

112103105 Assignment Bash Scripting

Script Execution by calling bash

```
janhavi@DESKTOP-L3L3PWR: ~/dtl
janhavi@DESKTOP-L3L3PWR:~$ cd dtl
-bash: cd: dtl: No such file or directory
janhavi@DESKTOP-L3L3PWR:~$ mkdir dtl
janhavi@DESKTOP-L3L3PWR:~$ cd dtl
janhavi@DESKTOP-L3L3PWR:~/dtl$ touch hello-world.sh
janhavi@DESKTOP-L3L3PWR:~/dtl$ nano hello-world.sh
janhavi@DESKTOP-L3L3PWR:~/dtl$ chmod +x hello-world.sh
janhavi@DESKTOP-L3L3PWR:~/dtl$ ./hello-world.sh
Hello World
janhavi@DESKTOP-L3L3PWR:~/dtl$ bash -x -v hello-world.sh
#!/bin/bash
@this is my hello-world bash script
echo "Hello World"
v echo 'Hello World'
Hello World
janhavi@DESKTOP-L3L3PWR:~/dtl$ cat x.sh
cat: x.sh: No such file or directory
janhavi@DESKTOP-L3L3PWR:~/dtl$ rm
rm: missing operand
Try 'rm --help' for more information.
janhavi@DESKTOP-L3L3PWR:~/dtl$ ls
hello-world.sh
janhavi@DESKTOP-L3L3PWR:~/dtl$ ls -F
hello-world.sh*
janhavi@DESKTOP-L3L3PWR:~/dtl$ ls -l
total 4
-rwxr-xr-x 1 janhavi janhavi 67 Jan 22 11:26 hello-world.sh
janhavi@DESKTOP-L3L3PWR:~/dtl$ echo 'echo Hello World!' > hello_world.sh
janhavi@DESKTOP-L3L3PWR:~/dtl$ cat hello_world.sh
echo Hello World!
janhavi@DESKTOP-L3L3PWR:~/dtl$ bash hello_world.sh
Hello World!
janhavi@DESKTOP-L3L3PWR:~/dtl$
```

Multiline File Creation

```
janhavi@DESKTOP-L41MOR: ~/dtl
try: sudo apt install <deb name>
janhavi@DESKTOP-L41MOR:~/dtl$ cat <<ALLDONE> hello_world_multiline.sh
echo Hello World!
echo Yet another line
echo This is getting boring
ALLDONE
janhavi@DESKTOP-L41MOR:~/dtl$ bash hello_world_multiline.sh
Hello World!
Yet another line
This is getting boring
janhavi@DESKTOP-L41MOR:~/dtl$ nano hello_world.sh
janhavi@DESKTOP-L41MOR:~/dtl$ chmod +x hello_world.sh
janhavi@DESKTOP-L41MOR:~/dtl$ ./hello_world.sh
This is the new file in which nano is being executed
It is related to bash script
janhavi@DESKTOP-L41MOR:~/dtl$
```

Script Execution with #! – Shebang and debugging

```
janhavi@DESKTOP-L41MOR: ~/dtl
janhavi@DESKTOP-L41MOR:~/dtl$ nano hello_world.sh
janhavi@DESKTOP-L41MOR:~/dtl$ chmod +x hello_world.sh
janhavi@DESKTOP-L41MOR:~/dtl$ ./hello_world.sh
This is the new file in which nano is being executed
It is related to bash script
janhavi@DESKTOP-L41MOR:~/dtl$ touch hello1.sh
janhavi@DESKTOP-L41MOR:~/dtl$ nano hello1.sh
janhavi@DESKTOP-L41MOR:~/dtl$ nano hello1.sh
janhavi@DESKTOP-L41MOR:~/dtl$ bash -x -v hello1.sh
#!/bin/bash
#v
echo Hello World!
+ echo Hello 'World!'
Hello World!
```

