

Script Execution by calling bash

```
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ mkdir bash_script
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ cd bash_script
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~/bash_script$ echo 'echo Hello World!' > hello_world.sh
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~/bash_script$ cat hello_world.sh
echo Hello World!
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~/bash_script$ bash hello_world.sh
bash: hello_world.sh: No such file or directory
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~/bash_script$ bash_script hello_world.sh
bash_script: command not found
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~/bash_script$ bash hello_world.sh
Hello World!
```

Multiline File Creation

```
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~/bash_script$ cat <<ALLDONE> hello_world_multiline.sh
> echo Hello World!
> echo Yet another line
> echo This is getting boring
> ALLDONE
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~/bash_script$ bash hello_world_multiline.sh
Hello World!
Yet another line
This is getting boring
```

Nano

```
GNU nano 4.8 new_file.sh
#!/bin/bash
echo This is the new file in which nano is executing.
echo It is related to bash script.
```

Script Execution with #! - Shebang

```
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~/bash_script$ chmod +x hello_world.sh
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~/bash_script$ ./hello_world.sh
Hello World!
```

Debugging

```
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~/bash_script$ touch hello1.sh
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~/bash_script$ nano hello1.sh
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~/bash_script$ bash -x -v hello1.sh
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~/bash_script$ nano hello1.sh
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~/bash_script$ ^C
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~/bash_script$ bash -x -v hello1.sh
#!/bin/bash -xv
echo "Hello World"
+ echo 'Hello World'
Hello World
echo I am executing bash script
+ echo I am executing bash script
I am executing bash script
```

Special Parameters

```

shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~/bash_script$ touch x.sh
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~/bash_script$ nano x.sh
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~/bash_script$ cat x.sh
#!/bin/bash
echo ${4} ${15} ${7} ${3} ${1} ${20}
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~/bash_script$ bash x.sh {A...Z}
{A...Z}
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~/bash_script$ touch xp.sh
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~/bash_script$ nano xp.sh
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~/bash_script$ bash xp.sh {A...Z}

{A...Z} Represent all args as single string
{A...Z} All args are represented as an array
1 is total number of args
hB current option flag
6693 is the PID of the shell
is the PID of the last executed BG command
xp.sh is the script name
echo final arg of last executed Foreground command
0 represents exit code of last command

```

Shell Expansion: 1. Brace Expansion

```

shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~/bash_script$ echo a{b,d,c}e
abe ade ace
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~/bash_script$ 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
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~/bash_script$ cd
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ mkdir z{1..10}
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ ls
add.c  archive.zip  Desktop  Downloads  DTL  main1.c  main.c  Pictures  struct1.c
sum3.tar  Videos  z10  z3  z5  z7  z9
a.out  bash_script  Documents  Downlods  Linux-Cheat-Sheet-Sponsored-By-Loggly.pdf  main4.c  Music  Public  struct.c
Templates  z1  z2  z4  z6  z8

```

2. Parameter Expansion – Arithmetic Expansion

```
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ a=4
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ b=8
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ echo $((a=a+b))
12
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ echo $a
12
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ ((a++))
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ echo $a
13
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ b=8
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ unset b
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ ((b--))
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ echo $b
-1
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ a=1
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ let a++
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ echo $a
2
```

3. Command Substitution

```
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ echo `uname -n`
uname -n
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ echo `uname -n`
shriya-HP-Pavilion-Laptop-14-dv1xxx
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ echo $(uname -n)
shriya-HP-Pavilion-Laptop-14-dv1xxx
```

Variables

```

shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ nano variables.sh
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ bash variables.sh
variables.sh: line 4: shriya: command not found
Welcome back ! Today is Thursday, which is the best day of the week!
Your Bash Shell version is: 5.0.17(1)-release. Enjoy!
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ a=4
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ b=8
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ echo $a
4
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ echo $b
8
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ echo ${a+b}
12

```

Arrays

```

shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ array=(a b c)
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ echo ${array[*]}
a b c
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ echo ${array[2]}
c
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ echo ${#array[*]}
3
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ for chr in ${array[@]}; do
> echo $chr
> done
a
b
c
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ for chr in ${array[@]}; do
> done
bash: syntax error near unexpected token `done'
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ for chr in ${array[*]}; do
> echo $chr
> done
a
b
c

