Assignment: Systemic Game Design

HEATWAVE

Mood piece: HEATWAVE. By Midjourney.

Calle Wahlstedt Nilsson
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Introduction

The smell of rotting corpses fills your nose as you wake up in a pile of your neighbours, friends and even family. You are in the heart of the invasion force and your only way to survive is cunning, wits and your use of mechanical engineering. Follow Castro through this narrative experience to find out for yourself; the fate of planet Earth.

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Game Overview

Game Concept

HEATWAVE has the player facing off against a foe which is nigh unstoppable for human hands to defeat. However, your hands can do more than just punching. With human ingenuity (and a little bit of history in engineering) you guide Castro through a linear narrative experience, attempting to escape the Invasion Force and alert authorities to prepare for the impending war.

Genre & Dimensions

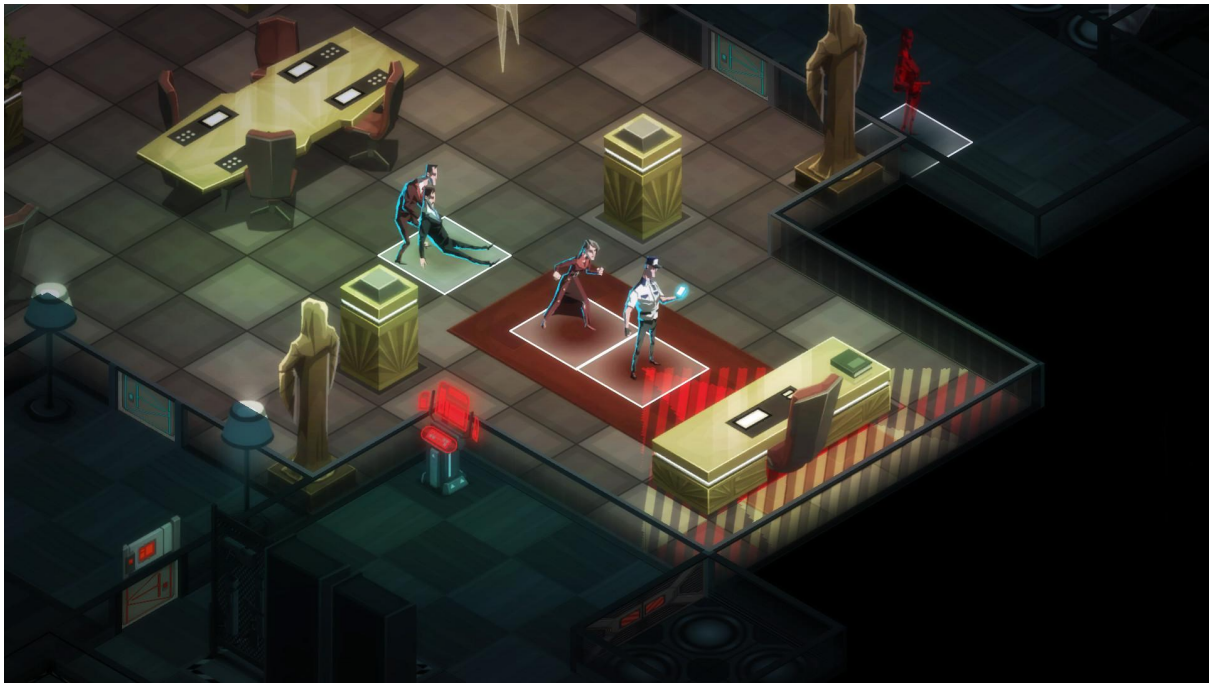
Dimension: *Isometric Top Down Perspective*
Genre: *Narrative, Stealth & Puzzle*[1]

Platform

This game best suits PC with Keyboard and mouse.

Target Audience

HEATWAVE caters to players who enjoy narrative stealth games and overcoming obstacles using the principles of mechanical engineering and thermodynamics.