Special Parameters

```
janhavi@DESKTOP-LJL1MOR: ~/dtl
Hello World!
janhavi@DESKTOP-LJL1MOR:~/dtl$ touch x.sh
janhavi@DESKTOP-LJL1MOR:~/dtl$ nano x.sh
janhavi@DESKTOP-LJL1MOR:~/dtl$ nano x.sh
janhavi@DESKTOP-LJL1MOR:~/dtl$ bash x.sh {A...Z}
{A...Z}
janhavi@DESKTOP-LJL1MOR:~/dtl$ nano xp.sh
janhavi@DESKTOP-LJL1MOR:~/dtl$ bash xp.sh{A...Z}
bash: xp.sh{A...Z}: No such file or directory
janhavi@DESKTOP-LJL1MOR:~/dtl$ nano xp.sh
janhavi@DESKTOP-LJL1MOR:~/dtl$ bash xp.sh {A...Z}
{A...Z} Represents all args as single string
{A...Z} All args are represents as an array
#Current option flag
$ is the PID of the shell
$ is the PID last executed BG command
xp.sh is the script name
echo final arg of last executed Foreground command
0 Represents the exit code of last command
janhavi@DESKTOP-LJL1MOR:~/dtl$
```

Shell Expansion: 1. Brace Expansion

```
janhavi@DESKTOP-LJL1MOR: ~
janhavi@DESKTOP-LJL1MOR:~/dtl$ echo a(b,b,c)e
a(b,b,c)e
janhavi@DESKTOP-LJL1MOR:~/dtl$ echo {A...Z}
{A...Z}
janhavi@DESKTOP-LJL1MOR:~/dtl$ cd
janhavi@DESKTOP-LJL1MOR:~$ echo {A..Z}
A B C D E F G H I J K L M N O P Q R S T U V W X Y Z
janhavi@DESKTOP-LJL1MOR:~$ cd
janhavi@DESKTOP-LJL1MOR:~$ mkdir z(1..10)
janhavi@DESKTOP-LJL1MOR:~$ ls
112103166 Q2.c bash_script file main.c q5.c z10 z6
112103165_janhavi_patil.tar Q3.c dir1 file1 q1.c q6.c z2 z7
Downloads _janhavi dir2 ggy.pdf q2.c q7.c z3 z8
Q1-.C _janhavi downloads hello.c q3.c sparse.h z4 z9
Q1.C a.out dtl janhavi q4.c z1 z5
janhavi@DESKTOP-LJL1MOR:~$
```

2. Parameter Expansion – Arithmetic Expansion

```
janhavi@DESKTOP-LJL1MOR:~$  
janhavi@DESKTOP-LJL1MOR:~$ a=4  
janhavi@DESKTOP-LJL1MOR:~$ b=8  
janhavi@DESKTOP-LJL1MOR:~$ echo $((a+b))  
12  
janhavi@DESKTOP-LJL1MOR:~$ echo $a  
4  
janhavi@DESKTOP-LJL1MOR:~$ ((a++))  
janhavi@DESKTOP-LJL1MOR:~$ echo $a  
5  
janhavi@DESKTOP-LJL1MOR:~$ b=8  
janhavi@DESKTOP-LJL1MOR:~$ unset $a  
janhavi@DESKTOP-LJL1MOR:~$ ((b--))  
janhavi@DESKTOP-LJL1MOR:~$ echo $b  
7  
janhavi@DESKTOP-LJL1MOR:~$ a=1  
janhavi@DESKTOP-LJL1MOR:~$ let a++  
janhavi@DESKTOP-LJL1MOR:~$ echo $a  
2  
janhavi@DESKTOP-LJL1MOR:~$
```

3. Command Substitution

```
janhavi@DESKTOP-LJL1MOR:~$  
2  
janhavi@DESKTOP-LJL1MOR:~$ echo name -n  
name -n  
janhavi@DESKTOP-LJL1MOR:~$ echo 'uname -n'  
uname -n  
janhavi@DESKTOP-LJL1MOR:~$ echo ${uname -n}  
DESKTOP-LJL1MOR  
janhavi@DESKTOP-LJL1MOR:~$
```

