Assignment

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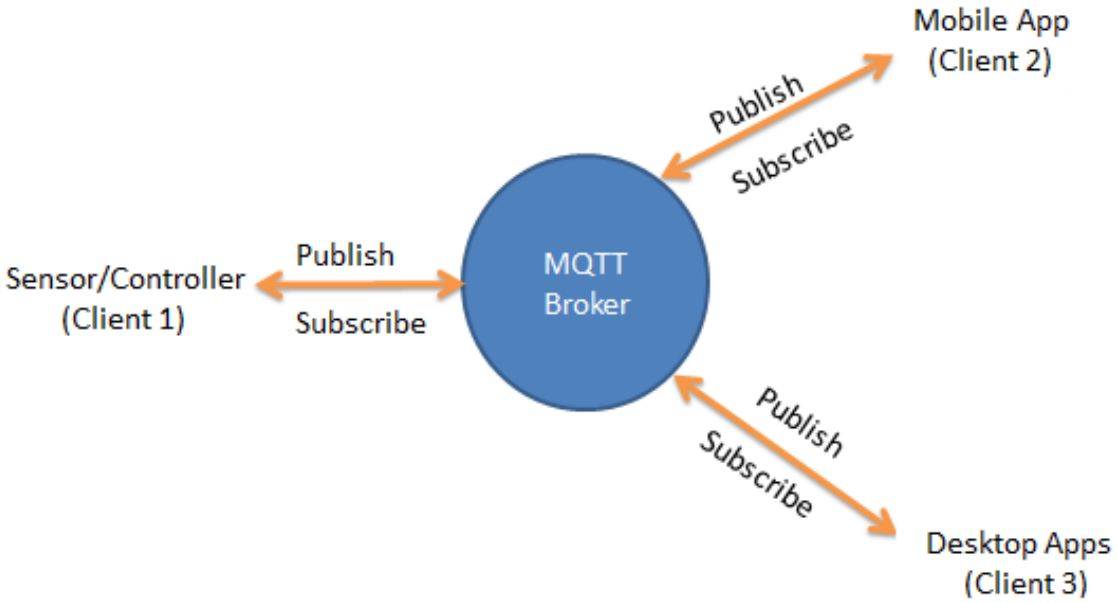
Roll No. : CS19MTECH11011

Implementation of Messenger Application using MQTT

This assignment implements the basic functionalities of chat application based on MQTT(Message Queue Telemetry Transport). It is lightweight messaging protocol for machine to machine communication.MQTT is based on Publish - Subscribe model in which there exits three main entities which are:

- Broker : controls the publish-subscribe message pattern
- Publisher : can be understood as source of data
- Subscriber : which is interested in the data

Following is the illustration of the MQTT based protocol:



As it is evident from the figure, any client can publish data to the broker. Also any client can subscribe to one or multiple topic to get messages of that particular topic.

Publish/subscribe is event-driven and enables messages to be pushed to clients. The central communication point is the MQTT broker, which is in charge of dispatching all messages between the senders and the rightful receivers. Each client that publishes a message to the broker, includes a topic into the message. The topic is the routing information for the broker. Each client that wants to receive messages subscribes to a certain topic and the broker delivers all messages with the matching topic to the client. The clients don't have to know each other. They only communicate over the topic.

Also the topics can be any kind of string. It can be simple or hierarchical , separated by '/'.

Quality of Service Levels (Three levels) :

- 0 = At most once (Best effort, No Ack)→ Fire and Forget
- 1= At least once (Acked, retransmitted ifAack not received)
- 2= Exactly once [Request to send (Publish), Clear-to-send (Pubrec), message (Pubrel), ack (Pubcomp).

There also exits concept of retained messages in which Server keeps messages even after sending it to all subscribers (New subscribers get the retained messages) .