Example of Camera View, *Invisible INC.*

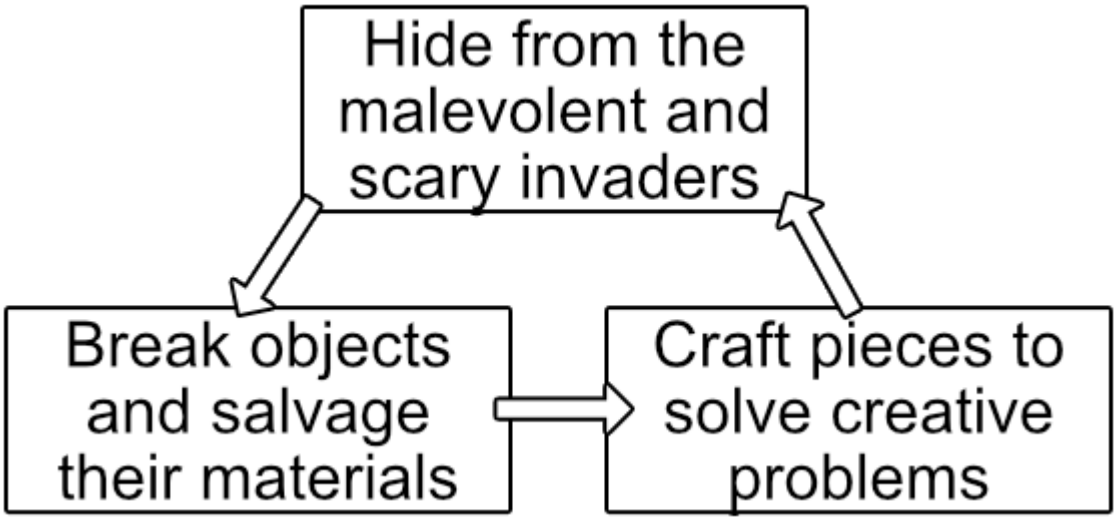
[1] Progression is tied to figuring out and interacting with the systemic elements in clever and intuitive ways.

Gameplay & Mechanics

HEATWAVE is a Real-time Stealth game where players must utilise their wits and knowledge about thermodynamics and mechanical engineering to overcome an unstoppable foe. By manipulating several attributes and elements of their environment they can proceed without having their organs harvested, or whatever other horror is in store if they're caught.

The player can find materials scattered around the level and collect materials from any interactable object if they have the means to break them down.

Gameplay Loop



Gameplay loop, HEATWAVE

Mechanics

Inventory

The player has an inventory that can hold different types of materials. The player can hoard no maximum amount of these materials at once.

A list of all materials the player can hold can be found in
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Collecting

When an object is destroyed, the player can salvage its materials and add them to their inventory. These materials can then be used to craft pieces and for certain scripted interactions around the game.

Attacking

When an object/entity attacks another object/entity it attempts to deal damage. If the attacking object's *force* is higher than the defending object's *hardiness* it will damage equal to the difference.

However, if the attacking object's *force* is not higher than the defending object's *hardiness*, the attacking object instead takes *retaliation damage* equal to the difference. An attacking object can therefore be destroyed as a retaliation.

Damage

When an object is attacked, the damage is calculated by $|Damage| = Hardiness - Force$. If $Defending\ Hardiness > Attacking\ Force$ then the attacking Object will instead take $Retaliation\ Damage = Force - Hardiness$ and possibly break.

All of these attributes and statistics are described in greater detail under Attributes & Status Conditions.

Player Actions & Controls

Move

The Player can move in eight different directions.

Craft Piece

The Player can open up the Crafting menu to turn materials from their inventory into pieces that they can place in the game world. More about pieces can be found under Crafting Pieces. The Player can store materials but not crafted pieces which have to be placed as they are crafted. Crafting is instantaneous.

Attack (Equal Reaction)

The Player attacks with any object in their hand at the selected object. The damage calculations are done as covered under Attacking.

Pick Up / Drop Object

The Player picks up an object if possible. When an object is carried the Player's move speed will be lowered.

Throw Object

The Player throws any held object. The range is determined per object.

Interact (per Object)

Certain objects such as doors can be interacted with, and the behaviour of the interaction is decided on a case-by-case basis.

Push / Pull

The Player attempts to push/pull an object. Their Force is compared to the object's Hardiness. If the Player's Force is greater then they succeed in moving the object.

Setting

The setting is described in layman's terms as "Realistic Sci-fi" with an emphasis on clarity so that the player can easily determine the material of any object. The mood and atmosphere of the game are dark and gritty to still give the player a sense of urgency and unease as they roam through the dark halls of an alien facility.

Art Style

The art style of the game features sci-fi elements in an otherwise realistic setting. Below are some example pictures from other pieces of media to act as a mood board/inspiration.

A combination of realism and Sci-Fi, *XCOM.*

Clear material choices from an isometric view and a potential inspiration for how building could work, *Space Survival: Sci-Fi RPG*.

Systemic Elements

Attributes & Status Conditions

Object Attributes

Every actor the player can interact with is an object. All of these objects have a material. These objects all have the following attributes:

Temperature

The temperature attribute does nothing on its own, but when compared to other attributes such as *Ignition Value* or *Freezing Value* it can affect Objects and give them certain Status Conditions explained further below.

Each Object has a *Temperature*. Temperature is on a scale from -100 to +100 where 0 Starting Temperature. Temperature can be increased or decreased by different conditions or actions.

An *infographic* regarding how temperature is affected by certain elements can be found at the end of this document.

