

Case 1: Small Network

Case 1-1:

Start 3 router processes with these config files and make screenshots of your forwarding table information to show me they computed the correct shortest path and next hop information.

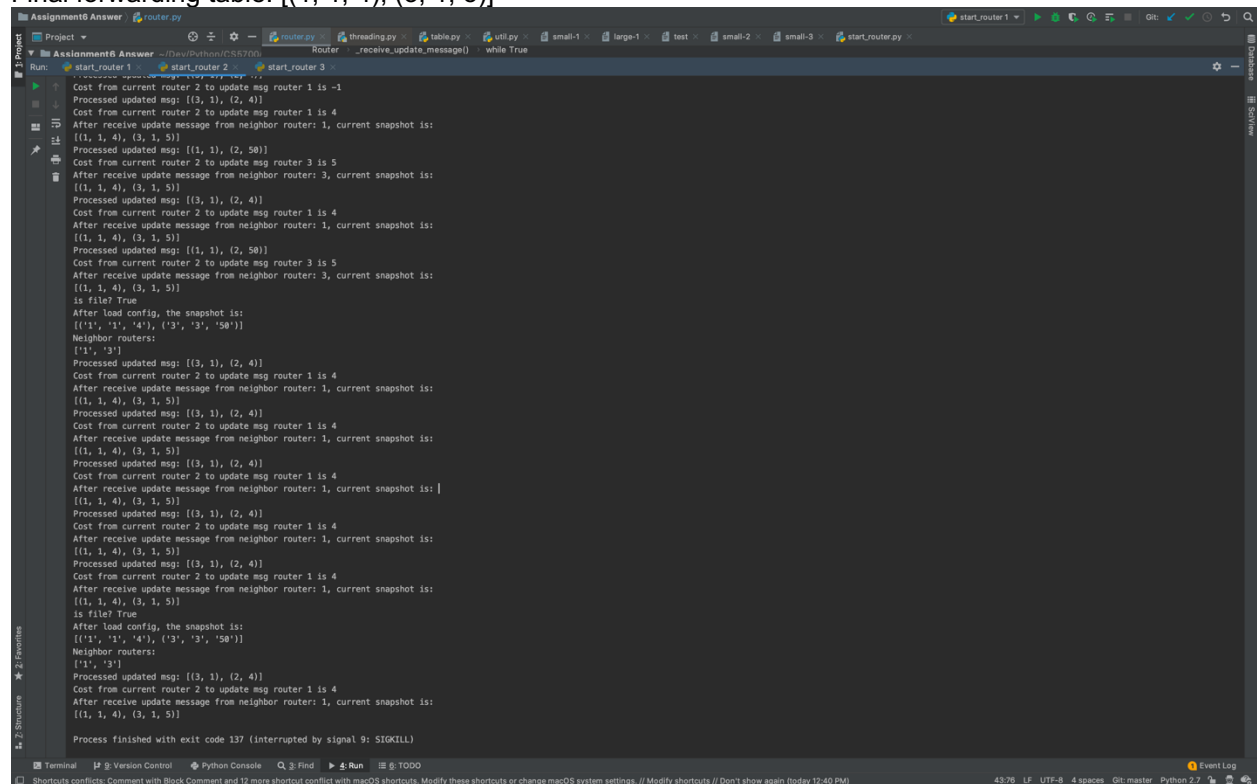
Router 1

Final forwarding table: [(3, 3, 1), (2, 2, 4)]

```
Assignment6 Answer router.py
Run: start_router_1 start_router_2 start_router_3
/usr/bin/python2.7 "/Users/kenshin/Dev/Python/CS5700/Assignment6 Answer/start_router.py" config/small-1
config file names: config/small-1
Router started.
is file? True
Current router id is: 1. Listening on port: 8001
After load config, the snapshot is:
[('3', '3', '1'), ('2', '2', '4')]
Neighbor routers:
['2', '3']
Processed updated msg: [(1, 4), (3, 50)]
Cost from current router 1 to update msg router 2 is -1
Processed updated msg: [(1, 4), (3, 50)]
Cost from current router 1 to update msg router 2 is 4
After receive update message from neighbor router: 2, current snapshot is:
[('3', '3', '1'), ('2', '2', '4')]
Processed updated msg: [(1, 3), (2, 50)]
Cost from current router 1 to update msg router 3 is 1
After receive update message from neighbor router: 3, current snapshot is:
[('3', '3', '1'), ('2', '2', '4')]
Processed updated msg: [(1, 3), (2, 50)]
Cost from current router 1 to update msg router 3 is 1
After receive update message from neighbor router: 3, current snapshot is:
[('3', '3', '1'), ('2', '2', '4')]
is file? True
After load config, the snapshot is:
[('3', '3', '1'), ('2', '2', '4')]
Neighbor routers:
['2', '3']
Processed updated msg: [(1, 4), (3, 50)]
Cost from current router 1 to update msg router 2 is 4
After receive update message from neighbor router: 2, current snapshot is:
[('3', '3', '1'), ('2', '2', '4')]
is file? True
After load config, the snapshot is:
[('3', '3', '1'), ('2', '2', '4')]
Neighbor routers:
['2', '3']
Processed updated msg: [(1, 4), (3, 50)]
Cost from current router 1 to update msg router 2 is 4
After receive update message from neighbor router: 2, current snapshot is:
[('3', '3', '1'), ('2', '2', '4')]
Process finished with exit code 137 (Interrupted by signal 9: SIGKILL)
```

