CIS*4820 Project Proposal - Updated
# Beeverse

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Overview

Beeverse is a survival city builder to grow and sustain a bee colony. The main objective is to keep your bees alive by collecting resources and expanding the colony. The game starts with a single honeycomb inhabited by your Queen Bee which you must expand from by building new Honeycomb structures. Honeycombs increase your bee population capacity and allow your Worker Bees to perform new tasks such as the construction of new Honeycomb types, resource conversion, and raising new Baby Bees. Bees have a lifespan and will passively die over time. The game will end if your Queen Bee dies without a replacement or your colony dies out from old age, so keep on building!

Game Level Diagram
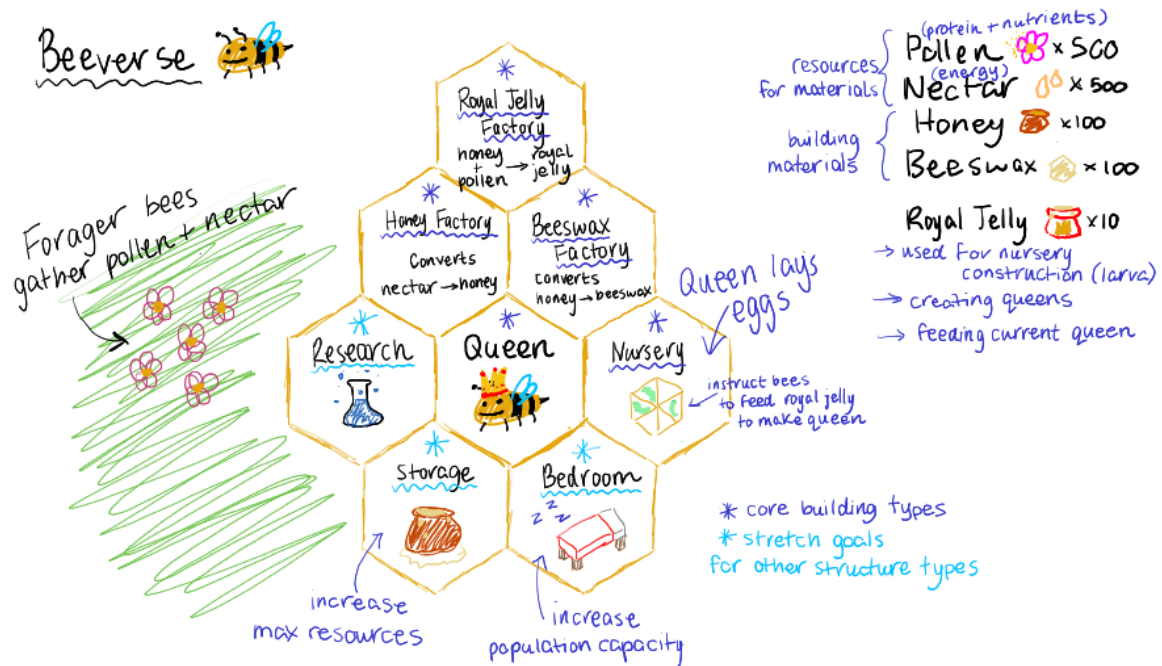
The game level will be an isometric view of a field with your bee colony at its centre. You'll start with a single honeycomb inhabited by your Queen Bee. Resources are your lifeline and are needed to build new structures, grow your population, and keep your Queen fed. You'll start with a small amount of resources to get things started, as well as a few Worker Bees. Worker Bees can be assigned various jobs which are discussed in greater detail later on. Note the Honeycombs starred with light blue are stretch goals for various other structure types.
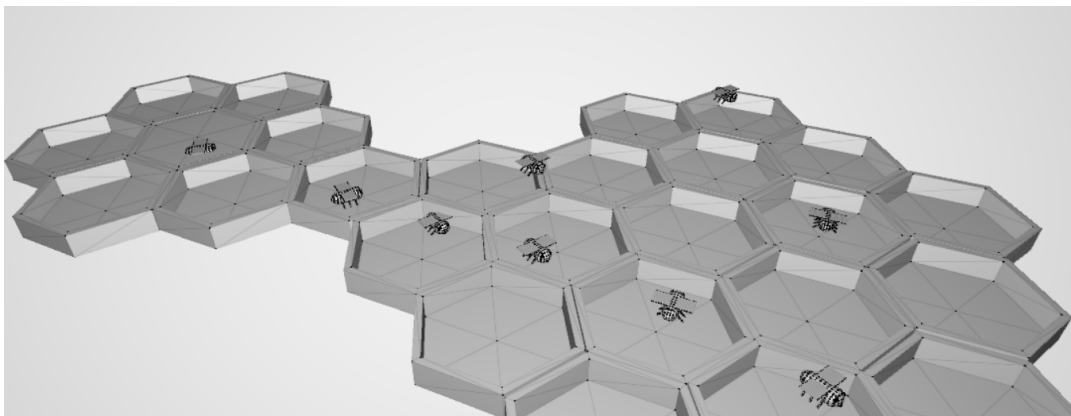
Sample 3D mockup made in Blender of the hexagonal game level in the early stages

