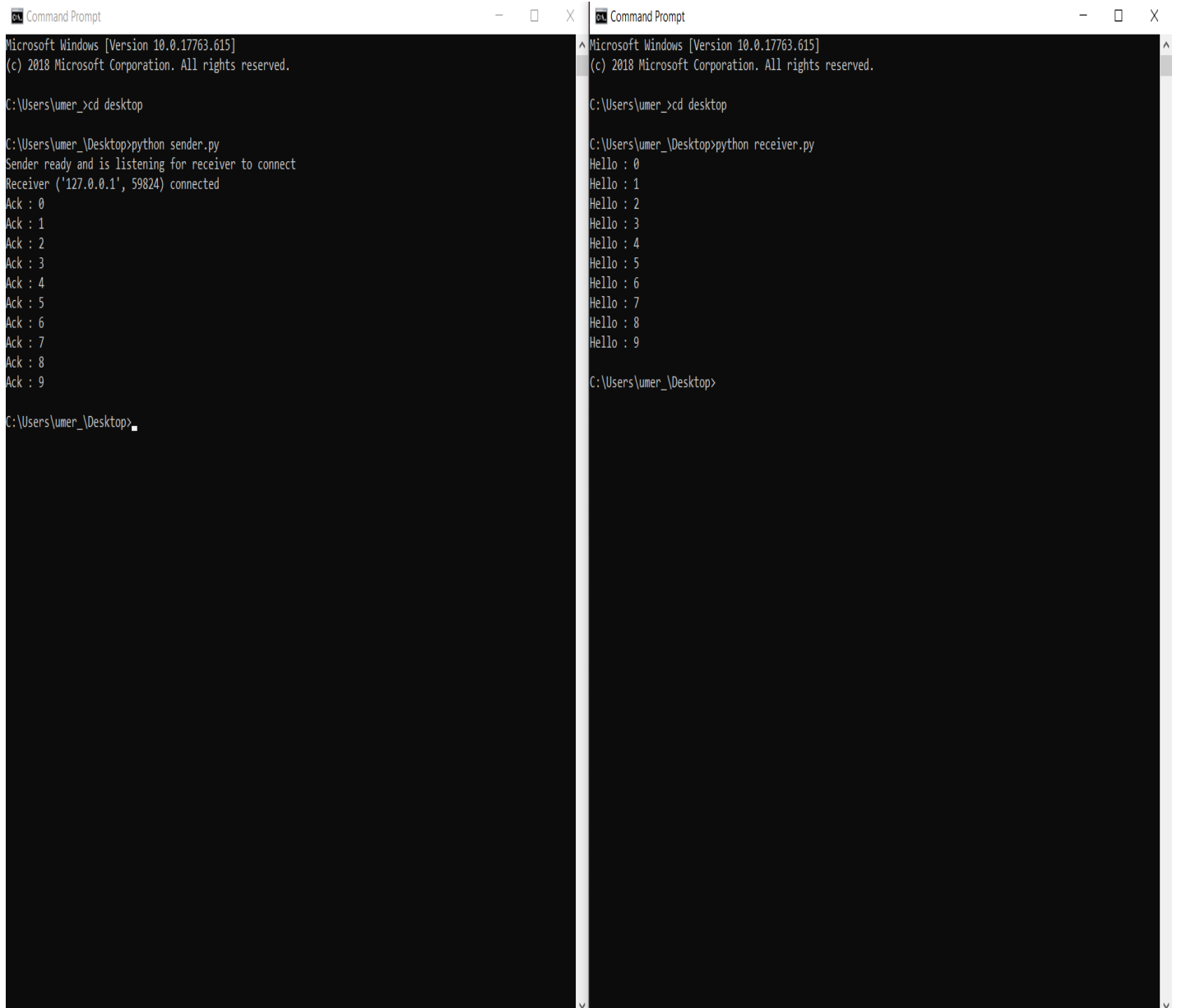


Project – 3

1. Stop – and – wait

Run the sender file first and then run the receiver file. Output on the sender and receiver terminal will be in correct order but if want to test for lost package, comment out the `s.send(str1.encode())` in receiver file and you will see no further packets will print out on terminal as sender is not receiving acknowledgements and trying to send same package again. Timeout implemented on sender file is 5 sec.



```
Microsoft Windows [Version 10.0.17763.615]
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C:\Users\umer>cd desktop

