Task 1

```
raisa_tahasen@tahasen-24141097:~$ mkdir cse484
raisa_tahasen@tahasen-24141097:~$ cd cse484
raisa_tahasen@tahasen-24141097:~/cse484$ touch rabbitmq.sh
raisa_tahasen@tahasen-24141097:~/cse484$ chmod +x rabbitmq.sh
raisa_tahasen@tahasen-24141097:~/cse484$ ./rabbitmq.sh
[sudo] password for raisa_tahasen:
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
curl is already the newest version (7.81.0-1ubuntu1.16).
gnupg is already the newest version (2.2.27-3ubuntu2.1).
gnupg set to manually installed.
apt-transport-https is already the newest version (2.4.12).
0 upgraded, 0 newly installed, 0 to remove and 17 not upgraded.
## Provides modern Erlang/OTP releases
##
deb [arch=amd64 signed-by=/usr/share/keyrings/rabbitmq.E495BB49CC4BBE5B.gpg] https://ppa1.r
abbitmq.com/rabbitmq/rabbitmq-erlang/deb/ubuntu jammy main
deb-src [signed-by=/usr/share/keyrings/rabbitmq.E495BB49CC4BBE5B.gpg] https://ppa1.rabbitmq
.com/rabbitmq/rabbitmq-erlang/deb/ubuntu jammy main

# another mirror for redundancy
deb [arch=amd64 signed-by=/usr/share/keyrings/rabbitmq.E495BB49CC4BBE5B.gpg] https://ppa2.r
abbitmq.com/rabbitmq/rabbitmq-erlang/deb/ubuntu jammy main
```

```
systemd/system/rabbitmq-server.service.
Processing triggers for man-db (2.10.2-1) ...
raisa_tahasen@tahasen-24141097:~/cse484$ sudo systemctl status rabbitmq-server
● rabbitmq-server.service - RabbitMQ broker
     Loaded: loaded (/lib/systemd/system/rabbitmq-server.service; enabled; vendor preset: >
     Active: active (running) since Sat 2024-09-07 13:15:49 +06; 2min 40s ago
   Main PID: 5000 (beam.smp)
      Tasks: 26 (limit: 2253)
     Memory: 91.7M
        CPU: 2.906s
     CGroup: /system.slice/rabbitmq-server.service
             ├─5000 /usr/lib/erlang/erts-14.2.5.2/bin/beam.smp -W w -MBas ageffcbf -MHas a>
             ├─5010 erl_child_setup 32768
             ├─5027 sh -s disksup
             ├─5028 /usr/lib/erlang/lib/os_mon-2.9.1/priv/bin/memsup