Game Entities

Resources

- **Pollen**
  - Used to create Royal Jelly and as an early game building material
  - [Stretch Goal] Used as passive food source for Worker Bees
  - Collected from Flower Fields by Worker Bees
- **Nectar**
  - Used to create Honey and as an early game building material
  - [Stretch Goal] Used as passive food source for Worker Bees
  - Collected from Flower Fields by Worker Bees
- **Honey**
  - Generated by Honey Factories
  - Used as a Honeycomb Structure building and upgrade material
- **Beeswax**
  - Generated by Beeswax Factories
  - Used as a Honeycomb Structure building and upgrade material
- **Royal Jelly**
  - Generated by Royal Jelly Factories
  - Used to start a new Baby Bee larva pod
    - Feeding extra to Baby Bees will grow them into a new Queen Bee
  - Used as a passive food source for the Queen Bee

Honeycomb Structures

- **Queen's Honeycomb**
  - Upgrades to this will increase the queens lifespan
- **Honey Factory**
  - Used to convert Nectar into Honey, increases Honey storage
  - Conversion rate: 5 Nectar ▢ 1 Honey
  - Conversion speed depends on # of Worker Bees and Honey Factory level
- **Beeswax Factory**
  - Used to convert Honey into Beeswax, increases Beeswax storage
  - Conversion rate: 3 Honey ▢ 1 Beeswax
  - Conversion speed depends on # of Worker Bees and Beeswax Factory level
- **Royal Jelly Factory**
  - Used to convert Honey and Pollen into Royal Jelly, increases Royal Jelly storage
  - Conversion rate: Honey + Pollen ▢ 1 Royal Jelly
- **Nursery (Brood Nest)**
  - Houses Baby Bee larva
  - Feed flat cost to start new larva
  - 1 Royal Jelly + 4 Honey to grow a Worker Bee
  - 5 Royal Jelly to create a new Queen Bee
- **Flower Field**
  - Worker can harvest Nectar and Pollen from the flowers

NPC Bees

Queen Bee

- Responsible for laying eggs
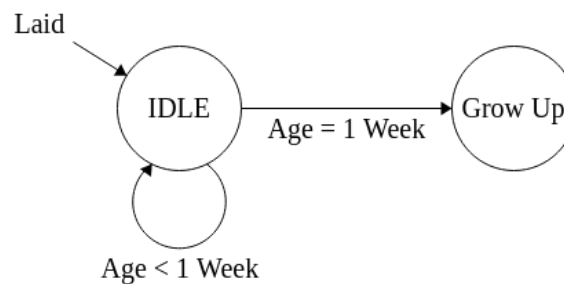- Keeps the hive alive, without a queen it's game over!