Router 2

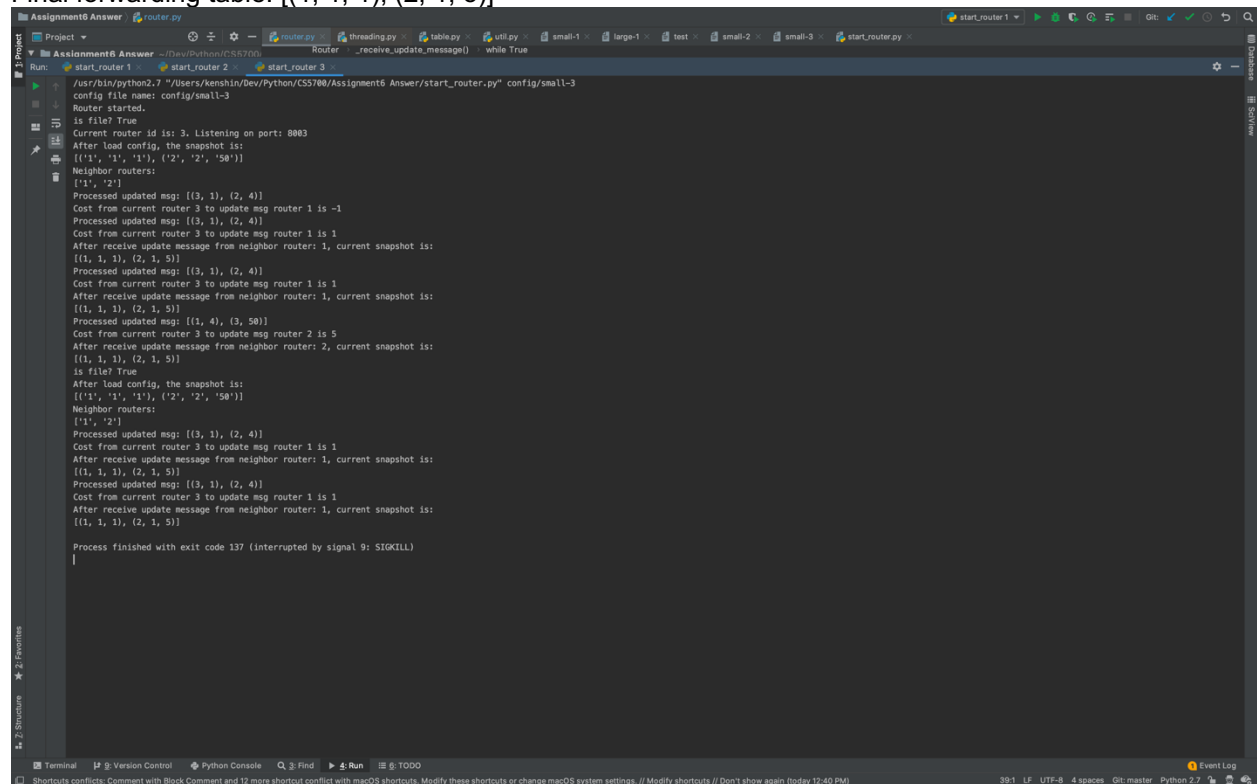
Final forwarding table: [(1, 1, 4), (3, 1, 5)]



```
Project: Assignment6 Answer
Run: start_router 1 start_router 2 start_router 3
Router _receive_update_message() while True
Cost from current router 2 to update msg router 1 is -1
Processed updated msg: [(3, 1), (2, 4)]
Cost from current router 2 to update msg router 1 is 4
After receive update message from neighbor routers: 1, current snapshot is:
[(1, 1, 4), (3, 1, 5)]
Processed updated msg: [(1, 1), (2, 50)]
Cost from current router 2 to update msg router 3 is 5
After receive update message from neighbor routers: 3, current snapshot is:
[(1, 1, 4), (3, 1, 5)]
Processed updated msg: [(3, 1), (2, 4)]
Cost from current router 2 to update msg router 1 is 4
After receive update message from neighbor routers: 1, current snapshot is:
[(1, 1, 4), (3, 1, 5)]
Processed updated msg: [(1, 1), (2, 50)]
Cost from current router 2 to update msg router 3 is 5
After receive update message from neighbor routers: 3, current snapshot is:
[(1, 1, 4), (3, 1, 5)]
is file? True
After Load config, the snapshot is:
[('1', '1', '4'), ('3', '3', '50')]
Neighbor routers:
['1', '3']
Processed updated msg: [(3, 1), (2, 4)]
Cost from current router 2 to update msg router 1 is 4
After receive update message from neighbor routers: 1, current snapshot is:
[(1, 1, 4), (3, 1, 5)]
Processed updated msg: [(3, 1), (2, 4)]
Cost from current router 2 to update msg router 1 is 4
After receive update message from neighbor routers: 1, current snapshot is:
[(1, 1, 4), (3, 1, 5)]
Processed updated msg: [(3, 1), (2, 4)]
Cost from current router 2 to update msg router 1 is 4
After receive update message from neighbor routers: 1, current snapshot is:
[(1, 1, 4), (3, 1, 5)]
Processed updated msg: [(3, 1), (2, 4)]
Cost from current router 2 to update msg router 1 is 4
After receive update message from neighbor routers: 1, current snapshot is:
[(1, 1, 4), (3, 1, 5)]
is file? True
After Load config, the snapshot is:
[('1', '1', '4'), ('3', '3', '50')]
Neighbor routers:
['1', '3']
Processed updated msg: [(3, 1), (2, 4)]
Cost from current router 2 to update msg router 1 is 4
After receive update message from neighbor routers: 1, current snapshot is:
[(1, 1, 4), (3, 1, 5)]
Process finished with exit code 137 (interrupted by signal 9: SIGKILL)
```

Router 3

Final forwarding table: [(1, 1, 1), (2, 1, 5)]




```
Project: Assignment6 Answer
Run: start_router 1 start_router 2 start_router 3
Router _receive_update_message() while True
config file name: config/small-3
Router started.
is file? True
Current router id is: 3. Listening on port: 8083
After Load config, the snapshot is:
[('1', '1', '1'), ('2', '2', '50')]
Neighbor routers:
['1', '2']
Processed updated msg: [(3, 1), (2, 4)]
Cost from current router 3 to update msg router 1 is -1
Processed updated msg: [(3, 1), (2, 4)]
Cost from current router 3 to update msg router 1 is 1
After receive update message from neighbor routers: 1, current snapshot is:
[(1, 1, 1), (2, 1, 5)]
Processed updated msg: [(3, 1), (2, 4)]
Cost from current router 3 to update msg router 1 is 1
After receive update message from neighbor routers: 1, current snapshot is:
[(1, 1, 1), (2, 1, 5)]
Processed updated msg: [(1, 4), (3, 50)]
Cost from current router 3 to update msg router 2 is 5
After receive update message from neighbor routers: 2, current snapshot is:
[(1, 1, 1), (2, 1, 5)]
is file? True
After Load config, the snapshot is:
[('1', '1', '1'), ('2', '2', '50')]
Neighbor routers:
['1', '2']
Processed updated msg: [(3, 1), (2, 4)]
Cost from current router 3 to update msg router 1 is 1
After receive update message from neighbor routers: 1, current snapshot is:
[(1, 1, 1), (2, 1, 5)]
Processed updated msg: [(3, 1), (2, 4)]
Cost from current router 3 to update msg router 1 is 1
After receive update message from neighbor routers: 1, current snapshot is:
[(1, 1, 1), (2, 1, 5)]
Process finished with exit code 137 (interrupted by signal 9: SIGKILL)
```

Case 1-2:

We will also take a look at the ‘Count-To-Infinity’ problem. After all routers converge to the right shortest path, update link cost of (1,2) from 4 to 60 in `config/small-1`, and show me screenshots of your forwarding table changes that illustrate this problem. And after all routers converge to the right shortest path, update link cost of (1,2) from 60 back to 4, and show me screenshots of your forwarding table changes. Do you see convergent time difference between “good information” and “bad information”?

Router1 with config file: $[1, (2, 4), (3, 1)]$

Final forwarding table: [(3, 3, 1), (2, 2, 4)]



The screenshot shows a VS Code editor with a Python script named `start_router.py` open. The script defines a network topology with three routers and their neighbors. The output in the console shows the execution of the script, including the loading of the configuration, the creation of the network, and the printing of the network topology.

```

def main():
    # Load the configuration
    config = load_config('config/small-1')

    # Create the network
    network = Network()

    # Add the routers
    network.add_router('R1', 1)
    network.add_router('R2', 2)
    network.add_router('R3', 3)

    # Add the neighbors
    network.add_neighbor('R1', 'R2', 4)
    network.add_neighbor('R2', 'R1', 4)
    network.add_neighbor('R2', 'R3', 1)
    network.add_neighbor('R3', 'R2', 1)

    # Print the network topology
    print(network)

if __name__ == '__main__':
    main()

