Hectoc Game

Team Name: *Code Ninjas*

<u>Team Members</u>
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Problem Statement:

Hectoc is a unique mental calculation game where players must creatively use a sequence of digits and mathematical operations to reach the total of 100. It challenges players' mathematical thinking, problem-solving skills, and fluency with numbers.

Key Features to Include:

- Real-Time Duels: Enable users to challenge each other in live, timed Hectoc battles.

- Dynamic Puzzle Generation: Implement algorithms to generate random six-digit sequences for each duel, ensuring varied and unpredictable challenges.

- Leaderboards & Rankings: Introduce a ranking system to track player performance, rewarding accuracy and speed.

Rules of play:

In Hectoc, player is given a random six digits number, Player inserts *,+,-,/, (), and exponentiation operation to form an equation that will be checked if it equals 100 or not. On the basis of the result the player is given points.

Players are judged on time and accuracy. If their equation evaluates to 100, they earn points based on speed. With each level, time limits decrease and allowed operations increase, making the game progressively harder.

Mathematical operations:

The game incorporates various mathematical operations including addition (+), subtraction (-), multiplication (×), division (÷), exponentiation (^), and the use of parentheses for grouping. These operations can be creatively combined to manipulate the digits effectively, leading to solutions that meet the target value of 100. Players often need to think critically about how to arrange these operations in order to find valid expressions, enhancing their arithmetic ability and mental agility.

FEATURES TO BE INCLUDED:-

- **Leaderboards:-**

Players will be judged on the basis on the basis of time and accuracy and a real time leaderboard will be present to increase the competitive behaviour among the players.

- **Classic Nostalgic User Interface:-**

The user interface will present the users with classic engaging game. This design evokes a sense of nostalgia while keeping the gameplay intuitive and engaging.

- **Decreasing time after each level:-**
This increases the challenge and intensity, forcing players to react faster, strategize better, and improve their skills. It keeps gameplay engaging by adding a sense of urgency, making each level feel more rewarding.

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- **Personal Bests of Users:-**
Personal Bests of Users is a feature that tracks and displays a player's highest scores, fastest times, or best performances in the game. It motivates players to beat their own records, enhancing replayability and competitiveness.

TECH STACK USED:

🛠 Tech Stack Used:

Frontend: React.js (Vite),Tailwind CSS,Bootsstrap,DOM js

Backend: Node.js,Express.

Database: Firebase (for storing user scores & history)/MongoDb/SQL

Real-time Communication: WebSockets via Socket.io

Proposed Solution:

HectoClash uses Node.js, Express, Socket.io, and MongoDB for real-time multiplayer gameplay. A random 6-digit number is generated, and players insert mathematical operations to form an equation that evaluates to 100.

The backend validates expressions, assigns points based on speed, and stores scores, personal bests, and leaderboard rankings in MongoDB. Socket.io enables real-time updates.

The React frontend allows players to input expressions, submit answers via API, and see live leaderboard updates.

Game Flow
1) Player joins & gets a random 6-digit number
2) Enters an equation using + - * / ** ()
3) Backend checks & assigns points
4) MongoDB updates scores & leaderboard
5) Socket.io updates all players instantly

Conclusions:-

Benefits & Effectiveness of HectoClash

1.Enhances Problem-Solving Skills – Encourages logical thinking and strategic placement of operators to reach 100.

2.Boosts Mathematical Ability – Strengthens arithmetic skills through interactive and engaging gameplay.

3.Encourages Competitive Learning – Real-time multiplayer mode keeps players engaged and motivated.

4.Improves Time Management – Players must think quickly under time constraints, enhancing decision-making skills.

5.Tracks Progress & Adapts Difficulty– Leaderboards, personal bests, and increasing challenges ensure continuous improvement.