



**Faculty of Engineering  
Ain Shams University  
Electrical Department**

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**Section: 1**

**Subject: Distributed Systems- Assignment 1**

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## Introduction:

In our system we basically have three nodes or we can call it tiers: the drivers, the computers, and the servers. The servers send the recommendations to the computers, where they, in turn, send these recommendations to the drivers in the streets.

## Answer

- I. Mobile Agent is a running code and data that can travel from a network to another, in our distributed system we can say that the computers are transferring the readings of the sensors to the server and the driver's Request to the Server, and ask for recommendations. In return they send the recommendations to the driver as it took it from the server.

### The scenario:

- a. The driver wants to go somewhere.
  - b. He will send to the Computer "intermediate node".
  - c. The computer send the reading and the destination to the server.
  - d. The server can make the recommendations based on the readings.
  - e. The server sends back the recommendations to the computer.
  - f. The computers in return send these recommendations to the driver.
- II. Screenshots  
The sequence: first run the server, then run the computer class, and finally run the client class.

- The client Class "Driver"

```
ServerClass x ClientClass x Computers x
C:\Users\Alaa\.jdk\openjdk-17.0.1\bin\java.exe "-javaagent:C:\Program Files\JetBrains\IntelliJ IDEA\lib\idea_rt.jar=5000:C:\Program Files\JetBrains\IntelliJ IDEA\bin" -Dfile.encoding=UTF-8
Connected To The Computer
Where Are You ?
Saint Fatima
Where Are You Going ?
AL-Hijaz St.
You Will Get The Recommendations ASAP, PLEASE WAIT !
The Best Route Is: Please Turn Right, after 50 metres turn left, after 50 metres Stop!
End Of Connection

Process finished with exit code 0
|
```



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- The Computer Class

```
ServerClass x ClientClass x Computers x
C:\Users\Alaa\.jdk\openjdk-17.0.1\bin\java.exe "-javaagent:C:\Program Files\JetBrains\IntelliJ IDEA Communit
[SERVER] Waiting for driver connection...
[SERVER] connected to driver
The Driver Is Going From Saint Fatima To AL-Hijaz St.
The server sent these recommendations: Please Turn Right, after 50 metres turn left, after 50 metres Stop!
The Computer Took The Recommendations From The Server
The Computer Sent The Recommendations To The Driver

Process finished with exit code 0
|
```

- The Server Class

```
ServerClass x ClientClass x Computers x
C:\Users\Alaa\.jdk\openjdk-17.0.1\bin\java.exe "-javaagent:C:\Program Files\JetBrains\IntelliJ IDEA Community Edition 2021.2.3\lib
[SERVER] Waiting for CLIENT computer connection...
[SERVER] connected to Computer client
These Recommendations Will Be Sent To The Computers: Please Turn Right, after 50 metres turn left, after 50 metres Stop!
[SERVER] sent recommendations to computer, closing

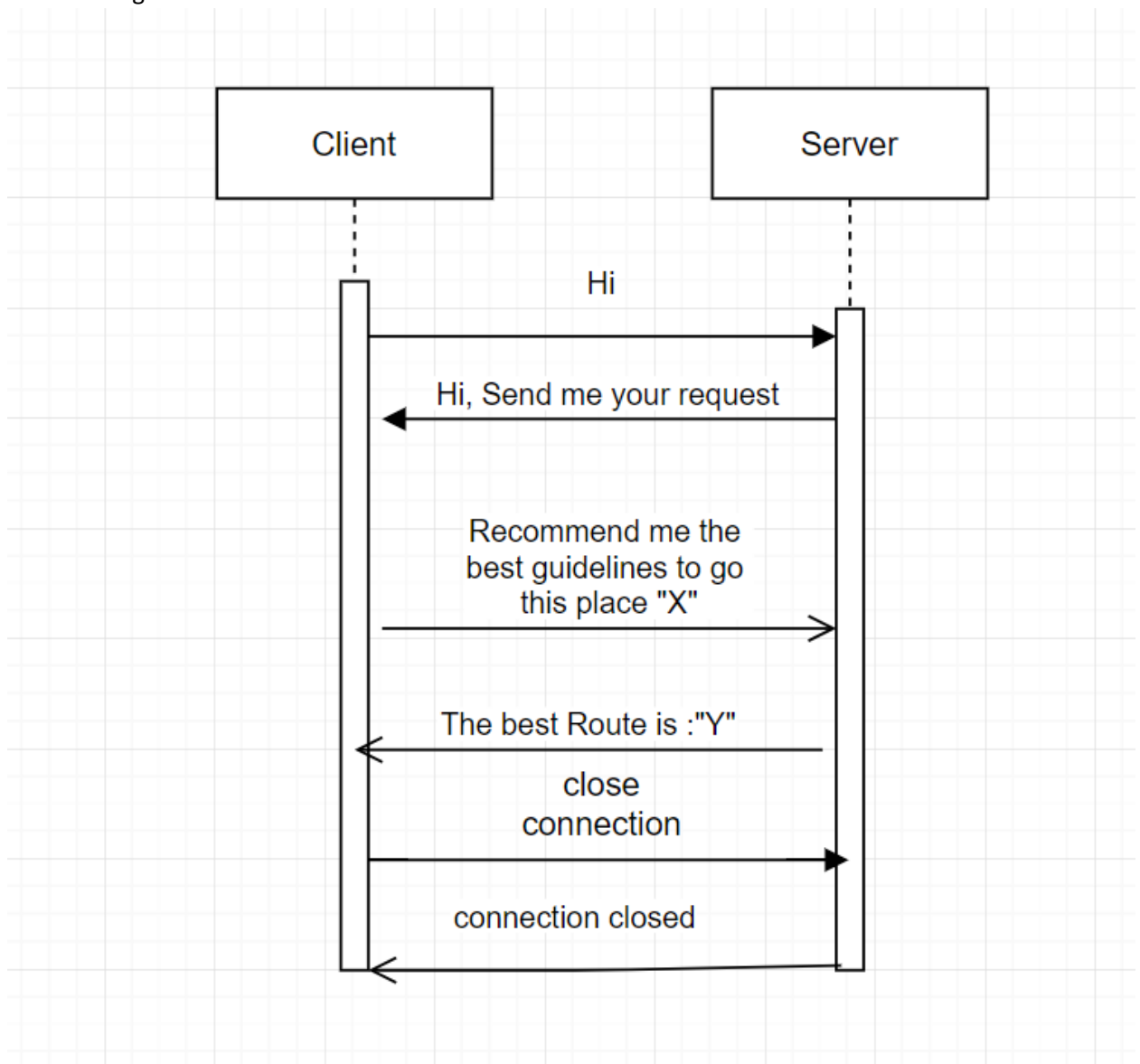
Process finished with exit code 0
|
```

