App Development Project Plan

Overview

This project will be a game of tag, involving turn-based strategy while balancing the resource stamina. The map will be a grid which is made of moveable tiles (the ground) and immovable tiles (walls). Fog-of-war will obstruct the vision of both players. The chaser and runner will begin in opposite corners of the map and take their turns simultaneously. A turn ends when both players have submitted their moves. Each player has 20 seconds to make their moves, and if the game does not end in 20 turns, the game will end with the runner as the winner. All movement for both players will be locked during the winning and losing state of the runner being captured, or the turns expiring.

Mechanics

Stamina: By default, stamina will be refresh to 6 at the start of each turn and for each valid move made, the stamina will be reduced by 1. The player cannot move if the stamina is at 0.

Turns: Players will take their turns at the same time; the movement data will be sent in real time to each player. Both players must end their turns to progress to the next turn. If a player's turn is not ended within 20 seconds, it will be ended for them.

Fog-of-War: By default, players can only see 5 tiles in each direction. This sight is stopped by walls; however, the fog only obscures the location of players and power-ups.

Power-Ups

Power-ups will always last 3 turns, and 2 different power-ups cannot be active at the same time. If a power-up is picked up while one of the same types is it effect, it will have its duration refreshed. If a power-up of a different type is picked while one is in effect, it will be overridden with the new power-up.

Visual Modifier: The visual power-up will be coloured green on the map and will change the way that fog-of-war works. If the chaser picks it up, it will blind the runner, reducing their vision to 1 tile in each direction. If the runner picker it up, it will double their base vision range to 10 tiles in each direction.

Movement Modifier: The movement power-up will be coloured yellow on the map and will change the way stamina works. If the chaser picks it up, it will add 2 additional stamina to the chaser while it is in effect. If the runner picks it up, it will reduce the chaser's stamina by 2 for the duration of the effect.

Interaction

The game will feature a header bar at the top of the screen which will display various information to the user i.e. amount of stamina remaining. Below the game screen there will be 5 buttons, one for each movement direction and the last allows the player to end their turn.

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Multiplayer Protocols

Whenever a valid move is made, the direction they moved will be sent to the server and communicated to the other player. Additionally, when the server receives end of turn information from both players, both players will receive the start of turn trigger.

Additional Features

- Teleporter: will send a player across the map to another teleporter.
- Barricade: a power-up which allows a player to place a temporary wall.
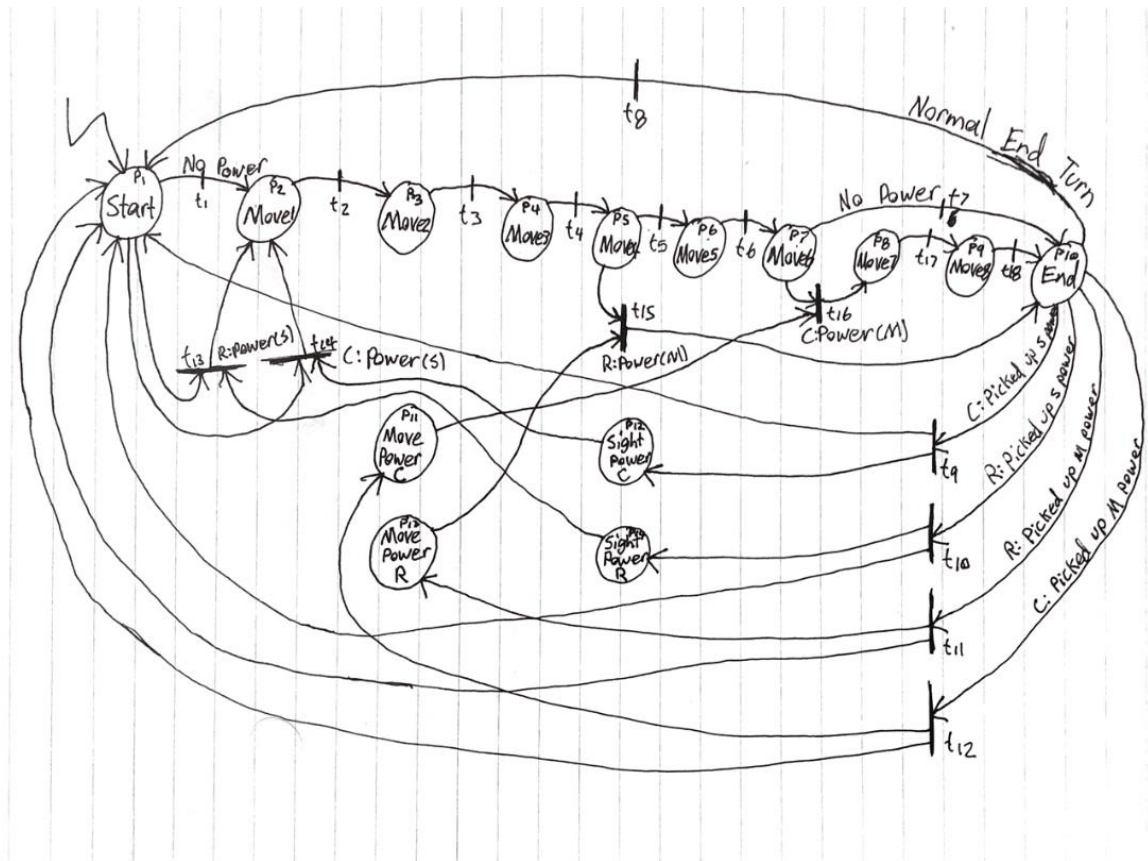- Random Maps: will choose a random map from a selection of pre-made maps.

