Lab Submission - 4

Name: Prithviraj Guntha

Reg. No.: 20BRS1188

Subject: Simulation and modelling

Subject code: CSE3102

Professor: Dr. Christy Jackson J

Slot: L57+L58

1. **Create an architecture where one publisher should send a string to the subscriber and the subscriber has to cypher it using the Caesar cypher. The subscriber then sends the encrypted message to another publisher and the publisher has the decrypt it and display the actual message.**

Code:

publisher1.py

```
  GNU nano 4.8                                                          pub1.py
#!/usr/bin/env python

import rospy
from std_msgs.msg import String

def pub1():
    rospy.init_node('pub1', anonymous=True)
    pub = rospy.Publisher('original_msg', String, queue_size=10)
    rate = rospy.Rate(10)

    while not rospy.is_shutdown():
        msg = "vitcc"
        rospy.loginfo(msg)
        pub.publish(msg)
        rate.sleep()

if __name__ == '__main__':
    try:
        pub1()
    except rospy.ROSInterruptException:
        pass
```

publisher2.py

```
  GNU nano 4.8                                                          pub2.py
#!/usr/bin/env python

import rospy
from std_msgs.msg import String

def callback(msg):
    ciphered_msg = msg.data
    rospy.loginfo("Received message: %s", ciphered_msg)

    # Decipher the message
    deciphered_msg = decipher(ciphered_msg)
    rospy.loginfo("Deciphered message: %s", deciphered_msg)

def pub2():
    rospy.init_node('pub2', anonymous=True)
    sub = rospy.Subscriber('ciphered_msg', String, callback)
    rate = rospy.Rate(10)

    while not rospy.is_shutdown():
        msg = "Ciphered message"
        rospy.loginfo(msg)
        rate.sleep()
```

```python
def decipher(ciphered_text, shift=3):
    deciphered_text = ""
    for char in ciphered_text:
        if char.isalpha():
            ascii_code = ord(char)
            shifted_ascii_code = (ascii_code - ord('a') - shift) % 26 + ord('a')
            deciphered_text += chr(shifted_ascii_code)
        else:
            deciphered_text += char
    return deciphered_text

if __name__ == '__main__':
    try:
        pub2()
    except rospy.ROSInterruptException:
        pass
```

subscriber.py

```python
# GNU nano 4.8                                                          sub.py
#!/usr/bin/env python

import rospy
from std_msgs.msg import String

def callback(msg):
    original_msg = msg.data
    rospy.loginfo("Received message: %s", original_msg)

    # Convert message to ciphered text
    ciphered_msg = caesar_cipher(original_msg)
    rospy.loginfo("Ciphered message: %s", ciphered_msg)

    # Publish the ciphered message
    pub2.publish(ciphered_msg)

def sub():
    rospy.init_node('sub', anonymous=True)
    global pub2
    pub2 = rospy.Publisher('ciphered_msg', String, queue_size=10)
    sub = rospy.Subscriber('original_msg', String, callback)
    rospy.spin()

def caesar_cipher(text, shift=3):
    ciphered_text = ""
    for char in text:
        if char.isalpha():
            ascii_code = ord(char)
            shifted_ascii_code = (ascii_code - ord('a') + shift) % 26 + ord('a')
            ciphered_text += chr(shifted_ascii_code)
        else:
            ciphered_text += char
    return ciphered_text

if __name__ == '__main__':
    try:
        sub()
    except rospy.ROSInterruptException:
        pass
```

