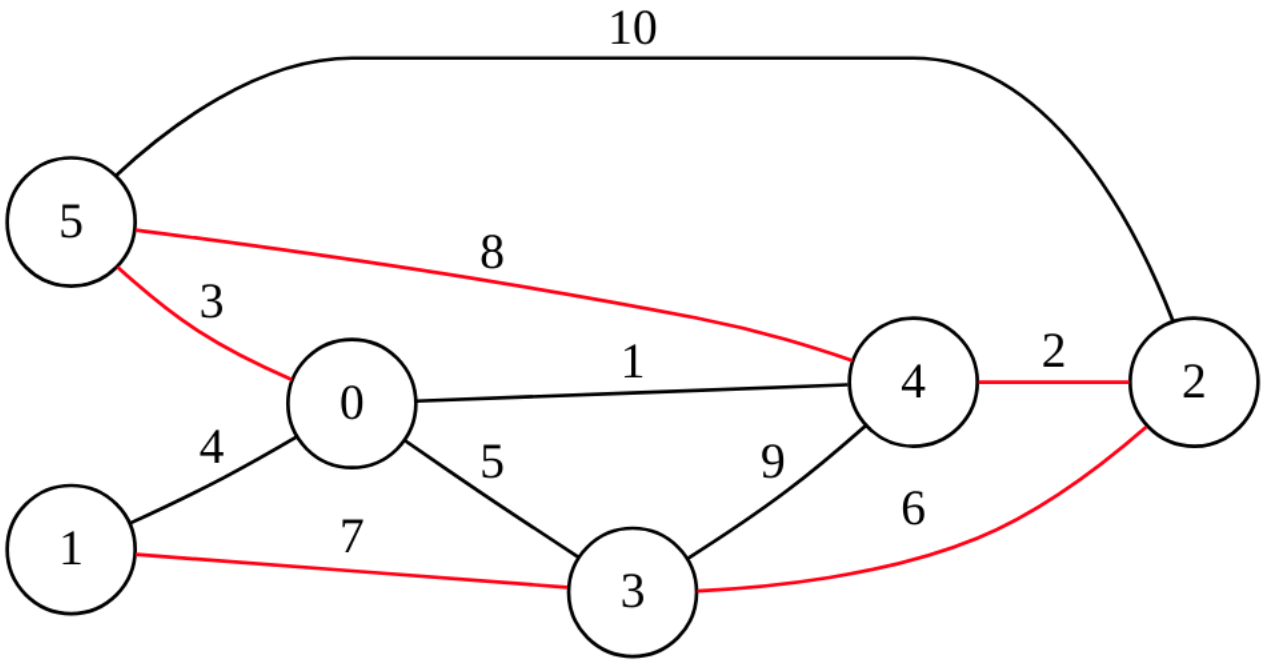
Test Cases

Case 1

Adjacency Matrix

```
node0:0|4|0|5|1|3
node1:4|0|0|7|9|0
node2:0|0|0|6|2|10
node3:5|7|6|0|4|0
node4:1|0|2|1|0|8
node5:3|0|10|0|8|0
```

Graph



"Coordinator--initiate-->Node0"

"Node0.wake()"

"Node0.status = Found"

"Node0--connect-->Node4"

"Node4.status = Found"

"Node4--connect-->Node0"

"Node0--initiate-->Node5" "Node0--initiate-->Node1" "Node0--initiate-->Node3"

"Node4--initiate-->Node2" "Node4--initiate-->Node5" "Node4--initiate-->Node3"

"Node0.status = Find" "Node4.status = Find"

"Node0--Test-->Node5" "Node4--Test-->Node2"

"Node5.wake()" "Node2.wake()"

"Node5.status = Found"

"Node5--connect-->Node0"

"Node0.status = Found"

"Node0--connect-->Node5"

"Node0--Accept-->Node5"

"Node2.status = Found"

"Node2--connect-->Node4"

"Node4.status = Found"

"Node4--connect-->Node2"

