**REQUIREMENTS**

**GROUP D1, CMPT370**

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**INTRODUCTION**

This document outlines the requirements for creating a system for the “Robot Arena” game. The “Robot Arena” game is a simple turn-based game, played on a board. There can be 2, 3 or 6 players at a time. Each player begins with three robots, each with different statistics. The players take turns moving their robots, starting with the robot with the highest movement. On their turn, a player may move, shoot or do nothing. The last player with a robot on the board wins the game. The system we are creating will implement this game and its rules on a computer system that allows the game to be played by multiple players at once. This will make the game less tedious to keep track of, and allow a comfortable gameplay experience than playing the game on a traditional tabletop board. One of the main features of the game is a visibility system, where the tank can only see as far as its range, which brings out new strategy and difficulty to the game. In addition, the game can be played over a network to allow the player to conveniently play from his or her own machine. The rest of this document will outline what such a system will require to be successful.

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**SYSTEM DIAGRAM**

Below is a high level diagram of the system:

**ACTIONS AND THEIR SCENARIOS**

Below is an overview of actions and scenarios compatible with the system.

One of the actors in this system is the user this represents a person who has started the program and is interacting with the system. The user can take the actions: Navigate Menu, Create Game, and Join Game.

**User: Navigate Menu Scenario**

When the user starts the program they are presented with the main menu screen. The user may navigate the menu which presents options for the game such as choosing to join or create a match, or exit the program.

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**User: Create Game Scenario**

When the user has chosen to create a game from the menu, they are presented with option regarding the number of human and non-human players are to be part of the match. A new game is initiated and the user becomes a player in the system. Should the player decide to cancel, they are sent back to the main menu.

**Preconditions: -**The player has successfully started the program and can navigate the menu screen.

**Post-conditions:** -The user is a player

**-**A new instance of the game is created

**Error-conditions:** -If the player does not have a network connection and chooses two or more human players, the game cannot be created and is not joinable by other human players.

**FIG x.x:**  *The above figure shows the sequence of events taken by a user who has chosen to create a new game. Note that at any time, should the player decide to cancel this action, they are sent back to the main meu screen.*

**User: Join Game**

The user may also choose to join a game as a player. In this scenario, the user choses the “Join Game” option from the menu screen. The user is then prompted to enter a form of match identification for the match they would like to join. If the user has a valid network connection, they are prompted to choose to be a player or an observer. connected to the match as a player.

**Preconditions:** -A valid game must exist

-There must be an empty player slot in the game

- The user and game must both have valid network connections

**Post-conditions:** -The user becomes a player

-The user has joined a match

**Error-conditions:** -The user has no network connection

**FIG x.x:** *The above figure shows the sequence of events when the user chooses to join a match as a player.*

**Secondary scenario: User – Join as observer**

Should the player choose to join the game as an observer instead of as a player (as in step 5 of the diagram above) they are connected to the game as an observer. This allows them only to watch a game in progress.

When a user has successfully joined a match, they become a player. The player is part of a match and as such can take turns. On their turn, they can take the actions: Forfeit, Inspect Tile, Move, Attack, and End Turn.

**Player: Forfeit**

When the user is part of a match, they become a player. Should the player desire to quit the game during an active match, they have the option to forfeit the game. They can do so by selecting the forfeit button, at which time they will be prompted with a confirmation dialogue. They may cancel the action and return to the game, or they can confirm the action and become an observer of the match. They can then leave the game at any time.

**Preconditions: -**The player is part of an active match

**Post-Conditions:** -The player becomes an observer and is no longer part of the match.

-The player’s robots are removed from the game

**FIG x.x:** *The above figure shows the sequence of events taken by a player who considers forfeiting the game. When the player forfeits, they become an observer. They may also cancel their forfeit.*

**Player: Inspect Tile**

On their turn, a player may inspect a tile. A tile can only be inspected if it is in range of one of the player’s robots. If the tile has any tanks on it, a window with a list of all robots on the tile and their stats will be shown to the player. If the tile is empty, the window will not be shown.

**Preconditions:** -The tile is within range of one of the player’s robots

**FIG x.x:** *The above figure shows the sequence of events the player takes when inspecting a tile.*

**Player: Move**

Along with inspecting a tile, on their turn a player may move one of their robots to a tile within range of the robot. They do so by selecting the move option and selecting a tile in range and confirming their choice via a confirm button. The robot will then move to the selected tile, and the line of sight for the player will be updated. Note that a player can repeat this action as long as the robot has not moved a number of tiles equal to its movement range.

**Preconditions:** -It is the player’s turn

-The robot the player is moving has not moved its movement range

**Post-conditions:**  -The robot has been moved to the tile selected

-The number of tiles traveled this turn is updated

to match the number of tiles the robot has moved

**Error-conditions:** -The player chooses a tile out of range of the robot

-The player has moved the movement amount for the robot

**FIG x.x:** *The above figure shows the sequence of events for a player who has chosen to move a robot. This action results in a robot being moved to the selected tile, and the player’s field of view being updated. Note that if the robot has moved its movement range, the robot can no longer be moved.*

**Player: Attack**

Along with moving, a player can attack on their turn. The player can attack a tile if it is in the shooting range of one of their robots. The selected tile then takes the amount of damage the player’s robot can give, and subtracts it from the health of all robots on the tile. Note that a player can move and shoot in the same turn, and can move after shooting, provided the robot’s movement range has not been exceeded. Also, a player can damage their own robot.

**Preconditions:** -It is the player’s turn

-The enemy robot is within shooting range of the player’s robot

**Post-conditions:** -The enemy robot takes the amount of damage the player’s robot can give

**FIG x.x:** *The above figure shows the sequence of events taken by a player*

*who has chosen to attack. Note that a player can damage their own robot.*

**Player: End Turn**

Finally, a player can end their turn. This can be done at any time during a player’s turn. The player chooses the “End Turn” button and will be prompted with a confirmation prompt. When the player confirms, their turn is over, and the next player takes their turn.

**Preconditions:** -It is the player’s turn

**Post-conditions:** -The player’s turn is over, and the next player takes their turn

**FIG x.x:** *The above figure shows the sequence of events taken by a player choosing to end their turn. This can be done at any time during the player’s turn. The next player gets their turn after this action.*

The Robot librarian is another actor in the system. It is used to manage robot programs. The Robot Librarian can: Enumerate, Download robot programs, and Update Match Statistics after a match.

**Robot Librarian: Enumerate**

The Robot Librarian can query for robot programs by different fields such as: Team, Name, Wins, Matches Played, Win/Loss Ratio. The Robot Librarian can also display statistics.

**Post-conditions:** -The query returns the list of robots in a sorted order

**Error conditions:** -The robot programs cannot be accessed

**Robot Librarian: Download**

The Robot Librarian can download robot programs so they can be run with the system.

**Preconditions:**  -A robot program is selected

**Post-conditions:** -A robot program is downloaded into the system

**Error conditions:** -The robot programs are unavailable

**Robot Librarian: Update Stats**

The server is the actor that handles communications between multiple machines for network gameplay. It can: Save the Game State and Receive and Respond to Requests for updates.

**Server: Save Game State**

**Server: Receive and Respond to Update Requests**

The observer is the last actor in the system. It is similar to a player, but cannot directly influence gameplay. The observer can see all tiles on the board and the robots on them. The observer has the ability to: Inspect Tiles, and Leave.

**Observer: Inspect Tiles**

**Observer: Leave**

**PLATFORM**

**SUMMARY**