```

The console output shows the execution of the script, including the loading of the configuration, the creation of the network, and the printing of the network topology.

```

Run: start_router_1 start_router_2 start_router_3

After load config, the snapshot is:
[[('3', '3', '1'), ('2', '2', '4')]]
Neighbor routers:
['2', '3']
Processed updated msg: [(1, 4), (3, 50)]
Cost from current router 1 to update msg router 2 is ~1
Processed updated msg: [(1, 4), (3, 50)]
Cost from current router 1 to update msg router 2 is 4
After receive update message from neighbor routers: 2, current snapshot is:
[('3', '3', '1'), ('2', '2', '4')]]
Processed updated msg: [(1, 1), (2, 50)]
Cost from current router 1 to update msg router 3 is 1
After receive update message from neighbor routers: 3, current snapshot is:
[('3', '3', '1'), ('2', '2', '4')]]
Processed updated msg: [(1, 1), (2, 50)]
Cost from current router 1 to update msg router 3 is 1
After receive update message from neighbor routers: 3, current snapshot is:
[('3', '3', '1'), ('2', '2', '4')]]
is file? True
After load config, the snapshot is:
[[('3', '3', '1'), ('2', '2', '4')]]
Neighbor routers:
['2', '3']
Processed updated msg: [(1, 4), (3, 50)]
Cost from current router 1 to update msg router 2 is 4
After receive update message from neighbor routers: 2, current snapshot is:
[('3', '3', '1'), ('2', '2', '4')]]
Processed updated msg: [(1, 1), (2, 50)]
Cost from current router 1 to update msg router 3 is 1
After receive update message from neighbor routers: 3, current snapshot is:
[('3', '3', '1'), ('2', '2', '4')]]
is file? True
After load config, the snapshot is:
[[('3', '3', '1'), ('2', '2', '4')]]
Neighbor routers:
['2', '3']
Processed updated msg: [(1, 4), (3, 50)]
Cost from current router 1 to update msg router 2 is 4
After receive update message from neighbor routers: 2, current snapshot is:
[('3', '3', '1'), ('2', '2', '4')]]
Processed updated msg: [(1, 1), (2, 50)]
Cost from current router 1 to update msg router 3 is 1
After receive update message from neighbor routers: 3, current snapshot is:
[('3', '3', '1'), ('2', '2', '4')]]
is file? True
After load config, the snapshot is:
[[('3', '3', '1'), ('2', '2', '60')]]
Neighbor routers:

```

Router2

Final forwarding table: [(1, 1, 4), (3, 1, 5)]

```
Assignment6 Answer  config  small-1
router.py  threading.py  table.py  util.py  small-1  large-1  test  small-2  small-3  start_router.py
Run:  start_router 1  start_router 2  start_router 3

After load config
/Users/kin/python2.7 ~/Users/kin/python/CS5780/Assignment6 Answer/start_router.py config/small-2
config file names: config/small-2
Router started.
is file? True
Current router_id is: 2. Listening on port: 8802
After load config, the snapshot is:
[('1', '1', '4'), ('3', '3', '5')]
Neighbor routers:
[('1', '3')]
Processed update msg: [(3, 1), (2, 4)]
Cost from current router 2 to update msg router 1 is -1
Processed update msg: [(3, 1), (2, 4)]
Cost from current router 2 to update msg router 1 is 4
After receive update message from neighbor routers: 1, current snapshot is:
[(1, 1, 4), (3, 1, 5)]
Processed update msg: [(1, 1), (2, 5)]
Cost from current router 2 to update msg router 3 is 5
After receive update message from neighbor routers: 3, current snapshot is:
[(1, 1, 4), (3, 1, 5)]
Processed update msg: [(3, 1), (2, 4)]
Cost from current router 2 to update msg router 1 is 4
After receive update message from neighbor routers: 1, current snapshot is:
[(1, 1, 4), (3, 1, 5)]
Processed update msg: [(1, 1), (2, 5)]
Cost from current router 2 to update msg router 3 is 5
After receive update message from neighbor routers: 3, current snapshot is:
[(1, 1, 4), (3, 1, 5)]
is file? True
After load config, the snapshot is:
[('1', '1', '4'), ('3', '3', '5')]
Neighbor routers:
[('1', '3')]
Processed update msg: [(3, 1), (2, 4)]
Cost from current router 2 to update msg router 1 is 4
After receive update message from neighbor routers: 1, current snapshot is:
[(1, 1, 4), (3, 1, 5)]
Processed update msg: [(3, 1), (2, 4)]
Cost from current router 2 to update msg router 1 is 4
After receive update message from neighbor routers: 1, current snapshot is:
[(1, 1, 4), (3, 1, 5)]
Processed update msg: [(3, 1), (2, 4)]
Cost from current router 2 to update msg router 1 is 4
After receive update message from neighbor routers: 1, current snapshot is:
[(1, 1, 4), (3, 1, 5)]
Processed update msg: [(1, 1), (2, 5)]
Cost from current router 2 to update msg router 3 is 5
After receive update message from neighbor routers: 3, current snapshot is:
[(1, 1, 4), (3, 1, 5)]
is file? True
```

