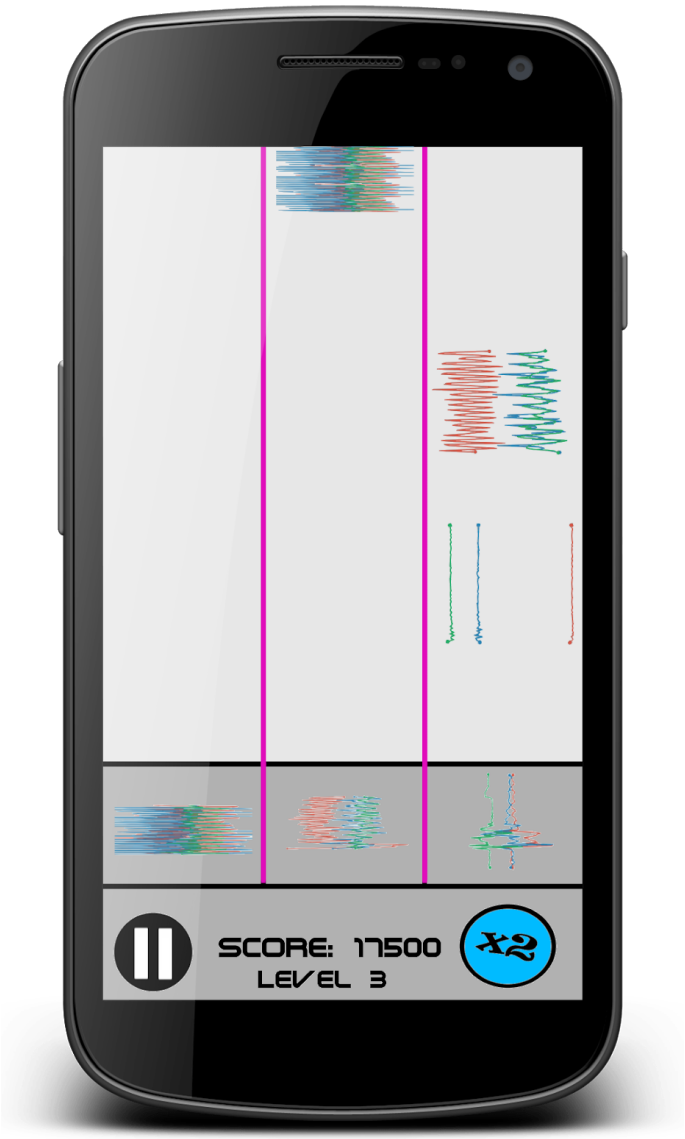
High Concept

Signal Ninja is an action mobile game about sorting signals with gameplay that feels like Tetris meets Fruit Ninja.

- Played on smartphones and tablets
- Signals appear along 3 moving tracks and must be sorted to the correct track
- Some signals are composed of multiple pieces that need to be cut up so the pieces can be sorted on the correct tracks



UI and Controls

HUD

Score
The score is shown at the center bottom of the screen, above the level and more prominently. The score increases for each correctly sorted signal.

Level
The level is shown at the center bottom of the screen. It indicates the difficulty. ***(Only one level is displayed for this prototype.)***

Multiplier
The multiplier is shown at the bottom right of the screen. It indicates a factor by which the score is multiplied whenever score is gained.

Pause Button
The pause button is shown at the bottom left of the screen. The player can click it to pause the level and see the **Pause Menu *(not implemented for this prototype)***.

