

Free/Libre and Open Source software

Lecture 2

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Shell

- sh – Bourne Shell
- csh – C Shell
- ksh – Korn Shell
- bash – Bourne Again Shell
- tcsh, pdksh, zsh
- ash, dash, ...
- busybox

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Variables

NAME=VALUE – initialize/set

\$NAME – get value

echo \$USER – print value of USER variable

set – list of variables

unset NAME – unset of variable NAME

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Most common environment variables

PATH – list of directory paths with executables separated by ":"

HOME – indicate where a user's home directory is located in the file system.

LANG, LC_ALL... – language locale

TZ – time zone

EDITOR, VISUAL – preferred editor

TERM – specifies the type of computer terminal or terminal emulator being used (e.g., vt100, ansi or dumb)

LINES, COLUMNS – size of screen in symbols

PS1 and PS2 – specifies how the prompt is displayed in the Bourne shell and variants

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Local variables

```
TEST=test  
echo $TEST
```

```
TEST=test1 sh -c 'echo $TEST'
```

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Shell programm

```
cat > test  
#!/bin/sh
```

```
echo variable TEST:  
echo $TEST  
^D
```

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Global variables

```
sh test
```

```
export TEST=test1 # Exporting of TEST var.  
env # List of exported variables
```

```
sh test
```

```
TEST=test2 sh test
```

```
unset TEST
```

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Special symbols

<Space> <Tab> <Newline>
\' \" ` < > | ; () [] ? ! # \$ & * =

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Separators

<Space> <Tab> – word separators

<Newline> ; – command separators

& – causes the preceding command to execute in the background (i.e., asynchronously, as its own separate process) so that the next command does not wait for its completion

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Quoting & escaping

- " – partial quoting [double quote]. "STRING" disables the interpretation of word separator characters within STRING.
- ' – full quoting [single quote]. 'STRING' preserves all special characters within STRING. This is a stronger form of quoting than "STRING".
- \ – escape [backslash]. A quoting mechanism for single characters.
- ` – command substitution. The `command` construct makes available the output of command for assignment to a variable. This is also known as backquotes or backticks. In POSIX-compatible environments may be used \$(command) form.

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Regular expressions

* – when a filename is expected, it matches any filename except those starting with a dot (or any part of a filename, except the initial dot)

? – when a filename is expected, it matches any single character

[*symbols...*] – any symbol of this set

[!*symbols...*] – none of this set

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Input/output channels redirecting

`prog > file` – stdout to file

`prog < file` – stdin from file

`prog >> file` – stdout append to file

`prog 2> file` – stderr to file

`prog 2>&1` – connect stdout & stderr

`prog > file 2>&1 != prog 2>&1 > file`

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Here-document

```
prog <<END_LABEL
```

```
.....
```

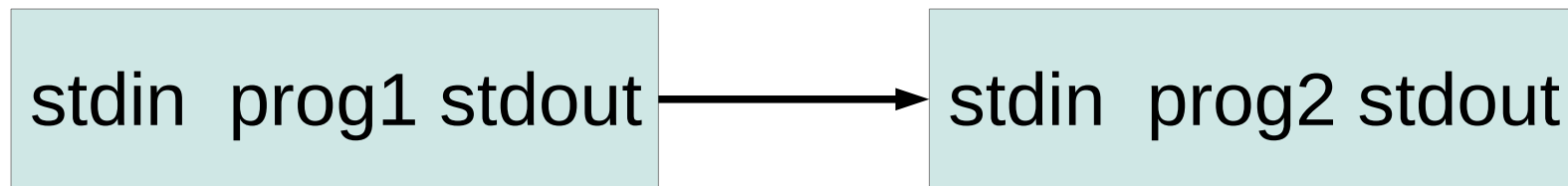
```
END_LABEL
```

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Pipelines

prog1 | prog2



prog1 args1... < file1 | prog2 args2... | ... | progN
argsN... > file2

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Aliases

```
alias ll='ls -al'  
alias
```

```
unalias ll  
alias
```

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Keyboard shortcuts

erase – [Ctrl]-[H], [Ctrl]-[?], [Backspace] or [Delete]

werase – [Ctrl]-[W]

kill – [Ctrl]-[U]

rprint – [Ctrl]-[R]

intr – [Ctrl]-[C] or [Delete]

quit (with dump) – [Ctrl]-[\\]

stop – [Ctrl]-[S]

start – [Ctrl]-[Q]

eof – [Ctrl]-[D]

susp – [Ctrl]-[Z]

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KSH/Bash keyboard shortcuts

[ESC]-[ESC] or [Tab] – Auto-complete files and folder names

[Ctrl]-[P] – Go to the previous command on "history"

[Ctrl]-[N] – Go to the next command on "history"

[Ctrl]-[F] – Move cursor forward one symbol

[Ctrl]-[B] – Move cursor backward one symbol

[Meta]-[F] – Move cursor forward one word

[Meta]-[B] – Move cursor backward one word

[Ctrl]-[A] – Go to the beginning of the line

[Ctrl]-[E] – Go to the end of the line

[Ctrl]-[L] – Clears the Screen, similar to the "clear" command

[Ctrl]-[R] – Let's you search through previously used commands

[Ctrl]-[K] – Clear the line after the cursor

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Initialization files

`/etc/profile` – system defaults

Bourne: `~/.profile`

Bash: `~/.bash_profile`

C-Shell: `~/.login`

`/etc/bashrc`

bash: `~/.bashrc`

csh: `~/.cshrc`