State Machine
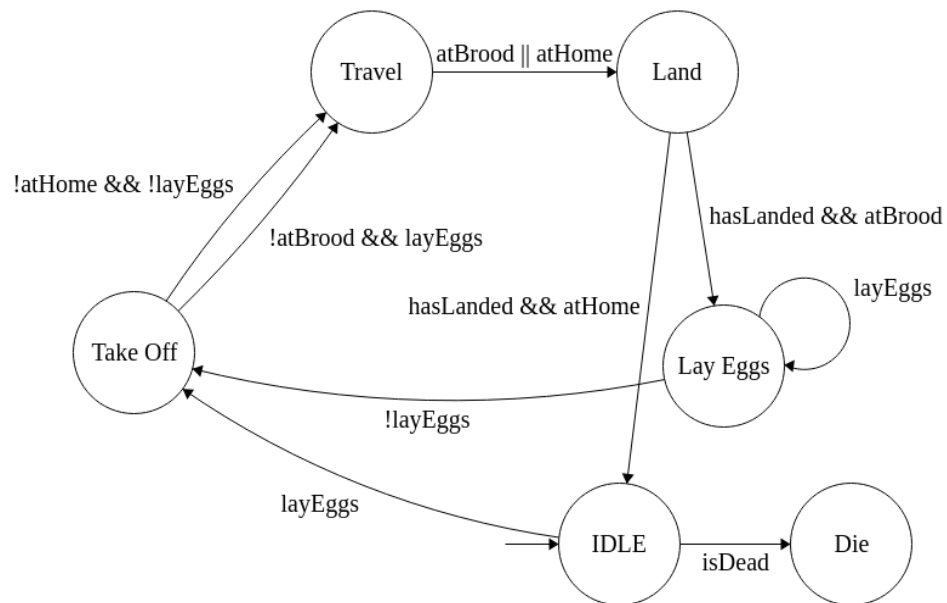
NOTE: The Queen can Die from any state if *isDead = age > maxAge* but for readability of the FSM we left out these transition arrows for all states except the base Idle state.

Baby Bee

- Responsible for looking cute!
- Grows into one of the two bee types:
  - Worker Bee if egg laid in basic Cell, fed base amount of Royal Jelly and Honey
 - Queen Bee if egg laid in Queen Cell, fed extra Royal Jelly

