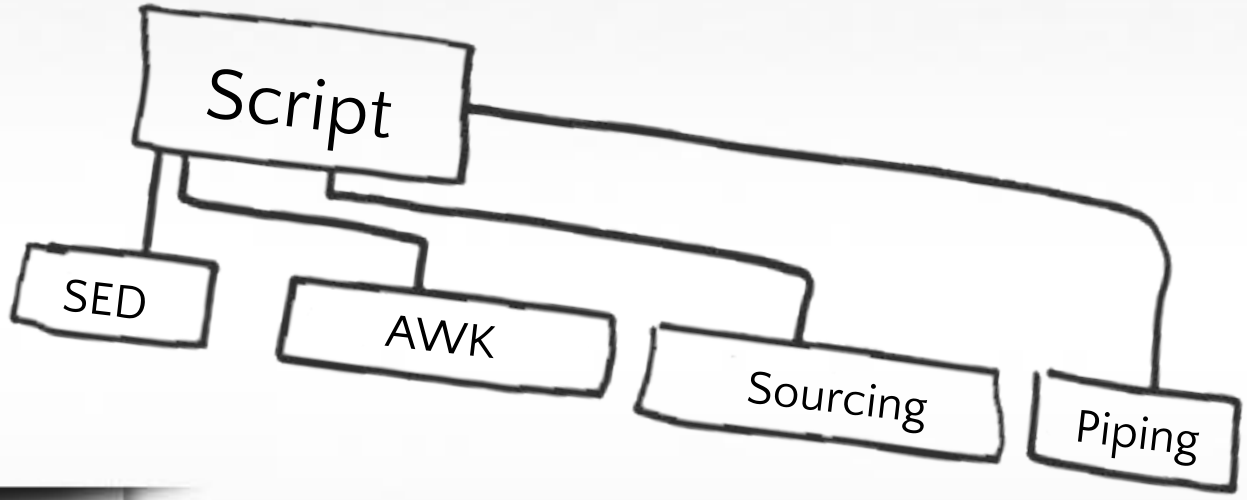
NOW

Shell Scripting



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Course Materials

You can access the course materials via this link

https://tinyurl.com/3kaww77s

Day 2 Contents

- Using / Avoid using Shell Script
- Standard Shells
- Built-in commands
- Variables
- Flow Control

When do you use shell script?

- When you want to extract information from a lot of data
- It supports the user by allowing tools for
  - Data selection
  - Data combination
  - Decision and rules.
- It automates repetitive tasks
- It so simple
- Doesn’t need a compiler
- It is portable

When do you AVOID Shell script

- This task will be done once.
- It is a complex task and need user interactive.
- It requires different software tools or different hardware environment.

Standard Shells

- Bourne Shell (sh)