             ├─5029 /usr/lib/erlang/lib/os_mon-2.9.1/priv/bin/cpu_sup
             ├─5031 /usr/lib/erlang/erts-14.2.5.2/bin/inet_gethost 4
             ├─5032 /usr/lib/erlang/erts-14.2.5.2/bin/inet_gethost 4
             ├─5043 /usr/lib/erlang/erts-14.2.5.2/bin/epmd -daemon
             └─5065 /bin/sh -s rabbit_disk_monitor

সেপ্টেম্বর 07 13:15:49 tahasen-24141097 rabbitmq-server[5000]:    Doc guides:  https://www.ra>
সেপ্টেম্বর 07 13:15:49 tahasen-24141097 rabbitmq-server[5000]:    Support:     https://www.ra>
সেপ্টেম্বর 07 13:15:49 tahasen-24141097 rabbitmq-server[5000]:    Tutorials:   https://www.ra>
```

```
        Memory: 91.7M
           CPU: 2.906s
        CGroup: /system.slice/rabbitmq-server.service
                ├─5000 /usr/lib/erlang/erts-14.2.5.2/bin/beam.smp -W w -MBas ageffcbf -MHas a>
                ├─5010 erl_child_setup 32768
                ├─5027 sh -s disksup
                ├─5028 /usr/lib/erlang/lib/os_mon-2.9.1/priv/bin/memsup
                ├─5029 /usr/lib/erlang/lib/os_mon-2.9.1/priv/bin/cpu_sup
                ├─5031 /usr/lib/erlang/erts-14.2.5.2/bin/inet_gethost 4
                ├─5032 /usr/lib/erlang/erts-14.2.5.2/bin/inet_gethost 4
                ├─5043 /usr/lib/erlang/erts-14.2.5.2/bin/epmd -daemon
                └─5065 /bin/sh -s rabbit_disk_monitor

সেপ্টেম্বর 07 13:15:49 tahasen-24141097 rabbitmq-server[5000]:   Doc guides:  https://www.ra>
সেপ্টেম্বর 07 13:15:49 tahasen-24141097 rabbitmq-server[5000]:   Support:     https://www.ra>
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সেপ্টেম্বর 07 13:15:49 tahasen-24141097 rabbitmq-server[5000]:   Monitoring:  https://www.ra>
সেপ্টেম্বর 07 13:15:49 tahasen-24141097 rabbitmq-server[5000]:   Upgrading:   https://www.ra>
raisa_tahasen@tahasen-24141097:~/cse484$ sudo systemctl start rabbitmq-server
raisa_tahasen@tahasen-24141097:~/cse484$ sudo systemctl enable rabbitmq-server
Synchronizing state of rabbitmq-server.service with SysV service script with /lib/systemd/s