Variables

```
janhavi@DESKTOP-LJL1M8R: ~  
DESKTOP-LJL1M8R  
janhavi@DESKTOP-LJL1M8R:~$ nano variables.sh  
janhavi@DESKTOP-LJL1M8R:~$ bash variables.sh  
back janhavi! Today is Sunday, which is the best day of the week!  
Your Bash shell version is : 5.1.16(1)-release. Enjoy!  
janhavi@DESKTOP-LJL1M8R:~$ a=4  
janhavi@DESKTOP-LJL1M8R:~$ b=8  
janhavi@DESKTOP-LJL1M8R:~$ echo $a  
4  
janhavi@DESKTOP-LJL1M8R:~$ echo $b  
8  
janhavi@DESKTOP-LJL1M8R:~$ echo ${a+$b}  
12  
janhavi@DESKTOP-LJL1M8R:~$
```

Arrays

```
12  
janhavi@DESKTOP-LJL1M8R:~$ array=(a b c)  
janhavi@DESKTOP-LJL1M8R:~$ echo ${array[*]}  
a b c  
janhavi@DESKTOP-LJL1M8R:~$ echo ${array[2]}  
c  
janhavi@DESKTOP-LJL1M8R:~$ echo ${#array[@]}  
bash: syntax error near unexpected token `do'  
janhavi@DESKTOP-LJL1M8R:~$ echo ${#array[*]}  
3  
janhavi@DESKTOP-LJL1M8R:~$ for chr in ${array[@]}; do  
> echo $chr  
> done  
a  
b  
c  
janhavi@DESKTOP-LJL1M8R:~$ for chr in ${array[*]}; do  
> echo $chr  
> done  
janhavi@DESKTOP-LJL1M8R:~$
```

Input, Output and Error Redirections

```
janhavi@DESKTOP-LJL1MOR: ~  
> done  
janhavi@DESKTOP-LJL1MOR:~$ touch foobar  
janhavi@DESKTOP-LJL1MOR:~$ ls -l foobar  
-rw-r--r-- 1 janhavi janhavi 0 Jan 22 12:28 foobar  
janhavi@DESKTOP-LJL1MOR:~$ echo $?  
0  
janhavi@DESKTOP-LJL1MOR:~$ ls -l foobar  
-rw-r--r-- 1 janhavi janhavi 0 Jan 22 12:28 foobar  
janhavi@DESKTOP-LJL1MOR:~$ echo $?  
0  
janhavi@DESKTOP-LJL1MOR:~$ ls -l foobar  
-rw-r--r-- 1 janhavi janhavi 0 Jan 22 12:28 foobar  
janhavi@DESKTOP-LJL1MOR:~$ echo $?  
0  
janhavi@DESKTOP-LJL1MOR:~$ #exit status(if 0--> success else fail)  
janhavi@DESKTOP-LJL1MOR:~$
```

Redirecting stdout and stderr

```
janhavi@DESKTOP-LJL1MOR:~$ ls foobar barfoo  
ls: cannot access 'barfoo': No such file or directory  
foobar  
janhavi@DESKTOP-LJL1MOR:~$ ls foobar barfoo > stdout.txt  
ls: cannot access 'barfoo': No such file or directory  
janhavi@DESKTOP-LJL1MOR:~$ ls foobar barfoo 2> stderr.txt  
ls: cannot access '2': No such file or directory  
janhavi@DESKTOP-LJL1MOR:~$ ls foobar barfoo 2> stdout&stderr.txt  
foobar  
janhavi@DESKTOP-LJL1MOR:~$ cat stdout.txt  
foobar  
janhavi@DESKTOP-LJL1MOR:~$ cat stderr.txt  
ls: cannot access 'barfoo': No such file or directory  
janhavi@DESKTOP-LJL1MOR:~$ cat stdout&stderr.txt  
cat: stdout&stderr.txt: No such file or directory  
janhavi@DESKTOP-LJL1MOR:~$
```