Most system administration scripts are Bourne shell scripts

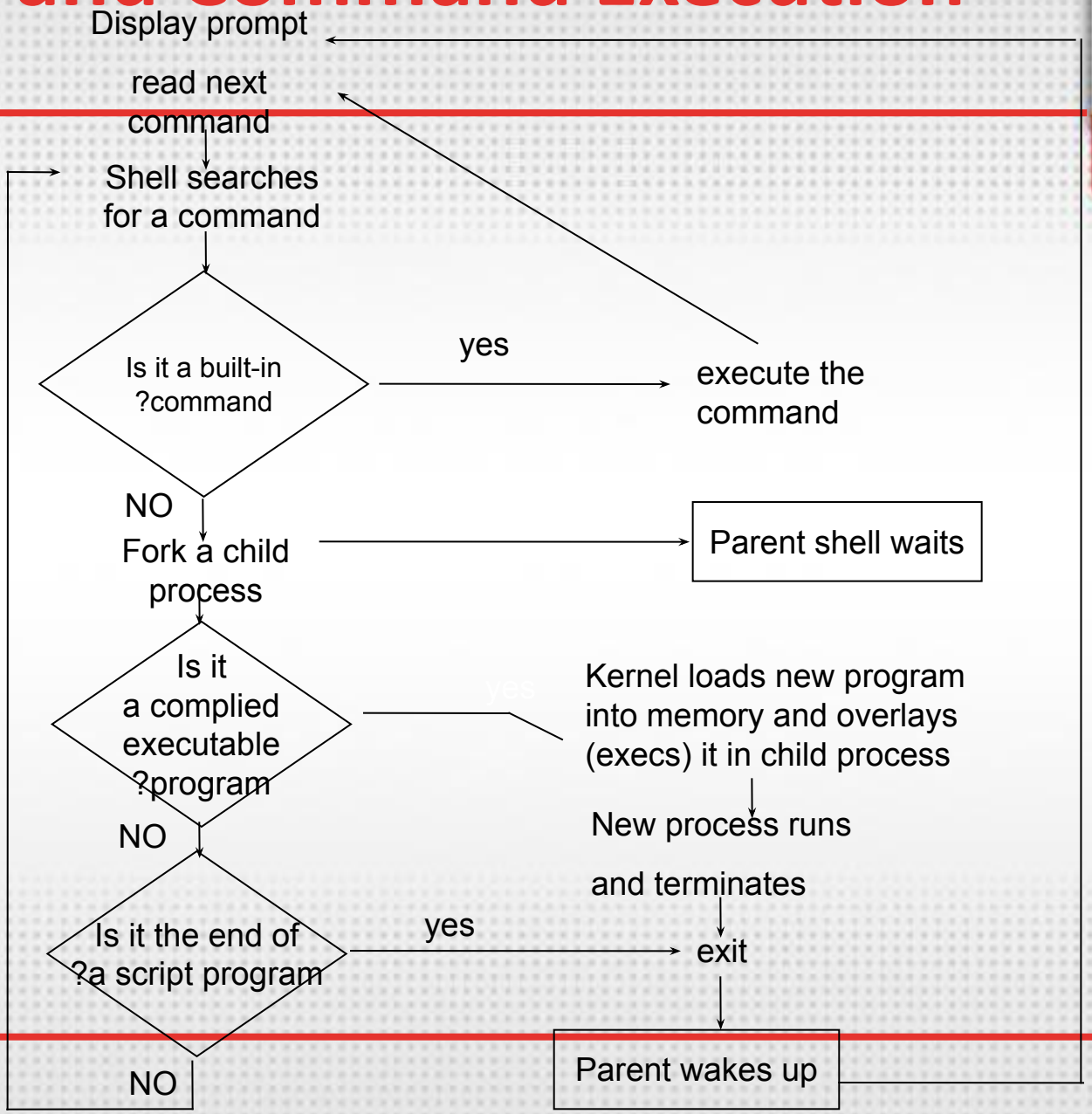
- C Shell (csh)

Command line history, aliasing, and job control

- sh shell is more simpler and faster
- Korn shell (ksh)

Editing history, aliasing, functions, regular expression wildcards, job control and special debugging features

Shell and Command Execution



Built-in Commands

- cd
- export
- umask
- exit
- break
- continue
- test
- for
- if

Built-in Commands

- newgrp
- read
- set
- until
- while

- To know if a command is built-in or not use the whence -v/type command

Creating a shell Script

- A shell program is a combination of Unix/Linux commands, programming constructions and comments.

- To execute the script use `chmod` command to turn on the execute permission.

Creating a shell Script

- The first line

```
#!/usr/bin/bash
```

- Comments

```
# calculating x
```

Example


```
$ vi hi1.sh
#!/usr/bin/bash
# this is my first bash shell script

echo hi there

$ chmod +x hi1.sh

$ ./hi1.sh
hi there
```

Using sourcing

```
$ . ./hi1.sh
hi there
$ source ./h1.sh
hi there
```

Variables

- Type of Variables:
  - Local Variables
  - Environment Variables
  - Predefined Variables

Local Variables

- Local variables are given values that are known only to the shell in which they are created.
- Variables names must begin with an alphabetic or underscore character.

Examples


```
$ state=cal
$ echo $state
      cal
$ name="Sherine Bahader"
$ echo $name
      Sherine Bahader
$ x=
$ echo $x

$ echo ${state}ifornia
      california
```

Arithmetic

- ksh/bash support integers

```
typeset -i variable


$ typeset -i num
$ num=5+5
$ echo $num
  10
```

Examples


```
$ num=5 + 5
bash: +: not found

$ num=4*6
$ echo $num
24

$ num="4 * 6"
$ echo $num
24

$ num=6.789
$ echo $num
6

$ num=hello
$ echo $num
0
```

Examples


```
$ i=5
$ let i=i+1
$ echo $i
6

$ let “i = i + 2”
$ echo $i
8

$ let “i+=1”
$ echo $i
Output:
9

$ i=9
$ ((i  = i * 6))
$ echo $i
54
```

Environment Variables

- To set a variable

```
VAR=value
export VAR=value
```

- To unset a variable

```
unset VAR
```

- To display all variables

```
set
env
printenv
export
```

- To display values stored in variables

```
echo $VAR
print $var
```

Environment Variables

- Environment variables are available to the shell in which they are created and any sub-shells.