Screen Layout

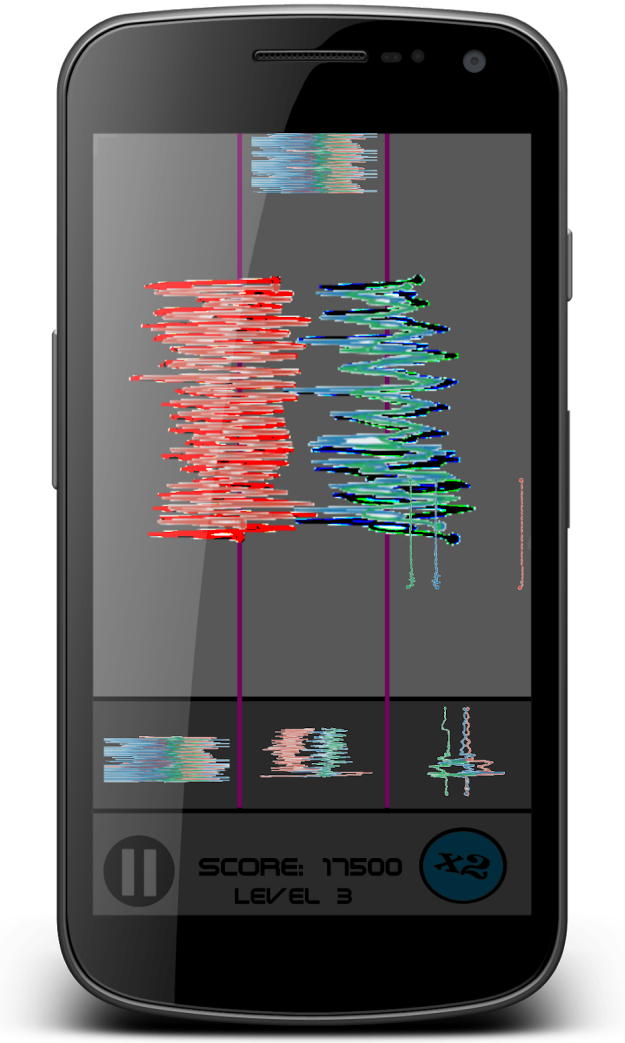
HUD
The HUD is positioned along the bottom strip of the screen.

Category Indicators
The Category Indicators are positioned along the second bottommost strip of the screen. Each Indicator has an equal width, aligned with its Track.

Tracks
The Tracks are aligned above their Category Indicators, taking up the remaining vertical space of the screen. Signals move from above the top of the screen down to the Category Indicators where they are scored.

Ninja Mode

When the player activates Ninja Mode, the selected signal is enlarged to the center of the screen. The rest of the screen is darkened and grayed to show that it is inactive.



Player Actions

Switch Tracks
The player can ***swipe*** (or **hold and drag**) left or right on a signal to move it to the track.

Pause
The player can click the pause button to bring up the Pause Menu (not implemented for this prototype).

Enter Ninja Mode
The player can **click** on a signal to enter **Ninja Mode**. If the system is in Ninja Cooldown, the system provides feedback that Ninja Mode isn't ready yet.

Exit Ninja Mode
By **not swiping** for 1 second, the player exits Ninja Mode.

Cut
While in Ninja Mode, the player can **swipe** horizontally to make a Cut, separating the signal into two signals, which can then be switched onto different tracks. Multiple Cuts can be made to the same signal object.

System Actions

Spawn Signal
The game will spawn a signal once per second, which travels downward at the [Signal Speed].

Score Signal
When a signal touches the Category Indicator, it visually and audibly de-materializes. Once a signal begins de-materializing, it can no longer be moved to a new track. When the last part of the signal de-materializes, score is assigned for the signal: if the signal was sorted corrected, the player is awarded Base Score x Multiplier points. Otherwise, the Multiplier is reduced to 1.

Cut Signal
When the player Cuts a signal, the system re-creates this object as two separate signals (see Technical Architecture).

Ninja Mode

While in Ninja Mode, Signal Speed is reduced to one fourth (25%) of its standard speed.

Start Ninja Cooldown
When the player exits Ninja Mode, the system begins a 1 second cooldown, during which the player cannot re-enter Ninja Mode.

Game Balance

Score
The score goes up by 50 for each correctly sorted signal.

Multiplier
The multiplier increases by 1 for every 3 signals correctly sorted. It returns to 1 on an incorrect sorting. (Max x3 for prototype.)

Signal Speed
The signal speed is such that the signal moves (25 + Level)% of the screen height per second.