ystemd-sysv-install.
Executing: /lib/systemd/systemd-sysv-install enable rabbitmq-server
raisa_tahasen@tahasen-24141097:~/cse484$
```
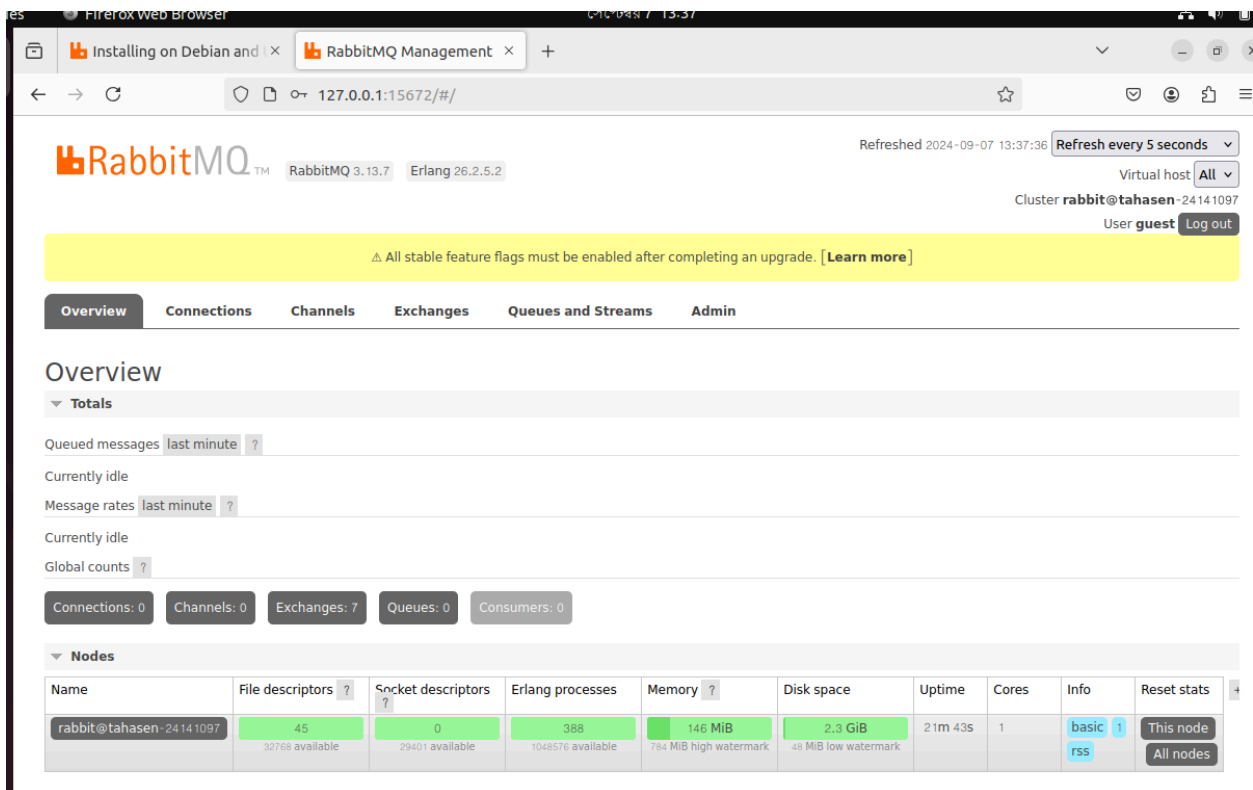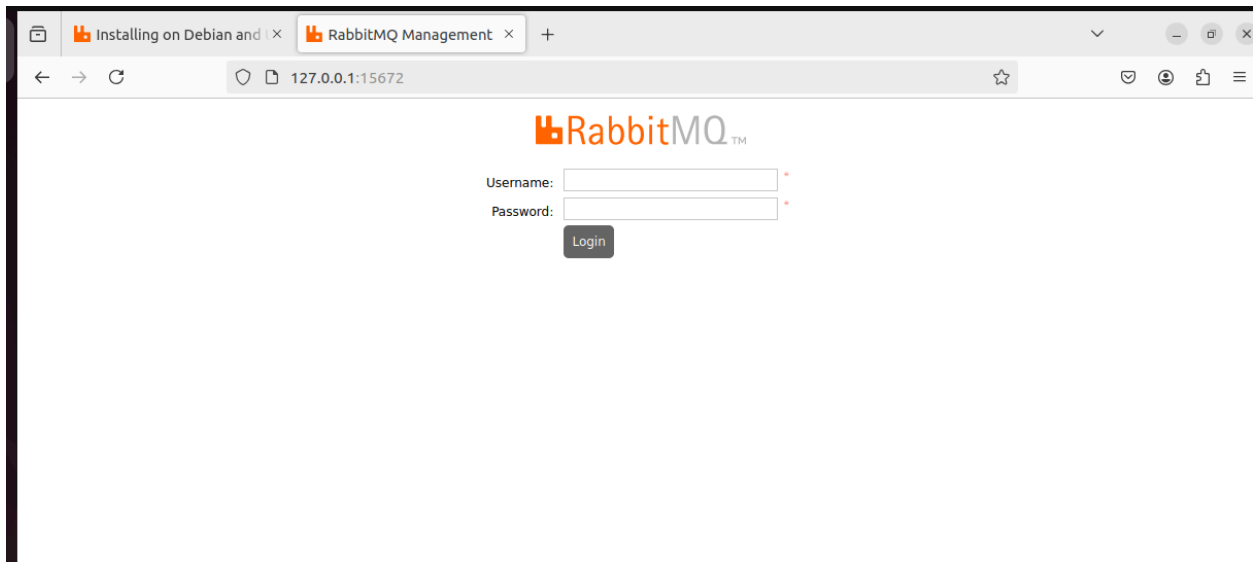
```
সেপ্টেম্বর 07 13:15:49 tahasen-24141097 rabbitmq-server[5000]:   Tutorials:   https://www.ra>
সেপ্টেম্বর 07 13:15:49 tahasen-24141097 rabbitmq-server[5000]:   Monitoring:  https://www.ra>
সেপ্টেম্বর 07 13:15:49 tahasen-24141097 rabbitmq-server[5000]:   Upgrading:   https://www.ra>
raisa_tahasen@tahasen-24141097:~/cse484$ sudo systemctl start rabbitmq-server
raisa_tahasen@tahasen-24141097:~/cse484$ sudo systemctl enable rabbitmq-server
Synchronizing state of rabbitmq-server.service with SysV service script with /lib/systemd/s
ystemd-sysv-install.
Executing: /lib/systemd/systemd-sysv-install enable rabbitmq-server
raisa_tahasen@tahasen-24141097:~/cse484$ sudo systemctl status rabbitmq-server
● rabbitmq-server.service - RabbitMQ broker
     Loaded: loaded (/lib/systemd/system/rabbitmq-server.service; enabled; vendor preset: >
     Active: active (running) since Sat 2024-09-07 13:15:49 +06; 8min ago
   Main PID: 5000 (beam.smp)
      Tasks: 26 (limit: 2253)
     Memory: 91.7M
        CPU: 3.956s
     CGroup: /system.slice/rabbitmq-server.service
             ├─5000 /usr/lib/erlang/erts-14.2.5.2/bin/beam.smp -W w -MBas ageffcbf -MHas a>
             ├─5010 erl_child_setup 32768
             ├─5027 sh -s disksup
             ├─5028 /usr/lib/erlang/lib/os_mon-2.9.1/priv/bin/memsup
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             ├─5031 /usr/lib/erlang/erts-14.2.5.2/bin/inet_gethost 4
             ├─5032 /usr/lib/erlang/erts-14.2.5.2/bin/inet_gethost 4
```

```
সেপ্টেম্বর 07 13:15:49 tahasen-24141097 rabbitmq-server[5000]:   Doc guides:   https://www.ra>
সেপ্টেম্বর 07 13:15:49 tahasen-24141097 rabbitmq-server[5000]:   Support:      https://www.ra>