Force

Each Object has two Force Attributes. *Object Base Force* and *Total Force.*
Force is the amount of incoming damage an object can cause to another object when pitted against *Hardiness.*

$$Total\ Force = (Object\ Base\ Force + Hardiness) * Momentum.$$

Hardiness

Each Object has a Hardiness Attribute. Hardiness is what determines how much an object can withstand before being damaged by the *Force* of an attacking object

Hardiness is calculated by $Hardiness = Object\ Hardiness * Material\ Hardiness\ Multiplier$

Durability

Each Object has a Durability Attribute. Durability determines how much Damage an object can take before it is destroyed. If the durability of an object is reduced to ≤ 0 it is destroyed.

Durability is calculated by $Durability = Object\ Durability * Material\ Durability\ Multiplier$

Momentum

Each Object has a Momentum Attribute. Momentum is the perceived speed of an Object. It is used both for physics calculations and for *Total Force Calculations*.

Momentum is calculated by comparing how many $Momentum = Units\ Moved\ /\ Seconds.$

Material Attributes

All object materials have the following attributes:

Ignition Value

Each Material has an Ignition Value. If $Object\ Temperature > Material\ Ignition\ Value$ then that Object is *Aflame.*

Freezing Value

Each Material has a Freezing Value. If $Object\ Temperature < Material\ Freezing\ Value$ then that Object is Frozen.

Hardiness Multiplier

Each Material has a Hardiness Multiplier.

$Total\ Object\ Hardiness = Object\ Hardiness * Material\ Hardiness\ Multiplier$

Durability Multiplier

Each Material has a Durability Multiplier.

$Total\ Object\ Durability = Object\ Durability * Material\ Durability\ Multiplier$

Material Keywords

Conductive

Conductive Objects will spread Electricity to nearby Conductive Objects from the source.

Objects in contact with Water are Conductive.

Aflame

Aflame Objects will decrease in *Durability* and *Temperature* over time.
Aflame Objects will increase the *Temperature* of nearby Objects.
Aflame Objects will decrease the Durability of any Objects on top of them.

Frozen

Frozen Objects have reduced *Hardiness*.
Frozen Objects are *slippery*.

Slippery

Slippery Objects reduce the friction of any entity walking atop them.
Slippery Objects can be pushed regardless of Force.

Heavy

Cannot be moved by strong gusts or be pushed.

Entity Attributes

Some objects such as the Player Avatar and NPCs are considered entities in addition to their object attributes they also have the following additional attributes:

Move Speed

Each entity has a Move Speed. The move speed determines how fast the entity moves.

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Elements

Some elements can occur naturally or be made by entity interference. Their attributes are as follows:

Fire

Fire is *Aflame*. Fire will be extinguished if it's $Temperature < Ignition\,Value$. Fire will increase the Temperature of nearby Objects and decrease the Temperature of itself.

Water

Water is *Conductive.* Water will turn to a Gust facing a random direction if it's $Temperature > Ignition\,Value.$ Water will decrease the Temperature of nearby Objects.

Ice

Ice is Frozen. Ice will turn to Water if its $Temperature > Freezing\,Value$

Electricity

Electricity is spawned from specific conductive objects in the world.

Electricity will spread to adjacent Objects with a Conductive Material away from the source (i.e. an object cannot spread to the object from which it gets electrified).

Gust

Gusts can push objects in their forward direction if it's $Force > Hardiness$. Gusts do not deal Damage.

Crafting Pieces (Mechanical Engineering stuff)

By using materials dropped from destroyed objects the player can craft different mechanical pieces that can be used to perform different tasks for the player. When a piece is affected by force from another Cause or Connector piece (covered below) they will do the *damage calculation* but do not deal retaliation damage if its hardiness is higher.

Pieces can be placed wherever there is space for it and any placed piece can be rotated in 90° increments.

There are a couple of different types of Pieces:

Cause

Start a reaction after a specific condition is met. The following pieces are all Causes.

Lever

Levers will start a reaction after it is interacted with by the player. The reaction will start instantaneously.

Fan

The fan is a modular Cause Piece. If a *gust* hits a fan it will start a reaction. If a reaction would hit a fan it would instead produce a *gust* in the direction of the fan.

Pressure Plate

Pressure plates start a reaction when they are stepped upon or if a box is placed atop them. Once a pressure plate is triggered it cannot trigger again.

Candle Wick

Candle wicks start a reaction after 3 total seconds *aflame*. Candle wicks do not lose durability from being *aflame*.

Connectors

Connectors move a reaction to another connector or into an effect piece. Connectors with different materials have different purposes. These are described in further detail in Assignment Systemic Game Design: HEATWAVE

Connectors will connect with any adjacent Cause and Effect piece on either end of it.

The following pieces are Connectors:

Straight Transport

Sends the reaction in one direction.

90° Transport

Turns the reaction 90° in another direction.

T Transport

Splits the reaction into two directions.

