Heroes of CIS: Final Report

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1 Overview

We essentially built the game we specified in our design document, but with a few enhancements. None of our risks caused significant problems, but a few had us scratching our heads for a while. The player is a CIS staff member in charge of maintaining the printers at all costs. He must fight his way through horde of students, keeping them from loading Tray 3 and repairing printers before they explode due to their print queue filling.

2 Gameplay

2.1 General

The Game occurs in a 2D playfield containing the player, students (enemies), printers, supply cabinets, walls, and "doors" (student spawn points) arranged in various positions. The printers occasionally break, requiring the player to fix them using a wrench from the supply cabinet. While the printers are broken, an unrelenting stream of print requests are added to their print queues, but when they are fixed, they slowly process the pages, causing the their queues to decrease. If the any of the printer's queues fill, the printer explodes and the game is over.

2.2 Player Controls

Using the arrow keys, the player must move between the printers and supply cabinets, avoiding obstacles and enemies on the way. Each arrow key moves the player in its repective direction, and the player's movement is blocked by walls and the edge of the playfield. The player's motion is also obstructed by printers, supply cabinets, students, and doors.

2.3 Supply Cabinets

Supply cabinets are modeled by immoble critters sitting at various points on the playfield. The player may obtain a wrench from them by simply colliding with them, but can only hold one wrench at a time. Supply cabinets never run out of supplies, so the player doesn't need to worry about running out.

2.4 Printers

Printers are also modeled by immoble critters located in corners here and there. They break at random intervals; every three seconds they have a 25% chance of breaking, so sometimes they break in rapid succession and sometimes they run perfectly for long periods of time. Printers can be fixed

by simply colliding with them while holding a wrench (if only this was true of the real world...), but doing so consumes the wrench.

As mentioned above, when the printers are broken, their print queues increase quickly (at a rate of one page per second), but when they are fixed, their print queues slowly decrease (by one page every three seconds). If their print queue exceeds 10 pages, they explode, ending the game.

2.5 Students and Doors

Students enter the playfield through doors at random intervals; every two seconds a door has a percent chance of spawning a number of students between one and three. The percentages vary per level: doors in Levels 1 and 2 have a 50% chance, and doors in Levels 3, 4 and 5 have only a 25% chance. Students also exit the playfield through the doors; usually they'll do so of their own will, but can be forced out of the room if they are pushed into the door more than three seconds after they are spawned.

Students come in three different varieties as follows:

2.5.1 Gray Students

These students lazily proceed towards a randomly selected printer and then exit through the nearest door. They move rather slowly and are quite subject to getting bumped around. They tend to build up into huge crowds of confused students, trying fruitlessly to progress towards their destinations. They're not a big hinderance to the player because the player can simply push them out of the way; used intelligently, they can actually make for fairly effective shields against the more dangerous student classes, but most of the time they just add to the confusion.

2.5.2 Pink Students

These students more rapidly progress towards a randomly selected printer, with the intent of loading paper into Tray 3. If they do manage to touch their selected printer, the printer breaks instantly and starts building up its print queue as normal. Fortunately, the player can tag these pink students to convert them into harmless grays. They'll also turn gray if they succeed in breaking the printer.

2.5.3 Red/Green Students

These students always enter the lab in their red form, moving rapidly in straight lines and bouncing of walls like gas particles. If they collide with the player, the player drops his wrench if he is carrying one. After 15 seconds, the red student converts into a more calmed green student, which moves towards the nearest door and does not steal the player's wrenches.

2.6 Levels

There are five levels in the game: Levels 1 and 2 take place in the LAC lab, Levels 3 and 4 take place in the AC lab, and Level 5 takes place in a hellish CIS nightmare. Levels differ in wall lay-out, number of printers, and number of doors. The player advances to the next level by surviving some set amount of time: 60 seconds for Levels 1 and 2, 90 seconds for Levels 3 and 4, and 120 seconds for Level 5. Since there is no level after Level 5, the game simply ends once the time limit elapses (we've never managed to last this long, by the way).

2.7 Scoring

The player recieves 10 points for fixing a printer, 15 points for intercepting a pink student, and 25 points for pushing a red student (while it's still red) out the door. Also, the player is awarded 50x the level number after finishing each level.

2.8 Graphics/Sound

The game has specialized graphics for the player, each kind of student, and the rest of the objects mentioned above. Also, print queues are represented graphically in a status box to the right of the playfield, as is an indicator of whether the player is holding a wrench. Sounds are fairly infrequent, mainly because POP is not very good at playing them, but a crashing sound is played when a printer jams.

3 Differences from SRS

The majority of the differences between our original game specification and the actual state of the game are for the better.

- The player can now intercept printer-breaking enemies to render them harmless (and gain points).
- Points are now based solely on actions, not on how long you survive. Moving to the next level, on the other hand, is based solely on how long you survive.
- The game is more level oriented than we originally planned. This allowed us to include both of the labs as parts of the game.
- Doors are now embodied as critters rather than regions. Also, there can be multiple doors.
- Red students now convert into green students after an amount of time. This helps prevent an enormous build up of wrench-stealing reds, which would render the game almost impossible.
- Pushing red students through the door gives the player a considerable amount of points, because it's fairly difficult to do and simultaneously a good idea (as that reds tend to steal your wrenches when you need them most).

4 Bugs and Possible Improvements

While the game is playable and fun, it's not bug free. We've spotted the following:

- POP seems to have some issues with spawing critters in the same location. When multiple enemies are spawned simultaneously at the door, they sometimes get stuck together and to the door. It looks sorta like they're holding hands.
- Also, in the first two levels, the player does not automatically move off of the supply cabinet when he is spawned there. It seems that POP defaults to pushing things off to the right, which happens to be into the edge of the playfield in these levels.
- In particularly crowded situations, some strange collision effects (such as students tunneling through walls) can be observed. This is more a fault of the POP architecture than our game.

Also, there are a few areas where our game could be improved:

- The levels are still in need of some balancing. We didn't have much time to play test our game, so we only managed to get it to the point where things seemed to get harder and it was possible to get to Level 4 if you were particularly good. Level 5 may very well be impossible, but it is the last level after all.
- An enemy cap could have been implemented to help keep innumerable hordes from getting out-of-hand.
- Enemy AIs could be improved, resulting in less walking into walls and bumping into each other. But then again, it's a pretty good simulation of sleep-depped Mudders as it is.
- As if the game wasn't challenging enough, we could make it so that printers need more than one kind of supply. For instance, they could run out of paper or toner in addition to having generic jams. Such a change would require a whole bunch more rebalancing.
- The graphics are nice, but they could be yet better. For instance, the print queues could have been made easier to read. Also, we could have squeezed in a few more sounds.