State Machine

Worker Bee

- Various Job Types depending on assigned task (Forager, Builder, Engineer, Nurse)
    - Forager: Responsible for foraging resources from Flower Fields
    - Builder: Responsible for building new Honeycomb Structures
    - Engineer: Responsible for resource conversion at Honeycomb Factories
    - Nurse: Responsible for tending to Baby Bees at the brood nest (nursery)
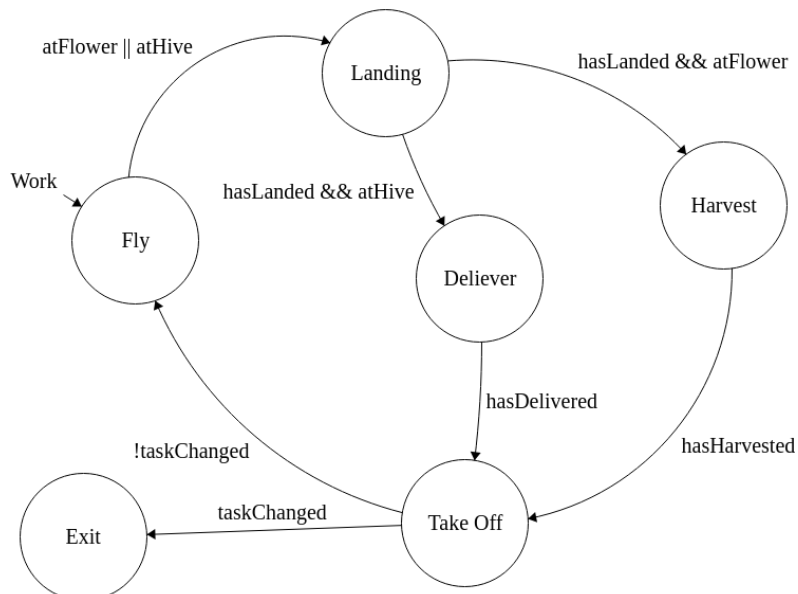
State Machine
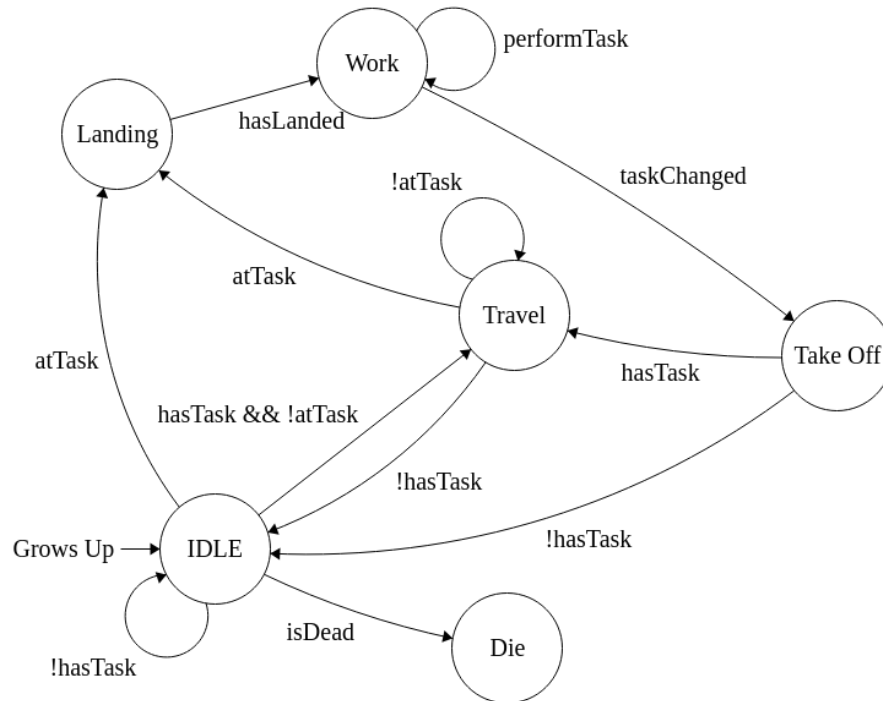
NOTE: Bees can transition to Die from any state if *isDead = age > maxAge* but for readability of the FSM we left out these transition arrows for all states except the base IDLE state.
UPDATE: This was not used as we found the bees flying around when working caused confusion about if they currently had a job or not.

Forager Job State Machine

Player

Controls - UPDATED

- A combination of the mouse and keyboard was used to move as we found it to flow better and allow for rotation of the camera.
- WASD are used to move the cameras locations
- Scroll Wheel is used for zoom
- Q and E are used for rotation (left and right or if right is enabled up and down)
- Clicking on a Honeycomb Structure brings up interactable info menu
- Clicking on a Bee brings up information panel

User Interface

- **Honeycomb Structure Menu**
    - Assign desired Bee to work at the honeycomb
    - Upgrading the honeycomb (Stretch goal)
    - See information about the selected honeycomb
- **Bee Information Panel**
    - Name (auto generated)
    - Age (in days)
    - Current assigned occupation (Forager, Builder, Engineer, Nurse, etc.)
    - Bee type (Queen, Baby, Worker)
    - [Stretch Goals] Sleep and Hunger bar levels
- **Colony Stats**
    - Resource amount and capacity
    - Bee population count
    - Age of the colony (how long the game has been going)
- **Notification Log - Logs messages about important events**
    - Bees dying
    - Queen nearing death
    - New Bees being born
    - Structures finishing building/upgrading
- **Game Menu**
    - Pausing the game brings up the Game Menu
    - Includes options for Credits, Save, Exit, etc.
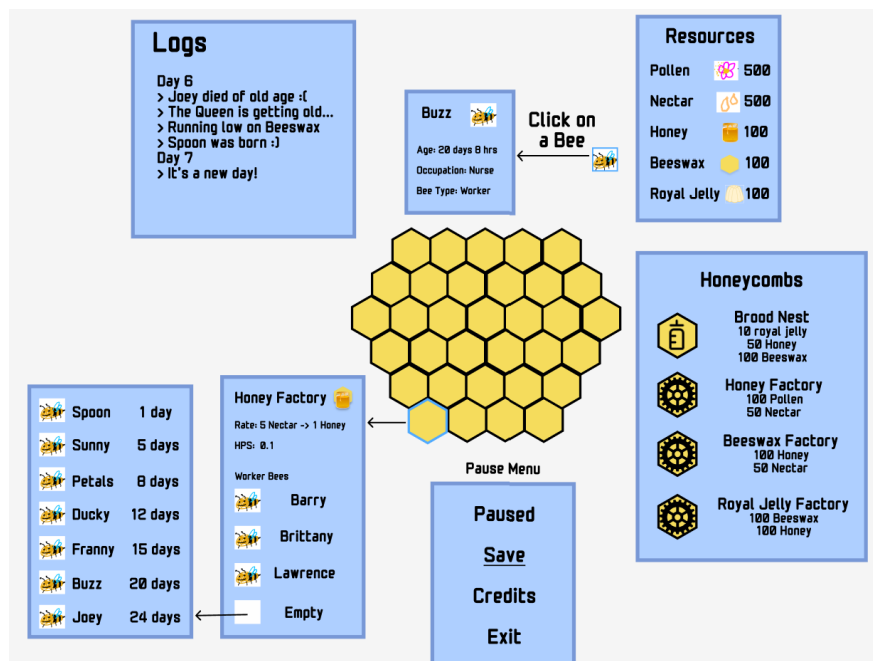
Requirements

