**National University of Computer & Emerging Sciences**

**Karachi Campus**



**QUORIDOR GAME WITH AI**

**Project Proposal**

**Artificial Intelligence**

**Section: E**

**Group Members:**

**22k-4617 Nimil Zubair**

**22k-4526 Waniya Badar**

**22k-4333 Alishba Hassan**

**Project Proposal**

**Introduction**

We propose to develop an advanced digital version of the strategic board game Quoridor. The game will allow two to four players to participate, with the option to play against AI or other human players against each other. The system will provide a smooth, interactive, and visually engaging interface to enhance the player experience. The game is both educational and entertaining, fostering strategic thinking and planning.

**Existing System**

Current Quoridor implementations provide either basic two-player modes or simple AI without adaptability. Some systems lack intuitive user interfaces and do not support multiplayer or advanced features. Additionally, most existing versions are limited in difficulty levels and player engagement aspects.

**Problem Statement**

Existing versions of Quoridor often lack scalability in player numbers, adaptive AI, and multiplayer support. They also do not offer customizable settings or dynamic gameplay elements that enhance replayability. This results in limited user engagement and repetitive gameplay experiences.

**Proposed Solution**

Our project aims to build a Python-based Quoridor game with a refined and interactive graphical user interface, supporting both AI and multiplayer modes. The AI will be designed with multiple difficulty levels using intelligent algorithms and heuristics. The system will also include customizable features, sound effects, and dynamic animations to ensure a rich and engaging gaming experience.

**Salient Features**

1. **Support for 2 to 4 players**  
   The game supports two to four players, with options for both human and AI participants, enhancing group play and versatility.
2. **Smart AI with multiple difficulty levels**  
   The AI adapts using intelligent algorithms, offering easy, medium, and hard levels to challenge players of different skills.
3. **Multiplayer mode**  
   Players can compete with others, making the game interactive and competitive for friends or global players.
4. **Customizable game settings**  
   Players can change settings like board size and wall count, allowing each game to feel fresh and adjustable.
5. **Animated moves and sound effects**  
   Smooth animations and sound effects make the game visually engaging and lively.
6. **Interactive and user-friendly graphical interface**  
   The GUI is designed to be simple and intuitive, ensuring ease of use for all players.
7. **Real-time game status updates**  
   Players receive live updates on turn changes, remaining walls, and game progress for better awareness.
8. **Intelligent wall placement strategy by AI**  
   The AI strategically places walls to block opponents and protect its path, making gameplay challenging.
9. **Highlighted possible moves for user convenience**  
   Possible moves for each player’s turn are highlighted, helping beginners easily understand options.
10. **Victory detection and end-game animation**  
    The system detects the winner automatically and displays a visual celebration at the end of the game.

**Tools & Technologies**

- Programming Language: Python  
- GUI Framework: Tkinter or PyGame  
- Operating System: Windows  
- AI Algorithms: BFS/DFS, Djikstra’s/A\* algorithm

- Version Control: Git