**Configuration of Scenarios.**

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| **Name** | **Class** | **Scenario** |
| setUpStage1 | MatrixGraphTest | Empty graph. |
| setUpStage2 | MatrixGraphTest | Initializes a graph with three nodes (1, 2, and 3). No edges are added in this stage. |
| setUpStage3 | MatrixGraphTest | Sets up a graph with five nodes (0, 1, 2, 3, and 4) and adds multiple weighted edges between them. |
| setUpStage4 | MatrixGraphTest | Creates a graph with eight nodes (1 to 8) and establishes connections with weighted edges between them. |
| setUpStage5 | MatrixGraphTest | Constructs a graph with nine nodes (0 to 8) and forms a complex network with weighted edges connecting them. |
| setUpStage6 | MatrixGraphTest | Initializes a graph with seven nodes (0 to 6) and adds weighted edges between them, forming a connected network. |
| setUpStage7 | MatrixGraphTest | Similar to setUpStage6, initializes a graph with seven nodes (0 to 6) and creates a connected network with weighted edges. |
| setUpStage8 | MatrixGraphTest | Establishes a graph with six nodes (0 to 5) and sets up a network of weighted edges, creating a connected structure. |

**Test Case Design.**

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| **Objetivo de la Prueba:** Verify that the graph is working correctly. | | | | |
| **Class** | **Method** | **Scenario** | **Input values** | **Expected outcome** |
| MatrixGraphTest | testAddNode1 | setUpStage1 | matrixGraph.addNode(1) | Node added successfully. |
| MatrixGraphTest | testAddNode2 | setUpStage2 | matrixGraph.addNode(2) | The addition of this node is not possible as there is one with the same key. |
| MatrixGraphTest | testAddNode3 | setUpStage3 | matrixGraph.addNode(6) | Node added successfully. |
| MatrixGraphTest | testAddEdge1 | setUpStage1 | matrixGraph.addEdge(1, 2, 5.0) | Empty graph |
| MatrixGraphTest | testAddEdge2 | setUpStage2 | matrixGraph.addEdge(5, 3, 3.0) | One or both nodes not found. |
| MatrixGraphTest | testAddEdge3 | setUpStage3 | matrixGraph.addEdge(2, 3, 4.0) | Edge added successfully. |
| MatrixGraphTest | testConsult1 | setUpStage1 | matrixGraph.consult() |  |
| MatrixGraphTest | testConsult2 | setUpStage2 | matrixGraph.consult() | 1  2  3 |
| MatrixGraphTest | testConsult3 | setUpStage3 | matrixGraph.consult() | 0 (0, 1) Weight: 2.0 (0, 3) Weight: 6.0 1 (0, 1) Weight: 2.0 (1, 2) Weight: 3.0 (1, 3) Weight: 8.0 (1, 4) Weight: 5.0 2 (1, 2) Weight: 3.0 (2, 4) Weight: 7.0 3 (0, 3) Weight: 6.0 (1, 3) Weight: 8.0 (3, 4) Weight: 9.0 4 (1, 4) Weight: 5.0 (2, 4) Weight: 7.0 (3, 4) Weight: 9.0 |
| MatrixGraphTest | testConsultNode1 | setUpStage1 | matrixGraph.consultNode(1) | Node not found. |
| MatrixGraphTest | testConsultNode2 | setUpStage2 | matrixGraph.consultNode(3) | 3 |
| MatrixGraphTest | testConsultNode3 | setUpStage3 | matrixGraph.consultNode(4) | 4 (1, 4) Weight: 5.0 (2, 4) Weight: 7.0 (3, 4) Weight: 9.0 |
| MatrixGraphTest | testConsultEdge1 | setUpStage3 | matrixGraph.consultEdge(0, 4) | Edge not found. |
| MatrixGraphTest | testConsultEdge2 | setUpStage4 | matrixGraph.consultEdge(2, 4) | (2, 4) Weight: 5.0 |
| MatrixGraphTest | testConsultEdge3 | setupStage5 | matrixGraph.consultEdge(2, 8) | (2, 8) Weight: 2.0 |
| MatrixGraphTest | testDeleteNode1 | setUpStage1 | matrixGraph.deleteNode(1) | Node not found |
| MatrixGraphTest | testDeleteNode2 | setUpStage2 | matrixGraph.deleteNode(2) | Node deleted successfully. |
