**Programming Test 2a**

**Administration and Programming Test (use any reference please challenge yourself)**

**Choose 1 question**

1. a) write the GNUPlot commands to plot cos(x)

**Answer: plot cos(x)**

b) write the matlab commands to plot cos(x)

**Answer:**

**x=[0:0.1:10]; % [start:interval:end];**

**y=cos(x);**

**plot(x,y);**

1. a) Write a short ‘C/C++’ program that will display the status of a system (comment your code).

**One Answer:**

**/\*myprog.c provides system status \*/**

**#include <stdio.h>**

**#include <stdlib.h>**

**int main(int argc, char \*argv[]) {**

**/\* check for parameter 1, give message \*/**

**while (argc<2) {**

**printf("Usage: %s %s\n", argv[0],"save\_file");**

**exit(1);**

**}**

**/\* Print System Information to screen and save to file \*/**

**printf("File: %s\n",argv[1]);**

**FILE \*file = fopen(argv[1],"w");**

**system("hostname | tee \*file");**

**system("uname -a | tee -a \*file");**

**system("df -k | tee -a \*file");**

**fclose(file);**

**return(0);**

**}**

b) How could you compile this source code to make it executable using gcc?

**Answer: gcc –o myprog myprog.c**

**Choose 3 questions**

1. List the basic steps to be taken by a Linux Administrator to install an xxxx.tar.gz application file – be specific as possible.

**Answer:**

**1) tar –zxvf xxxx.tar.gz**

**2) cd xxxx**

**3) ./configure**

**4) make**

**5) make install**

1. a) Briefly discus how you would set up a PERL script as an executable (use examples if needed).

**Answer:**

**- Put the perl interpreter #!/bin/perl , #!/usr/local/bin/perl at the top of the script**

**- chmod 7XX myscript.pl to make it executable**

1. Write a PERL one-liner to change the word olduser to newuser in the file somefile.txt and make a backup file called somefile.bak ?

**Answer:**

**perl -p -i.bak -e 's/newuser/olduser/g' somefile.txt**

1. Explain the differences between the ifconfig command and the ipconfig command.

**Answer:**

**- The Linux ifconfig command can list and modify network interface parameters.**

**- The Windows ipconfig command can list and modify network parameters.**

1. Write a short vbscript program to determine a user logged into a Windows Machine (comment your code).

**One Answer:**

**Vbscript to determine and display logged in user including date and time**

**dtToday = Date()**

**dtTime = Time()**

**set objNetwork = createobject("wscript.network")**

**wscript.echo objNetwork.Username,dtToday, dtTime**

**Choose 3 questions**

1. Explain a process you’re familiar with to remotely access a Linux machine – be specific.

**Answer:**

**From local Linux or MAC terminal use ‘ssh remote\_linux’ command to access remote Linux box.**

**From local Windows machine use putty or another ssh client to access remote Linux host.**

1. Using a language you’re familiar with write a short program that has some utility, include comments to explain its usage and purpose. Make your program executable.

**Answer:**

**Awk oneliner to print the total number of K-Bytes in a Linux directory**

**ls -l files | awk '{ x += $5 } END { print "total K-bytes: " (x + 1023)/1024 }'**

**Perl oneliner to change every instance of a word in a file named somefile**

**perl -i.bak -pe 's/oldword/NEWWORD/g' /home/usr/somefile**

**Any C/C++, Java, Python, Ruby, Powershell program, MatLab m-file that works will do**

1. a) What’s wrong with the following shell script?

**#/bin/sh**

echo “Enter username: “

read **usrnme**

if [ grep “**usrname**” /etc/passwd ]; then

echo “Username usrnme already exists!”

exit 1

elif [ ! grep “usrnme” /etc/passwd]; then

adduser –m usrname

echo password | passwd –stdin **username**

exit 0

fi

**Answer:**

* **The interpreter line at the top is wrong it should be #!/bin/sh**
* **The variable for username is inconsistent – usrnme, usrname, username**

b) When working correctly what does the shell script above do?

