Wormhole Invaders

A colourful shooting game with a LED strip for 1 to 7 players

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Introduction

An alien fleet is attacking — but not head-on. The invaders travel through an elongated wormhole and approach you one by one in different forms.

You defend the base and have a superlaser at your disposal with a **red**, a **green** and a **blue** laser beam. Combinations are also possible. For **magenta** you fire **blue** and **red** simultaneously. **Red** and **green** give **yellow**. **Green** and **blue** together give a **cyan** laser pulse, and for white you use all three colours simultaneously.

The invaders have their own colours and also fire at your base. Fire with the correct laser colour and the invader or enemy projectile is destroyed. Use the wrong colour and things may not end well for you…

The game is playable for a toddler and challenging for a teenager. At lower levels the invaders don't shoot back — they do at higher levels. Educational too: hand-eye coordination is put to the ultimate test. And best of all, you can play alone or with the whole family!

Playing a game

Multiplayer

Doorloop bij het opstarten de volgende stappen:

Follow these steps at startup:

1. **Player selection**
   Choose which players participate. Browse with red and blue through the names, press green to toggle a player on or off (the display shows the name brighter when the player is active), and confirm with the black button.
2. **Level selection**

   Choose the start level and stop level using red (higher) and blue (lower). Confirm with black or green. These preferences are remembered.
3. **Play order**

   The order of players is determined randomly once and stays fixed. All players take turns playing the same level in sequence. Then everyone advances to the next level.
4. **Elimination**

   If the invaders reach your base, you are eliminated. You no longer participate in subsequent levels, but your score remains.

   Standings and winner

5. **Standings and winner**
   The game ends when all players are eliminated or all levels are completed. Scores are shown from low to high, followed by a rainbow animation for the winner.

If multiple players share the same final score, the one who completed the most levels wins.

Solo

For solo play the same first two steps apply (player selection and level selection). The game then runs through all levels in sequence:

- Clear a level and you automatically advance to the next one.
- If the invaders reach your base, the game ends immediately.
- At the end you see your final score on the display and a score bar on the strip.

Hardware

Buttons

The device has three coloured buttons and one black button. Each coloured button has a built-in LED:

- **Red** — next player / level up.
- **Blue** — previous player / level down.
- **Green** — toggle selection on/off (during player selection).
- **Black** — confirm choice.
- **Black** held (3 seconds) — fully restarts the game.

Display

The six-digit display shows the relevant information at all times:

- **Player selection:** the name of the player under the cursor (brighter = active).
- **Level selection:** the chosen start or stop level number.
- **Announcement:** the name of the player whose turn it is, while the white countdown ribbon on the strip counts down.
- **During play:** your current score.
- **Wrong colour:** the score briefly dims.
- **Eliminated:** OVER — followed by your final score for that level.
- **Standings:** names and scores from low to high.

The LED strip

- **Level-indicator LEDs:** one dim LED per level at the near end — shows orientation and current level.

- **White countdown ribbon:** the white ribbon for your turn shrinks from the far end toward your base — when it disappears, the game begins.
- **Danger zone:** the pixels closest to your base glow dim white as the wave approaches.
- **Score bar after elimination:** white LEDs show your score; red LEDs fill the gap to the high score. If you set a new high score, the previous high score portion is white and your improvement shows in green.
- **Score bar in standings:** green bar proportional to each player's total score.
- **Rainbow:** winner animation across the entire strip.

The Invaders

The wave

Asteroid

- **Appearance:** one pixel in red, green or blue.
- **Shoot:** press the button with the matching colour.
- **Hit:** one shot is enough, +1 point.
- **Miss:** your laser pulse strengthens the wave — the miss colour joins the front, −1 point.

Planet

- **Appearance:** one pixel in yellow, cyan or magenta.
- **Shoot:** two buttons simultaneously — red+green for yellow, green+blue for cyan, red+blue for magenta.
- **Hit:** one shot is enough, +2 points.
- **Miss:** your laser pulse strengthens the wave — the miss colour joins the front, −2 points.

Star

- **Appearance:** one white pixel. Always at the back of the wave as the last enemy.
- **Shoot:** all three buttons simultaneously (red + green + blue).
- **Hit:** one shot is enough, +3 points. All three button LEDs flash briefly as a reward.
- **Miss:** your laser pulse strengthens the wave — the miss colour joins the front, −3 points.

