DOCUMENTATION & SCREENSHOTS

Test Case 1 : File not Found Error

```
************************************************************
-- DOWNLOAD FILE (RRQ) --
NAME OF FILE TO DOWNLOAD: File1.jpg
Note: ./ => retain original name
CUSTOM FILE NAME WHEN DOWNLOADED LOCALLY: Test1.jpg
File will be saved as 'Test1.jpg'
************************************************************
-- NEGOTIATION OPTIONS --
Do you want to have a custom block size? (y/n): n
Do you want to have a custom timeout? (y/n): n
Constructed RRQ packet: b'\x00\x01File1.jpg\x00octet\x00'
Sent RRQ for 'File1.jpg' to ('192.168.0.126', 69)
************************************************************
Received opcode: 5
Server returned error 1: File not found
************************************************************
```

Test Case 2 : Read File (RRQ) without Options
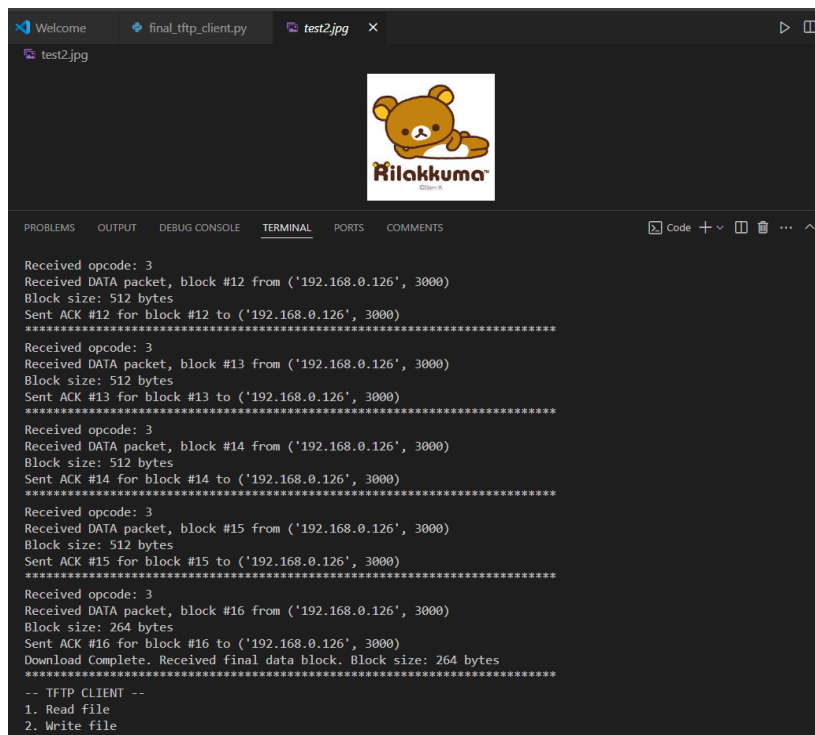
Test Case 3: Read File (RRQ) with Options

```
-- DOWNLOAD FILE (RRQ) --
NAME OF FILE TO DOWNLOAD: FileB.bin
Note: ./ => retain original name
CUSTOM FILE NAME WHEN DOWNLOADED LOCALLY: test3.bin
File will be saved as 'test3.bin'
*****************************************************************
```

```
-- NEGOTIATION OPTIONS --
Do you want to have a custom block size? (y/n): y
Enter custom block size value: 24
Custom block size: 24
Do you want to have a custom timeout? (y/n): 5
Invalid choice. Please enter 'y' or 'n'.
Do you want to have a custom timeout? (y/n): y
Enter custom timeout value: 5
Custom timeout: 5
Constructed RRQ packet: b'\x00\x01FileB.bin\x00octet\x00blksize\x0024\x00timeout\x005\x00'
Sent RRQ for 'FileB.bin' to ('192.168.0.126', 69)
*********************************************************************
Received opcode: 6
Received OACK from server. Negotiating options...
Negotiated options: {'blksize': '24', 'timeout': '5'}
Negotiated block size: 24
Negotiated timeout: 5
```