**Answer:**

**The shell script accepts input to create a Linux user account. It checks to see if the chosen username already exists, sends a message and quits if it does, creates the account and password if it doesn’t exist.**

1. Briefly discuss how to boot a Linux system into single user mode (grub, or lilo).

**Answer:**

**Boot system to the splash screen and edit the kernel line entering a 1, S, s at the very end of the line.**

**Answer all of the remaining questions**

1. Briefly explain the architectural Structure of Active Directory.

**Answer:**

**Microsoft Active Directory is a directory service for Windows Domain Networks and has a hierarchical structure consisting of Forest’s, trees, sites, domains and Organizational Units (OU’s) held together by schema, replication, trusts and a Global Catalog with rules implemented by group policy.**

1. Briefly discuss shared and static libraries for Windows and Linux.

**Answer:**

**Libraries are a collection of commonly used programming routines that are included in executables for functionality. Static libraries like shared libraries contain object files like modules, and precompiled codes. Unlike shared libraries, static libraries are compiled into the executable that uses them. Shared libraries are only linked (during compilation) to executables and dynamically loaded when the executable is run. Shared libraries loaded into memory have their memory locations shared by the kernel with all applications that use the particular library**. **For Linux, shared library files have a ‘.so’ extension and static libraries have an ‘.a’ extension. For windows DLL (Dynamically Linked Library) files are shared libraries and have a ‘.dll’ extension, windows static library files have a ‘.lib’ extension.**

1. a) In any language you’re familiar with write a socket program (please comment your code).

**One Answer:**

**Server:**

**#!/usr/bin/perl**

**# Filename : exserver.pl**

**require “ctime.pl”**

**use IO::Socket;**

**# use port 2345**

**$server=IO::Socket::INET->new (LocalPort=>2345, Type=>SOCK\_STREAM,Reuse=>1,Listen=>10)**

**Or die “Can’t create socket\n”;**

**$connect=1;**

**print “waiting for connection #$connection\n”;**

**while($cli=$server->accept())**

**{**

**while(<$cli>)**

**{**

**print “Received $\_”;**

**result=eval ($\_);**

**print “Result is $result\n”;**

**}**

**$connect++;**

**Print “Waiting for connection #$connect\n”;**

**}**

**Client:**

**#!/usr/bin/perl**

**# Filename : exclient.pl**

**use IO::Socket;**

**# create the socket, connect to the port**

**$socket=IO::Socket::INET->new (PeerAddr=>’localhost’,**

**PeerPort=>2345,**

**Proto=>’tcp’,**

**type=>SOCK\_STREAM) or die “can’t create socket$!\n”;**

**while (1)**

**{**

**print "Enter an expression or ‘Q’ to quit ";**

**$expr=<STDIN>;**

**chop;**

**last if ($expr=~/^Q/i);**

**print $socket “$expr”;**

**$ret=($socket>;**

**Print “Received $ret\n”;**

**}**

**close ($socket) or die "close: $!";**

b) How would you make your program executable?

**Answer:**

**chmod u+x exclient.pl exserver.pl**

C) Explain how your socket program works.

**Answer:**

**The client gets an expression from the user and then sends it to the server for evaluation. The server returns the evaluation to the client.**

1. What layer in the TCP/IP stack is routing performed, please explain and give examples.

**Answer:**

**The Internet Layer exchanges data across network boundaries using IP (Internet Protocol) addresses. This layer’s function is to transport IP datagrams to the next IP router closer to the destination.**

1. a) Explain how you would display the IP routing table on a Window machine (give examples).

**Answer:**

* **from a cmd window type: route print -4 (IPV4).**

b) How would you display the routing table on a Linux Machine (give examples)?

**Answer:**

**From a Linux terminal type: route -v**