Numeric Comparison

```
janhavi@DESKTOP-LJL1MOR: ~  
janhavi@DESKTOP-LJL1MOR:~$ a=1  
janhavi@DESKTOP-LJL1MOR:~$ b=2  
janhavi@DESKTOP-LJL1MOR:~$ [ $a -lt $b ]  
[1: command not found  
janhavi@DESKTOP-LJL1MOR:~$ [ &a -lt $b ]  
[1] 145  
-bash: [: missing `']  
a: command not found  
[1]+ Exit 2  
janhavi@DESKTOP-LJL1MOR:~$ [ $a -lt $b ]  
-bash: 1 -lt 2: syntax error in expression (error token is "2")  
janhavi@DESKTOP-LJL1MOR:~$ $ [ $a -lt $b ]  
$: command not found  
janhavi@DESKTOP-LJL1MOR:~$ echo $?  
0  
janhavi@DESKTOP-LJL1MOR:~$ [ $a -gt $b ]  
-bash: [: missing `']  
janhavi@DESKTOP-LJL1MOR:~$ [ $a -gt $b ]  
-bash: [: missing `']  
janhavi@DESKTOP-LJL1MOR:~$ [ $a -lt $b ]  
janhavi@DESKTOP-LJL1MOR:~$ echo $?  
0  
janhavi@DESKTOP-LJL1MOR:~$ [ $a -gt $b ]  
janhavi@DESKTOP-LJL1MOR:~$ echo $?  
1  
janhavi@DESKTOP-LJL1MOR:~$ [ $a -ne $b ]  
janhavi@DESKTOP-LJL1MOR:~$ echo $?  
0  
janhavi@DESKTOP-LJL1MOR:~$ [ $a -eq $b ]  
janhavi@DESKTOP-LJL1MOR:~$ echo $?  
1  
janhavi@DESKTOP-LJL1MOR:~$
```

Comparing Strings

```
janhavi@DESKTOP-LJL1MOR: ~  
janhavi@DESKTOP-LJL1MOR:~$ [ "apple" = "oranges" ]  
janhavi@DESKTOP-LJL1MOR:~$ echo $?  
1  
janhavi@DESKTOP-LJL1MOR:~$  
janhavi@DESKTOP-LJL1MOR:~$ str1="apples"  
janhavi@DESKTOP-LJL1MOR:~$ str2="oranges"  
janhavi@DESKTOP-LJL1MOR:~$ [ str1= str2 ]  
-bash: [: missing `']  
janhavi@DESKTOP-LJL1MOR:~$ echo $?  
2  
janhavi@DESKTOP-LJL1MOR:~$ [ str1= str2 ]  
janhavi@DESKTOP-LJL1MOR:~$ echo $?  
0  
janhavi@DESKTOP-LJL1MOR:~$
```

Conditional Arithmetic

```
janhavi@DESKTOP-LJL1MOR: ~  
0  
janhavi@DESKTOP-LJL1MOR:~$ a=4  
janhavi@DESKTOP-LJL1MOR:~$ if (((a-5)==0)) ;  
> C  
> ^C  
janhavi@DESKTOP-LJL1MOR:~$ if (((a-5)==0 )) ; then echo yes ; else echo no ; fi  
-bash: ((: (a-5)==0 : syntax error: operand expected (error token is "=0 ")  
no  
janhavi@DESKTOP-LJL1MOR:~$ if (((a<10))) ; then echo yes ; else echo no ; fi  
yes  
janhavi@DESKTOP-LJL1MOR:~$ if (((a==4))) ; then echo yes ;  
> ^C  
janhavi@DESKTOP-LJL1MOR:~$ if (((a==4))) ; then echo yes ; else echo no ; fi  
yes  
janhavi@DESKTOP-LJL1MOR:~$  
janhavi@DESKTOP-LJL1MOR:~$
```

Bash Arithmetics:

1. Arithmetic Expansion

```
janhavi@DESKTOP-LJL1MOR: ~  
yes  
janhavi@DESKTOP-LJL1MOR:~$ a=$(( 12 + 5 ))  
janhavi@DESKTOP-LJL1MOR:~$ echo $a  
17  
janhavi@DESKTOP-LJL1MOR:~$ echo $(( 12 + 5 ))  
17  
janhavi@DESKTOP-LJL1MOR:~$ echo $(( 100 - 1 ))  
99  
janhavi@DESKTOP-LJL1MOR:~$ echo $(( 3*11 ))  
33  
janhavi@DESKTOP-LJL1MOR:~$ division=$((100/10))  
division: command not found  
janhavi@DESKTOP-LJL1MOR:~$ division=$((100/10))  
janhavi@DESKTOP-LJL1MOR:~$ echo division  
division  
janhavi@DESKTOP-LJL1MOR:~$ division=$((100/10))  
janhavi@DESKTOP-LJL1MOR:~$ echo $division  
10  
janhavi@DESKTOP-LJL1MOR:~$ x=10;y=33  
janhavi@DESKTOP-LJL1MOR:~$ z=$(( $x + $y ))  
janhavi@DESKTOP-LJL1MOR:~$ echo $z  
43  
janhavi@DESKTOP-LJL1MOR:~$
```


2. expr Command

```
janhavi@DESKTOP-LJL1MOR: ~  
43  
janhavi@DESKTOP-LJL1MOR:~$ expr 2 + 2  
4  
janhavi@DESKTOP-LJL1MOR:~$ expr 6\*6  
36  
janhavi@DESKTOP-LJL1MOR:~$ expr 6 \" 6  
36  
janhavi@DESKTOP-LJL1MOR:~$ expr 6 \ 3  
expr: syntax error: unexpected argument ' 3'  
janhavi@DESKTOP-LJL1MOR:~$ expr 6 / 3  
2  
janhavi@DESKTOP-LJL1MOR:~$ expr 1000 -999  
expr: syntax error: unexpected argument '-999'  
janhavi@DESKTOP-LJL1MOR:~$ expr 1000 - 999  
1  
janhavi@DESKTOP-LJL1MOR:~$
```

2. let Command

```
janhavi@DESKTOP-LJL1MOR: ~  
1  
janhavi@DESKTOP-LJL1MOR:~$ let a=2+2  
janhavi@DESKTOP-LJL1MOR:~$ echo $a  
4  
janhavi@DESKTOP-LJL1MOR:~$ let b=1*($a-1)  
janhavi@DESKTOP-LJL1MOR:~$ echo $  
$  
janhavi@DESKTOP-LJL1MOR:~$ echo $b  
12  
janhavi@DESKTOP-LJL1MOR:~$ let c=$((b**3))/2  
janhavi@DESKTOP-LJL1MOR:~$ echo $c  
864  
janhavi@DESKTOP-LJL1MOR:~$ let c++  
janhavi@DESKTOP-LJL1MOR:~$ echo $c  
865  
janhavi@DESKTOP-LJL1MOR:~$ let c-  
-bash: let: c:: syntax error: operand expected (error token is "-")  
janhavi@DESKTOP-LJL1MOR:~$ let c--  
janhavi@DESKTOP-LJL1MOR:~$ echo $c  
864  
janhavi@DESKTOP-LJL1MOR:~$
```

3. bc Command

```
shreya@LAPTOP-709J572C:~$ echo '8.5 / 2.3' | bc
3
shreya@LAPTOP-709J572C:~$ echo 'scale=2;8.5 / 2.3' | bc
3.69
shreya@LAPTOP-709J572C:~$ echo 'scale=30;8.5 / 2.3' | bc
3.695652173913043478260869565217
shreya@LAPTOP-709J572C:~$ squareroot=$( echo 'scale=50;sqrt(50)' | bc
> ^C
shreya@LAPTOP-709J572C:~$ squareroot=$( echo 'scale=50;sqrtr(50)' | bc)
Runtime error (func=(main), adr=13): Function sqrtr not defined.
shreya@LAPTOP-709J572C:~$ squareroot=$( echo 'scale=50;sqrt(50)' | bc)
shreya@LAPTOP-709J572C:~$ echo $squareroot
7.07106781186547524400844362104849039284835937688474
shreya@LAPTOP-709J572C:~$
```