Shell Programming

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- Shell Basics
- Shell Scripts
- Shell Syntax
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- ***What is Shell?***
  - ***Shell*** is a tool to execute commands.
  - A ***shell*** is a program that acts as the interface between you and the Linux system, allowing you to enter commands for the operating system to execute.
- **Shell as a Programming Language**
  - Sequence of commands and allow the shell to execute them interactively**.**
  - Store those commands in a file that you can then invoke as a program.
- **How to write a Shell script**
  - Shell extension is .sh.
  - Making a script executable.
    - $ chmod a+x <script_name>

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Environment Variables

Environment variables

- Shells let the **user define *variables***.
  They can be reused in shell commands.
  Convention: lower case names
- You can also define ***environment variables***: variables that are also visible within scripts or executables called from the shell.
  Convention: upper case names.
- env
  Lists all defined environment variables and their value.

Shell variables examples

Shell variables (bash)

- projdir=/home/marshall/coolstuff
  ls -la $projdir; cd $projdir

Environment variables (bash)

- cd $HOME
- export DEBUG=1
  ./find_extraterrestrial_life
  (displays debug information if DEBUG is set)

Main standard environment variables

Used by lots of applications!

- LD_LIBRARY_PATH
  Shared library search path
- DISPLAY
  Screen id to display X (graphical) applications on.
- EDITOR
  Default editor (vi, emacs...)
- HOME
  Current user home directory
- HOSTNAME
  Name of the local machine

MANPATH
Manual page search path

PATH
Command search path

PRINTER
Default printer name

SHELL
Current shell name

TERM
Current terminal type

USER
Current user name

PATH environment variables

- PATH
  Specifies the shell search order for commands

/home/acox/bin:/usr/local/bin:/usr/kerberos/bin:/usr/bin:/bin:/usr/X11R6/bin:/bin:/usr/bin

- LD_LIBRARY_PATH
  Specifies the shared library (binary code libraries shared by applications, like the C library) search order for ld

/usr/local/lib:/usr/lib:/lib:/usr/X11R6/lib

- MANPATH
  Specifies the search order for manual pages

/usr/local/man:/usr/share/man

Alias

Shells let you define command *aliases*: shortcuts for commands you use very frequently.

Examples

- alias ls='ls -la'
  Useful to always run commands with default arguments.
- alias rm='rm -i'
  Useful to make rm always ask for confirmation.
- alias frd='find_rambaldi_device --asap --risky'
  Useful to replace very long and frequent commands.
- alias cia='. /home/sydney/env/cia.sh'
  Useful to set an environment in a quick way
  (. is a shell command to execute the content of a shell script).

~/.bashrc file

- ~/.bashrc
  Shell script read each time a bash shell is started
- You can use this file to define
  - Your default environment variables (PATH, EDITOR...).
  - Your aliases.
  - Your prompt (see the bash manual for details).
  - A greeting message.

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Hello World Program

script2.c – Hello World Program

```
#!/bin/sh
#Hello world script program
echo "Hello World"
read var
echo "var value:$var
```

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Shell Command Line arguments

script3.c – Shell command line arguments

```
#!/bin/sh
# Shell parameters and command line arguments
IFS='*'
echo "Shell name:\$0=$0"
echo "shell 1st argument:\$1=$1"
echo "shell 2nd argument:\$2=$2"
echo "shell no. of arguemnts:\$#=$#"
echo "shell pid no:\$$=$$"
echo "list all paramters:\$*=$*"
echo "list all paramters:\$@=$@"
```

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Shell Control Statements

script3.c – Shell command line arguments

```
#!/bin/sh
# Shell parameters and command line arguments
IFS='*'
echo "Shell name:\$0=$0"
echo "shell 1st argument:\$1=$1"
echo "shell 2nd argument:\$2=$2"
echo "shell no. of arguemnts:\$#=$#"
echo "shell pid no:\$$=$$"
echo "list all paramters:\$*=$*"
echo "list all paramters:\$@=$@"
```