Router 3

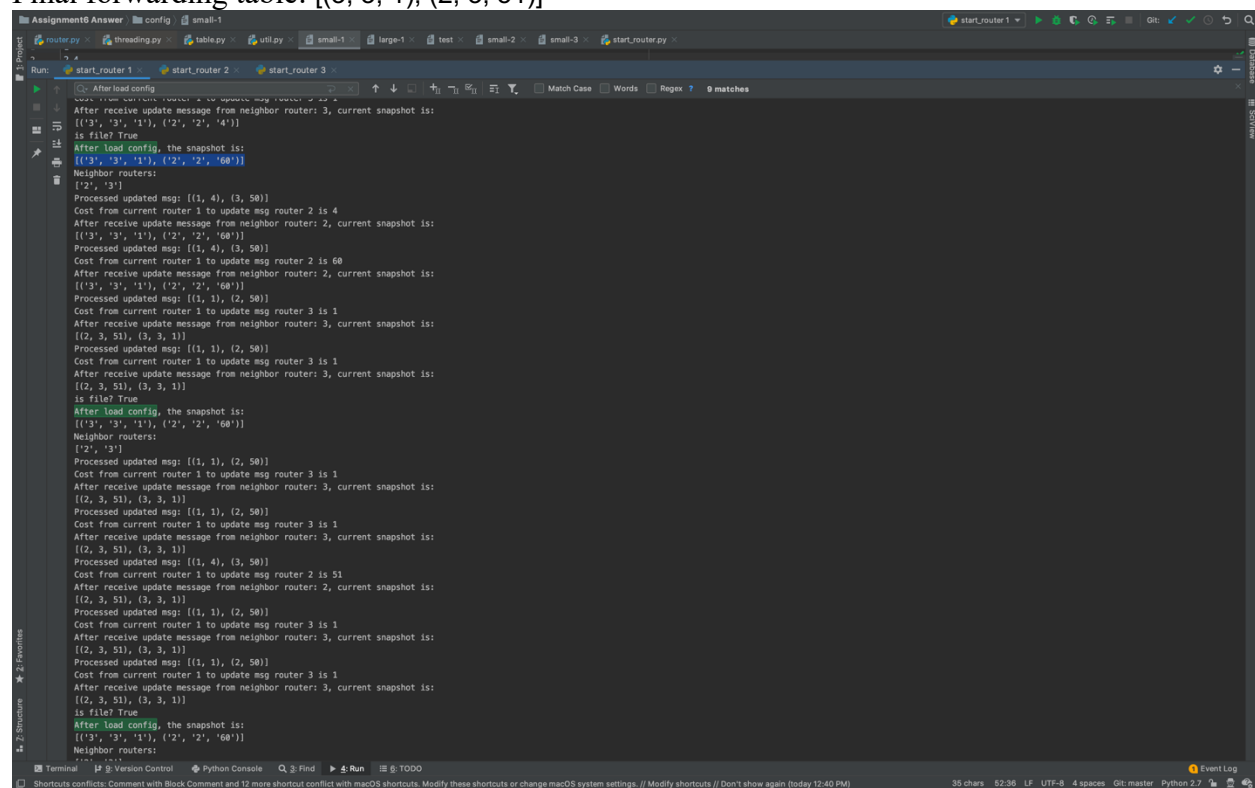
Final forwarding table: [(1, 1, 1), (2, 1, 5)]

```
Assignment6 Answer  config  small-1
router.py  threading.py  table.py  util.py  small-1  large-1  test  small-2  small-3  start_router.py
Run: start_router_1  start_router_2  start_router_3
After load
/usr/bin/python2.7 "/Users/kenshin/Dev/Python/CS5780/Assignment6 Answer/start_router.py" config/small-3
config file name: config/small-3
Router started.
is file? True
Current router id is: 3. Listening on port: 8083
After Load config, the snapshot is:
[('1', '1', '1'), ('2', '2', '50')]
Neighbor routers:
['1', '2']
Processed update msg: [(3, 1), (2, 4)]
Cost from current router 3 to update msg router 1 is -1
Processed update msg: [(3, 1), (2, 4)]
Cost from current router 3 to update msg router 1 is 1
After receive update message from neighbor routers: 1, current snapshot is:
[(1, 1, 1), (2, 1, 5)]
Processed update msg: [(3, 1), (2, 4)]
Cost from current router 3 to update msg router 1 is 1
After receive update message from neighbor routers: 1, current snapshot is:
[(1, 1, 1), (2, 1, 5)]
Processed update msg: [(1, 4), (3, 50)]
Cost from current router 3 to update msg router 2 is 5
After receive update message from neighbor routers: 2, current snapshot is:
[(1, 1, 1), (2, 1, 5)]
Processed update msg: [(3, 1), (2, 4)]
Cost from current router 3 to update msg router 1 is 1
After receive update message from neighbor routers: 1, current snapshot is:
[(1, 1, 1), (2, 1, 5)]
is file? True
After Load config, the snapshot is:
[('1', '1', '1'), ('2', '2', '50')]
Neighbor routers:
['1', '2']
Processed update msg: [(3, 1), (2, 4)]
Cost from current router 3 to update msg router 1 is 1
After receive update message from neighbor routers: 1, current snapshot is:
[(1, 1, 1), (2, 1, 5)]
Processed update msg: [(3, 1), (2, 4)]
Cost from current router 3 to update msg router 1 is 1
After receive update message from neighbor routers: 1, current snapshot is:
[(1, 1, 1), (2, 1, 5)]
Processed update msg: [(3, 1), (2, 4)]
Cost from current router 3 to update msg router 1 is 1
After receive update message from neighbor routers: 1, current snapshot is:
[(1, 1, 1), (2, 1, 5)]
Processed update msg: [(3, 1), (2, 4)]
Cost from current router 3 to update msg router 1 is 1
After receive update message from neighbor routers: 1, current snapshot is:
[(1, 1, 1), (2, 1, 5)]
is file? True
After Load config, the snapshot is:
[('1', '1', '1'), ('2', '2', '50')]
Neighbor routers:
['1', '2']
```

Not stop the program, just change Router1 with config file: [1, (2, 60), (3,1)]

Router1

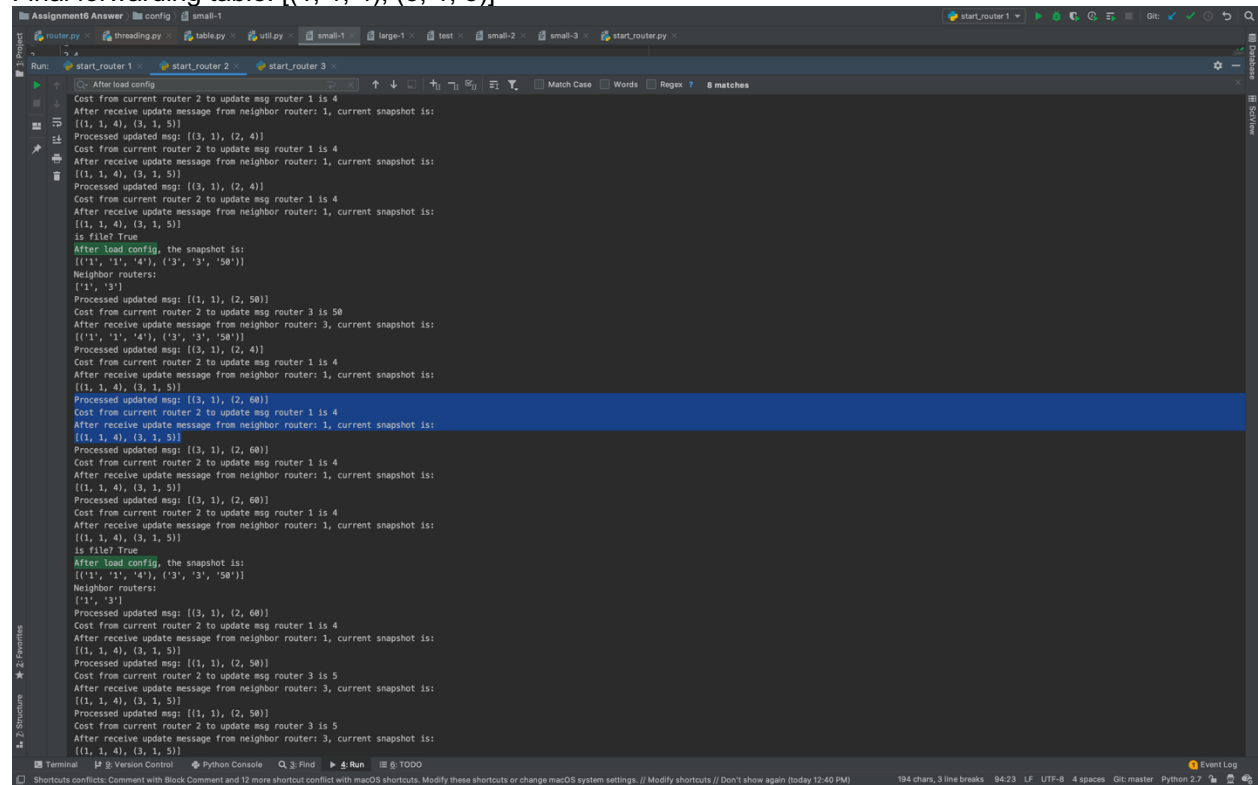
Final forwarding table: [(3, 3, 1), (2, 3, 51)]



```
Assignment6 Answer  config  small-1
router.py  threading.py  table.py  util.py  small-1  large-1  test  small-2  small-3  start_router.py
Run:  start_router 1  start_router 2  start_router 3
After load config
Cost from current router 1 to update msg router 2 is 4
After receive update message from neighbor router: 3, current snapshot is:
[(1, 2, 3), (1, 1), (1, 2, 2, 4)]
is file? True
After load config, the snapshot is:
[(1, 3, 3), (1, 1), (1, 2, 2, 60)]
Neighbor routers:
[1, 2, 3]
Processed updated msg: [(1, 4), (3, 50)]
Cost from current router 1 to update msg router 2 is 4
After receive update message from neighbor router: 2, current snapshot is:
[(1, 2, 3), (1, 1), (1, 2, 2, 60)]
Processed updated msg: [(1, 4), (3, 50)]
Cost from current router 1 to update msg router 2 is 60
After receive update message from neighbor router: 2, current snapshot is:
[(1, 3, 3), (1, 1), (1, 2, 2, 60)]
Processed updated msg: [(1, 1), (2, 50)]
Cost from current router 1 to update msg router 3 is 1
After receive update message from neighbor router: 3, current snapshot is:
[(2, 3, 51), (3, 3, 1)]
Processed updated msg: [(1, 1), (2, 50)]
Cost from current router 1 to update msg router 3 is 1
After receive update message from neighbor routers: 3, current snapshot is:
[(2, 3, 51), (3, 3, 1)]
is file? True
After load config, the snapshot is:
[(1, 3, 3), (1, 1), (1, 2, 2, 60)]
Neighbor routers:
[1, 2, 3]
Processed updated msg: [(1, 1), (2, 50)]
Cost from current router 1 to update msg router 3 is 1
After receive update message from neighbor routers: 3, current snapshot is:
[(2, 3, 51), (3, 3, 1)]
Processed updated msg: [(1, 1), (2, 50)]
Cost from current router 1 to update msg router 3 is 1
After receive update message from neighbor routers: 3, current snapshot is:
[(2, 3, 51), (3, 3, 1)]
Processed updated msg: [(1, 4), (3, 50)]
Cost from current router 1 to update msg router 2 is 51
After receive update message from neighbor router: 2, current snapshot is:
[(2, 3, 51), (3, 3, 1)]
Processed updated msg: [(1, 1), (2, 50)]
Cost from current router 1 to update msg router 3 is 1
After receive update message from neighbor router: 3, current snapshot is:
[(2, 3, 51), (3, 3, 1)]
Processed updated msg: [(1, 1), (2, 50)]
Cost from current router 1 to update msg router 3 is 1
After receive update message from neighbor routers: 3, current snapshot is:
[(2, 3, 51), (3, 3, 1)]
is file? True
After load config, the snapshot is:
[(1, 3, 3), (1, 1), (1, 2, 2, 60)]
Neighbor routers:
[1, 2, 3]
```