Diagrams

Figure 1: Petri-net of the system.

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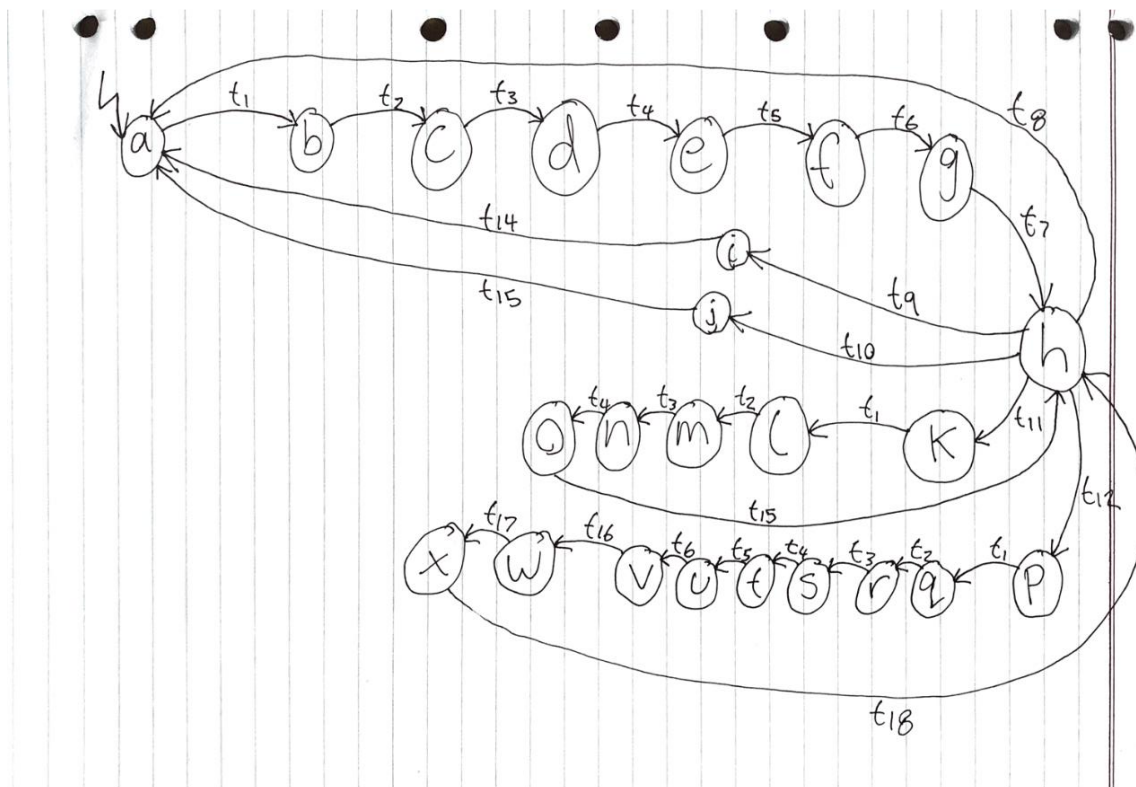|	t1	t2	t3	t4	t5	t6	t7	t8	t9	t10	t11	t12	t13	t14	t15	t16	t17	t18
a	1000000000000	0100000000000																
b		0100000000000	0010000000000															
c			0010000000000	0001000000000														
d				0001000000000	0000100000000													
e					0000100000000	0000010000000												
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g							0000001000000	0000000100000										
h								0000000100000	1000000000000	1000000000100	1000000000001	1000000000010	1000000001000					
i	1000000000100													0100000000000				
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k	1000000000010	0100000000010																
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m			0010000000010	0001000000010														
n				0001000000010	0000100000010													
o					0001000000010											0000000010000		
p	1000000001000	0100000001000																
q		0100000001000	0010000001000															
r			0010000001000	0001000001000														
s				0001000001000	0000100001000													
t					0000100001000	0000010001000												
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v						0000010001000										0000000100000		
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Figure 2: Transition table for the Petri-net in figure 1.

Figure 3: DFA of the transition table in figure 2.

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