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সেপ্টেম্বর 07 13:15:49 tahasen-24141097 rabbitmq-server[5000]:   Monitoring:   https://www.ra>
সেপ্টেম্বর 07 13:15:49 tahasen-24141097 rabbitmq-server[5000]:   Upgrading:    https://www.ra>
raisa_tahasen@tahasen-24141097:~/cse484$ sudo rabbitmq-plugins enable rabbitmq_management
Enabling plugins on node rabbit@tahasen-24141097:
rabbitmq_management
The following plugins have been configured:
  rabbitmq_management
  rabbitmq_management_agent
  rabbitmq_web_dispatch
Applying plugin configuration to rabbit@tahasen-24141097...
The following plugins have been enabled:
  rabbitmq_management
  rabbitmq_management_agent
  rabbitmq_web_dispatch

started 3 plugins.
raisa_tahasen@tahasen-24141097:~/cse484$ sudo rabbitmq-plugins list
Listing plugins with pattern ".*" ...
 Configured: E = explicitly enabled; e = implicitly enabled
 | Status: * = running on rabbit@tahasen-24141097
 |/
```

```
  rabbitmq_management_agent
  rabbitmq_web_dispatch

started 3 plugins.
raisa_tahasen@tahasen-24141097:~/cse484$ sudo rabbitmq-plugins list
Listing plugins with pattern ".*" ...
 Configured: E = explicitly enabled; e = implicitly enabled
 | Status: * = running on rabbit@tahasen-24141097
 |/
[  ] rabbitmq_amqp1_0                     3.13.7
[  ] rabbitmq_auth_backend_cache          3.13.7
[  ] rabbitmq_auth_backend_http           3.13.7
[  ] rabbitmq_auth_backend_ldap           3.13.7
[  ] rabbitmq_auth_backend_oauth2         3.13.7
[  ] rabbitmq_auth_mechanism_ssl          3.13.7
[  ] rabbitmq_consistent_hash_exchange    3.13.7
[  ] rabbitmq_event_exchange              3.13.7
[  ] rabbitmq_federation                  3.13.7
[  ] rabbitmq_federation_management       3.13.7
[  ] rabbitmq_jms_topic_exchange          3.13.7
[E*] rabbitmq_management                  3.13.7
[e*] rabbitmq_management_agent            3.13.7
[  ] rabbitmq_mqtt                        3.13.7
[  ] rabbitmq_peer_discovery_aws          3.13.7
```

