Functional requirements:

Game:

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| **Requirement:** | **Rationale:** |
| Way to check ant brain | Check if ant brain is valid |
| Way to check ant world | Check if ant world is valid |
| Visualise ant world | Visualised with swing GUI |
| Allow two player games | Two players as different ant teams |
| Keep statistics | To know how each team did in the game |
| Tournaments | Teams can submit their ant brains and worlds |

Ant Brain:

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| **Requirement** | **Rationale:** |
| Ant brain is a finite state machine | Move from state to another |
| Ant brain is able to sense surroundings | Sense here, ahead, left ahead, right ahead |
| Move | Move to the sensed surroundings |

Ant:

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| **Requirement:** | **Rationale:** |
| Ant has unique id | Id determines order in which ants take actions |
| Ant has an integer between 0-9999 | Integer represents current state of brain |
| Boolean has\_food field | Shows if ant carries food |
| Ant shall have colour | Denotes which team ant is a part of |
| Integer representing “resting” | Represents the number of turns ant rests |
| If ant is surrounded by 5 ants of other team | Ant dies |
| If cornered by 4 ants of other team | Ant doesn’t die |
| Ant keeps track of direction | To know the current direction |
| Ant has several different actions | Sense surroundings, mark/unmark cell, pick up food, drop food, turn left/right, move to adjacent cell, flip |

Ant World:

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| **Requirement:** | **Rationale:** |
| Ant world is an hexagonal grid | Each cell is a hexagon |
| Each cell can be rocky, clear or contain an ant hill | Ant cannot go to rocky cells and each others ant hills |
| Ant hills can’t be adjacent to each other |  |
| Each cell can contain at most one ant, non-negative number of food between 0-9 and at most one set of chemical markers | Ants can’t go to same cells as other ants, cells can contain food that ants can pick and ants can sense chemical markers |

GUI requirements:

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| **Requirement:** | **Rationale:** |
| Displays world including cell content | Allows player to see the world |
| Scales with world dimensions (x,y) |  |
| Swing GUI interface |  |
| UI will show the state of the game every n frames | Customisable by the user |