**Level 1: Black and White (bulletPattern: normal, movePattern: group, waveType: 6)**

Enemies: X number of enemies moving in square formation

Gateway: Kill all enemies to progress

Adjustable Numbers: # of enemies, speed of enemies, frequency of bullets fired

Special: None

**Level 2: Synchronized (bulletPattern: sync, movePattern: group, waveType: 7)**

Enemies: X number of enemies moving in square formation

Gateway: Kill all enemies to progress

Adjustable Numbers: # of enemies, speed of enemies, frequency of bullets fired

Special: Every X seconds, all enemies shoot same colored bullets at same time

**Level 3: Patterns (bulletPattern: weird, movePattern: upDown, waveType: 3)**

Enemies: X number of enemies moving in up-down formation

Gateway: Kill all enemies to progress

Special: Enemies shoot lots of bullets in cone-shaped spread. Certain areas of the stage are safe from certain colored bullets.

Adjustable Numbers: # of enemies, speed of enemies, frequency of bullets fired, parameters of conal bullet spread

**Level 4: Flippers (bulletPattern: normal, movePattern: flip, waveType: 8);**

Enemies change colors every X seconds. Enemies slowly move down to off screen.

Gateway: Back row of enemies that only moves up and down. These enemies must be killed in order to win.

**Level 5: Phoenix (bulletPattern: boss1, movePattern: boss1, waveType: 4)**

Boss level 1. One boss replaced by other.

**Level 6: Obstacles (waveType: 9)**

Add obstacles that block bullets and cannot be moved into.

**Level 7: Seekers (movePattern: homing, waveType: 10)**

Intelligent obstacles slowly follow players and must be avoided.

**Level 8: Backfire (bulletPattern: weird, wavetype: 11)**

Similar to patterns, but pattern is harder to figure out.

**Level 9: On either side (bulletPattern: boss2, movePattern: boss2, waveType: 5)**

Boss level 2.

function createWave(waveType, count, timeGap, interval, isGateway)

**waveType**: type of wave of aliens created at onTick()

**count:** number of alien creating loops in onTick(). (Basically the number of aliens created)

Example: if onTick() creates 10 aliens in a loop in a particular wave. count is the number of times that loop is repeated in the designated wave.

**timeGap:** time that has to elapse before the next wave begins.

**Interval:** pause time between alien creation loops.

Example: if interval is 0.25, onTick pauses for 0.25 seconds before the next alien creating loop begins.

**isGateway:** if this is true, it prevents the next wave from starting until the number of aliens on screen becomes zero.

function createLevel(levelType, num, timeGap) {

**levelType: what level it currently is.**

**Num:** number of cumulative waves up until this level.

Example: if level 1 had 10 waves and level 2 had 9, num of level 2 should be 19.

**timeGap:** time that has to elapse before the next level activates.

function createAliens(x, y, speed\_x, speed\_y, image, bulletPattern, movePattern, colorType, hp) {

**x**: x-position

**y** : y-position

**x** : x-velocity

**y** : y-velocity

**image** : the image for this creature

**bulletPattern**: the type of bulletPattern used.

**movePattern:** if there are special movement patterns.

**colorType:** color of creature. Either black or white

**hp:** amount of life of the creature

GLOSSARY:

bulletPatterns:

|  |  |
| --- | --- |
| normal:  creatures shoot towards the player.  Color of bullets are the same as creature color  adjusting ALIEN\_TORPEDO\_RECHARGE\_TIME changes firing rate | weird:  Fires 5 bullets in a ‘conic’ radius to the left.  Color of bullets are the same as creature color  adjusting ALIEN\_TORPEDO\_RECHARGE\_TIME changes firing rate  adjusting value of s changes number of bullets  adjusting the divisor used to change speed\_x and speed\_y changes the spread of bullets |
| Sync:  Causes all creatures with the same bulletPattern sync to shoot at the same time at each interval towards the players  Color of bullets are the same as creature color  Adjusting the integer in  now - groupLastTorpedoTime > 3  changes the group firing rate | boss1:  Has two interval loops governed by alien.lastTorpedoTime and bossBulletNum  To simulate bursts of bullets between intervals  In black form  Shoots a barrage of black bullets in a semi-circle conic spread towards the left  In white form  Shoots a barrage of black and white bullets in a semi-circle conic spread towards the left  Uses the sin and cos formula to change the angle of the bullet’s directions |
| Boss2:  Has two interval loops governed by alien.lastTorpedoTime and bossBulletNum  To simulate bursts of bullets between intervals  In black form  Shoots a barrage of black bullets spread out towards the player  In white form  Shoots a barrage of white bullets spread out towards the player. |  |

movePatterns:

|  |  |
| --- | --- |
| normal:  moves like normal, following the x and y velocity given | upDown:  changes the y-velocity when near either the top or bottom of the screen. |
| Boss1  When a sufficient x-distance to the left has been crossed, causes the boss to move up and down.  Boss in white form moves quicker | Boss2:  Moves up and down slowly. Changes the y-velocity when near the top or bottom of screen |
| Group:  When a sufficient x-distance to the left has been crossed, creature starts to move in a square formation.  Changes velocities between intervals.  x-distance depends on groupNum, which is given to the creatures when they’re created in group waves.  This is to create varying distances between waves of creatures. | Flip:  Causes the creature to move diagonally.  Changes the velocities appropriately when reaching the ends of the screen.  Between intervals, the creatures flip colors. |
| Homing:  Causes the creature to move towards the players.  The creature’s velocities change depending on the player’s position, directing the creature towards the player. |  |