Steps to run the code :

1. Run the HiveMQ server in background (go in the bin folder of hiveMQ).

```
$ ./run.sh
```

2. Go to the extracted zip folder of the code and run the file “final.py”. Follow the steps as per your requirement (the code is already menu driven). This will create one client for the chat application.

```
$ python final.py
```

3. The above step has to repeated for every client. Open a separate terminal and again run the same script using the above command. Make sure that all the CSV’s are in the same folder as the script file because these files will serve as a record for the entry of users.

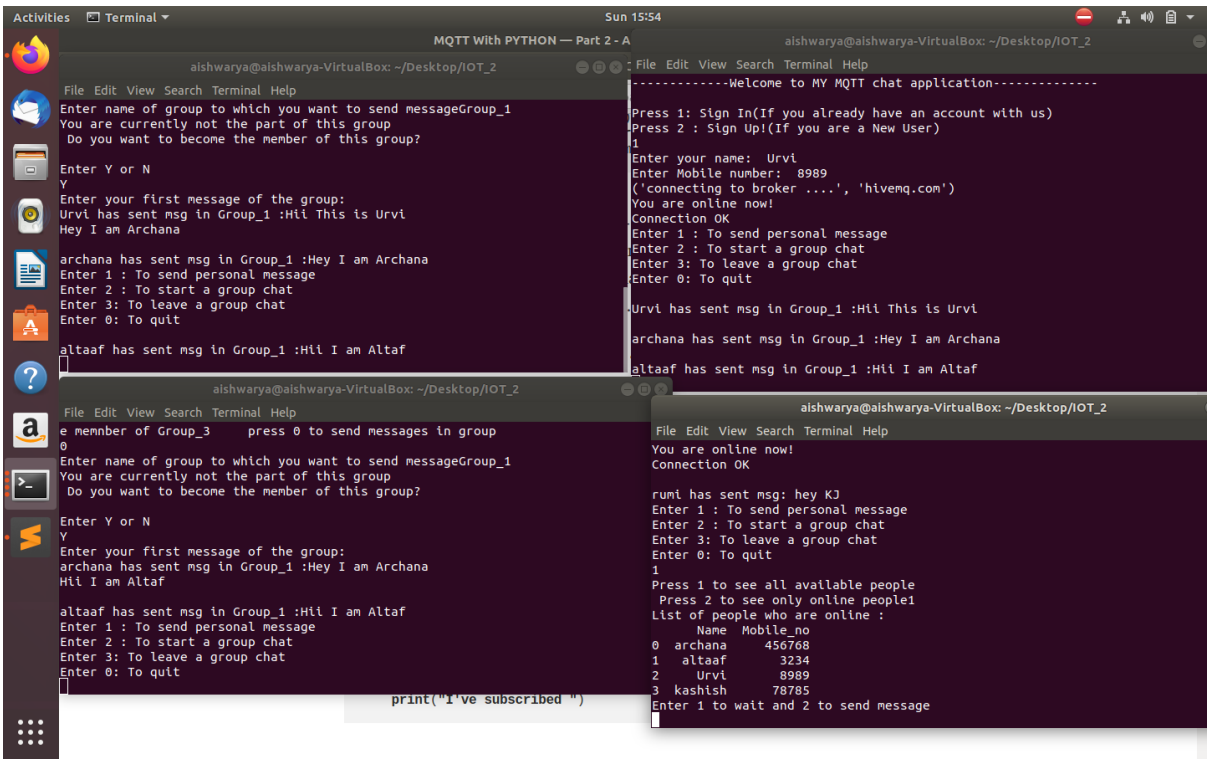
Registration.csv := This will consists of all the registered user of the chat application.

