

**Department of Computer Science
University of Massachusetts Lowell
91.102 Computing II
Fall 2015**

Lab 8: shell scripting

In this lab, you will learn how to use shell scripting (bash) and common Linux command line tools to perform some commonly used tasks such as test data generation. A partially completed script, lab8.sh, is supplied for the lab—usage and arguments processing is already implemented. The script may be found at

<http://www.cs.uml.edu/~kseethar/Fall2015/91.102/labs/lab8/>

List of Linux Commands Used in Lab

- bash
 - if
 - while
 - arithmetic operators
 - echo
 - getopts
 - case
 - variables—local and global
 - error handling—return codes
 - functions
- Linux commands:
 - grep
 - sed
 - tr
 - awk
 - sort
 - uniq
 - head
 - tail
 - fold
 - cut
 - find
 - xargs
 - dd
 - df
 - du
 - |

Lab8

- generate a file of 1MB with random data
- generate a file of 1GB with random data
- generate a file of 1MB with all 0s data

- generate a file of 1MB with all 1s data
- write a shell script, gen_data.sh [-h] [-n nrows]
 - handle errors returned by commands and exit
 - generate random numbers, one per line
 - default size of file is 64 rows
 - optional argument nrows will specify how many rows
 - write to stdout
 - support usage via -h
 - add -L parameter to specify lower range; default is 0
 - add -H parameter to specify higher range; default is 1000000
 - add -u parameter to generate unique numbers [no duplicates]
 - add -s parameter to sort the output in descending order
 - add -S parameter to sort the output in ascending order
 - add -c <ncols> parameter to specify how many columns of numbers per line; default is 1.
 - add -x parameter to generate random alpha numeric string instead of number; default width of each string is 16
 - optional argument -w <width> will specify width of string
- generate a file of 4 columns; cut only the second column
- generate a file of 4 columns; cut only the second and third column
- generate a file of 1000 lines and extract the first 100 lines
- generate a file of 1000 lines and extract the last 100 lines
- generate a file of 1000 lines and extract the first 100 odd lines
- generate a file of 1000 lines and extract the last 100 even lines
- generate a file of 100 alpha numeric string and sort it such that line 100 is line 1, line 99 is line 2 and so on
- example usage:

./lab8.sh is used to generate random (numeric or alphanumeric) data.

usage: ./lab8.sh command [-h] [-c <cols>] [-d <delimiter>] [-r <rows>] [-s] [-u] [-w <width>] [-x] [-H <highlimit>] [-L <lowlimit>] [-S]

```
-h print this usage
-c <cols>
  number of columns to generate; default is 1
-d <delimiter>
  delimiter to use for multi-column output; default is ' '
-r <rows>
  number of rows to generate; default is 64
-s descending sort; default is 0
-u generate unique data; default is 0
-w <width>
  width of alphanumeric data; default is 16
-x generate alphanumeric data; default is 0
-H <highlimit>
  higher bound for random number; default is 1000000
-L <lowlimit>
  lower bound for random number; default is 0
-S ascending sort; default is 0
```

Example usage:

To run the ./lab8.sh using defaults
./lab8.sh

To run the ./lab8.sh to generate unique data sorted ascending, 3 columns and 1000 rows:
./lab8.sh -u -S -c 3 -r 1000

To run the ./lab8.sh to generate unique data sorted ascending in the range [0..255], 3 columns and 1000 rows:

```
./lab8.sh -u -S -c 3 -r 1000 -L 0 -H 255
```

To run the ./lab8.sh to generate alphanumeric data, 3 columns and 1000 rows:

```
./lab8.sh -x -c 3 -r 1000
```

To run the ./lab8.sh to generate numeric data, 3 columns, 4 rows, sorted ascending, unique, and delimiter |:

```
./lab8.sh -c 3 -r 4 -S -L 10 -H 20 -u -d "|"
```

```
10|15|18
```

```
14|10|20
```

```
16|15|19
```

```
19|10|10
```

To run the ./lab8.sh to generate alphanumeric data, 4 columns, 4 rows, unique, and delimiter ,:

```
./lab8.sh -c 4 -r 4 -u -x -d ","
```

```
qj7g0qJP3USHuDTq,7tIyr3lFp3AOclRU,fwPQygyVivv8HVT6,p76T8izT5nowEJ9i
```

```
iDdQz2Fgc1lFEBPx,h7ax7llwKm17BbYv,ji6WW5jvoiScma9I,kAi3xdST0s4Tl2GZ
```

```
aFSSsqix09dotdpv,SrXkClXzJpnPu5Y5,H0gIsiahXfb0lI5O,lWHyKQ563LLsU0V7
```

```
lneS9lzyZjCE0S6B,Iq0cb0wQVsi1KIbJ,MeQa49JYTQBpSmAc,CW8Hw20YGGhrf8Y7
```

Useful Links

- <http://tldp.org/HOWTO/Bash-Prog-Intro-HOWTO.html>
- <http://www.tldp.org/LDP/Bash-Beginners-Guide/html/>
- man <linuxcommand>

Deliverables

- completed shell script
- sample input and output
- a report of the observations