Router2

Final forwarding table: [(1, 1, 4), (3, 1, 5)]



The screenshot shows a code editor with a file explorer on the left and a search bar at the top. The main editor area displays a log of network simulation events for Router2. The log includes messages about receiving update messages from neighbor routers, processing updated messages, and the final state of the forwarding table. The final forwarding table is highlighted in blue and matches the text in the question: [(1, 1, 4), (3, 1, 5)].

```
After load config
Cost from current router 2 to update msg router 1 is 4
After receive update message from neighbor routers: 1, current snapshot is:
[(1, 1, 4), (3, 1, 5)]
Processed updated msg: [(1, 1), (2, 4)]
Cost from current router 2 to update msg router 1 is 4
After receive update message from neighbor routers: 1, current snapshot is:
[(1, 1, 4), (3, 1, 5)]
Processed updated msg: [(1, 1), (2, 4)]
Cost from current router 2 to update msg router 1 is 4
After receive update message from neighbor routers: 1, current snapshot is:
[(1, 1, 4), (3, 1, 5)]
is file? True
After load config, the snapshot is:
[('1', '1', '4'), ('3', '3', '50')]
Neighbor routers:
['1', '3']
Processed updated msg: [(1, 1), (2, 50)]
Cost from current router 2 to update msg router 3 is 50
After receive update message from neighbor routers: 3, current snapshot is:
[('1', '1', '4'), ('3', '3', '50')]
Processed updated msg: [(1, 1), (2, 4)]
Cost from current router 2 to update msg router 1 is 4
After receive update message from neighbor routers: 1, current snapshot is:
[(1, 1, 4), (3, 1, 5)]
Processed updated msg: [(1, 1), (2, 60)]
Cost from current router 2 to update msg router 1 is 4
After receive update message from neighbor routers: 1, current snapshot is:
[(1, 1, 4), (3, 1, 5)]
Processed updated msg: [(1, 1), (2, 60)]
Cost from current router 2 to update msg router 1 is 4
After receive update message from neighbor routers: 1, current snapshot is:
[(1, 1, 4), (3, 1, 5)]
is file? True
After load config, the snapshot is:
[('1', '1', '4'), ('3', '3', '50')]
Neighbor routers:
['1', '3']
Processed updated msg: [(1, 1), (2, 60)]
Cost from current router 2 to update msg router 1 is 4
After receive update message from neighbor routers: 1, current snapshot is:
[(1, 1, 4), (3, 1, 5)]
Processed updated msg: [(1, 1), (2, 50)]
Cost from current router 2 to update msg router 3 is 5
After receive update message from neighbor routers: 3, current snapshot is:
[(1, 1, 4), (3, 1, 5)]
Processed updated msg: [(1, 1), (2, 50)]
Cost from current router 2 to update msg router 3 is 5
After receive update message from neighbor routers: 3, current snapshot is:
[(1, 1, 4), (3, 1, 5)]
```

Router 3

Final forwarding table: [(1, 1, 1), (2, 2, 50)]