| MatrixGraphTest | testDeleteNode3 | setUpStage3 | matrixGraph.deleteNode(1) | Node deleted successfully. |
| MatrixGraphTest | testDeleteEdge1 | setUpStage1 | matrixGraph.deleteEdge(1, 2) | One or both nodes not found. |
| MatrixGraphTest | testDeleteEdge2 | setUpStage2 | matrixGraph.deleteEdge(1, 2) | Edge not found |
| MatrixGraphTest | testDeleteEdge3 | setUpStage3 | matrixGraph.deleteEdge(1, 2) | Edge deleted successfully. |
| MatrixGraphTest | testBFS1 | setUpStage4 | matrixGraph.BFS(1) | 1 2 3 4 5 6 7 8 |
| MatrixGraphTest | testBFS2 | setUpStage3 | matrixGraph.BFS(2) | 2 1 4 0 3 |
| MatrixGraphTest | testBFS3 | setUpStage6 | matrixGraph.BFS(10) | Node not found. |
| MatrixGraphTest | testDFS1 | setUpStage4 | matrixGraph.DFS(8,1,3) | 1 2 4 5 3 6 7 8 |
| MatrixGraphTest | testDFS2 | setupStage5 | matrixGraph.DFS(5,0,3) | 0 1 2 5 7 |
| MatrixGraphTest | testDFS3 | setUpStage6 | matrixGraph.DFS(20,0,3) | Node not found |
| MatrixGraphTest | testDijkstra1 | setupStage5 | matrixGraph.dijkstra(0) | [0.0, 4.0, 12.0, 19.0, 21.0, 11.0, 9.0, 8.0, 14.0] |
| MatrixGraphTest | testDijkstra2 | setUpStage7 | matrixGraph.dijkstra(0) | [0.0, 2.0, 6.0, 7.0, 17.0, 22.0, 19.0] |
| MatrixGraphTest | testDijkstra3 | setUpStage7 | matrixGraph.dijkstra(10) | [] |
| MatrixGraphTest | testFloydWarshall1 | setUpStage8 | matrixGraph.getFloydWarshallResultString() | 0.0 500.0 200.0 700.0 800.0 800.0  500.0 0.0 300.0 200.0 500.0 300.0  200.0 300.0 0.0 500.0 600.0 600.0  700.0 200.0 500.0 0.0 300.0 100.0  800.0 500.0 600.0 300.0 0.0 400.0  800.0 300.0 600.0 100.0 400.0 0.0 |
| MatrixGraphTest | testFloydWarshall2 | setUpStage4 | matrixGraph.getFloydWarshallResultString() | 0.0 5.0 2.0 10.0 7.0 7.0 7.0 7.0  5.0 0.0 7.0 5.0 2.0 7.0 12.0 12.0  2.0 7.0 0.0 12.0 9.0 5.0 5.0 5.0  10.0 5.0 12.0 0.0 7.0 12.0 17.0 17.0  7.0 2.0 9.0 7.0 0.0 5.0 14.0 14.0  7.0 7.0 5.0 12.0 5.0 0.0 10.0 10.0  7.0 12.0 5.0 17.0 14.0 10.0 0.0 10.0  7.0 12.0 5.0 17.0 14.0 10.0 10.0 0.0 |
| MatrixGraphTest | testFloydWarshall3 | setUpStage6 | matrixGraph.getFloydWarshallResultString() | 0.0 2.0 6.0 7.0 17.0 22.0 19.0  2.0 0.0 8.0 5.0 15.0 20.0 17.0  6.0 8.0 0.0 8.0 18.0 23.0 20.0  7.0 5.0 8.0 0.0 10.0 15.0 12.0  17.0 15.0 18.0 10.0 0.0 6.0 2.0  22.0 20.0 23.0 15.0 6.0 0.0 6.0  19.0 17.0 20.0 12.0 2.0 6.0 0.0 |
| MatrixGraphTest | testPrim1 | setUpStage3 | matrixGraph.primMST(0, 10) | (0, 1) Weight: 2.0 (1, 2) Weight: 3.0 (1, 4) Weight: 5.0 (0, 3) Weight: 6.0 |
| MatrixGraphTest | testPrim2 | setupStage5 | matrixGraph.primMST(1, 10) | (0, 1) Weight: 4.0 (0, 7) Weight: 8.0 (7, 6) Weight: 1.0 (6, 5) Weight: 2.0 (5, 2) Weight: 4.0 (2, 8) Weight: 2.0 (2, 3) Weight: 7.0 (3, 4) Weight: 9.0 |
| MatrixGraphTest | testPrim3 | setUpStage6 | matrixGraph.primMST(1,4) | (0, 1) Weight: 2.0 (1, 3) Weight: 5.0 (0, 2) Weight: 6.0 (3, 4) Weight: 10.0 (4, 6) Weight: 2.0 (4, 5) Weight: 6.0 |
| MatrixGraphTest | testKruskal1 | setUpStage3 | matrixGraph.kruskalMST() | (0, 1) Weight: 2.0 (1, 2) Weight: 3.0 (1, 4) Weight: 5.0 (0, 3) Weight: 6.0 |
| MatrixGraphTest | testKruskal2 | setupStage5 | matrixGraph.kruskalMST() | (6, 7) Weight: 1.0 (2, 8) Weight: 2.0 (5, 6) Weight: 2.0 (0, 1) Weight: 4.0 (2, 5) Weight: 4.0 (2, 3) Weight: 7.0 (0, 7) Weight: 8.0 (3, 4) Weight: 9.0 |
| MatrixGraphTest | testKruskal3 | setUpStage6 | matrixGraph.kruskalMST() | (0, 1) Weight: 2.0 (4, 6) Weight: 2.0 (1, 3) Weight: 5.0 (0, 2) Weight: 6.0 (4, 5) Weight: 6.0 (3, 4) Weight: 10.0 |