implementation
- Route Protection: Middleware for secure routes
- Role-Based Access: Different capabilities for students/teachers