"Node2--Accept-->Node4"

"Node0--Test-->Node1" "Node4--Test-->Node5"

"Node5--initiate-->Node2" "Node5--initiate-->Node4"

"Node2--initiate-->Node5" "Node2--initiate-->Node3"

"Node2.status = Find" "Node5.status = Find"

"Node1.status = Found"

"Node0.wake()"

"Node1--connect-->Node0"

"Node0.status = Found"

"Node0--connect-->Node1"

"Node1--Accept-->Node0"

"Node5--Reject-->Node4"

"Node0--Test-->Node3" "Node4--Test-->Node3"

"Node3.status = Found"

"Node3.wake()"

"Node3--connect-->Node0"

"Node0.status = Found"

"Node0--connect-->Node3"

"Node3--Accept-->Node0"

"Node3--Reject-->Node4"

"Node1--initiate-->Node3" "Node3--initiate-->Node4" "Node3--initiate-->Node1"
"Node3--initiate-->Node2"

"Node5.status = Find"

"Node5--Test-->Node2"

"Node2--connect-->Node3" "Node3--Reject-->Node2"

"Node5--Test-->Node4"

"Node2--connect-->Node3" "Node3--Reject-->Node2"

"Node2--Test-->Node5"

"Node2--connect-->Node3" "Node3--Reject-->Node2"

"Node2.status = Find"

"Node2--Test-->Node5"

"Node5--connect-->Node0" "Node0--Reject-->Node5"

"Node2--Test-->Node3"

"Node2--connect-->Node3" "Node3--Reject-->Node2"

"Node1.status = Find"

"Node1--Test-->Node3"

"Node3--Connect-->Node0" "Node0--Reject-->Node3"

"Node3.status = Find"

"Node3--Test-->Node4"

"Node4--Connect-->Node0" "Node0--Reject-->Node4"

"Node3--Test-->Node1"

"Node1--Connect-->Node0" "Node0--Reject-->Node1"

"Node3--Test-->Node2"

"Node2--Connect-->Node5" "Node5--Reject-->Node2"

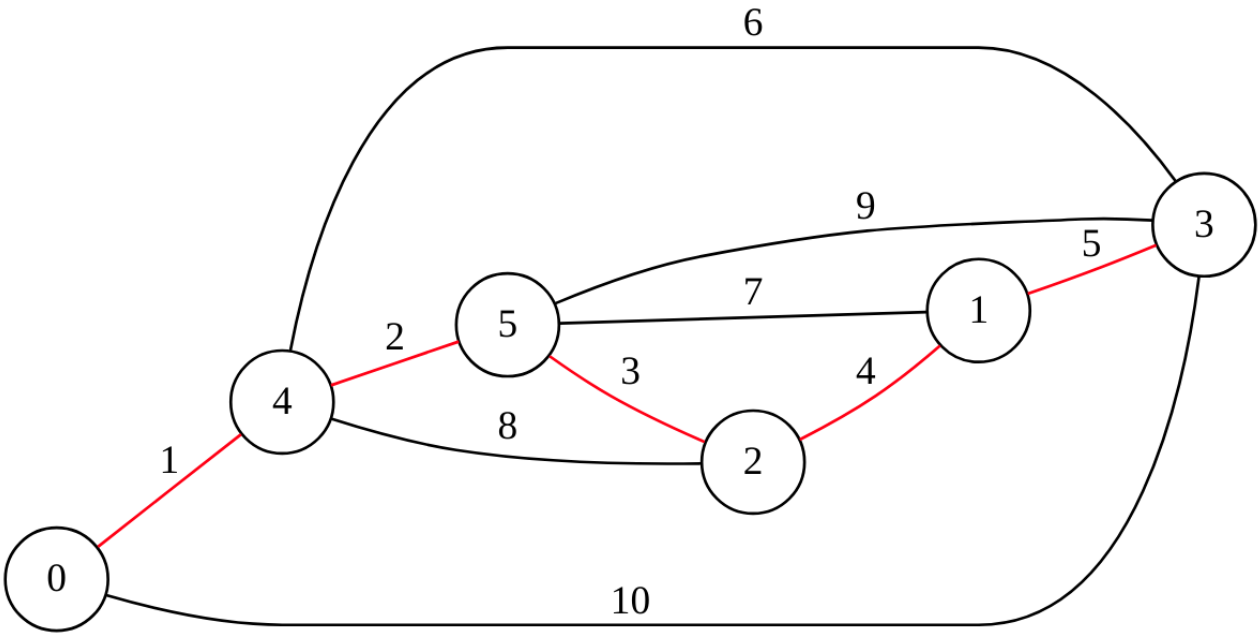
The Edges in MST are: 0->5, 0->4, 0->1, 0->3, 4->2

