Uva Wellassa University of Sri Lanka
Faculty of Science and Technology
Department of Computer Science and Technology
300 level 2nd Semester Examination – Sept. / Oct. 2015
CST 321-3 System Level Programming

Uva Wellassa University

Instructions to candidates
Duration: Three (03) hours
Number of questions: Six (06) Essay questions
Answer all the questions
Mark allocation: 100

1.

a. Briefly explain the layered architecture of the UNIX operating system by using a suitable diagram. (05 mark)

b. What is meant by a Linux distribution? List two (2) examples of popular Linux distributions. (04 mark)

c. Name two (2) different boot loaders which are used in Linux installation. (02 mark)

d. What is meant by making a executable directory? (04 mark)

2.

a. Give a single UNIX command that can be used to list the available free space of all the mounted file systems. (03 mark)

b. The following is a line in the output of "ls -l " executed on "/tmp" directory.
-r-------- 1 saman staff 0 2015-09-17 09:21 exam-paper.txt

i. Who is the owner of the above file, "exam-paper.txt" ? (01 mark)
ii. What is the UNIX command that should be used to assign the given permission status? (02 mark)
iii. Can the user "kamal" read the contents of the file? Explain your answer. (02 mark)
iv. Can the user "kamal" delete the file? Explain your answer. (02 mark)

c. In which way you can debug a UNIX shell script? (02 mark)

d. What is meant by special variables in UNIX shell scripts? (03 mark)

4.8

3.

a. Give two different ways to execute UNIX commands in background. (02 mark)

b. Name two commands which can be used to find background job and describe how you call to that job to work in foreground? (04 mark)

c. In which ways would a UNIX process differ from a UNIX programme? (03 mark)

d. Explain the output of the following shell script.

```
#!/bin/bash
clear
echo " Hello, $LOGNAME ";
echo " Current date is `date +%d-%m-%Y` "
echo " User is `whoami` "
echo " Current directory `pwd` "
echo " I am $$ "
```

(06 mark)

4.

a. Consider the following C program code. What does "int argc", "char *argv[]" mean?

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

(03 mark)

b. What are the differences between "static variables" and "automatic variables"? (03 mark)

c. How to declare a static variable in a C programme? (02 mark)

d. Explain the function and the output of the following programme.

```
#include <stdio.h>
int main (int argc, char *argv [ ] ) {
    system ("clear") ;
    int x = 1, y = 2;
    int *ip ;
    ip = &x;
    printf ( "Value of *ip = %d\n", *ip );

    y = *ip ;
    printf ( "Value of y = %d\n", y ) ;

    *ip = 3;
    printf ( "Value of *ip = %d\n", *ip ) ;
    printf ( "Value of x = %d\n", x ) ;
    printf ( "Address x = %p\n", &x) ;
    printf ( "Value of ip = %p\n", ip ) ;
    return 0;
}
```

(07 mark)

5.

a. What is meant by a "pipe" in the UNIX operating environment? Give an example of a UNIX pipe and explain how it works. (05 mark)

b. What is a "named pipe"? How can it recognize in a file system? (03 mark)

c. Explain the execution of the following programme line by line.

```
#include <stdio.h>
#include <stdlib.h>
#include <string.h>
int main (int argc , char *agrv){

    int pipefd[2];
    int i;
    char s[1000];
    char *s2;

    if (pipe (pipefd) < 0 ) {
            perror ("pipe") ;
            exit (1);
    }

    s2 = "Pipe test program";
    write (pipefd[1] , s2, strlen (s2) );
    i = read (pipefd[0] , s, 1000);
    s[ i ] = '\0';
    printf ( "What will appear here : %s\n" , s ) ;
    return 0;
}
```

(12 mark)

6. Write a shell script to store employee details in ABC company in a file called "employeeinfo.csv". First, the operator needs to enter employee ID for each employee (i.e. 1,2, etc.) and then he enters the details based on the following menu.

1) Full Name
2) NIC number
3) Address
4) Continue
5) Exit

The option 1, 2 and 3 are used to get Full Name, NIC number and Address respectively for one employee. If the operator selects option 4, the system should return back to the initial stage to request the next employee ID from the user. Option 5 allows the operator to exit from the system.

(20 mark)

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