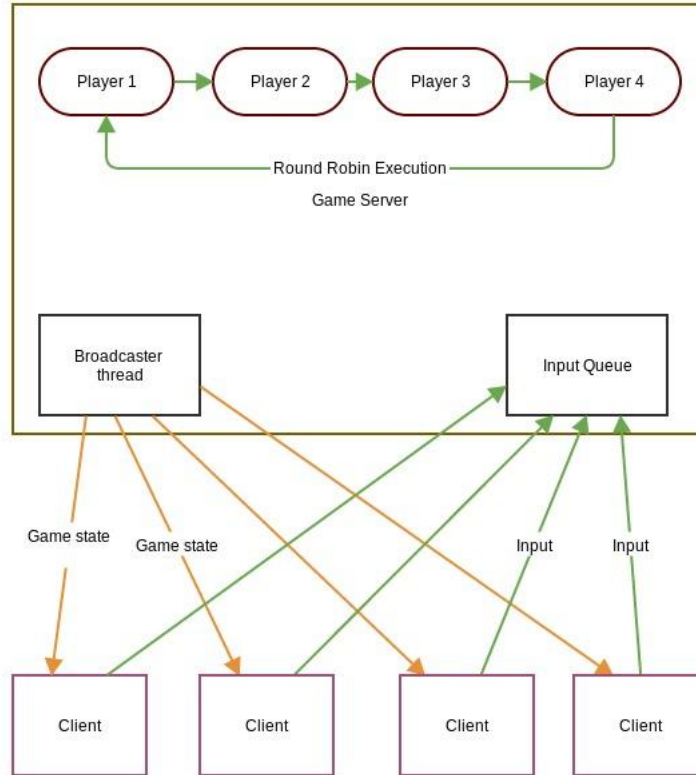


# Game Design Document

## 1 System Design



The game is designed is based on client-server model. There is a single game server and as many as four game clients. At least one of the game client has to be human. Rest of the game clients can be either human or AI bot. The game client generates the following commands:

- goto  $\langle xpos \rangle \langle ypos \rangle$
- attack  $\langle pid \rangle$
- useitem  $\langle x \rangle$
- grabitem  $\langle xpos \rangle \langle ypos \rangle$
- quit

The human player generates above commands using mouse and keyboard. The AI bot generates these commands based on the AI logic. The game client sends these commands generated by human or AI bot to the game server. The game server has a player associated with each game client. These players on server has command queue associated with them. Whenever game server receives the commands from game clients, it enqueues them into appropriate player command queue. The players are scheduled in *round-robin* fashion. Each player is a deterministic state machine which changes its state depending upon the command to be processed from its command queue.

The game server maintains the game state which is essentially terrain, player information, temple health, and fired magic spells. The game server broadcasts this information to all game clients. The game clients use this information to render the screen. Screen rendering is not done if game client is running in AI mode.

The path finding in terrain is done using *A\* Algorithm*. Due to efficiency of A\* algorithm, the chase of the moving target in real-time is possible. The fired spells travel along the straight line obtained using *Bresenham line drawing algorithm*.

## 2 User Interface

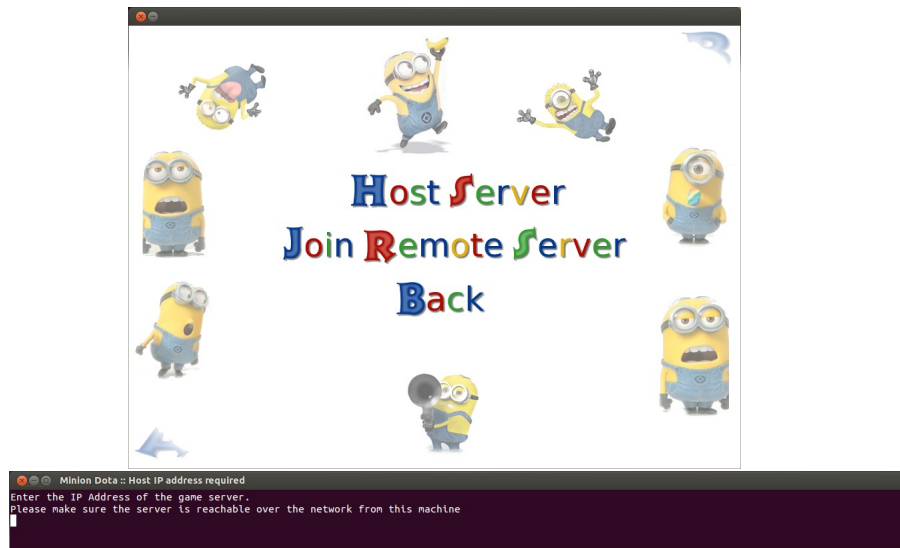
### 2.1 Menus

The main screen displays all the options for the game.