Case 2

Adjacency Matrix

```
node0: 0|0|0|10|1|0
node1: 0|0|4|5|0|7
node2: 0|4|0|0|8|3
node3: 10|5|0|0|6|9
node4: 1|0|8|6|0|5
node5: 0|7|3|9|2|0
```

Graph




```
Before Begin

- Initialize all Node Status to 'sleeping'
- Initialize all Node fragment-level to 0


Begin:      Coordinator sends **Begin Message** to Nodes[0, 1, 2, 3,
4, 5] specifiying each Nodes neighbors and weight information



Node 0
    Status: sleeping
    Links:
        0--4: basic
        0--5: basic
        fragment-level: 0
Node 1
    Status: sleeping
    Links:
        1--2: basic
        1--3: basic
        1--5: basic
        fragment-level: 0
Node 2
```

```
    Status: sleeping
    Links:
        2--1: basic
        2--4: basic
        2--5: basic
        fragment-level: 0
Node 3
    Status: sleeping
    Links:
        3--1: basic
        3--2: basic
        3--4: basic
        3--5: basic
        fragment-level: 0
Node 4
    Status: sleeping
    Links:
        4--0: basic
        4--2: basic
        4--3: basic
        4--5: basic
        fragment-level: 0
Node 5
    Status: sleeping
    Links:
        5--1: basic
        5--2: basic
        5--3: basic
        5--4: basic
        fragment-level: 0
```