C:\Users\umer\Desktop>python sender.py
Sender ready and is listening for receiver to connect
Receiver ('127.0.0.1', 59824) connected
Ack : 0
Ack : 1
Ack : 2
Ack : 3
Ack : 4
Ack : 5
Ack : 6
Ack : 7
Ack : 8
Ack : 9

C:\Users\umer\Desktop>

Microsoft Windows [Version 10.0.17763.615]
(c) 2018 Microsoft Corporation. All rights reserved.

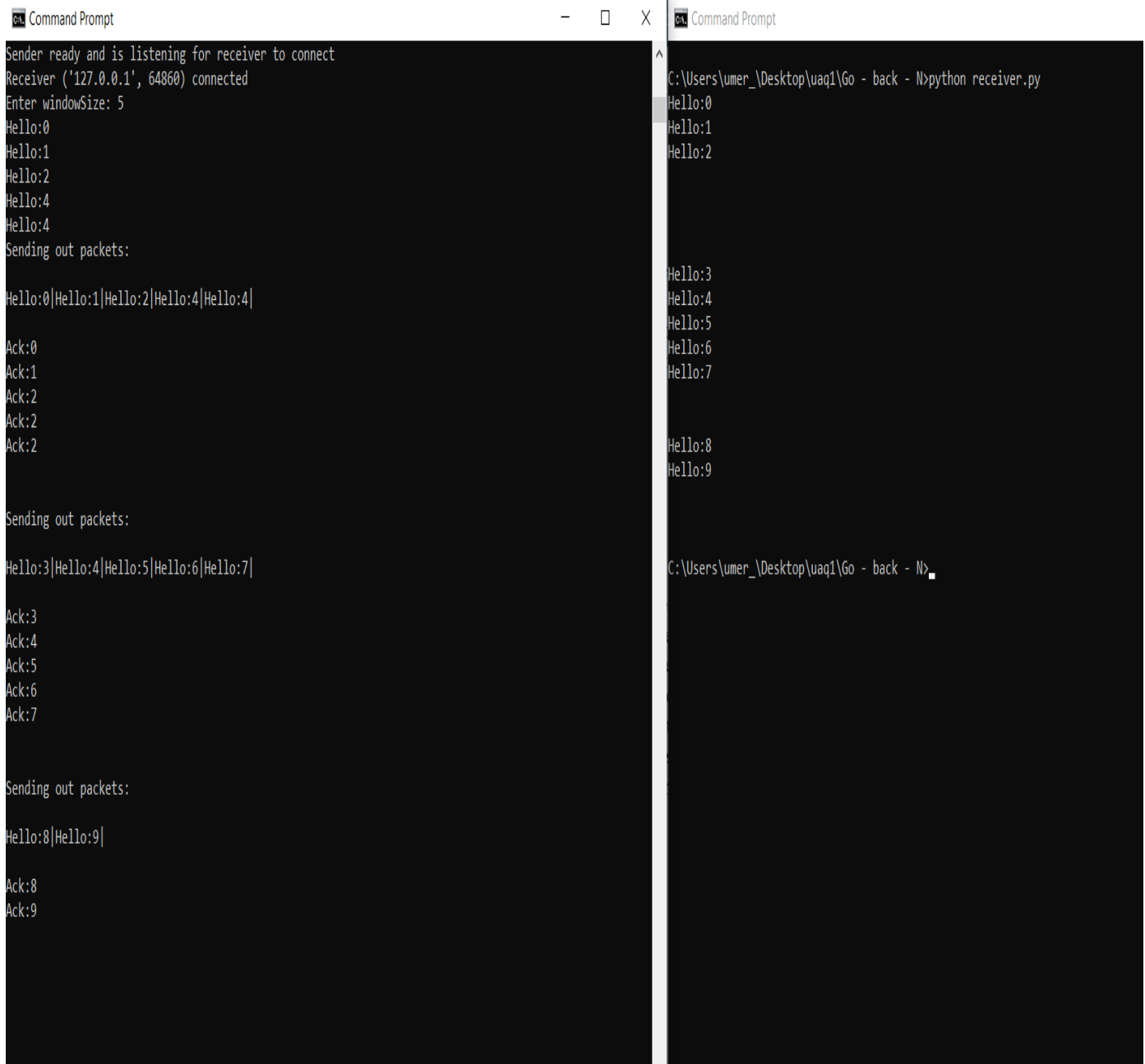
C:\Users\umer>cd desktop

C:\Users\umer\Desktop>python receiver.py
Hello : 0
Hello : 1
Hello : 2
Hello : 3
Hello : 4
Hello : 5
Hello : 6
Hello : 7
Hello : 8
Hello : 9

C:\Users\umer\Desktop>
```

2. Go – back – N

Run the sender file first and then run the receiver file. On running both files, user will be asked to enter window size which can be anywhere between 1 to 9. Once window size is entered on sender file, user need to input 5 packets with format Hello:x (x is any number between 0 to 9) in case user want to test for incorrect sequence. Once sequence of packet is entered, program will run and give out correct input. User can see the packets being sent on sender terminal.



```
Command Prompt
Sender ready and is listening for receiver to connect
Receiver ('127.0.0.1', 64860) connected
Enter windowSize: 5
Hello:0
Hello:1
Hello:2
Hello:4
Hello:4
Sending out packets:
Hello:0|Hello:1|Hello:2|Hello:4|Hello:4|
Ack:0
Ack:1
Ack:2
Ack:2
Ack:2
Sending out packets:
Hello:3|Hello:4|Hello:5|Hello:6|Hello:7|
Ack:3
Ack:4
Ack:5
Ack:6
Ack:7
Sending out packets:
Hello:8|Hello:9|
Ack:8
Ack:9

C:\Users\umer_\Desktop\uaq1\Go - back - N>python receiver.py
Hello:0
Hello:1
Hello:2
Hello:3
Hello:4
Hello:5
Hello:6
Hello:7
Hello:8
Hello:9
C:\Users\umer_\Desktop\uaq1\Go - back - N>
```

3. Selective Repeat

Run the sender file first and then run the receiver file. User will be prompted to enter first 5 packets and sequence can be anywhere between 0 to 9 with format Hello:x (x is any number from 0 to 9) followed by enter key. User will see printed out packets being sent, and packets being received on both sender and receiver terminals. To show the user that program works fine, we have implemented second input from user where user will be asked again to enter next five packets with same formatting and sequence number can be anywhere between 0 to 9. In case of timeout, sender will send the packets again for whom acknowledgement not received yet. We have attached the screen shot with wrong input of sequence numbers and the output.

```
Microsoft Windows [Version 10.0.17763.615]
(c) 2018 Microsoft Corporation. All rights reserved.

C:\Users\umer_>cd desktop
C:\Users\umer_\Desktop>cd uaq1
C:\Users\umer_\Desktop\uaq1>cd Selective Repeat
C:\Users\umer_\Desktop\uaq1\Selective Repeat>python sender.py
Sender ready and is listening for receiver to connect
Receiver ('127.0.0.1', 64684) connected
Enter first 5 packets:
Hello:0
Hello:2
Hello:3
Hello:5
Hello:9
Sending out entered packets:
Hello:0|Hello:2|Hello:3|Hello:5|Hello:9|

Ack:0
Ack:2
Ack:3

Ack:1
Ack:4
Enter next 5 packets:
Hello:1
Hello:5
Hello:7
Hello:9
Hello:2
Sending out entered packets:
Hello:1|Hello:5|Hello:7|Hello:9|Hello:2|

Ack:5
Ack:7
Ack:9

Ack:6
Ack:8
C:\Users\umer_\Desktop\uaq1\Selective Repeat>
```

```
Microsoft Windows [Version 10.0.17763.615]
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C:\Users\umer_>cd desktop
C:\Users\umer_\Desktop>cd uaq1
C:\Users\umer_\Desktop\uaq1>cd Selective Repeat
C:\Users\umer_\Desktop\uaq1\Selective Repeat>python receiver.py

Packets Received
Hello:0|Hello:2|Hello:3|Hello:5|Hello:9|

Hello:0
Hello:2
Hello:3

Packets Received
Hello:1|Hello:4|

Hello:1
Hello:4

Packets Received
Hello:1|Hello:5|Hello:7|Hello:9|Hello:2|

Hello:5
Hello:7
Hello:9

Packets Received
Hello:8|Hello:6|

Hello:6
Hello:8
C:\Users\umer_\Desktop\uaq1\Selective Repeat>
```