RabbitMQ™

Username: [   ] *

Password: [   ] *

[Login]

RabbitMQ™   RabbitMQ 3.13.7   Erlang 26.2.5.2

Refreshed 2024-09-07 13:37:36   [Refresh every 5 seconds ▾]

Virtual host [All ▾]

Cluster **rabbit@tahasen**-24141097

User **guest** [Log out]

⚠ All stable feature flags must be enabled after completing an upgrade. [**Learn more**]

| **Overview** | Connections | Channels | Exchanges | Queues and Streams | Admin |

Overview

▾ **Totals**

Queued messages [last minute] ?

Currently idle

Message rates [last minute] ?

Currently idle

Global counts ?

[Connections: 0]   [Channels: 0]   [Exchanges: 7]   [Queues: 0]   [Consumers: 0]

▾ **Nodes**

Name	File descriptors ?	Socket descriptors ?	Erlang processes	Memory ?	Disk space	Uptime	Cores	Info	Reset stats
rabbit@tahasen-24141097	45 32768 available	0 29401 available	388 1048576 available	146 MiB 784 MiB high watermark	2.3 GiB 48 MiB low watermark	21m 43s	1	basic 1 rss	This node All nodes

```
                        raisa_tahasen@tahasen-24141097: ~/cse484          Q  ≡  –  □  ×

raisa_tahasen@tahasen-24141097:~/cse484$ sudo rabbitmq-plugins list [E*]rabbitmq_management
Listing plugins with pattern "[E*]rabbitmq_management" ...
 Configured: E = explicitly enabled; e = implicitly enabled
 | Status: * = running on rabbit@tahasen-24141097
 |/
raisa_tahasen@tahasen-24141097:~/cse484$ sudo apt update
Hit:1 https://download.docker.com/linux/ubuntu jammy InRelease
Hit:2 https://ppa2.rabbitmq.com/rabbitmq/rabbitmq-erlang/deb/ubuntu jammy InRelease
Hit:3 http://security.ubuntu.com/ubuntu jammy-security InRelease
Hit:4 https://ppa2.rabbitmq.com/rabbitmq/rabbitmq-server/deb/ubuntu jammy InRelease
Hit:5 https://ppa1.rabbitmq.com/rabbitmq/rabbitmq-erlang/deb/ubuntu jammy InRelease
Hit:6 https://ppa1.rabbitmq.com/rabbitmq/rabbitmq-server/deb/ubuntu jammy InRelease
Hit:7 http://us.archive.ubuntu.com/ubuntu jammy InRelease
Get:8 http://us.archive.ubuntu.com/ubuntu jammy-updates InRelease [128 kB]
Hit:9 http://us.archive.ubuntu.com/ubuntu jammy-backports InRelease
Fetched 128 kB in 3s (37.2 kB/s)
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
150 packages can be upgraded. Run 'apt list --upgradable' to see them.
raisa_tahasen@tahasen-24141097:~/cse484$ sudo apt install python3-pip
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
```

```
 Processing triggers for man-db (2.10.2-1) ...
 Processing triggers for mailcap (3.70+nmu1ubuntu1) ...
 raisa_tahasen@tahasen-24141097:~/cse484$ pip3 --version
 pip 22.0.2 from /usr/lib/python3/dist-packages/pip (python 3.10)
 raisa_tahasen@tahasen-24141097:~/cse484$ python -m pip install pika --upgrade
 Command 'python' not found, did you mean:
   command 'python3' from deb python3
   command 'python' from deb python-is-python3
 raisa_tahasen@tahasen-24141097:~/cse484$ python3 -m pip install pika --upgrade
 Defaulting to user installation because normal site-packages is not writeable
 Collecting pika
   Downloading pika-1.3.2-py3-none-any.whl (155 kB)
 ━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━ 155.4/155.4 KB 320.2 kB/s eta 0:00:00
 Installing collected packages: pika
 Successfully installed pika-1.3.2
 raisa_tahasen@tahasen-24141097:~/cse484$
```

