Hacettepe University
Department of Computer Science and Engineering
BIL235 Programming Laboratory
Experiment 5

Subject:	Writing UNIX Shell Scripts
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Deadline:	21/12/2005 – 16:45
Programming Language:	Bourne Again Shell (`bash`)

AIM

The aim of this experiment is to get students familiar with both the session and the programming environment of the Unix (Linux) Operating System.

Unix and its variants have become the de-facto (i.e., not in writing but by common consent) industrial standard for multitasking server systems. In recent times, flavors of Unix (Linux) have been ported to machines with limited hardware, such as PC's (Personal Computers). A working knowledge of Unix will probably be the best advantage of a computer engineer in the future.

BACKGROUND

With Unix, users can access the system via a terminal. After the autentication phase (login) a special program called "shell" runs for each user outputting a "prompt" (normally a $ sign) on the screen. A shell can be described as a layer between the user and Unix itself. It is a command line interpreter through which a user can execute ready made programs called shell commands such as `ls, ps, cp, mv, cat` etc. A shell has also programming capabilities like loops and conditional executions. It then gives users the possibility to write "scripts" to define a specific job as a whole. A script is a collection of commands (or executable programs) along with loops and conditions. It can be considered as a program where the statements (instructions) are the commands. A shell script is stored in a file with a given name. It is executed every time this file name is stated.

The most common shells for Unix are `sh (Bourne Shell)` and `bash (Bourne Again Shell)`. In this experiment, you have to use `bash`. For its usage, please refere to the documents defined in the References.

Shell redirection is a base for UNIX systems. Unless clearly specified, shell commands takes their input from the keyboard and directs their output to the screen. The ">" operator specifies to the shell that the output of a command is to be redirected to a file following the ">" sign. (Similarly, the "<" operator tells the shell that the input is to be taken from the files following the "<" sign.) Additionally, there is another feature of UNIX that allows the user to specify successive file redirections. Called *pipe*, this feature allows the redirection of the output of a program to the input of another.

Database systems are storage software which enable users to store data with a given format in files and query within the data or data fields. A relational database system simply consists of tables. All tables have a defined number of columns and rows.

A reference on a database is a cross check between tables. For example; if table A has a field which refers to a record in table B, the refered record cannot be deleted until no fields refers to it.

OBJECTIVE

In this experiment you are asked to write a simple database script (shell program) which will be used to handle tables (to create or delete tables) and records (insert, delete or query data rows within the tables) related to a given database.

Your script should have a command line in order for the users to type commands such as: create table, delete table, insert or delete row to a given table, query on a table, quit the program etc.

Table Operations:

"create_table": Before creating the table your program should ask the user: the table name, the number and the names of the columns and possible references to other tables.

"delete_table": Before deleting every row (record) in the table and the table itself your program should ask the user the table name.

Record Operations:

"insert_record": Before inserting a given record your program should ask the user: the table name where the record will be inserted, fields names and contents and possible references.

"delete_record": Deleting a record from a given table.

"query_record": Running a query on existing records. For example; In table "sallary", whose income is bigger than "100".

Further Reading

1. Unix's on-line manual system which is accessed by command man(1),
2. Using UNIX (CS Library No=122),
3. Advanced Unix Programming (CS Library No=139,151),
4. http://www.linux.org.tr
5. http://www.google.com
6. http://www.penguen.net

Please read also the following manuals: cut(1), sed(1), awk(1), grep(1), mail(1), bash(1), for(1), if(1), diff(1), netstat(8), md5sum(1), let(1), expr(1), last(1)

NOTES

1. You are asked to follow announcements made to Courses.Bil342 newsgroup which is located at nntp://news.cs.hacettepe.edu.tr .
2. The soft copy of this paper can bu found at ftp://ftp.cs.hacettepe.edu.tr/pub/dersler/Bil2XX/Bil235/05-06/5
3. Your report and program must be submitted at the same time.
4. You are asked to give both soft and hard copy of your reports. Valid Soft-Copy formats are HTML and PDF.
5. You should submit your work and report on a floppy with the following structure:
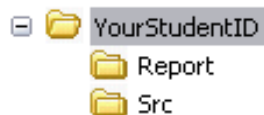
6. E-mail submissions are not accepted.
7. Late submissions will not be accepted.
8. At the submission your experiments will be checked for common errors. Works with this kind of errors may be refused for grading. Do not leave everything to the last minute.
9. Class attendance is compulsory. 10 points will be deducted from the student grade in case of any absence.
10. Office hours will be held on Wednesday afternoons.
11. Please send any additional questions to Courses.Bil342 newsgroup.

Good Luck