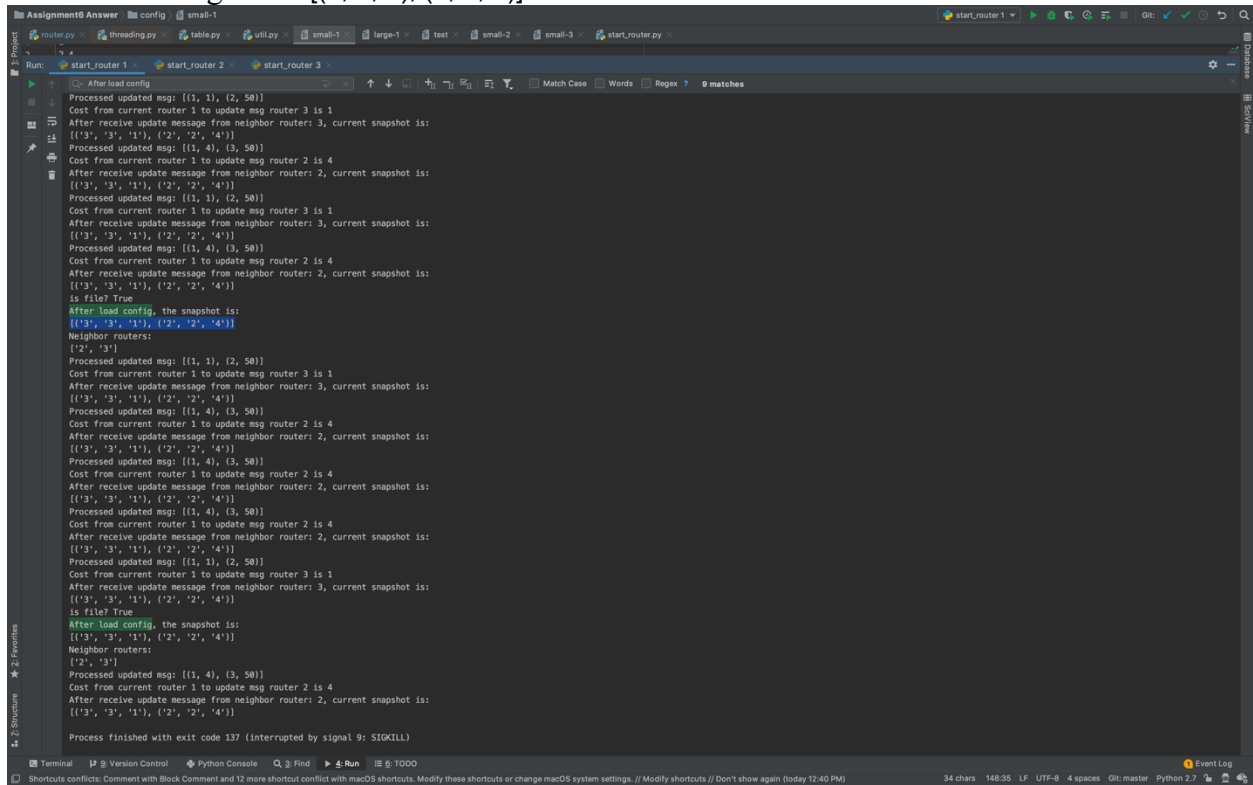
```
Assignment6 Answer  config  small-1
router.py  threading.py  table.py  util.py  small-1  large-1  test  small-2  small-3  start_router.py
Run:  start_router_1  start_router_2  start_router_3

After load
After receive update message from neighbor router: 1, current snapshot is:
[(1, 1, 1), (2, 1, 5)]
Processed updated msg: [(3, 1), (2, 4)]
Cost from current router 3 to update msg router 1 is 1
After receive update message from neighbor router: 1, current snapshot is:
[(1, 1, 1), (2, 1, 5)]
Processed updated msg: [(3, 1), (2, 60)]
Cost from current router 3 to update msg router 1 is 1
After receive update message from neighbor router: 1, current snapshot is:
[(1, 1, 1), (2, 1, 5)]
is file? True
After load config, the snapshot is:
[('1', '1', '1'), ('2', '2', '50')]
Neighbor routers:
['1', '2']
Processed updated msg: [(3, 1), (2, 60)]
Cost from current router 3 to update msg router 1 is 1
After receive update message from neighbor router: 1, current snapshot is:
[('1', '1', '1'), ('2', '2', '50')]
Processed updated msg: [(1, 4), (3, 50)]
Cost from current router 3 to update msg router 2 is 50
After receive update message from neighbor router: 2, current snapshot is:
[('1', '1', '1'), ('2', '2', '50')]
Processed updated msg: [(3, 1), (2, 60)]
Cost from current router 3 to update msg router 1 is 1
After receive update message from neighbor router: 1, current snapshot is:
[('1', '1', '1'), ('2', '2', '50')]
is file? True
After load config, the snapshot is:
[('1', '1', '1'), ('2', '2', '50')]
Neighbor routers:
['1', '2']
Processed updated msg: [(3, 1), (2, 60)]
Cost from current router 3 to update msg router 1 is 1
After receive update message from neighbor router: 1, current snapshot is:
[('1', '1', '1'), ('2', '2', '50')]
Processed updated msg: [(1, 4), (3, 50)]
Cost from current router 3 to update msg router 2 is 50
After receive update message from neighbor router: 2, current snapshot is:
[('1', '1', '1'), ('2', '2', '50')]
Processed updated msg: [(3, 1), (2, 60)]
Cost from current router 3 to update msg router 1 is 1
After receive update message from neighbor router: 1, current snapshot is:
[('1', '1', '1'), ('2', '2', '50')]
Processed updated msg: [(1, 4), (3, 50)]
```


Not stop the program, just change Router1 with config file: [1, (2, 4), (3,1)]

Router1

Final forwarding table: [(3, 3, 1), (2, 2, 4)]



```
Assignment6 Answer  config  small-1
router.py  threading.py  table.py  util.py  small-1  large-1  test  small-2  small-3  start_router.py
Run:  start_router 1  start_router 2  start_router 3
After load config
Processed updated msg: [(1, 1), (2, 50)]
Cost from current router 1 to update msg router 3 is 1
After receive update message from neighbor router: 3, current snapshot is:
[(('3', '3', '1'), ('2', '2', '4'))]
Processed updated msg: [(1, 1), (2, 50)]
Cost from current router 1 to update msg router 2 is 4
After receive update message from neighbor router: 2, current snapshot is:
[(('3', '3', '1'), ('2', '2', '4'))]
Processed updated msg: [(1, 4), (3, 50)]
Cost from current router 1 to update msg router 3 is 1
After receive update message from neighbor router: 3, current snapshot is:
[(('3', '3', '1'), ('2', '2', '4'))]
Processed updated msg: [(1, 4), (3, 50)]
Cost from current router 1 to update msg router 2 is 4
After receive update message from neighbor router: 2, current snapshot is:
[(('3', '3', '1'), ('2', '2', '4'))]
is file? True
After load config, the snapshot is:
[(('3', '3', '1'), ('2', '2', '4'))]
Neighbor routers:
['2', '3']
Processed updated msg: [(1, 1), (2, 50)]
Cost from current router 1 to update msg router 3 is 1
After receive update message from neighbor router: 3, current snapshot is:
[(('3', '3', '1'), ('2', '2', '4'))]
Processed updated msg: [(1, 4), (3, 50)]
Cost from current router 1 to update msg router 2 is 4
After receive update message from neighbor router: 2, current snapshot is:
[(('3', '3', '1'), ('2', '2', '4'))]
Processed updated msg: [(1, 4), (3, 50)]
Cost from current router 1 to update msg router 2 is 4
After receive update message from neighbor router: 2, current snapshot is:
[(('3', '3', '1'), ('2', '2', '4'))]
Processed updated msg: [(1, 1), (2, 50)]
Cost from current router 1 to update msg router 3 is 1
After receive update message from neighbor router: 3, current snapshot is:
[(('3', '3', '1'), ('2', '2', '4'))]
is file? True
After load config, the snapshot is:
[(('3', '3', '1'), ('2', '2', '4'))]
Neighbor routers:
['2', '3']
Processed updated msg: [(1, 4), (3, 50)]
Cost from current router 1 to update msg router 2 is 4
After receive update message from neighbor router: 2, current snapshot is:
[(('3', '3', '1'), ('2', '2', '4'))]
Process finished with exit code 137 (interrupted by signal 9: SIGKILL)
```