initial = 4

Coordinator.send(nodes[initial],"WakeUP")

```
Node 4
    Status: found
    Links:
        4--0: branch
        4--2: basic
        4--3: basic
        4--5: basic
```

```
    fragment-level: 0

Request Connect: 4--> 0

Node 0
    Status: sleeping
    Links:
        0--3: basic
        0--4: branch
    fragment-level: 0

Request Connect: 0 --> 4

Node 0
    Status: found
    fragment-level: 1
    fragment-ID: 1

Node 4
    fragment-level: 1
    fragment-ID: 1

Request Initiate:

Node 0
    Status: find
    Links:
        0--4: branch
        0--5: basic
        fragment-level: 1
        fragment-ID: 1
Node 1
    Status: sleeping
    Links:
        1--2: basic
        1--3: basic
        1--5: basic
        fragment-level: 1
        fragment-ID: 1
Node 2
    Status: sleeping
    Links:
        2--1: basic
```

```
        2--4: basic
        2--5: basic
        fragment-level: 1
        fragment-ID: 1
Node 3
    Status: sleeping
    Links:
        3--1: basic
        3--2: basic
        3--4: basic
        3--5: basic
        fragment-level: 1
        fragment-ID: 1
Node 4
    Status: find
    Links:
        4--0: branch
        4--2: basic
        4--3: basic
        4--5: basic
        fragment-level: 1
        fragment-ID: 1
Node 5
    Status: sleeping
    Links:
        5--1: basic
        5--2: basic
        5--3: basic
        5--4: basic
        fragment-level: 1
        fragment-ID: 1

Node 4 link-test-probe Node 5

Node 0 link-test-probe Node 2

Node4.send(nodes[5],"WakeUP")

Node0.send(nodes[2],"WakeUP")

Node 5
    Status: Found
    Links:
```

```
        5--1: basic
        5--2: branch
        5--3: basic
        5--4: rejected
        fragment-level: 1
        fragment-ID: 1

Request Connect: 5 --> 2

Node 2
    Status: Found
    Links:
        2--1: basic
        2--4: rejected
        2--5: branch
        fragment-level: 1
        fragment-ID: 1

Request Connect: 2 --> 5

Node 5
    fragment-level: 2
    fragment-id: 2

Node 2
    fragment-level: 2
    fragment-id: 2

Request Initiate:

Node 0
    Status: find
    Links:
        0--4: branch
        0--5: basic
        fragment-level: 2
        fragment-ID: 2
Node 1
    Status: sleeping
    Links:
        1--2: basic
        1--3: basic
        1--5: basic
```

```
        fragment-level: 2
        fragment-ID: 2
Node 2
    Status: find
    Links:
        2--1: basic
        2--4: rejected
        2--5: branch
        fragment-level: 2
        fragment-ID: 2
Node 3
    Status: sleeping
    Links:
        3--1: basic
        3--2: basic
        3--4: basic
        3--5: basic
        fragment-level: 2
        fragment-ID: 2
Node 4
    Status: find
    Links:
        4--0: branch
        4--2: basic
        4--3: basic
        4--5: basic
        fragment-level: 2
        fragment-ID: 2
Node 5
    Status: find
    Links:
        5--1: basic
        5--2: branch
        5--3: basic
        5--4: rejected
        fragment-level: 2
        fragment-ID: 2


Node 4 link-test-probe Node 3

Node 0 link-test-probe Node 5
```

```
Node 5 link-test-probe Node 1

Node 2 link-test-probe Node 1

Node4.send(nodes[3],"WakeUP")

Node0.send(nodes[5], "WakeUP")

Node5.send(nodes[1],"WakeUP")

Node2.send(nodes[1], "WakeUP")

Node 3
    Status: found
    Links:
        3--1: branch
        3--2: rejected
        3--4: rejected
        3--5: rejected
        fragment-level: 2
        fragment-ID: 2

Request Connect: 3 -> 1

Node 1
    Status: found
    Links:
        1--2: basic
        1--3: branch
        1--5: basic
        fragment-level: 2
        fragment-ID: 2

Request Connect: 1 -> 3

Node 1
    fragment-level: 3
    fragment-ID: 3

Node 3
    fragment-level: 3
    fragment-ID: 3
```

```
Node 5
    Status: found
    Links:
        5--1: basic
        5--2: branch
        5--3: rejected
        5--4: branch
        fragment-level: 3           #updated form Node 1 and Node 3
        fragment-ID: 3

Request Connect: 5 -> 4

Node 4
    Status: found
    Links:
        4--0: branch
        4--2: basic
        4--3: basic
        4--5: branch
        fragment-level: 3
        fragment-ID: 3

Request Connect: 4 -> 5

Node 4
    fragment-level: 4
    fragment-ID: 4

Node 5
    fragment-level: 4
    fragment-ID: 4

Initiate Message:

Node 0
    Status: find
    Links:
        0--4: branch
