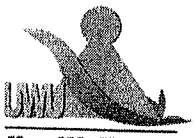
Uva Wellassa University of Sri Lanka
Faculty of Science and Technology
Department of Computer Science and Technology
300 Level 2nd Semester Examination – Jan. / Feb. 2016
CST 321-3 System Level Programming



Instructions to candidates

Part B

Duration: Two (02) hours
Number of questions: Three (03)
Answer all the questions
Mark allocation: 70
Create **separate folder** for each question.
CMS will have **three separate links** for the questions and you need to upload the folder as a **ZIP file** to the relevant link.
When you are uploading, rename the **ZIP files** with your **Examination Number** and the **Question Number** as shown in the example (i.e. UWU_EX_12_0001_Q1).
You are allowed to refer your own notes but **sharing notes** is **strictly prohibited.**

1.

a. Write a shell script to get **five (05) numeric inputs** as **command line arguments**. Then sort them according to the **ascending** order. Now get the sum of **three (03) middle numbers** (except 1st and 5th number) and **print** that value on the shell.

(7 mark)

b. Write a shell script **function** to display following messages according to the given conditions using the system date. (Hint: Use **+%d-%m-%Y** with date command to format the date)

- If today between January to March:
  We are in 1st quarter
- If today between April to June:
  We are in 2nd quarter
- If today between July to September:
  We are in 3rd quarter
- If today between October to December:
  This is the final quarter

(8 mark)

2.

a. Write a shell script to calculate the gross salary of an employee.

- First, program should **ask the basic salary** of the employee
- Then company will **add** House Rent Allowance (HRA) and Dearness Allowance (DA) according to the basic salary (HRA = **20%** of basic salary, DA = **50%** of basic salary)
- After adding HRA and DA to basic salary, they will **calculate gross salary**
- Finally the program should **print** this **gross salary** on the shell

(5 mark)

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b. Write a shell script to backup a file. The file name to backup should be provided as a **command line argument**. The backup file should have the same file name but an (additional) extension **.bak**.
   - If the user provides no input value for the name, the script should display an **error message**.
   - If there is an input file name, but it does not exist, the script should display an **error message**.
   - If the input file exists, the script should create the backup file and **overwrite** an existing backup file with the same name if necessary.

(15 mark)

3. 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 operator.
   - Option **5** allows the operator to **exit** from the system.

   When operator tries to exit from the system, script should **count** and **print** the **total number of available employees** in the **employeeinfo.csv** file and their **NIC Numbers** in the following format.

```
Number of Employees: <<employee count>>
NIC Numbers:
    190234442V
    200234442V
```

   Other than the above requirements, the program should **handle signals** throwing from the system side to the script to avoid information missing of an employee in the **employeeinfo.csv** file due to an un-saving data. Therefore, your program should include the followings.
   - **Ignore and continue executing** the script for the **signal** value **1** (SIGHUP), **2** (SIGINT) and **3** (SIGQUIT) .
   - If system throws a **signal** value **15** (SIGTERM) signal, catch that signal; **save all unsaved data** to the **employeeinfo.csv** file and allow signal to proceed with default signal action.

(35 mark)