

**Term Assignment #AS02 announced on 29 Nov 2022****Due at 23:59 in Dec 21/22 2021.**

Upload **your code (.py, .ipynb, or .java)** to the homework submission system. Note that you **MUST write comments** within the codes to explain your codes. Code without comments get zero points.

Q0. Learn socket programming.

0-1. Watch the video of "TFTP".

(<https://www.youtube.com/watch?v=N9f3WQhf1vQ>)

0-2. Watch the video of "Endianness".

([https://www.youtube.com/watch?v=KPEPyS\\_IBzM](https://www.youtube.com/watch?v=KPEPyS_IBzM))

0-3. Read the example codes of TFTP server and TFTP client.

[https://github.com/hsiaom26/Socket/blob/master/TFTP\\_Socket\\_Server.ipynb](https://github.com/hsiaom26/Socket/blob/master/TFTP_Socket_Server.ipynb)

[https://github.com/hsiaom26/Socket/blob/master/TFTP\\_Socket\\_Client\\_Download.ipynb](https://github.com/hsiaom26/Socket/blob/master/TFTP_Socket_Client_Download.ipynb)

<https://github.com/hsiaom26/Socket/blob/master/TFTPServer.java>

0-4. Download tftp packet capture files from course website, open them by Wireshark and try to understand the TFTP protocol.

TFTP: <https://wiki.wireshark.org/SampleCaptures#tftp>

Q1. Modify the TFTP server code of provided by TA and make it a more completed TFTP server that supports the following functions.

- Write your **name, ID, department** in the very first line in your code.
- The server runs at **UDP port 6969** on **127.0.0.1** IP address.
- Implement **roll-over block id**. Please see TFTP in Wikipedia carefully ([https://en.wikipedia.org/wiki/Trivial\\_File\\_Transfer\\_Protocol](https://en.wikipedia.org/wiki/Trivial_File_Transfer_Protocol)). There are several important notes listed below.
  - The original TFTP protocol has a transfer file size limit of 512 bytes/block x 65535 blocks = 32 MB.
  - Today most servers and clients support block number roll-over (block counter going back to 0 or 1 after 65535) which gives an essentially unlimited transfer file size.
- In RFC 1350,
  - Block numbers are consecutive and begin with one.
  - A WRQ is acknowledged with an ACK packet having a block number of zero.
- More explanations are in the section "Block counter roll-over" in the following document <https://www.compuphase.com/tftp.htm>.

- Please use “wrap to zero” in your implementation.
- When testing, the filename of the big file MUST be ‘bigfile.txt’.

Note:

- TA will use a customized TFTP client to connect to your server and see if the expected behavior occurs.
- Your server should be runnable without any user input. TA will use a script to automatically execute your server codes with “bigfile.txt”. You should test your server codes in the same way. Otherwise, no points will be given.
- Since we do not require document, please write **comments** in your codes. The comments will be graded as well.