ASSIGNMENT 4

CSCI 6704 – Advanced Topics In Networks

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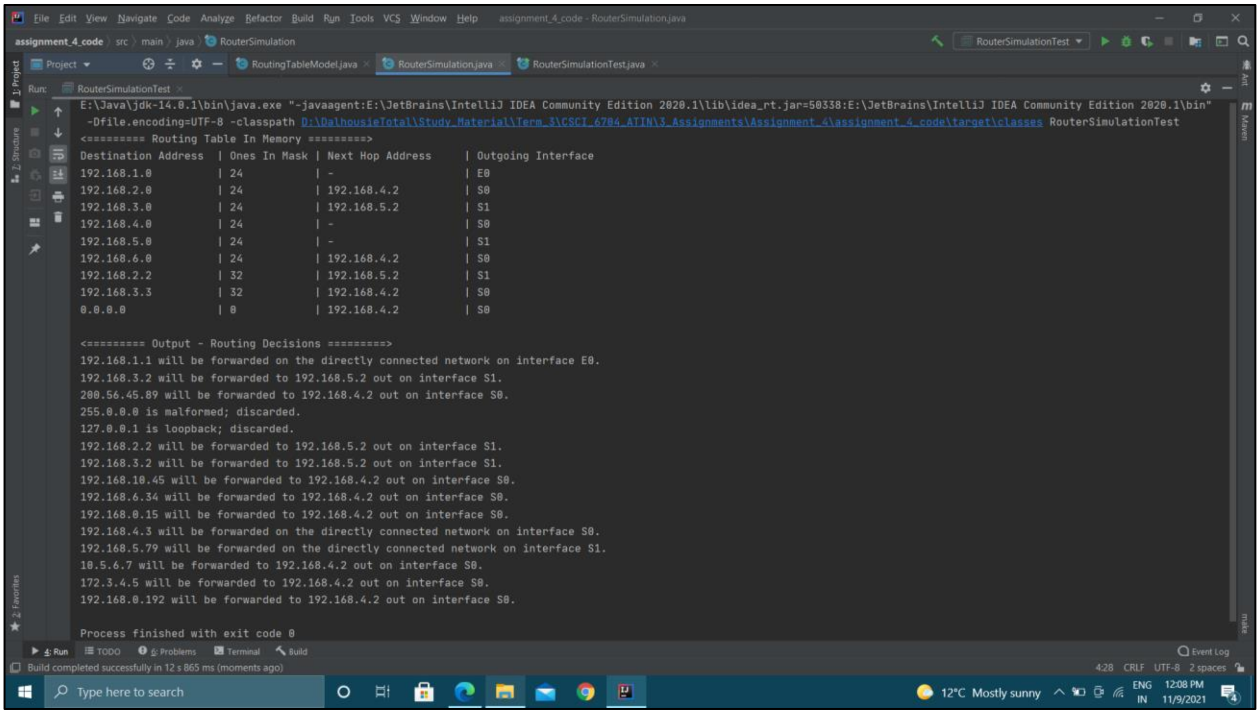
Source Code

The source code for Assignment 4 is in folder **assignment_4_code**. The files inside this folder are inside package – **assignment_4_code/src/main/java/**. These files are as below:

1. **files** folder – This folder contains all the input and output files. The text files inside this folder are as below.
    a. **RoutingTable.txt** – This file contains the routing table entries. Each entry consist of three things which are as follow:
        i. Destination address/Number of ones in the mask (Example: X.X.X.X/X)
        ii. Next hop address (Example: – or X.X.X.X)
        iii. Outgoing interface (Example: E0)
    b. **RandomPackets.txt** – This file contains a list of packets with random destination addresses arriving at the router. (Example: X.X.X.X).
    c. **RoutingOutput.txt** – This file contains the routing decisions made by the router for each packet.
2. **RoutingTableModel.java** – This java file contains the model class for each entry of the router. The entries from the file **RoutingTable.txt** is stored inside the RoutingTableModel class. Also, all entries are stored using the LinkedHashMap data structure.
3. **RoutingSimulation.java** – This java file contains the actual routing logic and routing algorithm. This class read entries from two files namely **RoutingTable.txt** and **RandomPackets.txt**, processes the packet, and stores the output in the **RoutingOutput.txt** file. The list of methods in this class are as below:
    a. Private methods:
        i. storeRoutingDecisionInFile(…params) – Stores the final routing decision made by the router in the **RoutingOutput.txt** file.
        ii. getRoutingMessage(…params) – Gets the routing message.
        iii. getRoutingDecision(…params) – Gets the routing decision. (Internally calls getRoutingMessage(…params) method)
        iv. readRoutingTableInMemory() – Reads the routing table from **RoutingTable.txt** file inside the memory.
    b. Public methods:
        i. execute() – Executes the **RoutingSimulation** class. This method internally calls other private methods.
4. **RoutingSimulationTest.java** – This java file contains the **RoutingSimulationTest** class. It executes the **RoutingSimulation** class using the **RoutingSimulation's** execute() method.