Effect

Consumes reaction for a special effect. The following pieces are Effects:

Door Ram

Attacks anything in the direction of the ram. If the attacked object is stationary then the ram deals damage with double force. Any non-stationary object dealt damage by the ram will be pushed an equal distance to the damage taken.

Catapult

Throws an item towards a set location in the catapult's direction. The range is determined by comparing the catapult's Force compared to the Object's Hardiness. If the range$<= 0$ then the catapult cannot fire.

Firestarter

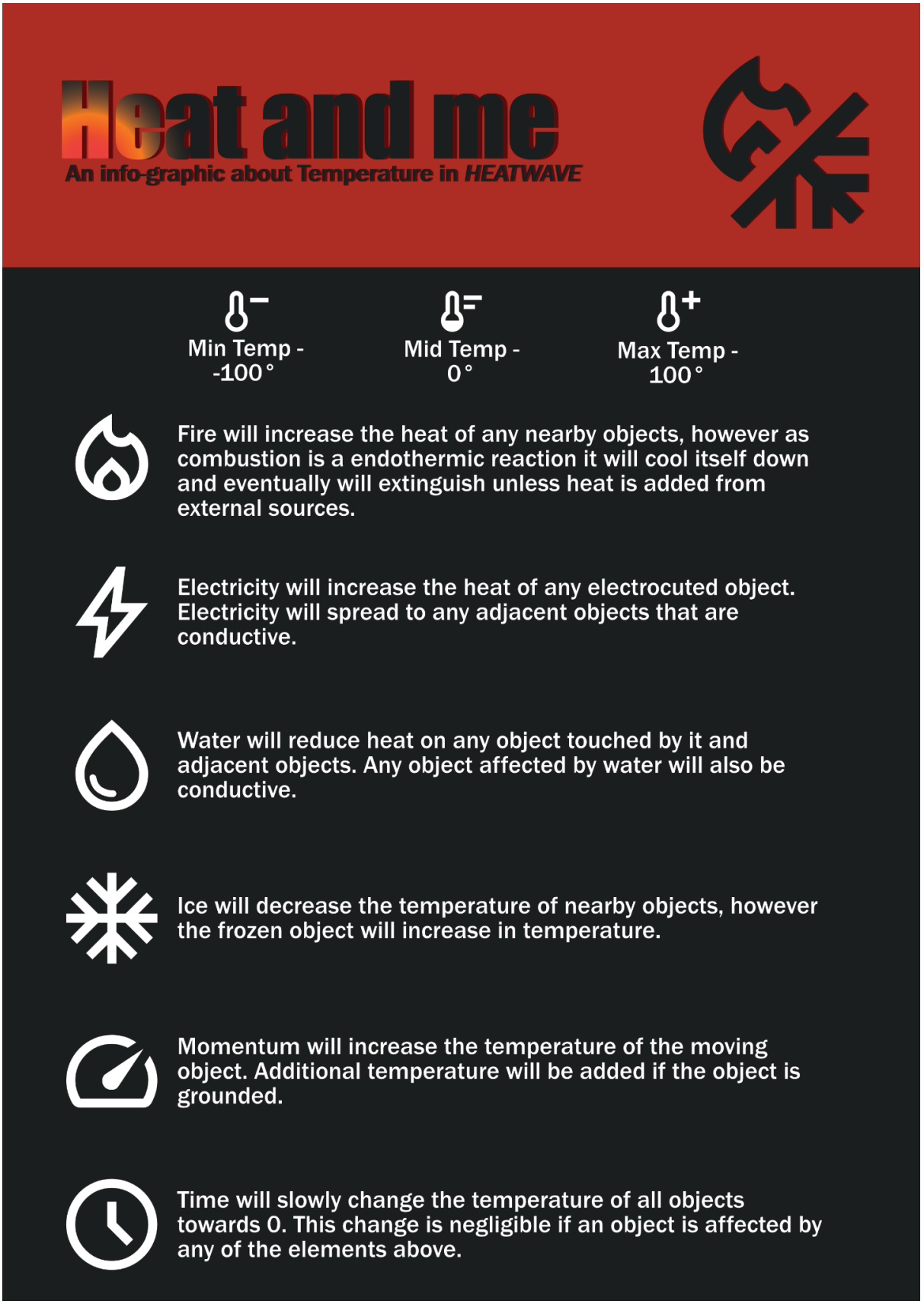
Immediately sets the Firestarter to its *Ignition Value*, making it *aflame* and spawning a fire. This destroys the Firestarter

Pump

When a Pump consumes a reaction it will pump any water through any rubber connectors attached to it until there is no water left, or there are no available connectors. Water will spill out of any rubber connectors not connected on both sides.

Fan

The fan is a modular Effect Piece. If a *gust* hits a fan it will start a reaction. If a reaction would hit a fan it would instead produce a *gust* in the direction of the fan.



Info-graphic about Temperature in HEATWAVE.