FEATURES

MVPP Feature #3

Name: Helicopter movement

Feature: The programmer can apply 'thrust' to the helicopter in the cardinal directions (up, down, left, and right). The thrust has both separate vertical and horizontal values, with a range of -100 (for backwards) and 100 (for forwards). The helicopter will not move instantaneously or stop instantaneously as well. It will have inertia and momentum adding both realism and an extra challenge for the player.

Constraints: The helicopter can move up or down on the screen but no portion of the helicopter can move offscreen. If the helicopter hits an object the player will either lose a life or lose the level. The helicopter hitting a victim results in either a save or kill, depending on velocity, as well as adding or subtracting to the player's points.

MVPP Feature #6

Name: Background scrolling

Feature: The background automatically scrolls independent of the helicopter.

Constraints: The background doesn't scroll backwards. The helicopter cannot go off screen.

Scroll speed is capped so it moves slowly.

MVPP Feature #8

Name: Victim Generation

Feature: Victims spawn throughout the entire map for the player to rescue using the helicopter's movement feature illustrated in Feature #3.

Constraints: The victims should spawn between a level of 5000 x 768 resolution, and should not clip through the floor or the ceiling of the level, but may clip from the front or to the back, ensuring that victims spawn within reach of the player, while still providing the rush of a challenge. The victims should scroll from right to left throughout the level so that the player-controlled helicopter may miss them.

MVPP Feature #9

Name: Environment Generation

Feature: Generate objects for the entire level, and make the objects scroll (1 pixel per frame). **Constraints:** Make sure objects are generated properly (not overlapping). Ensure objects are not scrolling too fast or too slow. Ensure helicopter has the ability to navigate through the objects (they aren't too close together). Ensure objects move at the same speed as victims.

MVPP Feature #10

Name: Victim Rescue

Feature: The helicopter picks up and rescues victims; when a victim is rescued the number of

saved victims increases as well as the score

Constraints: Victim can be rescued from any angle or velocity. Saving a victim adds 50 points

to the score.

MVPP Feature #11

Name: Lives

Feature: The player starts the level with 5 lives, which are decreased by 1 each time the helicopter collides with a building. When the player has < 0 lives (-1) the end screen is displayed for losing.

Constraints: The player cannot have more than 5 lives or less than 0. If less than 0 occurs, the end screen for losing is displayed. The player cannot lose lives within the grace period given after hitting a building (invincibility frames).

MVPP Feature #12

Name: Title Screen

Feature: Displays the title of the game and has a start/quit button.

Constraints: The game doesn't start until the user presses the start button. In addition an 's' shortcut will exit the screen. Caps Lock cannot be on -- input only works off of lower-case "s" key. The title screen can also be skipped before startup if the user desires.

MVPP Feature #13

Name: Pause

Feature: Darkens the screen and halts the game, saving the current state; and has a continue button and a guit button

Constraints: The game doesn't continue until the continue button is pressed, and the current game isn't affected by pausing

MVPP Feature #14

Name: End Screen

Feature: Displays a graphical end screen and has a restart/quit button

Constraints: The game doesn't restart until the button is pressed, as well as quit

MVPP Feature #15

Name: Victim Distance Sensor

Feature: MiniAT has ports to return the X and Y distance from the helicopter to the nearest victim. The X distance is the distance between the front of the helicopter and the left side of the victim. The Y distance is the distance between the top of the helicopter and the helicopter and the bottom of the nearest victim.

Constraints: The victim which is found is the closest to the helicopter; the victim isn't behind the helicopter (already passed by);

MVPP Feature #16

Name: Building Distance Sensor

Feature: MiniAT has ports to return the X and Y distance to the top of both ground and ceiling buildings. The X distance for each type is the distance between the front of the helicopter and the left side of the closest ground/ceiling building. The Y distance for ground buildings is the distance between the bottom of the helicopter and the top of the building; the Y distance for ceiling buildings is the distance between the top of the helicopter and the bottom of the ceiling buildings.

Constraints: Buildings must be in front of or currently in line with the helicopter; ground and ceiling sensors are separate entities.

MVPP Feature #17

Name: Lose Screen

Feature: After losing all lives, the lose screen pops up, displaying a message indicating that the player has lost the game. The screen offers buttons to both restart and quit.

Constraints: Lose screen must only pop up when the player loses all lives, indicating that they have lost the game; restart starts the simulation from the beginning of the level and score/lives reset.

DESIGN

- Score:
 - o Increase for each victim rescued
 - Increase for each distance checkpoint
 - The farther the checkpoint, the more it's worth
 - The faster the level is completed, the more points awarded
 - Decrease for each victim killed
- Collision:
 - o Helicopter collides with obstacle: lose a life
 - Helicopter collides with a victim: if hit with helicopter, victim is killed
 - Helicopter collides with ceiling/floor of window: no problem as long as no obstacle is there
 - If collision with non-window-border environment occurs, no lives lost.
 - If collision with buildings happens at 0 lives → "You Lose" end screen plays.
- Obstacles:
 - Obstacles are part of the level, levels are premade

Rescuing Victims:

- The helicopter drops a rope to reach the victim
- The victim has to 'climb' the rope
- While the victim is climbing the rope they are vulnerable to other obstacles

Helicopter Physics:

 The helicopter follows a set of physics rules (inertia/momentum), so it won't start or stop moving instantly

Helicopter Movement:

- The helicopter will have a x and y velocity, which will be affected by thrust
- The helicopter can move anywhere on the screen
- Cannot move backwards through the level Super Mario Bros level progression
- The helicopter can touch each edge of the screen and not crash, as long as an object isn't there

MiniAT Movement:

- Peripherals to apply horizontal and vertical thrust, range [-100, 100]
- Peripherals to return the helicopter's x and y position (in exact pixels)

MiniAT Sensors:

- Life sensor
 - Peripheral to return the number of lives the player has left
- Victim sensor
 - Peripheral to return the horizontal distance to the nearest victim
 - Peripheral to return the vertical distance to the nearest victim
- Object sensor
 - Peripheral to return the horizontal distance to the nearest object
 - Peripheral to return the vertical distance to the top of the nearest object

SCREENS:

- Title Screen
 - o Shows the name of the game, buildings, and has buttons to start or quit

Pause Screen

- Darkens the current play screen
- Displays pause message
- Has buttons for continue or quit

End Screen

- Has buttons for restart or quit
- Shows credits for authors of program (Our names)

Lose Screen

- Displays message indicating that you lost the game.
- Has buttons to restart game or quit.

• Has background image of cityscape.