Must Haves

- Resources (Pollen, Nectar, Honey, Beeswax, Royal Jelly)
- Honeycomb Structures (Nursery, Factories, Queen's Home)
- Flower Fields
- Bees (Queen, Baby Bee Larva, Worker Bees)
- Bees passively die of old age

Should Haves

- Progress bars over conversion factories, build progress, flower gathering
  - Progress bars within Baby Bee info panel for growth time
- Lighting changes over the course of a day (darkness at night)
- Music in background
  - Sound effects for clicks, building noises, bee noises
- Baby Bee Larva moving around in cell (Looking even cuter)
- Highlight buildable area for better UX

Stretch Goals (Could Haves)

- Worker Bees can plant new Flower Fields (pollination!)
- Bees passively feed off of pollen (maybe nectar/honey) and can die of starvation
- Winter comes periodically, withering Flower Fields, forcing your hive to survive off stored resources (honey) for added difficulty (Log: Winter is coming…)
- Research Honeycomb
  - Adds Scientist job type, the ability for Bees to research further Honeycomb upgrades and colony power ups
  - Power Up Ideas
    - Increased life span
    - Increased work speed
    - Small Stomach: Bees eat less food
    - Bees have increased carrying capacity
- Bedroom Honeycomb
  - Replaces the current mechanic of population capacity by Honeycombs
  - Instead Bedrooms needed to increase capacity
  - Bees have a Sleep stat that depletes and need replenished by a Bedroom
- Storage Honeycomb
  - Replaces current mechanic of added storage per Factory
  - Bees must carry resources to the Storage Honeycomb after gathering/conversion
  - Increase storage capacity for resources

Group Member Responsibilities

As a group of two, we'll largely be sharing responsibility for game design decisions, asset creation, and game programming. In the below Timeline, we've split up tasks where possible, but due to the intertwined nature of city builder-type games (one action affects the whole world!), we will employ pair programming as necessary.

Timeline

Work has been split up across the next few weeks to ensure that at least core functionality of Beeverse (an alpha build) will be completed within the allocated time. Assuming we start implementation on March 10th, this gives us about 2.5 weeks of development time. The following plan is subject to change based on each of our availability and any unexpected roadblocks we may encounter throughout implementation.

UPDATE: below is the actual timeline in which we completed the work. As we are a team of 2 we shared a lot of the work and completed it together even if it was under an individual's name so we wish to be marked together instead of separately.

