

Design Document

This program is one that simulates a computer version of freeze tag. The player maneuvers around the arena while trying to freeze all the robots before the player runs out of battery or all the robots become super bots. The player, robots, super bots, and home base all move around the arena with the potential to collide with obstacles, walls, and each other.

An obstacle is a stationary object in the arena which mobile entities collide with. If the player collides with an obstacle, the player's heading is directed directly away from the obstacle, the player loses 20 units of charge. Robots and super robots interact with obstacles in the same way as the player without the loss of charge since they don't have a battery. The recharge station is a special type of obstacle with the ability to give the player a full charge upon the player colliding with it.

The home base is a mobile object in the arena that makes robots that collide with it into super robots. The home base has a collision sensor which it uses to bounce off objects and create super robots in the place of robots that collide with it. If the player collides with the home base, the home base reacts like it has collided with an obstacle.

The player is controlled by a person whose goal is to run into all the robots to make them freeze to win the game while not running out of charge or allowing the robots to all become super bots. Whenever the player collides with any other object in the arena as determined by the arena, the player loses 20 units of charge. The one exception to this rule is if the player collides with the recharge station which is a stationary obstacle which delivers a full charge upon the robot colliding with it. The player also freezes a robot upon colliding with it. The player is frozen for an undetermined amount of time if it collides with a super robot. The player controls the robot by pressing the arrow keys to turn left, turn right, speed up, and slow down.

A robot is a mobile object in the arena that uses its sensors to collide with the home base to become a super bot before the player freezes it. After a robot becomes a super robot, it uses its sensors to unfreeze normal robots by colliding with them and freezing the player by colliding with it. The arena contains 5 robots and each robot has a collision sensor, proximity sensor, and an entity type sensor to assist it in maneuvering about the arena. The sensors read in information that was given to the mobile entity by the arena, and then the sensors inform the mobile entity of what course of action should be taken.

A collision sensor is used by the robots, super robots, home base, and player to determine if they have collided with any other object in the arena. The arena loops through all the mobile objects in the arena and fills out a collision event to pass to the mobile object. The mobile object then determines if a collision has occurred and then takes the correct course of action.

A proximity sensor is used by robots and super robots to determine if an object is in front of it. This sensor has a defined angle of width and range to look for objects in front of the robot or super robot. The proximity sensor also returns how far the object is from the robot or super robot. The arena fills out a proximity event for each robot and super robot for every other object in the arena, and the robot or super robot uses the vent information to determine what course of action should be taken. This sensor works very closely with the entity type sensor to determine the course of action of the robot or super robot.

An entity type sensor is used by robots and super robots to determine the type of an object in a defined range around the robot or super robot. The arena fills out a proximity event for each robot and super robot for every other object in the arena, and the robot or super robot uses the vent information to determine what course of action should be taken.

The program terminates if the player runs out of charge which results in a lose or the player manages to freeze all the robot which results in a win. The arena contains a pause and a reset button toe pause the game or start the game over respectiviely.