Take Home Exam Solutions

1. "get_only_dir(directory)" function in python and bash

Python: (Test in python2.7) See "get_only_dir.py". You would be prompted for an input path.
Bash: see "get_only_dir.sh". You would be prompted for an input path.

2. "swap (int* array, int n)" function in C++

See "swap.cpp".
There is a test case provided in the main function printing out both the original array and the swapped array.

3. Client/Server

- Assumed details:
  - Client and server are both powered up and connected to a stable network, with IP and domain names set up accurately.
  - Client and server both have checksum functions, both the request and response and are validated for every communication session.
  - Client can only send a new request when the previous communication session is completed. (To prevent client receiving and processing out of date response)
  - Client check timestamp for server response, will only receive and process server response during current communication session.
  - Server can only receive and process requests from authenticated, updated clients to prevent invalid or malicious communications.
  - Clients can only receive and process respond to authenticated and updated servers, to prevent invalid or malicious input communications.
  - Client and server each generates a log file for each communication session, keeping track of each successfully sent/received request/response. Will also log start/terminate message into log file.
  - Client and server must be HIPAA-compliant.

Failure possibilities:
1. A firewall might be blocking one or both way communications.
2. Clients not receiving server response after sending request for a certain period of time, and also after several more attempts.
3. All server ports may be occupied, client unable to establish connection with all available server ports.

Test Plans:

1. Firewall Checking

Step no.	Test Procedures	Expected Result
1	Check network connections.	Connections established successfully.
2	Find the port range of server (eg. 1234 - 1238).	
3	Execute “netstat -a -n” on terminal and look for a “:1234” to “:1238” listener.	
4	If port 1234 listener is not displayed, or feel that the firewall may be blocking them, start the windows firewall logging and and check logs for dropped connections: “Control Panel->Windows Firewall->Advanced Settings->click on ”Settings” button -> select “Log dropped packets”-> “Look at the log file location”.	The server port is not be present on the firewall log file.

1.2 Client not receiving server response

Step **no**.	Test **Procedures**	**Expected Result**
1	Check network connections.	Connections established successfully.
2	Open and read client log file. Should see existing log entries for sent client requests and received server response.	Check client log for sent requests, received responses, and client termination message.
3	Open and read server log file. Should see existing log entries for sent client requests and received server response.	Check server log for sent requests, received responses, and client termination message.

The results of server and client log files with possible explanations for the issue are shown below:

Client Log	Server Log	Possible test result
No client sent request, no received server response.	No sent server response, no received request.	Connections not established successfully.
Exist client sent request, no received server response.	No sent server response, no received request.	Sent client request lost; connections not established successfully, or client terminated before receiving response.
Exist client sent request, no received server response.	No sent server response, exist client request.	Server did not or was unable to send response.
Exist client sent request, no received server response.	Exist sent server response, exist client request.	Sent server response lost; connections not established successfully, or client terminated before receiving response.

1.3 All ports occupied

Step no.	Test Procedures	Expected Result
1	Check network connections.	Connections established successfully.
2	Check if server ports are allowed on firewall.	Server port is allowed on the firewall.
3	Client sends request to server.	
4	If server refuses connection, repeat step 3 for all the allowed server ports.	

Test Report:
See attachment “Cilent/server_Failure_Test_Report_v1.0.pdf ”.

4. Please list all tools you have use for testing (debugging, code coverage, memory leak, unit test frameworks, others?)
Gdb (for c code testings), python, bash.

5. Please list all languages you are proficient with in writing test scripts
Python, C++, C, Matlab.

6. When is your earliest availability to start?
~ June 18th 2018.