Week 1 (March 10th - March 16th)

Lawrence

- ☑ ~~Design Bees - animation and texture (maybe use premade assets if mine are cursed)~~
- ☑ ~~Design Larva with wiggle animations~~
- ☑ ~~Implement Base Bee script (basic animation, take off, land, idle)~~
- ☑ ~~Implement HUD (resources, basic menu (pause, credits, exit), Log menu)~~
- ☑ ~~Game state (how many resources you have, bees, game time)~~
- ☑ ~~Main menu~~

Brittany

- ☑ ~~Design Honeycomb Prefab in Unity~~

- ☑ ~~Level design, scripts to place new Honeycomb structures~~
- ☑ ~~Create textures for honeycombs~~
- ☑ ~~Background grass/terrain~~
- ☑ ~~Sky~~
- ☑ ~~Move camera~~

Week 2 (March 17th - March 24th)

Lawrence

- ☑ ~~Construct Honeycomb structures from UI~~
- ☑ ~~builder~~
- ☑ ~~Flower Field Menu~~
- ☑ ~~Factory Menu~~
- ☑ ~~Resources mangement~~
- ☑ ~~Construction cost~~
- ☑ ~~Game over screen~~

Brittany

- ☑ ~~Bee Info menu~~
- ☑ ~~Construction Icons~~
- ☑ ~~Refactor and apply themes to UI elements~~
- ☑ ~~Design prefabs for Queen Honeycomb, Honeycomb Factories, Nursery Honeycomb~~
- ☑ ~~Design Flower Fields~~

Misc Todo

- ☑ ~~Convert resources instead of create (for factories)~~
- ☑ ~~Dont close menu when a bee is assigned or removed~~
- ☑ ~~Dont play game when paused~~
- ☑ ~~Idle bee animation~~
- ☑ ~~Add text to factory menu~~
- ☑ ~~Add nectar and pollen counts to menu~~
- ☑ ~~Change game state to update in 5 minute chunks~~
- ☑ ~~Baby egg needs profile pic~~
- ☑ ~~Rotation when zoomed in is slow and feels unresponsive, normalize~~
- ☑ ~~Space missing in death message, better death message with days lived~~
- ☑ ~~Button sprites depress on click (super low priority)~~
- ☑ ~~Bees zooming all over in main menu~~
- ☑ ~~Pic of new brood nest for build honeycomb menu~~

- ☑ ~~Growth bar for baby profile needs to be functional~~
- ☐ Custom game cursor (low priority)
- ☑ ~~Work spots in flowers~~

Week 3 (March 25th - March 29th)

Lawrence

- ☑ ~~Limit buildable area to fixed square within meadow~~
- ☑ ~~Add log messages as time goes on (Achivements)~~
- ☑ ~~Randomize the lifespan of bees~~
- ☑ ~~Starter bees should be proper age for adult bee~~
- ☑ ~~Music and background sounds~~
- ☑ ~~Balance resource gathering~~
- ☑ ~~Queen bee lay eggs~~
- ☑ ~~Nurse bees sit on top when working~~
- ☑ ~~Idle animation for baby bees (wiggly bois)~~

Brittany

- ☑ ~~Implement Nursery script~~
- ☑ ~~Baby bee script~~
- ☑ ~~Nursery UI menu~~
- ☑ ~~script for generating flower patches on game start~~
- ☑ ~~Button to reset the camera~~
- ☐ Game over screen ui
- ☑ ~~Add limits to x z movement and rotation (only x rotation can go 360)~~
- ☑ ~~Adjust zoom speed based on current FOV (amount added/removed from FOV per scroll)~~
- ☐ Fix sky, experiment with clouds, make sure can't see below sky dome ever
- ☐ Population at top of page under resource
- ☐ Game over screen needs fixed
- ☐ Controls screen from pause menu
- ☑ ~~Queen pillow colour~~

Bug Fixes

- ☑ ~~When rotating fully up/down, the screen stutters, directions flip backwards~~
- ☑ ~~Total resources isn't updated~~
- ☑ ~~Queen age doesn't increment~~

Week 3 (March 25th - March 29th)

- ☑ ~~Playtest~~
- ☑ ~~Night day - sky assets can move through time of daye~~
- ☑ ~~Implement stretch goals~~
- ☑ ~~Bug fixing~~
- ☑ ~~Completing any work unfinished from previous weeks~~