**Samples from another Example:**

```
C:\Users\Alaa\.jdk\openjdk-17.0.1\bin\java.exe "-javaagent:C:\Program Files\JetBrains\Int
Connected To The Computer
Where Are You ?
Abbasia
Where Are You Going ?
Abdou-Basha
You Will Get The Recommendations ASAP, PLEASE WAIT !
The Best Route Is: Please Turn Right, after 50 metres turn left, after 50 metres Stop!
End Of Connection
```



III. The ALP diagram:





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IV. Multithreaded Screenshots:

Multi-threading is used in this point so multiple clients can be served at the same time.

Samples from Examples:

```
C:\Users\Acaa\.jaks\openjdk-17.0.1\bin\java.exe --javaagent:C:\Program Files\JetB
```

```
Connected To The Computer
```

```
Where Are You ?
```

```
A
```

```
Where Are You Going ?
```

```
B
```

```
You Will Get The Recommendations ASAP, PLEASE WAIT !
```

```
The Best Route Is: Turn Right After 100 m, then turn left and Stop after 50 m.
```

```
End Of Connection
```

```
Connected To The Computer
```

```
Where Are You ?
```

```
C
```

```
Where Are You Going ?
```

```
D
```

```
You Will Get The Recommendations ASAP, PLEASE WAIT !
```

```
The Best Route Is: Turn Right After 100 m, then turn left and Stop after 50 m.
```

```
End Of Connection
```

```
Connected To The Computer
```

```
Where Are You ?
```



```
serverMulti x computerMulti x driverMulti x
C:\Users\Alaa\.jdk\openjdk-17.0.1\bin\java.exe "-java:
[SERVER] Waiting for driver connection...
[SERVER] connected to driver
The Driver Is Going From A To B
The Computer Took The Recommendations From The Server
The Computer Sent The Recommendations To The Driver
[SERVER] connected to driver
The Driver Is Going From C To D
The Computer Took The Recommendations From The Server
The Computer Sent The Recommendations To The Driver
[SERVER] connected to driver
```

### Working Files:

- GitHub Repository Link:  
<https://github.com/AlaaShatat/Monitoring-System>
- The README.txt file:  
[https://drive.google.com/drive/folders/1AOOvU9op6GNLOmgrlcP9o4KS8G3\\_9OOL?usp=sharing](https://drive.google.com/drive/folders/1AOOvU9op6GNLOmgrlcP9o4KS8G3_9OOL?usp=sharing)

**Note:** You can find in the Repository the README.txt file and all the working files including the source Code.