For Task 1, at first, I made a directory named cse484 and created a file with the name "rabbitmq.sh". Then I copied the installation code for my Ubuntu22.04 into the file and executed the file after updating the permissions using the command, "chmod +x rabbitmq.sh" and "./rabbitmq.sh". After that to check whether the server was installed properly and the status of the server, I used the "sudo systemctl status rabbitmq-server" command and the output showed "active". Then the necessary plugins were installed using the "sudo rabbitmq-plugins enable rabbitmq_management".

After that I went to Firefox browser and searched "127.0.0.1:15672" and the server window appeared asking for username and password.

After that I installed pip using the following commands: "sudo apt update", "sudo apt install python3-pip" and "python3 –version" and the output showed the version "python 3.10"

Then 2 python files were created with the names "send.py" and "receive.py" and the following codes were added.

In send.py, the code below were added, but instead of 'Hello World !" in the body I wrote "Hello World ! I am Raisa Tahasen from cse484, ID: 24141097 ".

```python
import pika

connection = pika.BlockingConnection(
    pika.ConnectionParameters(host='localhost'))
channel = connection.channel()

channel.queue_declare(queue='hello')

channel.basic_publish(exchange='', routing_key='hello', body='Hello World!')
print(" [x] Sent 'Hello World!'")
connection.close()
```

```
raisa_tahasen@tahasen-24141097:~/cse484$ python3 send.py
 [x] Sent 'Hello World!'
raisa_tahasen@tahasen-24141097:~/cse484$ gedit send.py
raisa_tahasen@tahasen-24141097:~/cse484$ python3 send.py
 [x] Sent 'Hello World! I am Raisa Tahasen from cse484, ID: 24141097'
raisa_tahasen@tahasen-24141097:~/cse484$
```

In receive.py the following code were added.

```python
import pika, sys, os

def main():
    connection = pika.BlockingConnection(pika.ConnectionParameters(host='localhost'))
    channel = connection.channel()

    channel.queue_declare(queue='hello')

    def callback(ch, method, properties, body):
        print(f" [x] Received {body}")

    channel.basic_consume(queue='hello', on_message_callback=callback, auto_ack=True)

    print(' [*] Waiting for messages. To exit press CTRL+C')
    channel.start_consuming()

if __name__ == '__main__':
    try:
        main()
    except KeyboardInterrupt:
        print('Interrupted')
        try:
            sys.exit(0)
        except SystemExit:
            os._exit(0)
```

After that I executed the receive.py file first in one terminal and the send.py file in another terminal and the receive.py file showed the following output.

```
raisa_tahasen@tahasen-24141097:~/cse484$ python3 receive.py
 [*] Waiting for messages. To exit press CTRL+C
 [x] Received b'Hello World!'
^CInterrupted
raisa_tahasen@tahasen-24141097:~/cse484$ python3 receive.py
 [*] Waiting for messages. To exit press CTRL+C
 [x] Received b'Hello World! I am Raisa Tahasen from cse484, ID: 24141097'
```

Task 2

For Task 2, the following codes were added to worker.py file and new_task.py file which was used to send arbitrary messages.

```python
1 #!/usr/bin/env python
2 import pika
3 import time
4
5 connection = pika.BlockingConnection(
6     pika.ConnectionParameters(host='localhost'))
7 channel = connection.channel()
8
9 channel.queue_declare(queue='task_queue', durable=True)
10 print(' [*] Waiting for messages. To exit press CTRL+C')
11
12
13 def callback(ch, method, properties, body):
14     print(f" [x] Received {body.decode()}")
15     time.sleep(body.count(b'.'))
16     print(" [x] Done")
17     ch.basic_ack(delivery_tag=method.delivery_tag)
18
19
20 channel.basic_qos(prefetch_count=1)
21 channel.basic_consume(queue='task_queue', on_message_callback=callback)
22
23 channel.start_consuming()
```

