Mine Runner

User Manual

The goal of Mine Runner is to reach the goal (shaped like a star) without being hit by a red enemy. Reaching the goal takes the player to a new level and increases the speed of the enemies.

Controls:
'A' – Move Left
'D' – Move Right
'Spacebar' – Jump
Left Mouse Button – Destroy clicked block near the hero

UI Buttons:
Reset – Reset the game to initial state
Pause – Pauses all action on screen
Difficulty '+' - Increases the speed of the enemies
Difficulty '-' - Decreases the speed of the enemies

Design

The game consists of three primitive lists for the blocks, a single primitive for the goal, and a scene node tree that contains the hero and 20 enemies.

The 3 block lists include 1 set of breakable brown blocks that the hero collides with and can destroy, a ring of gray blocks that the hero collides with but can't destroy, and several layers around the edge of gray blocks that are just aesthetic.

The goal is a single primitive that resets the level and increases the difficulty if the hero reaches it.

The scene node tree contains one hero and an array of 20 enemies.

The hero consists of a torso, arm, left leg, right leg and head. The head, arm and legs are all child nodes of the torso.

Each enemy consists of a torso with a head child node.

On each update the hero moves based on gravity in the y direction and user input in the x direction. The player can also jump to give the hero a positive y velocity that will decrement by gravity, resulting in an arching motion. The hero always faces the direction it is moving.

On each update the enemies will move towards the hero by finding the vector between the enemy and the hero, and then dividing that by the distance to maintain a constant speed. This speed is multiplied by scaling value based on the difficulty. Enemies will always face towards the hero.

On left-mouse-click, the block under the mouse is destroyed if it is within a reasonable (1/2 block width) from the hero. This also triggers an animation on the hero.

Collision with an enemy leads to a reset of the level. The difficulty remains the same.

Collision with the hero is done by finding and translating the pivot point of the head, and creating a box around that point that encapsulates the hero. This is checked against the blocks and the enemies.

Diagram
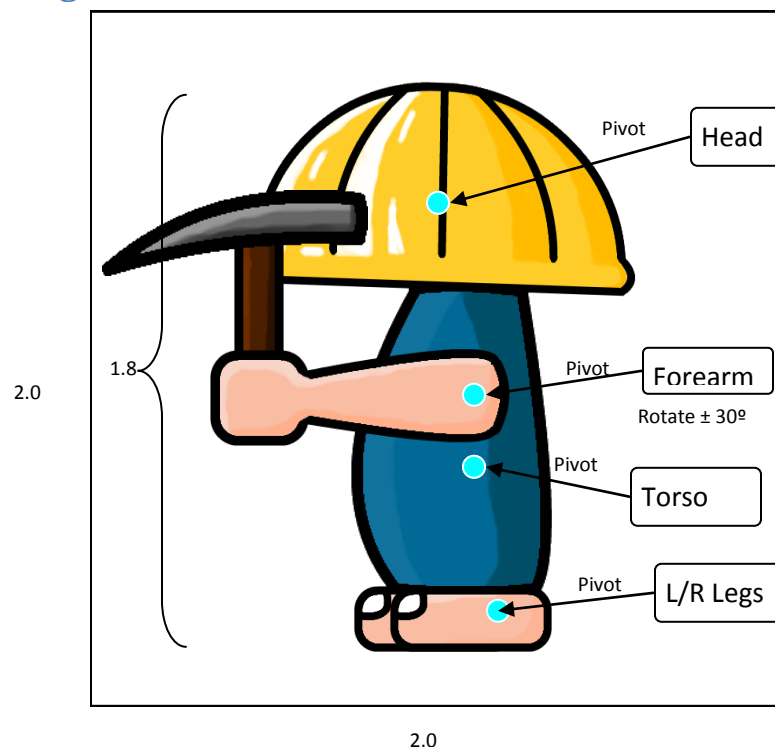
Evaluation

Known Bugs
It is possible to break the collision if corners of blocks are hit in certain ways.

Next Version
- Enemies will be drawn behind the blocks and have particles draw on top of the block that it is behind.
- Hero will be able to destroy an enemy if it is behind a block that it destroys.