Output:

```
lab22@205A-scope--64:~/catkin_ws/src/my_robot_tutorials/scripts$ python3 pub1.py
[INFO] [1676634580.061399]: vitcc
[INFO] [1676634580.161749]: vitcc
[INFO] [1676634580.261673]: vitcc
[INFO] [1676634580.361584]: vitcc
[INFO] [1676634580.461711]: vitcc
[INFO] [1676634580.561729]: vitcc
[INFO] [1676634580.661713]: vitcc
[INFO] [1676634580.761723]: vitcc
[INFO] [1676634580.861737]: vitcc
[INFO] [1676634580.961734]: vitcc
[INFO] [1676634581.061516]: vitcc
[INFO] [1676634581.161687]: vitcc
[INFO] [1676634581.261722]: vitcc
[INFO] [1676634581.361733]: vitcc
[INFO] [1676634581.461702]: vitcc
[INFO] [1676634581.561727]: vitcc
[INFO] [1676634581.661719]: vitcc
[INFO] [1676634581.761728]: vitcc
[INFO] [1676634581.861723]: vitcc
[INFO] [1676634581.961708]: vitcc
[INFO] [1676634582.061722]: vitcc
[INFO] [1676634582.161717]: vitcc
```

```
lab22@205A-scope--64:~/catkin_ws/src/my_robot_tutorials/scripts$ python3 sub.py
[INFO] [1676634592.565185]: Received message: vitcc
[INFO] [1676634592.568075]: Ciphered message: ylwff
[INFO] [1676634592.665316]: Received message: vitcc
[INFO] [1676634592.668139]: Ciphered message: ylwff
[INFO] [1676634592.765446]: Received message: vitcc
[INFO] [1676634592.768857]: Ciphered message: ylwff
[INFO] [1676634592.865456]: Received message: vitcc
[INFO] [1676634592.868933]: Ciphered message: ylwff
[INFO] [1676634592.965454]: Received message: vitcc
[INFO] [1676634592.968949]: Ciphered message: ylwff
[INFO] [1676634593.065445]: Received message: vitcc
[INFO] [1676634593.068505]: Ciphered message: ylwff
[INFO] [1676634593.165407]: Received message: vitcc
[INFO] [1676634593.168729]: Ciphered message: ylwff
[INFO] [1676634593.265511]: Received message: vitcc
[INFO] [1676634593.268858]: Ciphered message: ylwff
[INFO] [1676634593.365471]: Received message: vitcc
[INFO] [1676634593.368973]: Ciphered message: ylwff
[INFO] [1676634593.465328]: Received message: vitcc
[INFO] [1676634593.468317]: Ciphered message: ylwff
```

```
lab22@205A-scope--64:~/catkin_ws/src/my_robot_tutorials/scripts$ python3 pub2.py
[INFO] [1676634609.316628]: Ciphered message
[INFO] [1676634609.364663]: Received message: ylwff
[INFO] [1676634609.365503]: Deciphered message: vitcc
[INFO] [1676634609.417120]: Ciphered message
[INFO] [1676634609.472390]: Received message: ylwff
[INFO] [1676634609.475510]: Deciphered message: vitcc
[INFO] [1676634609.517143]: Ciphered message
[INFO] [1676634609.571676]: Received message: ylwff
[INFO] [1676634609.574462]: Deciphered message: vitcc
[INFO] [1676634609.617127]: Ciphered message
[INFO] [1676634609.671670]: Received message: ylwff
[INFO] [1676634609.674652]: Deciphered message: vitcc
[INFO] [1676634609.717196]: Ciphered message
[INFO] [1676634609.771888]: Received message: ylwff
[INFO] [1676634609.774879]: Deciphered message: vitcc
[INFO] [1676634609.817194]: Ciphered message
[INFO] [1676634609.871756]: Received message: ylwff
[INFO] [1676634609.874674]: Deciphered message: vitcc
[INFO] [1676634609.917186]: Ciphered message
[INFO] [1676634609.971755]: Received message: ylwff
[INFO] [1676634609.974648]: Deciphered message: vitcc
[INFO] [1676634610.017186]: Ciphered message
[INFO] [1676634610.071606]: Received message: ylwff
[INFO] [1676634610.074548]: Deciphered message: vitcc
[INFO] [1676634610.117200]: Ciphered message
[INFO] [1676634610.171617]: Received message: ylwff
[INFO] [1676634610.174555]: Deciphered message: vitcc
```