Technical Architecture

Overview, Main Scene Hierarchy
- Background graphic
- Ninja Mode Timer
- Ninja Mode Shader
- Signal spawner parent node
    - Signal spawner timer
    - Signal spawner controller script
    - Signal spawners
        - Signal spawner script
- Category Indicators parent node
    - Category Indicator sprites
- HUD
    - Pause button
    - Score label
    - Level label
    - Multiplier scene
        - Multiplier sprite

Scripts and Their Functions

Main

- Receive updates to score, multiplier, and level, and notify HUD
- Receive updates on Ninja Mode, track Ninja Mode Cooldown
- Send global notification for Ninja Mode status

HUD

- Updates the visualization for all HUD elements when called by Main.

Signal Spawner Controller

- Activate Signal Spawner script

Signal Spawner

- Generate a signal

Signal

- Data: X, Y, Z, Label
    - *N* length vectors
        - X, Y, Z are floats
            - Used for drawing the signal
        - Label is int
            - Used for scoring the signal
            - (The label may be different at different parts of the signal)
- Receive player inputs
    - Move left or right
    - Ask Main to enter Ninja Mode
    - If in Ninja Mode, receive player inputs
        - Log cuts made
        - On Exit Ninja Mode, process cuts made, dividing into new signals if need be.
- Score and de-materialize itself based on position

Signals

A signal is not made from an art asset, but instead dynamically drawn from a matrix of data.

Data

The data consist of 3 float vectors (X, Y, and Z) all of variable length *n*. Signals can be different lengths, but within a signal, the X, Y, and Z lines will be the same length.

Spawning and De-Spawning
The root of the signal is at the top. When a signal is spawned, it is placed high enough above the top of the screen that the bottom of the signal is just above the top of the screen. The signal is scored when the root crosses the Category Indicator.

Spawning Script - Controller
One invisible signal spawner is at the top of each track, and all of them are managed by one signal spawner controller. When a signal needs to be spawned (1/sec), the controller randomly chooses a signal spawner to activate.

Spawning Script - Spawner
When activated by the spawner controller, the signal spawner generates a random signal from the data. (This process may be simplified in the prototype.)

Signal Script

- Const swipe_minimum = 50?
- On player input
    - If not Ninja Mode
        - If drag is long enough to definitely be a swipe (> swipe_min pixels)
            - Move left or right on drag release
        - If click and release without long drag
            - Enter Ninja Mode
    - If Ninja Mode
        - If drag is long enough to definitely be a swipe (> swipe_min pixels)
            - On drag release, take the middle of the cut (the signal's center) and cut horizontally at that height
        - If drag is not long enough
            - Give visual and audio feedback that input was pressed but useless

- Receive player inputs
    - Move left or right
    - Ask Main to enter Ninja Mode

        - If in Ninja Mode, receive player inputs
            - Log cuts made
            - On Exit Ninja Mode, process cuts made, dividing into new signals if need be.
    - Score and de-materialize itself based on position
        - Const cut_buffer, width of allowable mistakes
        - Only start counting as incorrect if a number of data points were labeled incorrectly > cut_buffer

Assets Needed

Details of each asset not added to this GDD because they weren't used in the prototype.

Visual Assets

Background Graphic
The background for the level includes the visualization of the tracks and a factory-aesthetic backdrop over which to place the HUD and Category Indicators.

Category Indicators
Visual examples of what signals belong on that track.

Multiplier
One sprite for each multiplier possibility, up to x3.

Multiplier Down

Multiplier Up

Signal Is Being Scored Correctly

Signal Is Being Scored Incorrectly

Signal Finished Scoring Correctly

Signal Finished Scoring Incorrectly

Player clicked but did nothing

Audio Assets

Background Music

The background track is always playing on loop while in a level. It is an upbeat, techno song.

SFX

Multiplier Down

Multiplier Up

Signal Is Being Scored Correctly

Signal Is Being Scored Incorrectly

Signal Finished Scoring Correctly

Signal Finished Scoring Incorrectly

Player Swiped

Enter Ninja Mode

Exit Ninja Mode

In Ninja Mode

Player tried to enter ninja mode when they can't

Player clicked but did nothing