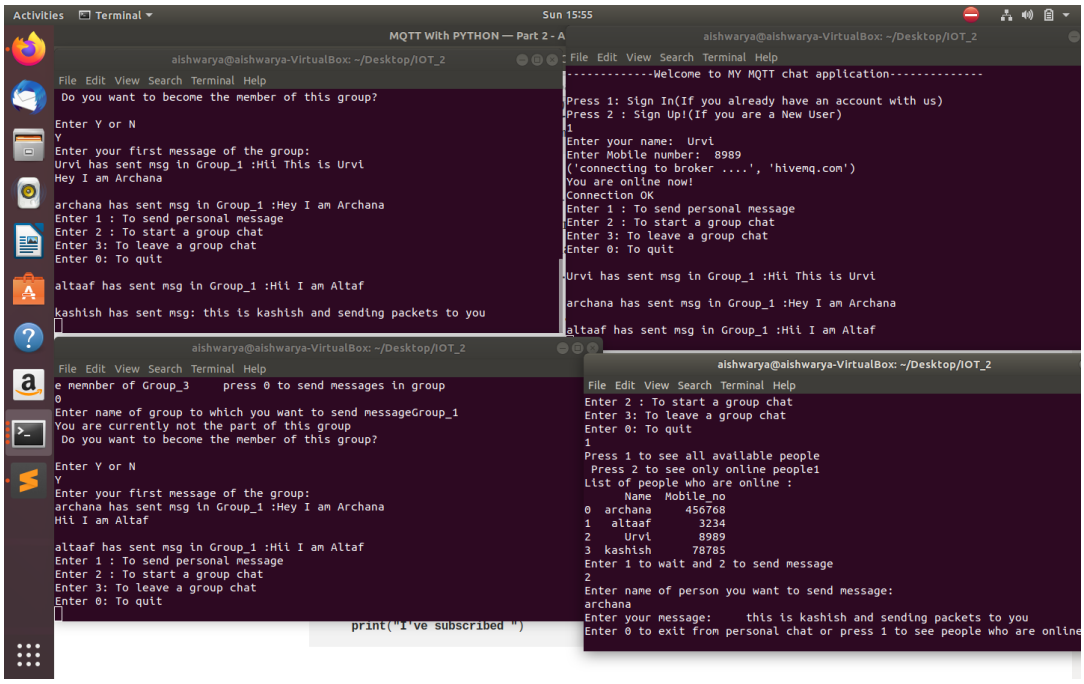
Online.csv := This will consists of active (online) users of the application. Whenever any user disconnects from the application(goes offline), the entry will be deleted from this file.

Group_x.csv := This consists of users added in a particular group named as Group_x.

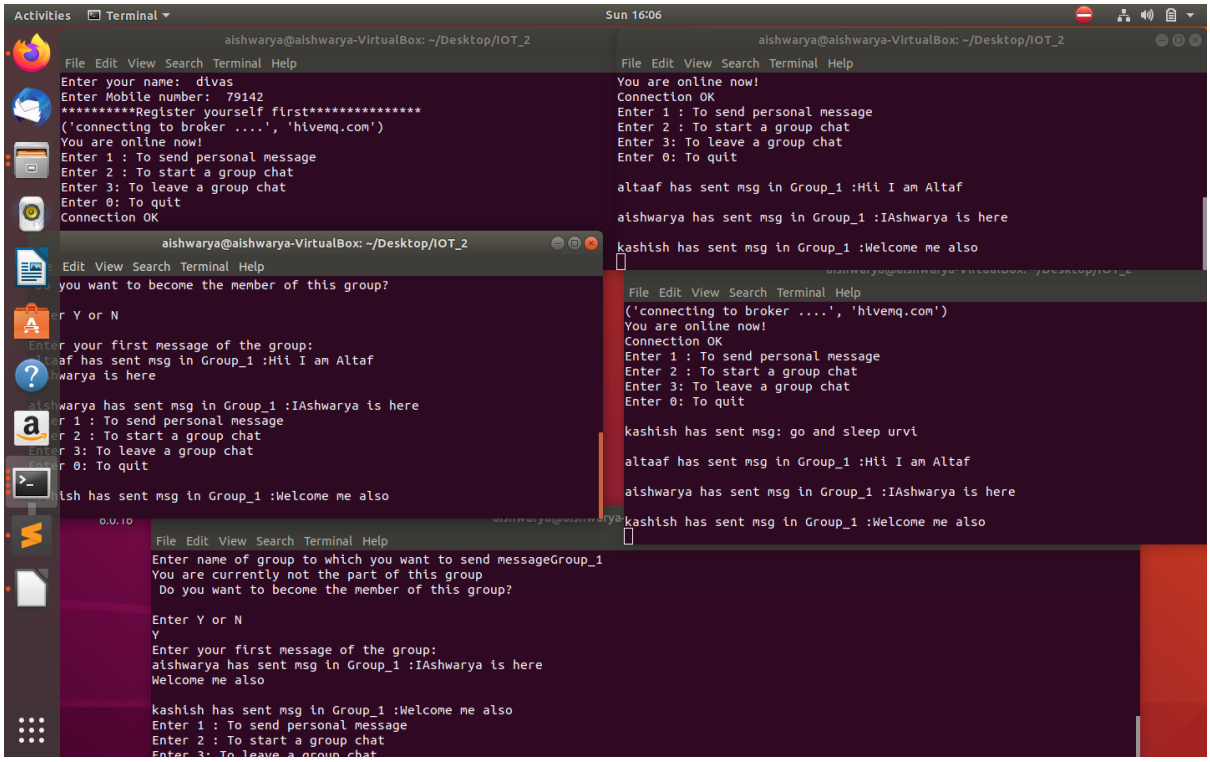
Following are the screenshots of the system state in different scenarios:

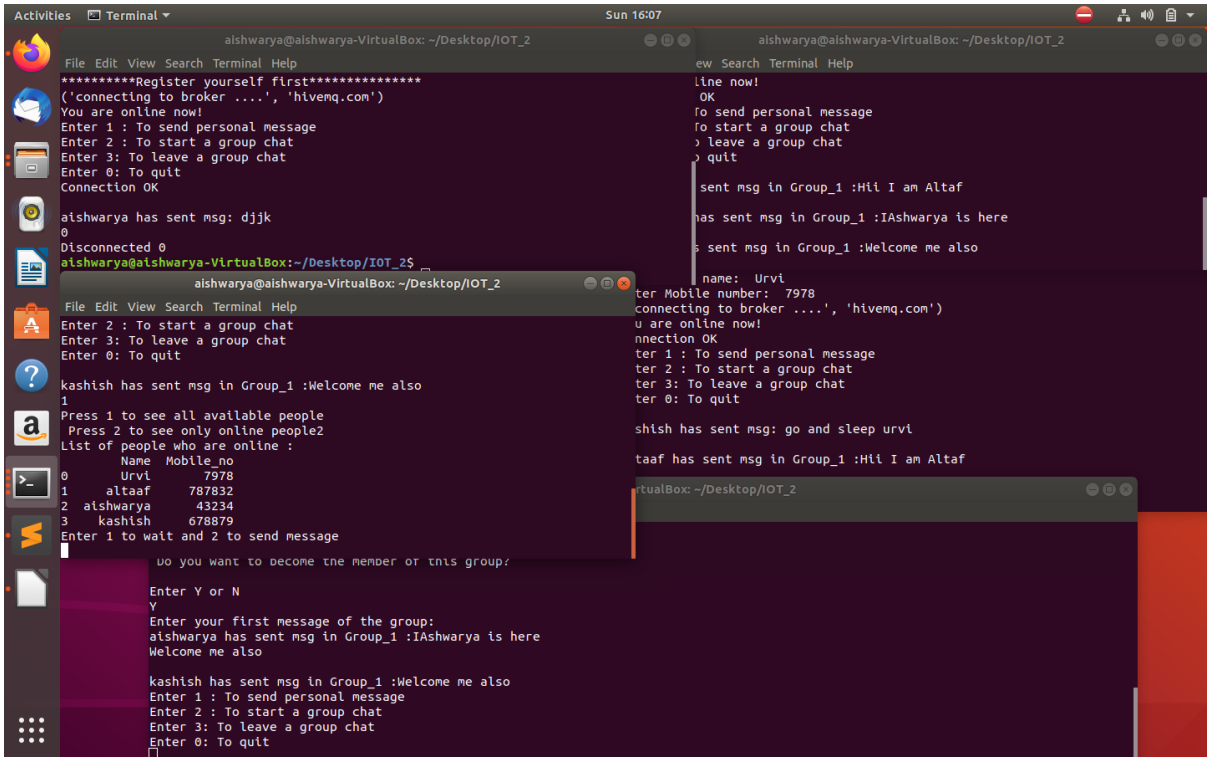
- User registration on the application and one to one chat :