Meteor

- **Appearance:** four consecutive pixels in the same colour, noticeably dimmer than single invaders. The more damage it takes, the dimmer the pixels become.
- **Shoot:** the same colour as the meteor pixels — primary or mixed, depending on the meteor. Always hit the front pixel first.
- **Hit:** 2 HP per pixel, 4 pixels in total. A meteor needs 8 hits to fully destroy. +1 point per destroyed pixel (maximum +4).
- **Miss:** your laser pulse strengthens the wave — the miss colour joins the front, −1 point.

Note: there are never more than three consecutive single invaders of the same colour in a row. Four or more consecutive pixels of one colour are always a meteor.

The bosses

At certain levels a boss appears after clearing all waves — an interstellar creature that advances from the far end of the strip. Bosses behave differently from waves:

- **No growth penalty:** firing the wrong colour at a boss has no consequence. The bullet simply disappears.
- **Bosses shoot back:** coloured projectiles fly toward your base. Intercept them by firing a bullet of the same colour. Miss one and it is immediately game over.
- **Segments:** a boss consists of multiple coloured segments, each with its own colour. Destroy the front segment first.

Rampart

- **What it is:** nine segments in alternating primary colours. Crawls slowly toward you.
- **Attack:** fires a single projectile at regular intervals. The projectile often differs in colour from the front segment.
- **Rage attack:** using the wrong colour three times activates rage mode. The Rampart fires a rapid burst of projectiles. Survive the burst and it calms down.
- **Strategy:** intercept projectiles with the correct colour, then destroy the front segment. Avoid wrong colours to prevent rage.
- **Points:** +1 point per destroyed segment.

Sentinel

- **What it is:** nine segments, initially dark and invulnerable.
- **Attack:** stops at three fixed positions on the strip. At each stop it picks a random colour, charges up (segments pulse as a warning) and fires a barrage of projectiles in that colour.
- **Vulnerable:** after the barrage the active segments become vulnerable and light up in the firing colour. Segments not destroyed in time stay active and make the next barrage longer.
- **Strategy:** survive the barrage by intercepting projectiles, then destroy the exposed segments as quickly as possible.
- **Shoot:** use the barrage colour — all active segments burn in that colour after the attack.
- **Points:** +1 point per destroyed segment.

Prism

- **What it is:** fifteen segments in random mixed colours (yellow, cyan, magenta). Moves continuously and fires occasional projectiles.
- **Phase change:** at two moments all segments turn white and the Prism is invulnerable for four seconds. Afterwards all segments receive new random mixed colours.

- **Burst:** immediately after each phase change it fires a rapid burst of projectiles in random colours — both primary and mixed. This is the most dangerous moment.
- **Strategy:** destroy as many segments as possible between phase changes. Prepare for the burst — one missed projectile means game over.
- **Shoot:** two buttons simultaneously for each segment — the colour differs per segment. Destroy the front segment first.
- **Points:** +1 point per destroyed segment.

The levels

The difficulty of each of the nine levels is configured using a matrix with ten columns:

#	Name	What it does
0	gap	Number of off-screen pixels between waves. More gap = more breathing room between waves. (No gap before the first wave.)
1	waves	Number of waves per level. With waves=2 everyone plays: wave → gap → wave. Score and distance bonus accumulate per wave.
2	ast	Number of asteroids (one pixel, primary colour: R/G/B, 1 button, +1 pt each).
3	star	Number of stars (white pixel, all 3 buttons simultaneously, +3 pt, always last in wave).
4	planet	Number of planets (one pixel, mixed colour: Y/C/M, 2 buttons simultaneously, +2 pt each).
5	meteor	Number of meteors in primary colour (4 consecutive pixels, 2 HP per pixel, +1 pt per destroyed pixel).
6	cmet	Number of meteors in mixed colour (same rules as meteor, but Y/C/M).
7	speed	Wave speed: 1=slow (800 ms/pixel), 2=medium (400 ms/pixel), 3=fast (150 ms/pixel).
8	bTyp	Boss type: 0=none, 1=Rampart, 2=Sentinel, 3=Prism. Appears after all waves are cleared.
9	bDif	Boss difficulty: 1=easy, 2=medium, 3=hard (0 if no boss).