```

Input, Output and Error Redirections

```

shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ touch foobar
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ ls -l foobar
-rw-rw-r-- 1 shriya shriya 0 Jan 12 00:41 foobar
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ echo $?
0
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ ls -l foobar
-rw-rw-r-- 1 shriya shriya 0 Jan 12 00:41 foobar
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ echo $?
0
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ ls -l foobar
-rw-rw-r-- 1 shriya shriya 0 Jan 12 00:41 foobar
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ echo $?
0
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ #exit status(if 0--> success else fail)

```

Redirecting stdout and stderr

```

shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ ls foobar barfoo
ls: cannot access 'barfoo': No such file or directory
foobar
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ ls foobar barfoo > stdout.txt
ls: cannot access 'barfoo': No such file or directory
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ ls foobar barfoo 2> stderr.txt
foobar
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ ls foobar barfoo &>stdoutandstderr.txt
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ cat stdout.txt
foobar
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ cat stderr.txt
ls: cannot access 'barfoo': No such file or directory
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ cat stdoutandstderr.txt
ls: cannot access 'barfoo': No such file or directory
foobar

```

Redirecting stdin

```

shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ cat>file1.txt
I am using keyboard to input text.
Cat command reads my keyboard input, converts it to stdout which is instantly redirected ti file1.txt
This is, until I press CTRL+D
^C
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ cat<file1.txt
I am using keyboard to input text.
Cat command reads my keyboard input, converts it to stdout which is instantly redirected ti file1.txt
This is, until I press CTRL+D

```

Numeric Comparison

```

shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ a=1
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ b=2
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ [ $a -lt $b ]
[1: command not found
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ [ $a -lt $b ]
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ echo $?
0
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ [ $a -gt $b ]
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ echo $?
1
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ [ $a -ne $b ]
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ echo $?
0
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ [ $a -eq $b ]
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ echo $?
1

```

Comparing Strings

```

shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ [ "apples" = "oranges" ]
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ echo $?
1
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ str1="apples"
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ str2="oranges"
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ [ str1 = str2 ]
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ echo $?
1

```

Conditional Arithmetic

```

shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ a=4
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ if (( (a-5) == 0 )) ; then echo yes ; else echo no ; fi
no
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ if (( a<10 )) ; then echo yes ; else echo no ; fi
yes
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ if ((a==4)); then echo yes; else echo no; fi
yes

```

Bash Arithmetics:

1. Arithmetic Expansion


```

shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ a=$((12 + 5))
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ echo $a
17
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ echo $(( 12 + 5 ))
17
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ echo $(( 100 - 1 ))
99
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ echo $(( 3 * 11 ))
33
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ division=$((100/10))
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ echo $division
10
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ x=10;y=33
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ z=$(( $x * $y ))
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ echo $z
330

```

2. expr Command

```

shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ expr 2 + 2
4
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ expr 6 * 6 expr:
expr: syntax error: unexpected argument 'add.c'
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ expr 6\*6
6*6
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ expr 6 \* 6
36
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ expr 6 / 3
2
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ expr 1000 - 999
1

```

3. let Command


```

shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ let a=2+2
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ echo $a
4
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ let b=4*($a-1)
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ echo $b
12
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ let c=($b**3)/2
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ echo $c
864
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ let c++
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ echo $c
865
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ let c-
bash: let: c-: syntax error: operand expected (error token is "-")
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ let c--
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ echo $c
864

```

4. bc Command

```

shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ echo '8.5 / 2.3' | bc
3
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ echo 'scale=2;8.5 / 2.3' | bc
3.69
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ echo 'scale=30;8.5 / 2.3' | bc
3.695652173913043478260869565217
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ squareroot=$( echo 'scale=50;sqrt(50)' | bc )
shriya@shriya-HP-Pavilion-Laptop-14-dv1xxx:~$ echo $squareroot
7.07106781186547524400844362104849039284835937688474

```