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PROBLEMS   OUTPUT   DEBUG CONSOLE   TERMINAL   PORTS   COMMENTS                    >_ Code + ∨ 🔟 🗑 ··· ×

NSCOM01_MP1_Rubr...    Received opcode: 3
Test1.jpg              Received DATA packet, block #167 from ('192.168.0.126', 3000)
test2.jpg              Block size: 24 bytes
test3.bin              Sent ACK #167 for block #167 to ('192.168.0.126', 3000)
                       *****************************************************************
                       Received opcode: 3
                       Received DATA packet, block #168 from ('192.168.0.126', 3000)
                       Block size: 24 bytes
                       Sent ACK #168 for block #168 to ('192.168.0.126', 3000)
                       *****************************************************************
                       Received opcode: 3
                       Received DATA packet, block #169 from ('192.168.0.126', 3000)
                       Block size: 24 bytes
                       Sent ACK #169 for block #169 to ('192.168.0.126', 3000)
                       *****************************************************************
                       Received opcode: 3
                       Received DATA packet, block #170 from ('192.168.0.126', 3000)
                       Block size: 24 bytes
                       Sent ACK #170 for block #170 to ('192.168.0.126', 3000)
                       *****************************************************************
                       Received opcode: 3
                       Received DATA packet, block #171 from ('192.168.0.126', 3000)
                       Block size: 16 bytes
                       Sent ACK #171 for block #171 to ('192.168.0.126', 3000)
                       Download Complete. Received final data block. Block size: 16 bytes
                       *****************************************************************
```

Test Case 4: Write File (WRQ) without Options

```
********************************************************************
-- UPLOAD FILE (WRQ) --
NAME OF FILE TO UPLOAD: pic2.jpg
Note: ./ => retain original name
CUSTOM FILE NAME WHEN UPLOADED TO SERVER: ./
File will be saved as 'pic2.jpg'
********************************************************************
-- NEGOTIATION OPTIONS --
Do you want to have a custom block size? (y/n): n
Do you want to have a custom timeout? (y/n): n
Do you want to have a custom transfer size? (y/n): n
Constructed WRQ packet: b'\x00\x02pic2.jpg\x00octet\x00'
Sent WRQ for 'pic2.jpg' to ('192.168.0.10', 69)
********************************************************************
```

```
********************************************************************
Received data from ('192.168.0.10', 3000)
Received opcode: 4
Received ACK #15 for block #15 from ('192.168.0.10', 3000)
Sent DATA packet, block #16 to ('192.168.0.10', 3000)
Block size: 264 bytes
********************************************************************
Received data from ('192.168.0.10', 3000)
Received opcode: 4
Received ACK #16 for block #16 from ('192.168.0.10', 3000)
Upload Complete. All data blocks sent.
********************************************************************
```

Captured packets in Wireshark:

```
584 138.358387    192.168.0.10       192.168.0.10       TFTP    51 Write Request, File: heh.txt, Transfer type: netascii
609 138.359309    192.168.0.10       192.168.0.10       TFTP    36 Acknowledgement, Block: 0
610 138.359778    192.168.0.10       192.168.0.10       TFTP    83 Data Packet, Block: 1 (last)
611 138.359943    192.168.0.10       192.168.0.10       TFTP    36 Acknowledgement, Block: 1
785 174.665273    192.168.0.10       192.168.0.10       TFTP    61 Read Request, File: FileA.jpg, Transfer type: octet, blksize=12
816 174.665812    192.168.0.10       192.168.0.10       TFTP    45 Option Acknowledgement, blksize=12
817 174.666422    192.168.0.10       192.168.0.10       TFTP    36 Acknowledgement, Block: 0
818 174.666494    192.168.0.10       192.168.0.10       TFTP    48 Data Packet, Block: 1
819 174.666942    192.168.0.10       192.168.0.10       TFTP    36 Acknowledgement, Block: 1
820 174.666993    192.168.0.10       192.168.0.10       TFTP    48 Data Packet, Block: 2
821 174.667409    192.168.0.10       192.168.0.10       TFTP    36 Acknowledgement, Block: 2
822 174.667463    192.168.0.10       192.168.0.10       TFTP    48 Data Packet, Block: 3
823 174.667911    192.168.0.10       192.168.0.10       TFTP    36 Acknowledgement, Block: 3
824 174.667945    192.168.0.10       192.168.0.10       TFTP    48 Data Packet, Block: 4
825 174.668374    192.168.0.10       192.168.0.10       TFTP    36 Acknowledgement, Block: 4
826 174.668426    192.168.0.10       192.168.0.10       TFTP    48 Data Packet, Block: 5
827 174.668781    192.168.0.10       192.168.0.10       TFTP    36 Acknowledgement, Block: 5
828 174.668820    192.168.0.10       192.168.0.10       TFTP    48 Data Packet, Block: 6
829 174.669316    192.168.0.10       192.168.0.10       TFTP    36 Acknowledgement, Block: 6
830 174.669366    192.168.0.10       192.168.0.10       TFTP    48 Data Packet, Block: 7
831 174.669834    192.168.0.10       192.168.0.10       TFTP    36 Acknowledgement, Block: 7
832 174.669871    192.168.0.10       192.168.0.10       TFTP    48 Data Packet, Block: 8
833 174.670347    192.168.0.10       192.168.0.10       TFTP    36 Acknowledgement, Block: 8
834 174.670396    192.168.0.10       192.168.0.10       TFTP    48 Data Packet, Block: 9
835 174.670840    192.168.0.10       192.168.0.10       TFTP    36 Acknowledgement, Block: 9
836 174.670890    192.168.0.10       192.168.0.10       TFTP    48 Data Packet, Block: 10
837 174.671404    192.168.0.10       192.168.0.10       TFTP    36 Acknowledgement, Block: 10
838 174.671462    192.168.0.10       192.168.0.10       TFTP    48 Data Packet, Block: 11
839 174.671875    192.168.0.10       192.168.0.10       TFTP    36 Acknowledgement, Block: 11
840 174.671925    192.168.0.10       192.168.0.10       TFTP    48 Data Packet, Block: 12
841 174.672359    192.168.0.10       192.168.0.10       TFTP    36 Acknowledgement, Block: 12
842 174.672393    192.168.0.10       192.168.0.10       TFTP    48 Data Packet, Block: 13
843 174.672865    192.168.0.10       192.168.0.10       TFTP    36 Acknowledgement, Block: 13
844 174.672918    192.168.0.10       192.168.0.10       TFTP    48 Data Packet, Block: 14
845 174.673318    192.168.0.10       192.168.0.10       TFTP    36 Acknowledgement, Block: 14
846 174.673361    192.168.0.10       192.168.0.10       TFTP    48 Data Packet, Block: 15
847 174.673797    192.168.0.10       192.168.0.10       TFTP    36 Acknowledgement, Block: 15
848 174.673849    192.168.0.10       192.168.0.10       TFTP    48 Data Packet, Block: 16
849 174.674339    192.168.0.10       192.168.0.10       TFTP    36 Acknowledgement, Block: 16
850 174.674384    192.168.0.10       192.168.0.10       TFTP    48 Data Packet, Block: 17
851 174.674770    192.168.0.10       192.168.0.10       TFTP    36 Acknowledgement, Block: 17
852 174.674813    192.168.0.10       192.168.0.10       TFTP    48 Data Packet, Block: 18
853 174.675421    192.168.0.10       192.168.0.10       TFTP    36 Acknowledgement, Block: 18
854 174.675472    192.168.0.10       192.168.0.10       TFTP    48 Data Packet, Block: 19
```

(Figure 1. For WRQ)