Screenshots

Figure 1 displays the results of the program execution which consists of the routing table and the output (i.e. routing decisions) made by the router.



```
E:\Java\jdk-14.0.1\bin\java.exe "-javaagent:E:\JetBrains\IntelliJ IDEA Community Edition 2020.1\lib\idea_rt.jar=50338:E:\JetBrains\IntelliJ IDEA Community Edition 2020.1\bin"
 -Dfile.encoding=UTF-8 -classpath D:\DalhousieTotal\Study_Material\Term_3\CSCI_6704_ATIN\3_Assignments\Assignment_4\assignment_4_code\target\classes RouterSimulationTest
<========= Routing Table In Memory =========>
Destination Address  | Ones In Mask | Next Hop Address     | Outgoing Interface
192.168.1.0          | 24           | -                    | E0
192.168.2.0          | 24           | 192.168.4.2          | S0
192.168.3.0          | 24           | 192.168.5.2          | S1
192.168.4.0          | 24           | -                    | S0
192.168.5.0          | 24           | -                    | S1
192.168.6.0          | 24           | 192.168.4.2          | S0
192.168.2.2          | 32           | 192.168.5.2          | S1
192.168.3.3          | 32           | 192.168.4.2          | S0
0.0.0.0              | 0            | 192.168.4.2          | S0

<========= Output - Routing Decisions =========>
192.168.1.1 will be forwarded on the directly connected network on interface E0.
192.168.3.2 will be forwarded to 192.168.5.2 out on interface S1.
200.56.45.89 will be forwarded to 192.168.4.2 out on interface S0.
255.0.0.0 is malformed; discarded.
127.0.0.1 is loopback; discarded.
192.168.2.2 will be forwarded to 192.168.5.2 out on interface S1.
192.168.3.2 will be forwarded to 192.168.5.2 out on interface S1.
192.168.10.45 will be forwarded to 192.168.4.2 out on interface S0.
192.168.6.34 will be forwarded to 192.168.4.2 out on interface S0.
192.168.0.15 will be forwarded to 192.168.4.2 out on interface S0.
192.168.4.3 will be forwarded on the directly connected network on interface S0.
192.168.5.79 will be forwarded on the directly connected network on interface S1.
10.5.6.7 will be forwarded to 192.168.4.2 out on interface S0.
172.3.4.5 will be forwarded to 192.168.4.2 out on interface S0.
192.168.0.192 will be forwarded to 192.168.4.2 out on interface S0.

Process finished with exit code 0
```

File Edit View Navigate Code Analyze Refactor Build Run Tools VCS Window Help
assignment_4_code - RouterSimulation.java
assignment_4_code › src › main › java › RouterSimulation
RouterSimulationTest
Project
RoutingTableModel.java
RouterSimulation.java
RouterSimulationTest.java
Run: RouterSimulationTest
4: Run
TODO
6: Problems
Terminal
Build
Event Log
Build completed successfully in 12 s 865 ms (moments ago)
4:28 CRLF UTF-8 2 spaces
Type here to search
12°C Mostly sunny
ENG IN
12:08 PM 11/9/2021

Figure 1 - Screenshot of the program execution

Figure 2 displays the routing decisions captured in the **RoutingOutput.txt** file.

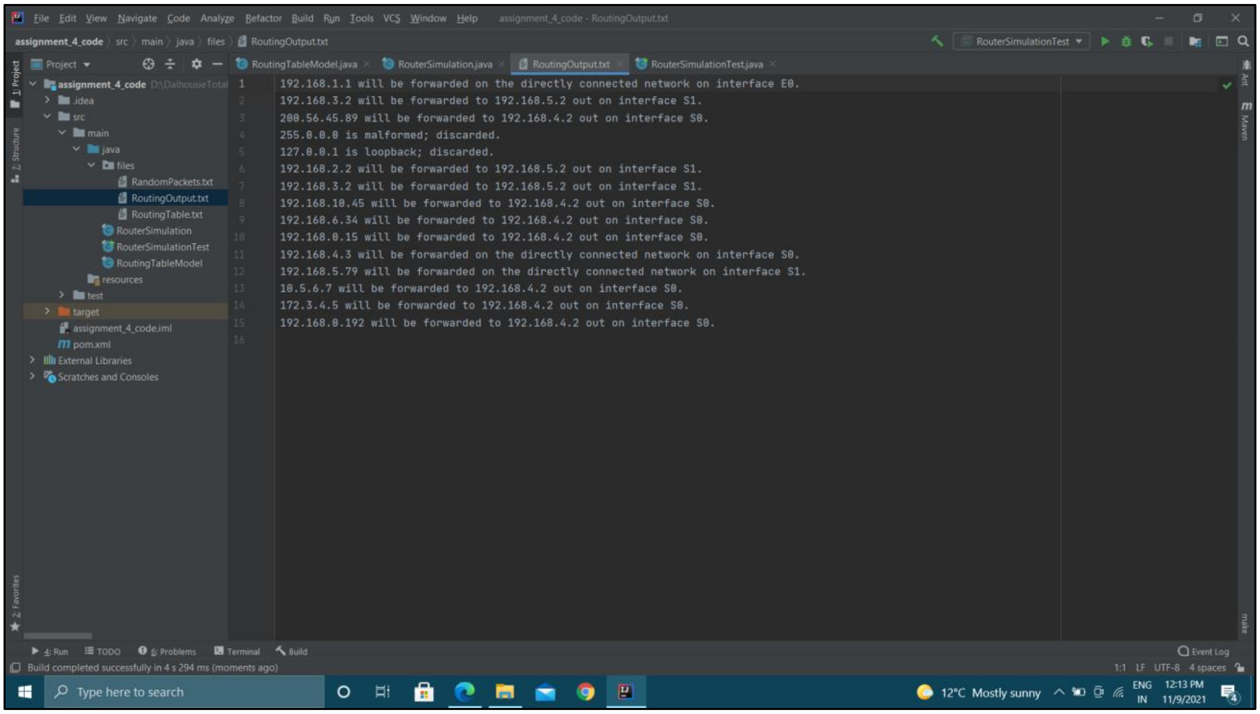


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Figure 2 – Screenshot of the RoutingOutput.txt file