Open ⌄   ⬓   **new_task.py**
~/cse484

```python
1 #!/usr/bin/env python
2 import pika
3 import sys
4
5 connection = pika.BlockingConnection(
6     pika.ConnectionParameters(host='localhost'))
7 channel = connection.channel()
8
9 channel.queue_declare(queue='task_queue', durable=True)
10
11 message = ' '.join(sys.argv[1:]) or "Hello World!"
12 channel.basic_publish(
13     exchange='',
14     routing_key='task_queue',
15     body=message,
16     properties=pika.BasicProperties(
17         delivery_mode=pika.DeliveryMode.Persistent
18     ))
19 print(f" [x] Sent {message}")
20 connection.close()
```

raisa_tahasen@tahase...   ×   raisa_tahasen@tahase...   ×   raisa_tahasen@tahase...   ×   ⌄

```
raisa_tahasen@tahasen-24141097:~$ cd cse484
raisa_tahasen@tahasen-24141097:~/cse484$ python3 new_task.py First message.
python3 new_task.py Second message..
python3 new_task.py Third message...
python3 new_task.py Fourth message....
python3 new_task.py Fifth message.....
 [x] Sent First message.
 [x] Sent Second message..
 [x] Sent Third message...
 [x] Sent Fourth message....
 [x] Sent Fifth message.....
raisa_tahasen@tahasen-24141097:~/cse484$
```

```
raisa_tahasen@tahasen-24141097:~/cse484$ python3 worker.py
 [*] Waiting for messages. To exit press CTRL+C
 [x] Received First message.
 [x] Done
 [x] Received Third message...
 [x] Done
 [x] Received Fifth message.....
 [x] Done
```

raisa_tahasen@tahasen-24141097: ~/cse484

raisa_tahasen@tahase... ×   raisa_tahasen@tahase... ×   raisa_tahasen@tahase... ×

```
raisa_tahasen@tahasen-24141097:~$ cd cse484
raisa_tahasen@tahasen-24141097:~/cse484$ python3 worker.py
[*] Waiting for messages. To exit press CTRL+C
[x] Received Second message..
[x] Done
[x] Received Fourth message....
[x] Done
```

```
Command  python  from deb python ts pythons
raisa_tahasen@tahasen-24141097:~/cse484$ python3 new_task.py First message This
is Raisa Tahasen.
python3 new_task.py Second message ID:24141097 ..
python3 new_task.py Third message Doing CSE484 ...
python3 new_task.py Fourth message Assignment 4....
python3 new_task.py Fifth message Bye .....
 [x] Sent First message This is Raisa Tahasen.
 [x] Sent Second message ID:24141097 ..
 [x] Sent Third message Doing CSE484 ...
 [x] Sent Fourth message Assignment 4....
 [x] Sent Fifth message Bye .....
raisa_tahasen@tahasen-24141097:~/cse484$
```

```
raisa_tahasen@tahasen-24141097:~/cse484$ python3 worker.py
[*] Waiting for messages. To exit press CTRL+C
[x] Received Second message ID:24141097 ..
[x] Done
[x] Received Fourth message Assignment 4....
[x] Done
```

```
raisa_tahasen@tahasen-24141097:~/cse484$ python3 worker.py
[*] Waiting for messages. To exit press CTRL+C
[x] Received First message This is Raisa Tahasen.
[x] Done
[x] Received Third message Doing CSE484 ...
[x] Done
[x] Received Fifth message Bye .....
[x] Done
```

At first I ran the worker.py file in 2 separate terminal and then the new_task.py file in another terminal. For the new_task.py file, in the first attempt I used the messages "First message.", "Second message.." and so on. In the output of the worker.py terminal it showed that the messages were received alternately between the terminals. The first, third and fifth messages were received by one terminal and the second and fourth message by the other terminal. In the

second attempt I added my name, ID and other texts with the message and the output are shown in the screenshots.