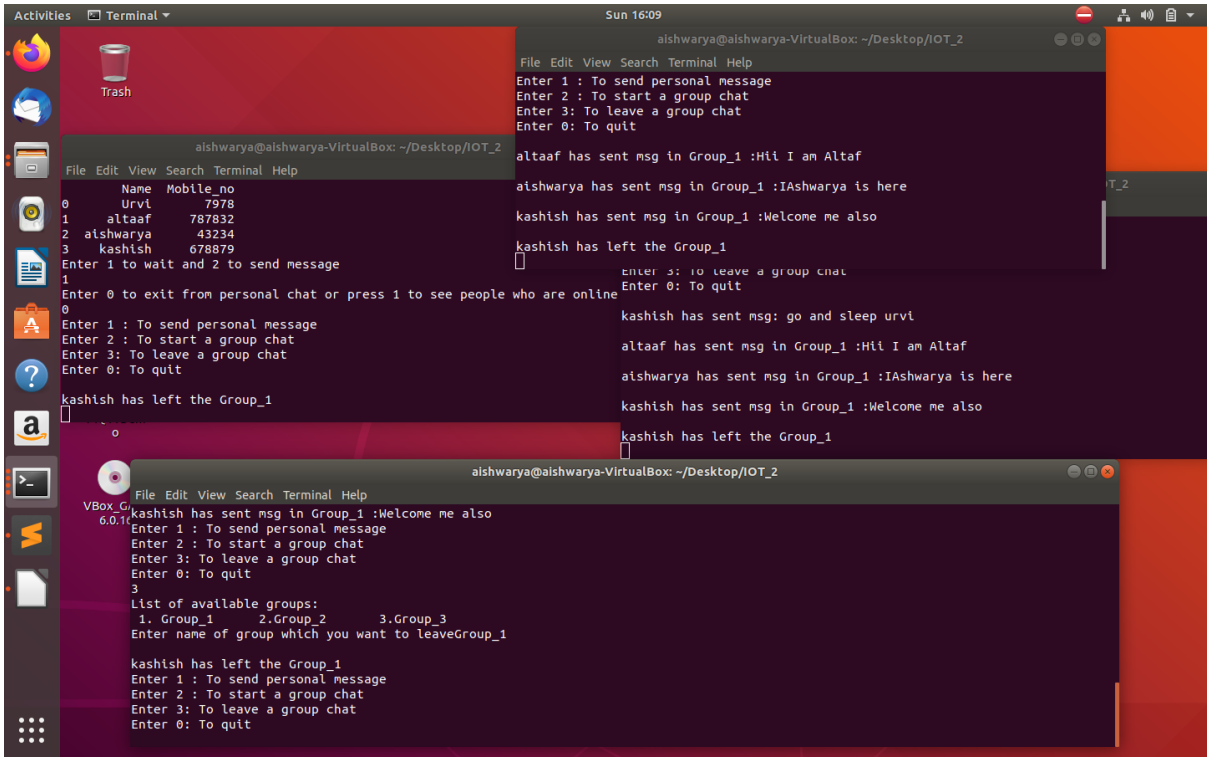


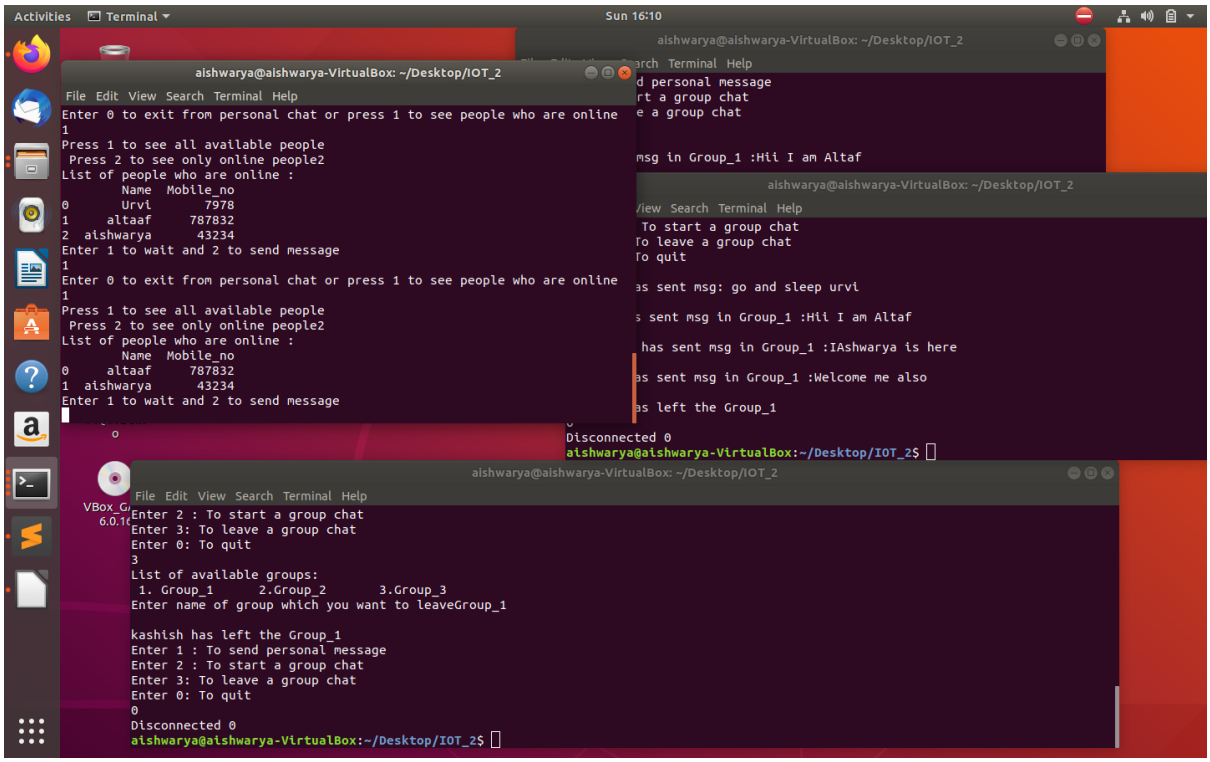


- Group chat:


Activities
Terminal
Sun 16:06
aishwarya@aishwarya-VirtualBox: ~/Desktop/IOT_2
File Edit View Search Terminal Help
Enter your name: divas
Enter Mobile number: 79142
**********Register yourself first***************
('connecting to broker ....', 'hivemq.com')
You are online now!
Enter 1 : To send personal message
Enter 2 : To start a group chat
Enter 3: To leave a group chat
Enter 0: To quit
Connection OK
You are online now!
Connection OK
Enter 1 : To send personal message
Enter 2 : To start a group chat
Enter 3: To leave a group chat
Enter 0: To quit
altaaf has sent msg in Group_1 :Hii I am Altaf
aishwarya has sent msg in Group_1 :IAshwarya is here
kashish has sent msg in Group_1 :Welcome me also
Enter name of group to which you want to send messageGroup_1
You are currently not the part of this group
Do you want to become the member of this group?
Enter Y or N
Y
Enter your first message of the group:
aishwarya has sent msg in Group_1 :IAshwarya is here
Welcome me also
kashish has sent msg in Group_1 :Welcome me also
Enter 1 : To send personal message
Enter 2 : To start a group chat


