**Test cases**

Consider the sprint task #1– Test algorithm

Some of the test cases for this task are as follows:

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| Test case  # | Scenario | Input(s) | Expected output |
| 1 | Choose one agent in each region | A click to choose agent position | An agent is marked in each region |
| 2 | The number of agent is greater than 1 and less than half the number of spaces. | Multiple clicks to choose agent’s position | Each region has many agents |
| 3 | One region has no agent | None | Error. Each region must have at least one agent. |
| 4 | The number of agent is more than the half of spaces in a region | Multiple clicks to choose agent’s position | Error. The number of agents should less than half of open spaces in each region |
| 5 | Choose two agents at the same position | Click twice on the same open space | Two agents are marked in the open space |

Consider the sprint task #3– Test algorithm

Some of the test cases for this task are as follows:

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| Test case  # | Scenario | Input(s) | Expected output |
| 1 | The environment has only one region. The region has only one agent. | Agent array, Region matrix, Number of steps | The agent travels all the open spaces then it stops. |
| 2 | The environment has only one region. The region has more than one agent. | Agent array, Region matrix, Number of steps | Agents travel the region at the same time. They have different paths. Once all open spaces are visited, algorithm stops. |
| 3 | The environment has more than one region. Each region has only one agent. | Agent array, Region matrix,  Number of steps | All agents in different regions travel at the same time. Once all open spaces are all visited, the algorithm stops. |
| 4 | The environment has more than one region. Each region has more than one agent. | Agent array, Region matrix, Number of steps | All agents in different a regions travel at the same time. Once all open spaces are all visited, the algorithm stops. |
| 5 | The environment has only one region. The region has only one agent. Enter a number indicates the steps an agent moves. | Agent array, Region matrix, Number of steps | The agent moves a fixed number of steps and stops. The algorithm stops. |
| 6 | The environment has only one region. The region has more than one agent. Enter a number indicates the steps an agent moves. | Agent array, Region matrix, Number of steps | All agents move a fix number of steps and stop. |
| 7 | The environment has more than one region. Each region has only one agent. Enter a number indicates the steps an agent moves. | Agent array, Region matrix, Number of steps | All agents move a fix number of steps and stop. |
| 8 | The environment has more than one region. Each region has more than one agent. Enter a number indicates the steps an agent moves. | Agent array, Region matrix, Number of steps | All agents move a fix number of steps and stop. |

Consider the sprint task #4 – Testing GUI and algorithm code after integration

Some of the test cases for this task are as follows:

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| Test case  # | Scenario | Input(s) | Expected output |
| 1 | The environment has only one region. The region has only one agent. User executes the program by one step. | Click on “Run step by step” | The agent moves by one step and then stops. Color of visited spaces will change. |
| 2 | The environment has only one region. The region has only one agent. User executes the program by fixed number of steps. | Number of steps, click on “Run” | The agent moves by number of steps and then stops. Color of visited spaces will change. |
| 3 | The environment has only one region. The region has more than one agent. User executes the program by one step. | Click on “Run step by step” | All agents move at the same and move by one step and then stops. They will have different paths. Color of visited spaces will change. |
| 4 | The environment has only one region. The region has more than one agent. User executes the program by fixed number of steps. | Number of steps, click on “Run” | All agents move at the same time and moves by number of steps and then stops. They will have different paths. Color of visited spaces will change. |
| 5 | The environment has more than one region. Each region has only one agent. User executes the program by one step. | Click on “Run step by step” | All agents move at the same and move by one step and then stops. They will have different paths. Color of visited spaces will change. |
| 6 | The environment has more than one region. Each region has only one agent. User executes the program by fixed number of steps. | Number of steps, click on “Run” | All agents move at the same time and moves by number of steps and then stops. They will have different paths. Color of visited spaces will change. |
| 7 | The environment has more than one region. Each region has more than one agent. User executes the program by one step. | Click on “Run step by step” | All agents move at the same and move by one step and then stops. They will have different paths. Color of visited spaces will change. |
| 8 | The environment has more than one region. Each region has more than one agent. User executes the program by fixed number of steps. | Number of steps, click on “Run” | All agents move at the same time and moves by number of steps and then stops. They will have different paths. Color of visited spaces will change. |
| 9 | Choose one agent in each region | A click to choose agent position | An agent is marked in each region |
| 10 | The number of agent is greater than 1 and less than the number of spaces. | Multiple clicks to choose agent’s position | Each region has many agents |
| 11 | One region has no agent | None | Error. Each region must have at least one agent. |
| 12 | The number of agent is more than the half of spaces in a region | Multiple clicks to choose agent’s position | Error. The number of agents should less than half of open spaces in each region |

Consider the sprint task #7: Testing GUI for graph view

Some of the test cases for this task are as follows:

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| Test case  # | Scenario | Input(s) | Expected output |
| 1 | User views position of the node in the environment | None | The position of the node in the environment should be displayed by the side of the node. |
| 2 | User views two buttons- one to execute the algorithm step by step and the other to execute the algorithm for a fixed number of times. | None | Two buttons should display in suitable positon |
| 3 | User double clicks a node | Double click on a node | The agents’ details in that node should  display |
| 4 | User click a node | Click on a node | Nothing should display |
| 5 | User views color changes when node is visited | Visiting a node | Color of the node should change |