Router2

Final forwarding table: [(1, 1, 4), (3, 1, 5)]

```
Assignment6 Answer  config  small-1
router.py  threading.py  table.py  util.py  small-1  large-1  test  small-2  small-3  start_router.py
Run:  start_router 1  start_router 2  start_router 3

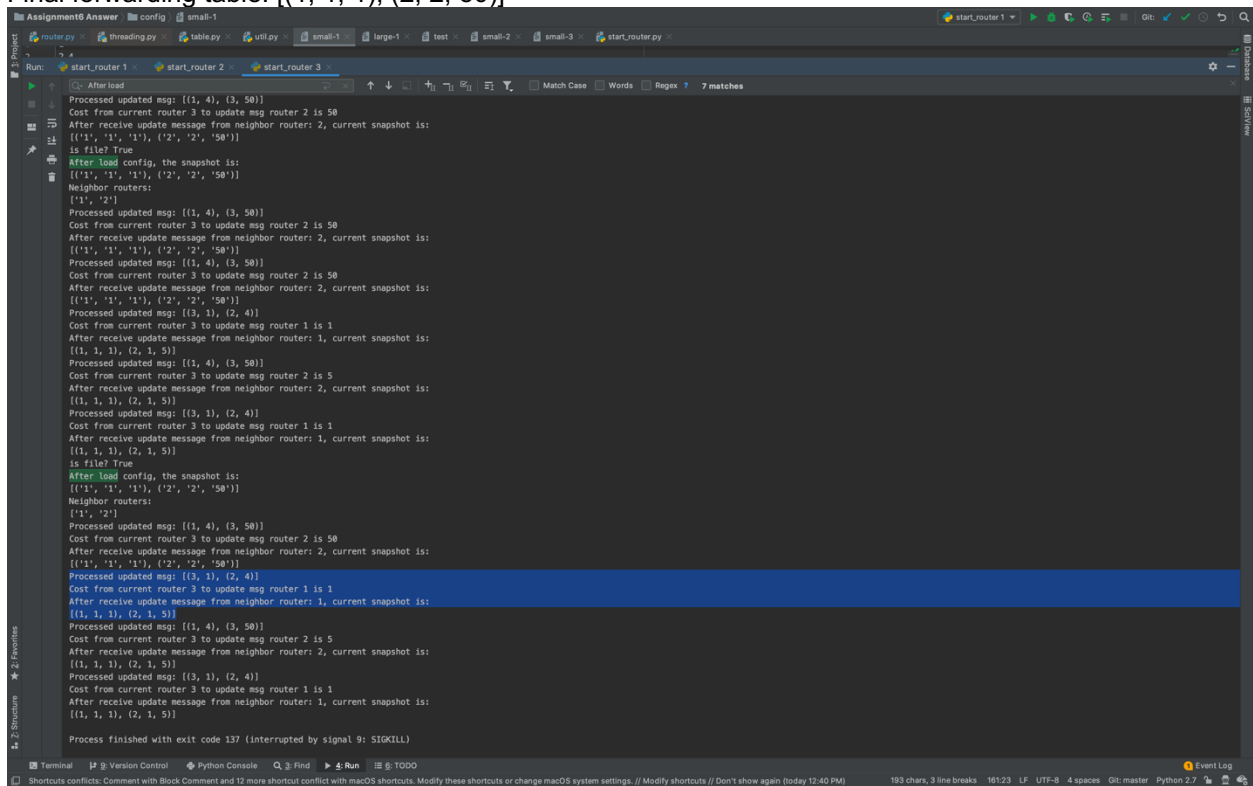
After load config:
Processed updated msg: [(1, 1), (2, 50)]
Cost from current router 2 to update msg router 3 is 50
After receive update message from neighbor router: 3, current snapshot is:
[('1', '1', '4'), ('3', '3', '50')]
Processed updated msg: [(1, 1), (2, 50)]
Cost from current router 2 to update msg router 3 is 50
After receive update message from neighbor router: 3, current snapshot is:
[('1', '1', '4'), ('3', '3', '50')]
Processed updated msg: [(1, 1), (2, 60)]
Cost from current router 2 to update msg router 1 is 4
After receive update message from neighbor router: 1, current snapshot is:
[(1, 1, 4), (3, 1, 5)]
is file? True
After load config, the snapshot is:
[('1', '1', '4'), ('3', '3', '50')]
Neighbor routers:
['1', '3']
Processed updated msg: [(1, 1), (2, 50)]
Cost from current router 2 to update msg router 3 is 50
After receive update message from neighbor router: 3, current snapshot is:
[('1', '1', '4'), ('3', '3', '50')]
Processed updated msg: [(1, 1), (2, 50)]
Cost from current router 2 to update msg router 3 is 50
After receive update message from neighbor router: 3, current snapshot is:
[('1', '1', '4'), ('3', '3', '50')]
Processed updated msg: [(1, 1), (2, 50)]
Cost from current router 2 to update msg router 3 is 50
After receive update message from neighbor router: 3, current snapshot is:
[('1', '1', '4'), ('3', '3', '50')]
Processed updated msg: [(1, 1), (2, 50)]
Cost from current router 2 to update msg router 3 is 50
After receive update message from neighbor router: 3, current snapshot is:
[('1', '1', '4'), ('3', '3', '50')]
is file? True
After load config, the snapshot is:
[('1', '1', '4'), ('3', '3', '50')]
Neighbor routers:
['1', '3']
Processed updated msg: [(3, 1), (2, 4)]
Cost from current router 2 to update msg router 1 is 4
After receive update message from neighbor router: 1, current snapshot is:
[(1, 1, 4), (3, 1, 5)]
Processed updated msg: [(1, 1), (2, 50)]
Cost from current router 2 to update msg router 3 is 5
After receive update message from neighbor router: 3, current snapshot is:
[(1, 1, 4), (3, 1, 5)]

Process finished with exit code 137 (interrupted by signal 9: SIGKILL)

Terminal  Python Console  Find  Run  TODO
Shortcuts conflicts: Comment with Block Comment and 12 more shortcut conflict with macOS shortcuts. Modify these shortcuts or change macOS system settings. // Modify shortcuts // Don't show again (today 12:40 PM)  193 chars, 3 line breaks  186:23  LF  UTF-8  4 spaces  Git: master  Python 2.7  Event Log
```

Router 3

Final forwarding table: [(1, 1, 1), (2, 2, 50)]