Activities
Terminal
Sun 16:07
aishwarya@aishwarya-VirtualBox: ~/Desktop/IOT_2
File Edit View Search Terminal Help
**********Register yourself first***************
('connecting to broker ....', 'hivemq.com')
You are online now!
Enter 1 : To send personal message
Enter 2 : To start a group chat
Enter 3: To leave a group chat
Enter 0: To quit
Connection OK
aishwarya has sent msg: djjk
0
Disconnected 0
aishwarya@aishwarya-VirtualBox:~/Desktop/IOT_2$
Enter 2 : To start a group chat
Enter 3: To leave a group chat
Enter 0: To quit
kashish has sent msg in Group_1 :Welcome me also
1
Press 1 to see all available people
Press 2 to see only online people2
List of people who are online :
Name Mobile_no
0 Urvi 7978
1 altaaf 787832
2 aishwarya 43234
3 kashish 678879
Enter 1 to wait and 2 to send message
Enter Y or N
Y
Enter your first message of the group:
aishwarya has sent msg in Group_1 :IAshwarya is here
Welcome me also
kashish has sent msg in Group_1 :Welcome me also
Enter 1 : To send personal message
Enter 2 : To start a group chat
Enter 3: To leave a group chat
Enter 0: To quit


Activities
Terminal
Sun 16:09
Trash
aishwarya@aishwarya-VirtualBox: ~/Desktop/IOT_2
File Edit View Search Terminal Help
Name Mobile_no
0 Urvi 7978
1 altaaf 787832
2 aishwarya 43234
3 kashish 678879
Enter 1 to wait and 2 to send message
1
Enter 0 to exit from personal chat or press 1 to see people who are online
0
Enter 1 : To send personal message
Enter 2 : To start a group chat
Enter 3: To leave a group chat
Enter 0: To quit
kashish has left the Group_1
Enter 1 : To send personal message
Enter 2 : To start a group chat
Enter 3: To leave a group chat
Enter 0: To quit
altaaf has sent msg in Group_1 :Hii I am Altaf
aishwarya has sent msg in Group_1 :IAshwarya is here
kashish has sent msg in Group_1 :Welcome me also
kashish has left the Group_1
kashish has sent msg: go and sleep urvi
altaaf has sent msg in Group_1 :Hii I am Altaf
aishwarya has sent msg in Group_1 :IAshwarya is here
kashish has sent msg in Group_1 :Welcome me also
kashish has left the Group_1
kashish has sent msg in Group_1 :Welcome me also
Enter 1 : To send personal message
Enter 2 : To start a group chat
Enter 3: To leave a group chat
Enter 0: To quit
3
List of available groups:
1. Group_1 2.Group_2 3.Group_3
Enter name of group which you want to leaveGroup_1
kashish has left the Group_1
Enter 1 : To send personal message
Enter 2 : To start a group chat
Enter 3: To leave a group chat
Enter 0: To quit


Activities
Terminal
Sun 16:10
aishwarya@aishwarya-VirtualBox: ~/Desktop/IOT_2
File Edit View Search Terminal Help
Enter 0 to exit from personal chat or press 1 to see people who are online
1
Press 1 to see all available people
Press 2 to see only online people2
List of people who are online :
Name Mobile_no
0 Urvi 7978
1 altaaf 787832
2 aishwarya 43234
Enter 1 to wait and 2 to send message
1
Enter 0 to exit from personal chat or press 1 to see people who are online
1
Press 1 to see all available people
Press 2 to see only online people2
List of people who are online :
Name Mobile_no
0 altaaf 787832
1 aishwarya 43234
Enter 1 to wait and 2 to send message
Disconnected 0
aishwarya@aishwarya-VirtualBox:~/Desktop/IOT_2$
Enter 2 : To start a group chat
Enter 3: To leave a group chat
Enter 0: To quit
3
List of available groups:
1. Group_1 2.Group_2 3.Group_3
Enter name of group which you want to leaveGroup_1
kashish has left the Group_1
Enter 1 : To send personal message
Enter 2 : To start a group chat
Enter 3: To leave a group chat
Enter 0: To quit
0
Disconnected 0
aishwarya@aishwarya-VirtualBox:~/Desktop/IOT_2$