Unix-like Operating Systems

Filesystem.

Jan Trdlička

Czech Technical University in Prague, Faculty of Information Technology
Department of Computer Systems

Contents

Discussion of homework

- Set values 3 and 5 to local shell variables `A` and `B`, respectively.
- How to calculate the sum of the values of `A` and `B` by the shell and print the result to the standard output?
- How to calculate the product of the values of `A` and `B` by the shell and print the result to the standard output?
- Set octal value 10 and hexadecimal value F1 to local shell variables `A` and `B`, respectively. Hint: see manual page of bash.
- How to calculate the decimal sum of the values of `A` and `B` by the shell and print the result to the standard output?

Discussion of homework

- Define local shell variables `A` and `B` in the following way

```
A="01010" ; B="AA"
```

- Assume that the variable `A` contains the binary number and variable `B` contains hexadecimal number.
- How to calculate the sum of the values of `A` and `B` by the shell and print the result like decimal number to the standard output?
  Hint: see manual page of bash.

Discussion of homework

- Create a subdirectory `PS1_3` in your home directory by the following command

```
mkdir "$HOME/PS1_3"
```

- Change the current directory by the following command

```
cd "$HOME/PS1_3"
```

- Crate files by the following command

```
touch {,.}{,.,a,b,c,d,e,f,A,B,C,D,E,F}\\
{,.,a,b,c,A,B,C}.{txt,c,cpp,txt,C}
```

- Print the number of all files, that were created by previous command `touch`, on standard output.
- How many non hidden files (filename doesn't begin with the dot) with extension "`.txt`" have been created by command `touch`?

Discussion of homework

- How many files with extension "`.txt`" have been created by command `touch`?
- How many filenames contain string "`aa`" ?
- How many filenames begin with string "`Fb`" or "`aC`" ?

Small test

- Login to https://learnshell.fit.cvut.cz and see bookmark "Exam"
- **Conditions during the test**
  - The student must work independently during the test.
  - The student can only use the Unix terminal and help from the manual pages.
  - The use of information from the Internet, slides and notes is prohibited.
- **Violation of these rules means a mark of F from this subject.**

Getting information about filesystem

- How to get information about the filesystem?
- How to determine the size of the root file system on server `fray1.fit.cvut.cz`?
- How to determine free space of the file system on the server `fray1.fit.cvut.cz`, where your home directory is located?
- How to determine the IP address of server, where the contents of your home directory from server `fray1.fit.cvut.cz` is located? Hint: use command `ping` to get IP address of server.

Getting information about directory/file

- How to get information about the directory/file?
- Login to the server `fray1.fit.cvut.cz` and change working directory to directory `/bin`. Explain output of the following commands.

```
echo "$PWD"
```

```
pwd
```

```
pwd -P
```

- How to list names of all directories/files in you home directory?
- How to list names and attributes of all directories/files in you home directory? Explain the meanings of attributes.

Getting information about directory/file

- How to list attributes of the root directory?
- Login to server `fray1.fit.cvut.cz`. How to determine i-node numbers of the following files
  - `/etc/init.d/pppd`,
  - `/etc/rcS.d/K50pppd`,
  - `/etc/rc0.d/K50pppd`,
  - `/etc/rc1.d/K50pppd`.
- Why the previous files have the same i-node number? What does it mean?
- How much disk space is allocated for contents of these files totally?

Getting information about directory/file

- What kind of information about your home directory can be display by commands `ls` and `stat`. Compare these commands.
- How to determine number of kilobytes which are allocated for your home directory?

Getting information about file contents

- How to get information about file contents?
- Login to the server `fray1.fit.cvut.cz`. Determine type of the following commands:
  - `pkgdiff`
  - `7z`
  - `firefox`

  If the command is an ELF dynamically linked file, then determine shared libraries used by this command.
  If the command is a script, then determine script interpreter.

Viewing the file contents

- How to display the file contents?
- Command `ls -l` print several columns to the standard output.
  How to determine the column separator?
- How to determine the number of nonempty lines in manual page of `bash`?
  Hint: use command `cat`.
- How to determine the number of empty lines in manual page of `bash`?
  Hint: use command `cat`.

Creation of directory/file

- How to create directory/file?
- Login to the server `fray1.fit.cvut.cz`.
  How to create the following directories/files in your home directory?
  - `PS1␣lab05/A/B/C` ... directories
  - `PS1␣lab05/java` ..... link to `/opt/java`
  - `PS1␣lab05/.hl-profile` ..... hard link to `$HOME/.profile`
- How to add line `PS1="$PATH:$HOME/bin"` to file `$HOME/.profile`?

Manipulation with directories/files

- How to manipulate with directories/files?
- Login to the server `fray1.fit.cvut.cz`.
  How to create the following directories/files in your home directory?
  - `PS1␣lab05/group` ... copy of `/etc/group`
  - `PS1␣lab05/init` ..... copy of `/etc/init.d`
- How to rename `PS1␣lab05/init` to `PS1␣lab05/init.d`?
- How to delete `PS1␣lab05/init.d`?

Homework

- Create shell script, which
  1. creates the following directory tree `temp-RRMMDD`
     where `RR` are the last two digits of the current year (00..99),
     `MM` is the number of the current month (01..12)
     and `DD` is the number of the current day (01..31),
  2. copies to this directory any three files `s1..s3`,
  3. lists files in directories and determines their type,
  4. removes this directories.