## Classes

Need a description of what each class does an what it inherits

| Type | Description |
| --- | --- |
| integer | A whole number |
| number | A real number |
| string | A list of characters |
| boolean | A true/1 or false/0 |
| \* object | An object |

### Ant

| Function name | Varibles | Type | Description |
| --- | --- | --- | --- |
| Ant | this.size | width : integer, height : integer | The size of the ant in pixels (default: CELL\_SIZE) |
| this.coord | x : number, y : number | The coordinate of the ant |
| this.id | integer | The unique ant id |
| this.species | Species object | The ants species which determines its characteristics |
| this.type | integer | The type of ant, use the ANT\_TYPE object when setting. e.g. ANT\_TYPE.worker |
| this.nest | Nest object | The ants home nest where it was born |
| this.colour | string | The hexadecimal colour of the ant e.g. ‘#FF0000’ (default: ‘#1C1C1C’) |
| this.health | number | The health of the ant, if <= 0 the ant is dead |
| this.hungerThreshold | number | The value of health bellow which the ant is determined to be hungry (default: 100) |
| this.healthRate | number | The rate at which the ants health decreases per tick (default: 0.1) |
| this.alive | boolean | Represents the ants living state (default: true) |
| this.goal | integer | The current goal which the ant is trying to accomplish, use the GOAL object when setting e.g. GOAL.findFood (default: GOAL.none) |
| this.target | x : number, y : number | The coordinate of a target the ant has chosen, the type of target depends on the ant i.e. a worker ant targets food while soldier ants target enemy ants (default: void(0)) |
| this.itemsInView | ants: [Ant object], food : [Food object] | Holds arrays of all ants and food within view (default: ants: [], food: []) |
| this.pheromonesInRange | [Pheromone object] | An array of all the pheromones in the ants antenna range (default: []) |
| this.sleep | integer | The number of ticks the ant needs to sleep for. Used for tasks which require actions which take multiple ticks to complete (default: 0) |
| this.followingPheromone | boolean | Used to tell if an ant is following a pheromone (default: false) |
| this.direction | number | The angle which the ant is facing in radians from the vertical axis clockwise (default: \*random direction\*) |
| this.prioritizeDirection | number | The direction the ant will tend to move in, used to achieve straighter more realistic paths (default: \*random direction\*) |
| Ant.addToMap | N/A |  | Adds the current position of the ant on the map |
| Ant.removeFromMap | N/A |  | Removes the current position of the ant from the map |
| Ant.isHungry | N/A |  | Determines whether the ant is hungry or not.  **Return** boolean - true if the ant is hungry else false |
| Ant.updateSleep | N/A |  | Updates this.sleep variable to simulate time passing during sleep |
| Ant.isFood | food | Food object | Determines whether a piece of food exists or not  **Return** boolean - true if piece of food exists else false |
| Ant.takeFood | food | Food.object | Takes a single piece of food  **Return** boolean - true if there is still food left, else false |
| Ant.atNest | N/A |  | Determines whether the ant is currently at its own nest i.e. standing on top of a NestPiece  **Return** boolean - true if the ant is standing on its nest, else false |
| Ant.seeNest | N/A |  | Determines whether the ant can see its own nest  **Return** boolean - true if ant can see its nest, else false |
| Ant.findFoodTarget | N/A |  | Choose the target piece of food the ant should go for |
| Ant.getFood | N/A |  | Walk towards food until on top of it and then pick it up one piece at a time |
| Ant.useFood | N/A |  | Determines the best use of food i.e. either eating the food if hungry or carrying it |
| Ant.scan | N/A |  | Looks at all blocks in front of the ant within eyesight, places all items of interest into this.itemsInView |
| Ant.smell | N/A |  | Similar to this.scan - Looks at all blocks in front of the ant within antenna size, places all pheromones into this.pheromoensInRange |
| Ant.secrete | N/A |  | Secrete pheromones |
| Ant.wonder | N/A |  | Wonder around the map, following pheromones of own species otherwise picking random directions |
| Ant.move | N/A |  | Updates the ants coordinates |
| Ant.die | N/A |  | Removes the ant from the simulation |

### Worker

Inherits Ant

| Function name | Varibles | Type | Description |
| --- | --- | --- | --- |
| Worker | this.coord | x : number, y : number | The coordinate of the ant |
| this.id | integer | The unique ant id |
| this.type | integer | The type of ant, use the ANT\_TYPE object when setting. e.g. ANT\_TYPE.worker (default: ANT\_TYPE.worker) |
| this.direction | number | The angle which the ant is facing in radians from the vertical axis clockwise (default: \*random direction\*) |
| this.prioritizeDirection | number | The direction the ant will tend to move in, used to achieve straighter more realistic paths (default: \*random direction\*) |
| this.carrying | integer | The amount of food the ant is carrying (default: 0) |
| this.carryingThreshold | integer | If an ant is carrying more food then this value and cannot see any food near it, ant will return to the nest to deposit the food (default: 4) |
| Worker.canCarry | N/A |  | Determines if an ant can carry food or not  **Return** boolean - true if ant can carry food else false |
| Worker.depositeFood | N/A |  | Navigate towards the nest and deposit food at the nest |
| Worker.dropFood | N/A |  | Drop a single piece of food at the nest  **Return** boolean - True if there is no more food to drop off, else false |
| Worker.useFood | N/A |  | Determines the best use of food i.e. eating it if hungry or carrying it |
|  | index | integer | The MAP index of the ant |
|  | food | Food object | The food object which is being used |
| Worker.doTask | N/A |  | Performs the actions required to complete a task |
| Worker.updateGoal | N/A |  | Determines if a goal has been completed or not and updates the next goal for the ant |
| Worker.updateHealth | N/A |  | Updates the ants this.health variable. Differs from ant.updateHealth as allows ants to eat food they are carrying if hungry |
| Worker.draw | ctx | Canvas context object | Draws the ant onto the canvas context |
|  | scaledCoord | integer | The coordinate of the map scaled to pixels |
| Worker.update | N/A |  | Update the ant each tick |

### Queen

inherits Ant

| Function name | Varibles | Type | Description |
| --- | --- | --- | --- |
| Queen | this.coord | x : number, y : number | The coordinate of the ant |
| this.id | integer | The unique ant id |
| this.type | integer | The type of ant, use the ANT\_TYPE object when setting. e.g. ANT\_TYPE.worker (default: ANT\_TYPE.worker) |
| this.steps | integer | The number of steps the queen will take until reaching the nest site |
| Queen.doTask | N/A |  | Decide what actions need to be done to accomplish a task |
| Queen.updateGoal | N/A |  | Checks to see if the goal is accomplished and updates it if necessary |
| Queen.pickDirection | N/A |  | Used to pick a direction in which the Queen will walk a specific number of steps in (this.steps) and then create a nest |
| Queen.createNest | N/A |  | Creates a nest object |
|  | nest | Nest object | The MAP index of the ant |
|  | index | integer | The index of the queen ant in this.species.ants used to determine which ant to remove from the list |
| Queen.draw | ctx | Canvas context object | Draw the queen onto the canvas context |
|  | scaledCoord | integer | The scaled MAP coordinate to pixels |
| Queen.update | N/A |  | Update the queen each tick |