

ELEC 4120: Computer Communications Networks  
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(Fall 2014)

Department of Electronic and Computer Engineering  
The Hong Kong University of Science and Technology

Programming Assignment 1  
7% Total Course Grade  
Due date: **Oct 29, 16:30**

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The objective of this programming assignment is to make you understand real socket programming. In your source code, please write down proper comment wherever you think it is important. You may discuss ideas with others in the class, but you need to implement your own program. Do not copy from other's problem source code. When you finish, create a ZIP file with your student ID as the file name. In the ZIP file, please include the source files and the corresponding executable files. Submit your ZIP file to the [elec4120fall14@gmail.com](mailto:elec4120fall14@gmail.com) with the subject line "[Name]-[Student ID]-PA1" before the due date. **No late work will be accepted.**

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*Reversal Echo Server*

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In this assignment, your task is to implement simple client and server programs, so that the server echoes back a reversed version of whatever the client sends to it.

*Sample operation:*

1. The client sends a string of characters: "Hello Server." to the server.
2. The server sends back: ".revreS olleH".

*Detailed Requirements:*

1. Implement the clients in both TCP and UDP and allow the user to choose which protocol to use at runtime.
2. For TCP programming, the server program should be a persistent server so that after transmitting each packet, the TCP connection should be kept alive.
3. Server only serves one client at a time (no multithreading).
4. When the server receives a message from the client, print it out on the screen with the client's IP address.
5. After printing the message on the screen, the server sends the modified version back to the client.
6. The client should print the received message on the screen.
7. When a client disconnects, the server closes the socket and waits for the next client to connect.
8. Handle common errors in socket programming (e.g., assigned port is occupied by other program; client resets the connections via control-c).
9. You can use any programming language you want to implement this assignment.

*Bonus Points (3%):*

No bonus will be given if you fail to meet the above requirements. Make sure you have correctly implemented the above requirements before you attempt the bonus points. If you include these additional features and would like to claim your bonus, please arrange a demo session with Samira NIAFAR (sniafar@ust.hk) before the assignment deadline.

1. Graphical User Interfaces (GUI) for both client and server.
2. Handling multiple clients concurrently. (Hint: It can be implemented via methods like multithreading, forking, ...).