Uva Wellassa University, Sri Lanka

End Semester Examination – Dec 2009

CST205-3 Systems Level Programming

CST462-3 Systems Level Programming

Time: Two (02) hours

Part A

Total **04** questions
Answer **all** questions

1)

i) Explain in brief using suitable diagrams the organization or the layered architecture of the UNIX operating system. (05 Marks)

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

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

iv) What is meant by making a directory executable? (04 Marks)

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

vi) Following is a line in the output of "`ls -l`" executed on "`/tmp`" directory.

```
-r-------- 1 kamal staff 0 2009-12-27 09:21 exam-paper.txt
```

a) Who is the owner of the above file, `exam-paper.txt`? (01 marks)

b) What is the UNIX command that should be used to assign the given permission status? (02 marks)

c) Can the user "`ruwan`" read the contents of the file? Explain your answer. (02 marks)

d) Can the user "`ruwan`" delete the file? Explain your answer. (02 marks)

2)

i) Give two different ways to execute commands in foreground in UNIX. (02 marks)

ii) What are the differences between above two execution methods? (04 marks)

iii) In which ways would a UNIX process differ from a UNIX program? (04 marks)

iv) What you meant by special variables in UNIX shell scripts? (02 marks)

v) How to list all special variables using single statement? (02 marks)

vi) In which way you can debug a shell script? (03 marks)

vii) Explain the function and the output of the following shell script

```
#!/bin/bash
clear
echo "Hello, $LOGNAME"
echo "Current date is `date +'%x'`"
echo "User is `whoami`"
echo "Current directory `pwd`"
echo "I am $$"
```

(08 marks)

8

3)

i) Consider the following C program code.

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

Are variables `argc` and `argv` local to main? Explain your answer. (05 mar

ii) What are the differences between `static variables` and `automatic variables`? (03 mar

iii) How to declare static variable in a C program? (02 mar

iv) Explain the function and the output of the following C program

```
#include<stdio.h>
int main(int argc, char *argv[]){
   int i;
   printf("Simple fork: pid = %d \n", getpid());
   i = fork();
   printf("%d - %d - %d\n", i, getpid(), getppid());
return (0);
}
```

(08 mark

v) Explain the function and the output of the following program

```
#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 = %08x\n", &x);
   printf("Value of ip = %08x\n", ip);
return 0;
}
```

(07 mark

4)

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

ii) What is a "named pipe"? How can it recognize in file system? (05 marks)

iii) Explain the execution of the following program line by line (15 marks)

```
#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;
}
```

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