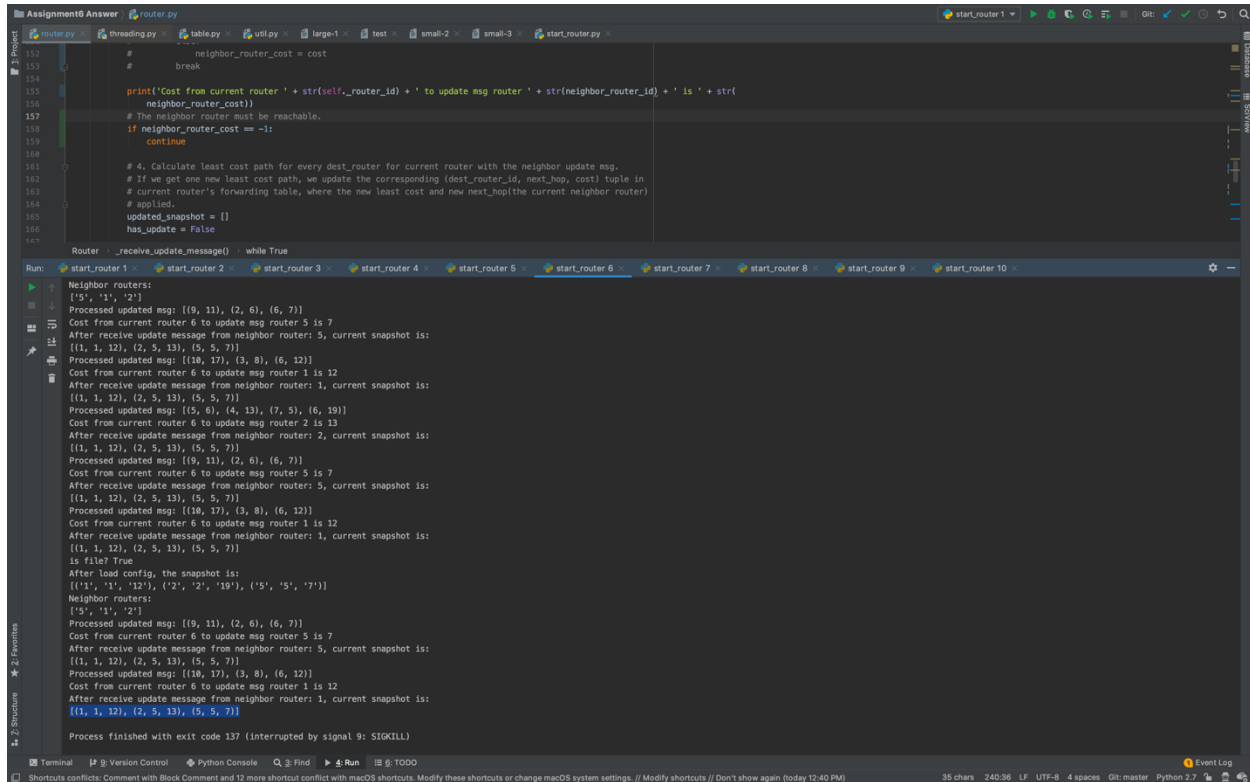
```
Assignment6 Answer  config  small-1
router.py  threading.py  table.py  utility.py  small-1  large-1  test  small-2  small-3  start_router.py
Run:  start_router_1  start_router_2  start_router_3
After load
Processed updated msg: [(1, 4), (3, 50)]
Cost from current router 3 to update msg router 2 is 50
After receive update message from neighbor router: 2, current snapshot is:
[(('1', '1', '1'), ('2', '2', '50'))]
is file? True
After load config, the snapshot is:
[(('1', '1', '1'), ('2', '2', '50'))]
Neighbor routers:
['1', '2']
Processed updated msg: [(1, 4), (3, 50)]
Cost from current router 3 to update msg router 2 is 50
After receive update message from neighbor router: 2, current snapshot is:
[(('1', '1', '1'), ('2', '2', '50'))]
Processed updated msg: [(1, 4), (3, 50)]
Cost from current router 3 to update msg router 2 is 50
After receive update message from neighbor router: 2, current snapshot is:
[(('1', '1', '1'), ('2', '2', '50'))]
Processed updated msg: [(3, 1), (2, 4)]
Cost from current router 3 to update msg router 1 is 1
After receive update message from neighbor router: 1, current snapshot is:
[(1, 1, 1), (2, 1, 5)]
Processed updated msg: [(1, 4), (3, 50)]
Cost from current router 3 to update msg router 2 is 5
After receive update message from neighbor router: 2, current snapshot is:
[(1, 1, 1), (2, 1, 5)]
Processed updated msg: [(3, 1), (2, 4)]
Cost from current router 3 to update msg router 1 is 1
After receive update message from neighbor router: 1, current snapshot is:
[(1, 1, 1), (2, 1, 5)]
is file? True
After load config, the snapshot is:
[(('1', '1', '1'), ('2', '2', '50'))]
Neighbor routers:
['1', '2']
Processed updated msg: [(1, 4), (3, 50)]
Cost from current router 3 to update msg router 2 is 50
After receive update message from neighbor router: 2, current snapshot is:
[(('1', '1', '1'), ('2', '2', '50'))]
Processed updated msg: [(3, 1), (2, 4)]
Cost from current router 3 to update msg router 1 is 1
After receive update message from neighbor router: 1, current snapshot is:
[(1, 1, 1), (2, 1, 5)]
Processed updated msg: [(1, 4), (3, 50)]
Cost from current router 3 to update msg router 2 is 5
After receive update message from neighbor router: 2, current snapshot is:
[(1, 1, 1), (2, 1, 5)]
Processed updated msg: [(3, 1), (2, 4)]
Cost from current router 3 to update msg router 1 is 1
After receive update message from neighbor router: 1, current snapshot is:
[(1, 1, 1), (2, 1, 5)]
Process finished with exit code 137 (interrupted by signal 9: SIGKILL)
```

Case 2: Large Network

Router6

Final forwarding table: [(11, 12), (2, 5, 13), (5, 5, 7)]

Through this we could know the Router6 find a new path to reach Router2 with next_hop Router5.



```
152     neighbor_router_cost = cost
153     break
154
155     print('Cost from current router ' + str(self._router_id) + ' to update msg router ' + str(neighbor_router_id) + ' is ' + str(
156         neighbor_router_cost))
157     # The neighbor router must be reachable.
158     if neighbor_router_cost == -1:
159         continue
160
161     # 4. Calculate least cost path for every dest_router for current router with the neighbor update msg.
162     # If we get one new least cost path, we update the corresponding (dest_router_id, next_hop, cost) tuple in
163     # current router's forwarding table, where the new least cost and new next_hop(the current neighbor router)
164     # applied.
165     updated_snapshot = {}
166     has_update = False
167
168     Router._receive_update_message() while True
```

Run: start_router 1 start_router 2 start_router 3 start_router 4 start_router 5 start_router 6 start_router 7 start_router 8 start_router 9 start_router 10

```
Neighbor routers:
['5', '1', '2']
Processed updated msg: [(9, 11), (2, 6), (6, 7)]
Cost from current router 6 to update msg router 5 is 7
After receive update message from neighbor routers: 5, current snapshot is:
[(1, 1, 12), (2, 5, 13), (5, 5, 7)]
Processed updated msg: [(10, 17), (3, 8), (6, 12)]
Cost from current router 6 to update msg router 1 is 12
After receive update message from neighbor routers: 1, current snapshot is:
[(1, 1, 12), (2, 5, 13), (5, 5, 7)]
Processed updated msg: [(5, 6), (4, 13), (7, 5), (6, 19)]
Cost from current router 6 to update msg router 2 is 13
After receive update message from neighbor routers: 2, current snapshot is:
[(1, 1, 12), (2, 5, 13), (5, 5, 7)]
Processed updated msg: [(9, 11), (2, 6), (6, 7)]
Cost from current router 6 to update msg router 5 is 7
After receive update message from neighbor routers: 5, current snapshot is:
[(1, 1, 12), (2, 5, 13), (5, 5, 7)]
Processed updated msg: [(10, 17), (3, 8), (6, 12)]
Cost from current router 6 to update msg router 1 is 12
After receive update message from neighbor routers: 1, current snapshot is:
[(1, 1, 12), (2, 5, 13), (5, 5, 7)]
is file? True
After load config, the snapshot is:
[('1', '1', '12'), ('2', '2', '19'), ('5', '5', '7')]
Neighbor routers:
['5', '1', '2']
Processed updated msg: [(9, 11), (2, 6), (6, 7)]
Cost from current router 6 to update msg router 5 is 7
After receive update message from neighbor routers: 5, current snapshot is:
[(1, 1, 12), (2, 5, 13), (5, 5, 7)]
Processed updated msg: [(10, 17), (3, 8), (6, 12)]
Cost from current router 6 to update msg router 1 is 12
After receive update message from neighbor routers: 1, current snapshot is:
[(1, 1, 12), (2, 5, 13), (5, 5, 7)]
Process finished with exit code 137 (interrupted by signal 9: SIGKILL)
```