```
785 174.665273    192.168.0.10       192.168.0.10       TFTP    61 Read Request, File: FileA.jpg, Transfer type: octet, blksize=12
816 174.665812    192.168.0.10       192.168.0.10       TFTP    45 Option Acknowledgement, blksize=12
817 174.666422    192.168.0.10       192.168.0.10       TFTP    36 Acknowledgement, Block: 0
818 174.666494    192.168.0.10       192.168.0.10       TFTP    48 Data Packet, Block: 1
819 174.666942    192.168.0.10       192.168.0.10       TFTP    36 Acknowledgement, Block: 1
820 174.666993    192.168.0.10       192.168.0.10       TFTP    48 Data Packet, Block: 2
821 174.667409    192.168.0.10       192.168.0.10       TFTP    36 Acknowledgement, Block: 2
822 174.667463    192.168.0.10       192.168.0.10       TFTP    48 Data Packet, Block: 3
823 174.667911    192.168.0.10       192.168.0.10       TFTP    36 Acknowledgement, Block: 3
824 174.667945    192.168.0.10       192.168.0.10       TFTP    48 Data Packet, Block: 4
825 174.668374    192.168.0.10       192.168.0.10       TFTP    36 Acknowledgement, Block: 4
826 174.668426    192.168.0.10       192.168.0.10       TFTP    48 Data Packet, Block: 5
827 174.668781    192.168.0.10       192.168.0.10       TFTP    36 Acknowledgement, Block: 5
828 174.668820    192.168.0.10       192.168.0.10       TFTP    48 Data Packet, Block: 6
829 174.669316    192.168.0.10       192.168.0.10       TFTP    36 Acknowledgement, Block: 6
830 174.669366    192.168.0.10       192.168.0.10       TFTP    48 Data Packet, Block: 7
831 174.669834    192.168.0.10       192.168.0.10       TFTP    36 Acknowledgement, Block: 7
832 174.669871    192.168.0.10       192.168.0.10       TFTP    48 Data Packet, Block: 8
833 174.670347    192.168.0.10       192.168.0.10       TFTP    36 Acknowledgement, Block: 8
834 174.670396    192.168.0.10       192.168.0.10       TFTP    48 Data Packet, Block: 9
835 174.670840    192.168.0.10       192.168.0.10       TFTP    36 Acknowledgement, Block: 9
836 174.670890    192.168.0.10       192.168.0.10       TFTP    48 Data Packet, Block: 10
837 174.671404    192.168.0.10       192.168.0.10       TFTP    36 Acknowledgement, Block: 10
838 174.671462    192.168.0.10       192.168.0.10       TFTP    48 Data Packet, Block: 11
839 174.671875    192.168.0.10       192.168.0.10       TFTP    36 Acknowledgement, Block: 11
840 174.671925    192.168.0.10       192.168.0.10       TFTP    48 Data Packet, Block: 12
841 174.672359    192.168.0.10       192.168.0.10       TFTP    36 Acknowledgement, Block: 12
842 174.672393    192.168.0.10       192.168.0.10       TFTP    48 Data Packet, Block: 13
843 174.672865    192.168.0.10       192.168.0.10       TFTP    36 Acknowledgement, Block: 13
844 174.672918    192.168.0.10       192.168.0.10       TFTP    48 Data Packet, Block: 14
845 174.673318    192.168.0.10       192.168.0.10       TFTP    36 Acknowledgement, Block: 14
846 174.673361    192.168.0.10       192.168.0.10       TFTP    48 Data Packet, Block: 15
847 174.673797    192.168.0.10       192.168.0.10       TFTP    36 Acknowledgement, Block: 15
848 174.673849    192.168.0.10       192.168.0.10       TFTP    48 Data Packet, Block: 16
849 174.674339    192.168.0.10       192.168.0.10       TFTP    36 Acknowledgement, Block: 16
850 174.674384    192.168.0.10       192.168.0.10       TFTP    48 Data Packet, Block: 17
851 174.674770    192.168.0.10       192.168.0.10       TFTP    36 Acknowledgement, Block: 17
852 174.674813    192.168.0.10       192.168.0.10       TFTP    48 Data Packet, Block: 18
853 174.675421    192.168.0.10       192.168.0.10       TFTP    36 Acknowledgement, Block: 18
```

(Figure 2. For RRQ)