        0--5: basic
        fragment-level: 4
        fragment-ID: 4
Node 1
    Status: find
```

```
    Links:
        1--2: basic
        1--3: branch
        1--5: rejected
        fragment-level: 4
        fragment-ID: 4
Node 2
    Status: find
    Links:
        2--1: basic
        2--4: rejected
        2--5: branch
        fragment-level: 4
        fragment-ID: 4
Node 3
    Status: find
    Links:
        3--1: branch
        3--2: basic
        3--4: basic
        3--5: basic
        fragment-level: 4
        fragment-ID: 4
Node 4
    Status: find
    Links:
        4--0: branch
        4--2: basic
        4--3: basic
        4--5: branch
        fragment-level: 4
        fragment-ID: 4
Node 5
    Status: find
    Links:
        5--1: basic
        5--2: branch
        5--3: basic
        5--4: branch
        fragment-level: 4
        fragment-ID: 4

Node 0 link-test-probe Node [5]
```

```
Node 1 link-test-probe Node [2]

Node 2 link-test-probe Node [1]

Node 3 link-test-probe Node [2, 4, 5]

Node 4 link-test-probe Node [2, 3]

Node 5 link-test-probe Node [1, 3]

Node0.send(nodes[5],"WakeUP")

Node1.send(nodes[2], "WakeUP")

Node2.send(nodes[1],"WakeUP")

Node3.send(nodes[2, 4, 5], "WakeUP")

Node4.send(nodes[2, 3], "WakeUP")

Node5.send(nodes[1, 3], "WakeUP")


Node 0
    Status: found
    Links:
        0--4: branch
        0--5: basic
        fragment-level: 4
        fragment-ID: 4

Request Connect: 0 -> 5

Node 0
    Status: found
    Links:
        0--4: branch
        0--5: rejected
        fragment-level: 4
        fragment-ID: 4

Node 1
```

```
    Status: found
    Links:
        1--2: branch
        1--3: branch
        1--5: rejected
        fragment-level: 4
        fragment-ID: 4

Request Connect: 1 -> 2

Node 2
    Status: found
    Links:
        2--1: branch
        2--4: rejected
        2--5: branch
        fragment-level: 4
        fragment-ID: 4

Request Connect: 2 -> 1

Node 2
    fragment-level: 5
    fragment-id: 5

Node 1
    fragment-level: 5
    fragment-id: 5

Node 3
    Status: found
    Links:
        3--1: branch
        3--2: basic
        3--4: basic
        3--5: basic
        fragment-level: 5
        fragment-ID: 5

Request Connect: 3 -> 2

Request Connect: 3 -> 4
```

```
Request Connect: 3 -> 5

Node 3
    Status: found
    Links:
        3--1: branch
        3--2: rejected
        3--4: rejected
        3--5: rejected
        fragment-level: 5
        fragment-ID: 5

Node 4
    Status: found
    Links:
        4--0: branch
        4--2: basic
        4--3: basic
        4--5: branch
        fragment-level: 5
        fragment-ID: 5

Request Connect: 4 -> 2

Request Connect: 4 -> 3

Node 4
    Status: found
    Links:
        4--0: branch
        4--2: rejected
        4--3: rejected
        4--5: branch
        fragment-level: 5
        fragment-ID: 5

Node 5
    Status: found
    Links:
        5--1: basic
        5--2: branch
        5--3: basic
        5--4: branch
```

```
        fragment-level: 5
        fragment-ID: 5

Request Connect: 5 -> 1

Request Connect: 5 -> 3

Node 5
    Status: found
    Links:
        5--1: rejected
        5--2: branch
        5--3: rejected
        5--4: branch
        fragment-level: 5
        fragment-ID: 5

Initiate Message:

Node 0
    Status: find
    Links:
        0--4: branch
        0--5: rejected
        fragment-level: 5
        fragment-ID: 5

Node 1
    Status: find
    Links:
        1--2: branch
        1--3: branch
        1--5: rejected
        fragment-level: 5
        fragment-ID: 5

Node 2
    Status: find
    Links:
        2--1: branch
        2--4: rejected
        2--5: branch
        fragment-level: 5
```

```
        fragment-ID: 5

Node 3
    Status: find
    Links:
        3--1: branch
        3--2: rejected
        3--4: rejected
        3--5: rejected
        fragment-level: 5
        fragment-ID: 5

Node 4
    Status: find
    Links:
        4--0: branch
        4--2: rejected
        4--3: rejected
        4--5: branch
        fragment-level: 5
        fragment-ID: 5

Node 5
    Status: find
    Links:
        5--1: rejected
        5--2: branch
        5--3: rejected
        5--4: branch
        fragment-level: 5
        fragment-ID: 5
```

-- No remaining edges to process, in the graph, so the algorithm terminates --