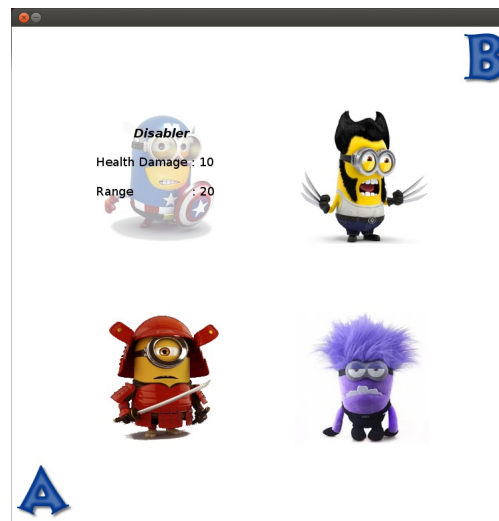


- Single player: In single player mode, the player will need to choose the heroes and the team for himself and 3 AI players.
- Multiplayer screen: In multiplayer mode either the game can start in host mode or in client mode. These modes can be chosen using the options

“Host Server” or “Join Remote Server” respectively. To join a remote server the client player needs to specify the IP address of the Host Player machine.

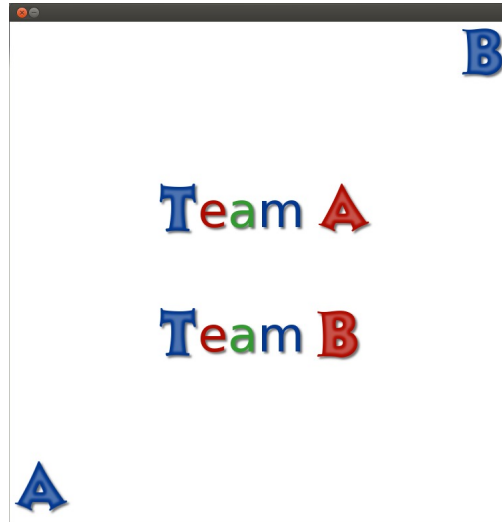


- Hero selection : The hero selection screen gives a choice of 4 heroes to the player. The capabilities of each hero is displayed on the screen itself.



- Team selection : The player can choose either of the 2 available teams , viz , Team A and Team B. The user is accordingly informed if the team

capacity if full or not.



- Settings : The the game speed can be controlled from the settings menu. The game currently has 3 speeds, viz, Slow, Medium and Fast. The game speed needs to be set at the beginning of the game at the host server only.



## 2.2 Game Controls

- Movement in terrain : Players can move freely in the terrain on the side of the diagonal division of which they are spawned and the war area. To move any where in the terrain the player can right click the destination.

- Attacking : Each hero has 2 attacking modes : Melee attack mode and Magic attack mode. To attack an enemy, player can take the mouse pointer to it and the pointer will turn into target mode which indicates the hero or the temple under the pointer is an enemy. Left click will initiate attack in melee mode. M + Left click will initiate attack in Magic mode.
- Collecting items : To collect an item visible in the terrain, take the mouse pointer on the item. The pointer will turn into grab mode indicating that the item can be grabbed by the player. Left click will initiate the player to grab the item. Any hero can collect limited number of items depending upon its satchel capacity.
- Using special powers: The special powers can be used depending upon their availability in the players satchel. Following are the keys to use the powers and the description of the powers.
  - Hammer(h key) : Enhances the melee attack by 1 unit.
  - Super Hammer(Shift + h) : Enhances the melee attack by 4 units.
  - Temple Healer(t) : Increases the health of the temple by 50 units.
  - Fireball(r) : Increases the damage of magic and melee attacks by 10 units each.
  - Banana(b) : Increases the health of the player by 10 units.

The Game screen:

