

Assignment 8

Problem definition:

Write a program using TCP socket for wired network for following

a. Say Hello to Each other

The screenshot for output of the Program is below:

```
ting for connection
-- Connection established sucessfully ----

eiver : hi
der : hello

eiver : how are you?
der : fine !!

eiver : bye
der : Sayonara

sage 'bye' received, Connection Ends.
```

```
-> Connection Established
Receiver : hi
Sender : hello

Receiver : how are you?
Sender : fine !!

Receiver : bye
Message 'bye' received, Connection Ends.
```

Screenshot of traces from Wireshark:

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000000	127.0.0.1	127.0.0.1	TCP	74	56786 → 5200 [SYN] Seq=0 Win=65495 Len=0 MSS=65495 SACK_PERM=1 TSval=3978738475 TSecr=0 WS=128
2	0.000023364	127.0.0.1	127.0.0.1	TCP	74	5200 → 56786 [SYN, ACK] Seq=0 Ack=1 Win=65483 Len=0 MSS=65495 SACK_PERM=1 TSval=3978738475 TSecr=3978738475 WS=128
3	0.000043355	127.0.0.1	127.0.0.1	TCP	66	56786 → 5200 [ACK] Seq=1 Ack=1 Win=65536 Len=0 TSval=3978738475 TSecr=3978738475
4	11.444836299	127.0.0.1	127.0.0.1	TCP	69	56786 → 5200 [PSH, ACK] Seq=1 Ack=1 Win=65536 Len=3 TSval=3978749920 TSecr=3978738475
5	11.444864510	127.0.0.1	127.0.0.1	TCP	66	5200 → 56786 [ACK] Seq=1 Ack=4 Win=65536 Len=0 TSval=3978749920 TSecr=3978749920
6	20.357812816	127.0.0.1	127.0.0.1	TCP	72	5200 → 56786 [PSH, ACK] Seq=1 Ack=4 Win=65536 Len=0 TSval=3978758832 TSecr=3978749920
7	29.357845482	127.0.0.1	127.0.0.1	TCP	66	56786 → 5200 [ACK] Seq=4 Ack=7 Win=65536 Len=0 TSval=3978758832 TSecr=3978758832
8	34.285213788	127.0.0.1	127.0.0.1	TCP	79	56786 → 5200 [PSH, ACK] Seq=4 Ack=7 Win=65536 Len=13 TSval=3978772760 TSecr=3978758832
9	34.285244139	127.0.0.1	127.0.0.1	TCP	66	5200 → 56786 [ACK] Seq=7 Ack=17 Win=65536 Len=0 TSval=3978772760 TSecr=3978772760
10	48.613350554	127.0.0.1	127.0.0.1	TCP	74	5200 → 56786 [PSH, ACK] Seq=7 Ack=17 Win=65536 Len=0 TSval=3978787088 TSecr=3978772760
11	48.613388482	127.0.0.1	127.0.0.1	TCP	66	56786 → 5200 [ACK] Seq=17 Ack=15 Win=65536 Len=0 TSval=3978787088 TSecr=3978787088
12	55.373800362	127.0.0.1	127.0.0.1	TCP	70	56786 → 5200 [PSH, ACK] Seq=17 Ack=15 Win=65536 Len=4 TSval=3978793849 TSecr=3978787088
13	55.373832558	127.0.0.1	127.0.0.1	TCP	66	5200 → 56786 [ACK] Seq=15 Ack=21 Win=65536 Len=0 TSval=3978793849 TSecr=3978793849
14	55.373941818	127.0.0.1	127.0.0.1	TCP	70	5200 → 56786 [PSH, ACK] Seq=15 Ack=21 Win=65536 Len=4 TSval=3978793849 TSecr=3978793849
15	55.373952044	127.0.0.1	127.0.0.1	TCP	66	56786 → 5200 [ACK] Seq=21 Ack=19 Win=65536 Len=0 TSval=3978793849 TSecr=3978793849
16	55.374101067	127.0.0.1	127.0.0.1	TCP	66	56786 → 5200 [FIN, ACK] Seq=21 Ack=19 Win=65536 Len=0 TSval=3978793849 TSecr=3978793849
17	55.374388996	127.0.0.1	127.0.0.1	TCP	66	5200 → 56786 [FIN, ACK] Seq=19 Ack=22 Win=65536 Len=0 TSval=3978793849 TSecr=3978793849
18	55.374393770	127.0.0.1	127.0.0.1	TCP	66	56786 → 5200 [ACK] Seq=22 Ack=20 Win=65536 Len=0 TSval=3978793849 TSecr=3978793849

b. File transfer

The screenshot for output of the Program is below:

```
Waiting for connection
---- Connection established sucessfully ----

Name of file to send : file.txt

File sent successfully
```

```
-> Connection Established
Enter the name of file to send : file.txt
Output file saved!

File sent successfully
```

Screenshot of traces from Wireshark:

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000000	127.0.0.1	127.0.0.1	TCP	74	53574 → 5200 [SYN] Seq=0 Win=65495 Len=0 MSS=65495 SACK_PERM=1 TSval=3979299465 TSecr=0 WS=128
2	0.000020539	127.0.0.1	127.0.0.1	TCP	74	5200 → 53574 [SYN, ACK] Seq=0 Ack=1 Win=65483 Len=0 MSS=65495 SACK_PERM=1 TSval=3979299465 TSecr=3979299465 WS=128
3	0.000041950	127.0.0.1	127.0.0.1	TCP	66	53574 → 5200 [ACK] Seq=1 Ack=1 Win=65536 Len=0 TSval=3979299465 TSecr=3979299465
4	11.557265377	127.0.0.1	127.0.0.1	TCP	75	53574 → 5200 [PSH, ACK] Seq=1 Ack=10 Win=65536 Len=0 TSval=3979311023 TSecr=3979299465
5	11.557265377	127.0.0.1	127.0.0.1	TCP	66	5200 → 53574 [ACK] Seq=10 Ack=10 Win=65536 Len=0 TSval=3979311023 TSecr=3979311023
6	11.557503603	127.0.0.1	127.0.0.1	TCP	78	5200 → 53574 [PSH, ACK] Seq=10 Ack=10 Win=65536 Len=12 TSval=3979311023 TSecr=3979311023
7	11.557519540	127.0.0.1	127.0.0.1	TCP	66	53574 → 5200 [ACK] Seq=10 Ack=13 Win=65536 Len=0 TSval=3979311023 TSecr=3979311023
8	11.557701537	127.0.0.1	127.0.0.1	TCP	75	53574 → 5200 [PSH, ACK] Seq=10 Ack=13 Win=65536 Len=9 TSval=3979311023 TSecr=3979311023
9	11.557765721	127.0.0.1	127.0.0.1	TCP	67	5200 → 53574 [PSH, ACK] Seq=13 Ack=19 Win=65536 Len=1 TSval=3979311023 TSecr=3979311023
10	11.557843835	127.0.0.1	127.0.0.1	TCP	75	53574 → 5200 [PSH, ACK] Seq=19 Ack=14 Win=65536 Len=9 TSval=3979311023 TSecr=3979311023
11	11.557961369	127.0.0.1	127.0.0.1	TCP	77	5200 → 53574 [PSH, ACK] Seq=14 Ack=28 Win=65536 Len=11 TSval=3979311023 TSecr=3979311023
12	11.558230408	127.0.0.1	127.0.0.1	TCP	66	53574 → 5200 [FIN, ACK] Seq=28 Ack=25 Win=65536 Len=0 TSval=3979311024 TSecr=3979311023
13	11.558391196	127.0.0.1	127.0.0.1	TCP	66	5200 → 53574 [FIN, ACK] Seq=25 Ack=29 Win=65536 Len=0 TSval=3979311024 TSecr=3979311024
14	11.558495488	127.0.0.1	127.0.0.1	TCP	66	53574 → 5200 [ACK] Seq=29 Ack=26 Win=65536 Len=0 TSval=3979311024 TSecr=3979311024

c. Calculator (Arithmetic and Trigonometry)

The screenshot for output of the Program is below:

```
Waiting for connection
---- Connection established sucessfully ----

Arithmetic and Trigonometric Calculator
1) Add
2) Subtract
3)multiply
4)div
5)sin
6)cos
7)tan
8)cosec
9)sec
10)cot

Operation Chosen: 1
Operand 1 Entered: 5
Operand 2 Entered: 6
Answer sent to user: 11

User chose to continue.

Operation Chosen: 3
Operand 1 Entered: 8
Operand 2 Entered: 65
Answer sent to user: 520

User chose to continue.

Operation Chosen: 5
Angle Entered: 30
Answer sent to user: 0.5

User chose to continue.

Operation Chosen: 9
Angle Entered: 45
Answer sent to user: 1.41421

```

```
Connection Established

Arithmetic and Trigonometric Calculator
1) Add
2) Subtract
3)multiply
4)div
5)sin
6)cos
7)tan
8)cosec
9)sec
10)cot

Choose your operation(1-10): 1
Enter operand 1: 5
Enter operand 2: 6

Answer Received: 11

Want to continue? (y/n): y

Choose your operation(1-10): 3
Enter operand 1: 8
Enter operand 2: 65

Answer Received: 520

Want to continue? (y/n): y

Choose your operation(1-10): 5
Enter angle(in degrees): 30

Answer Received: 0.5

Want to continue? (y/n): y

Choose your operation(1-10): 9
Enter angle(in degrees): 45

Answer Received: 1.41421

Want to continue? (y/n): 

```

Screenshot of traces from Wireshark:

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000000	127.0.0.1	127.0.0.1	TCP	74	44480 → 5200 [SYN, ACK] Seq=0 Win=65536 Len=0 MSS=65536 SACK_PERM=1 TSval=3979757135 TSecr=0 WS=128
2	0.000025026	127.0.0.1	127.0.0.1	TCP	74	5200 → 44480 [SYN, ACK] Seq=0 Ack=1 Win=65536 Len=0 MSS=65536 SACK_PERM=1 TSval=3979757135 TSecr=3979757135 WS=128
3	0.000047238	127.0.0.1	127.0.0.1	TCP	66	44480 → 5200 [ACK] Seq=1 Ack=1 Win=65536 Len=0 TSval=3979757135 TSecr=3979757135
4	0.000186068	127.0.0.1	127.0.0.1	TCP	266	5200 → 44480 [PSH, ACK] Seq=1 Ack=1 Win=65536 Len=200 TSval=3979757135 TSecr=3979757135
5	0.000207514	127.0.0.1	127.0.0.1	TCP	66	44480 → 5200 [ACK] Seq=1 Ack=201 Win=65488 Len=0 TSval=3979757135 TSecr=3979757135
6	4.788916220	127.0.0.1	127.0.0.1	TCP	70	44480 → 5200 [PSH, ACK] Seq=1 Ack=201 Win=65536 Len=4 TSval=3979761924 TSecr=3979757135
7	4.788944628	127.0.0.1	127.0.0.1	TCP	66	5200 → 44480 [ACK] Seq=201 Ack=5 Win=65536 Len=0 TSval=3979761924 TSecr=3979761924
8	5.16985828	127.0.0.1	127.0.0.1	TCP	74	44480 → 5200 [PSH, ACK] Seq=5 Ack=201 Win=65536 Len=8 TSval=3979764652 TSecr=3979761924
9	5.17000116	127.0.0.1	127.0.0.1	TCP	66	5200 → 44480 [ACK] Seq=201 Ack=13 Win=65536 Len=0 TSval=3979764652 TSecr=3979764652
10	5.17026250	127.0.0.1	127.0.0.1	TCP	74	44480 → 5200 [PSH, ACK] Seq=13 Ack=201 Win=65536 Len=8 TSval=3979764652 TSecr=3979764652
11	5.17032745	127.0.0.1	127.0.0.1	TCP	66	5200 → 44480 [ACK] Seq=201 Ack=21 Win=65536 Len=0 TSval=3979764652 TSecr=3979764652
12	5.17197496	127.0.0.1	127.0.0.1	TCP	74	5200 → 44480 [PSH, ACK] Seq=201 Ack=21 Win=65536 Len=8 TSval=3979764652 TSecr=3979764652
13	5.17197992	127.0.0.1	127.0.0.1	TCP	66	44480 → 5200 [ACK] Seq=21 Ack=209 Win=65536 Len=0 TSval=3979764652 TSecr=3979764652
14	10.557813572	127.0.0.1	127.0.0.1	TCP	70	44480 → 5200 [PSH, ACK] Seq=21 Ack=209 Win=65536 Len=4 TSval=3979767692 TSecr=3979764652
15	10.599742953	127.0.0.1	127.0.0.1	TCP	66	5200 → 44480 [ACK] Seq=209 Ack=25 Win=65536 Len=0 TSval=3979767735 TSecr=3979767692
16	15.74905765	127.0.0.1	127.0.0.1	TCP	70	44480 → 5200 [PSH, ACK] Seq=25 Ack=209 Win=65536 Len=4 TSval=3979772884 TSecr=3979767735
17	15.749100964	127.0.0.1	127.0.0.1	TCP	66	5200 → 44480 [ACK] Seq=209 Ack=29 Win=65536 Len=0 TSval=3979772884 TSecr=3979772884
18	21.717995459	127.0.0.1	127.0.0.1	TCP	74	44480 → 5200 [PSH, ACK] Seq=29 Ack=209 Win=65536 Len=8 TSval=3979778852 TSecr=3979772884
19	21.717109721	127.0.0.1	127.0.0.1	TCP	66	5200 → 44480 [ACK] Seq=209 Ack=37 Win=65536 Len=0 TSval=3979778852 TSecr=3979778852
20	21.717139108	127.0.0.1	127.0.0.1	TCP	74	44480 → 5200 [PSH, ACK] Seq=37 Ack=209 Win=65536 Len=8 TSval=3979778852 TSecr=3979778852
21	21.717143697	127.0.0.1	127.0.0.1	TCP	66	5200 → 44480 [ACK] Seq=209 Ack=45 Win=65536 Len=0 TSval=3979778852 TSecr=3979778852
22	21.717261265	127.0.0.1	127.0.0.1	TCP	74	5200 → 44480 [PSH, ACK] Seq=209 Ack=45 Win=65536 Len=8 TSval=3979778852 TSecr=3979778852
23	21.717272299	127.0.0.1	127.0.0.1	TCP	66	44480 → 5200 [ACK] Seq=45 Ack=217 Win=65536 Len=0 TSval=3979778852 TSecr=3979778852
24	25.877129321	127.0.0.1	127.0.0.1	TCP	70	44480 → 5200 [PSH, ACK] Seq=45 Ack=217 Win=65536 Len=4 TSval=3979783012 TSecr=3979778852
25	25.919779802	127.0.0.1	127.0.0.1	TCP	66	5200 → 44480 [ACK] Seq=217 Ack=49 Win=65536 Len=0 TSval=3979783055 TSecr=3979783012
26	28.133217983	127.0.0.1	127.0.0.1	TCP	74	44480 → 5200 [PSH, ACK] Seq=49 Ack=217 Win=65536 Len=8 TSval=3979785268 TSecr=3979783055
27	28.133232618	127.0.0.1	127.0.0.1	TCP	66	5200 → 44480 [ACK] Seq=217 Ack=53 Win=65536 Len=0 TSval=3979785268 TSecr=3979785268
28	42.885336323	127.0.0.1	127.0.0.1	TCP	74	44480 → 5200 [PSH, ACK] Seq=53 Ack=217 Win=65536 Len=8 TSval=3979800020 TSecr=3979785268
29	42.885350539	127.0.0.1	127.0.0.1	TCP	66	5200 → 44480 [ACK] Seq=217 Ack=61 Win=65536 Len=0 TSval=3979800020 TSecr=3979800020
30	42.885379984	127.0.0.1	127.0.0.1	TCP	74	44480 → 5200 [PSH, ACK] Seq=61 Ack=217 Win=65536 Len=8 TSval=3979800020 TSecr=3979800020
31	42.885384638	127.0.0.1	127.0.0.1	TCP	66	5200 → 44480 [ACK] Seq=217 Ack=69 Win=65536 Len=0 TSval=3979800020 TSecr=3979800020
32	42.885492965	127.0.0.1	127.0.0.1	TCP	74	5200 → 44480 [PSH, ACK] Seq=217 Ack=69 Win=65536 Len=8 TSval=3979800020 TSecr=3979800020
33	42.885563300	127.0.0.1	127.0.0.1	TCP	66	44480 → 5200 [ACK] Seq=69 Ack=225 Win=65536 Len=0 TSval=3979800020 TSecr=3979800020