PATH

HOME

PS1

LOGNAME

PS2

….

Environment Variables


```
PS1="$LOGNAME@`uname -n`: \$ "
echo $PS1
user1@host1: $
echo $PATH
/usr/dt/bin:/usr/openwin/bin:/usr/bi
n:/usr/ucb
PATH=$PATH:~
echo $PATH
/usr/bin:/bin
```

Environment Variables

- Quoting is a process that instructs the shell to mask, or ignore, the special meaning of metacharacters.
- Single forward quotation instruct the shell to ignore all metacharacters.
- Double quotation instruct the shell to ignore all metacharacters except $ ` \
- A backslash (\) character prevents the shell from interpreting the next character as a metacharacter.

Environment Variables


```
echo '$SHELL‘
$SHELL

echo "$SHELL"
/bin/ksh

echo "\$SHELL"
$SHELL

echo "Today's date is `date`“
Today's date is Tue May 2 14:10:05 MDT 2002

echo "The user is currently in the $(pwd) directory.“
The user is currently in the /home/user1 directory.
```

Predefined Variables

- Predefined variables are variables known to the shell and their values are assigned by the shell.

- `$#`

Number of arguments

- `$*`

List of all arguments

- `$0`

Script name

- `$1, $2,...`

First argument, second argument,..

- `$?`

Return code of the last command

Examples


```
$ print The name of the script $0
$ print The first argument $1
$ print The second argument $2
$ print the number of arguments $#
$ oldarg=$*
# reset predefined variables
$ set Ahmed Mohamed Adel
$ print all arguments are $*
$ print the number of arguments $#
$ print $oldarg
# predefined variables are unassigned
$ set --
$ print Good-bye for now, $1
$ set $oldarg
$ print $*
```

Reading User Input


```
#!/usr/bin/ksh
print “Are you happy ?”
read answer
print “$answer is the right response.”

print “What is your full name?”
read first middle last
print “hello $first”

print “where do you work?”
read
print I guess $REPLY keeps you busy !

read place?”where do you live?”
print Welcome to $place, $first $last
```

Conditional Constructs and Flow control

- Conditional commands allow you to perform some tasks based on whether or not a condition succeeds or fails
  - `if`
  - `if/else`
  - `if/elif/else`
- The shell expects a command after an `if` and the exit status of the command is used to evaluate the condition.
- To evaluate an expression use the `test` command or square brackets.

The `if` command


```
if command
then
    … commands …
fi
        or
if [ expression ]
then
    … commands …
fi

if command
then
    … commands …
    if command
    then
        … commands …
    fi
fi
```

Testing and logical operations

- String Testing

`string1=string2`	string1 is equal string2
`string1!=string2`	string1 is not equal string2
`string`	string is not null
`-z string`	Length of string is zero
`-n string`	Length of string is nonzero

Testing and logical operations (cont.)

- Integer Testing

```
int1 -eq int2
int1 -ne int2
int1 -gt int2
int1 -ge int2
int1 -lt int2
int1 -le int2
```

- equal to
- not equal to
- greater than
- greater or equal
- less than
- less or equal

Testing and logical operations (cont.)

- `!`
- `-a`
- `-o`
- `-f filename`
- `-h filename`
- `-r filename`
- `-w filename`
- `-x filename`

- not operator
- and operator
- or operator
- file existence
- symbolic link
- readable
- writable
- executable

Examples


```
$ test -r fname

$ test "islam" = "islama"

$ test 5 -gt 3

$ test "sbahader" = "sbahader" -a 5 -gt 3
```

Examples


```
$ if  test  -f   file1
   >then
   >cat file1
>fi

$ if  [  -f   file1  ]
   > then
   > cat file1
>fi

$ echo "Are you ok?"
$ read answer
$ if [ $answer = Y -o $answer = y ]
    > then
    > echo "Glad to hear that ☺"
  fi
```

Thanks ☺️

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