

Linux/Unix System Programming

CSCI 2153

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BASH Programming

File Operators:

File operators are a powerful set of logical operators within Bash. Listed below are several different operators that Bash can perform on files.

Operators	Description
-a filename	True if the file exists; it can be empty or have some content but, so long as it exists, this will be true
-b filename	True if the file exists and is a block special file such as a hard drive like /dev/sda or /dev/sda1
-c filename	True if the file exists and is a character special file such as a TTY device like /dev/TTY1
-d filename	True if the file exists and is a directory
-e filename	True if the file exists; this is the same as -a above

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File Operators:

Operators	Description
-f filename	True if the file exists and is a regular file, as opposed to a directory, a device special file, or a link, among others
-g filename	True if the file exists and is set-group-id, SETGID
-h filename	True if the file exists and is a symbolic link
-k filename	True if the file exists and its "sticky" bit is set
-p filename	True if the file exists and is a named pipe (FIFO)
-r filename	True if the file exists and is readable, i.e., has its read bit set
-s filename	True if the file exists and has a size greater than zero; a file that exists but that has a size of zero will return false
-t fd	True if the file descriptor fd is open and refers to a terminal

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File Operators:

Operators	Description
-u filename	True if the file exists and its set-user-id bit is set
-w filename	True if the file exists and is writable
-x filename	True if the file exists and is executable
-G filename	True if the file exists and is owned by the effective group ID
-L filename	True if the file exists and is a symbolic link
-N filename	True if the file exists and has been modified since it was last read
-O filename	True if the file exists and is owned by the effective user ID
-S filename	True if the file exists and is a socket

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File Operators:

Operator	Description
File1 -ef file2	True if file1 and file2 refer to the same device and iNode numbers
file1 -nt file2	True if file1 is newer (according to modification date) than file2, or if file1 exists and file2 does not
File1 -ot file2	True if the file exists and is writable

BASH Programming

String Comparison Operators:

String comparison operators enable the comparison of alphanumeric strings of characters. Listed below are only a few of these operators.

```
#!/bin/bash
echo
echo
MyVar="a"
if [ -z $MyVar ] ; then
    echo "[ $MyVar ] is zero length"
else
    echo "[ $MyVar ] contains data"
fi
```

```
#!/bin/bash
echo
echo
File="TestFile"
if [ -e $File ] ; then
    echo "The file $File exists."
else
    echo "The file $File does not exist."
fi
```

BASH Programming

String Operators:

Operators	Description
<code>-z string</code>	True if the length of string is zero
<code>-n string</code>	True if the length of string is non-zero
<code>string1 == string2</code> or <code>string1 = string2</code>	True if the strings are equal; a single = should be used with the test command for POSIX conformance. When used with the <code>[[</code> command, this performs pattern matching as described above (compound commands).
<code>string1 != string2</code>	True if the strings are not equal
<code>string1 < string2</code>	True if string1 sorts before string2 lexicographically (refers to locale-specific sorting sequences for all alphanumeric and special characters)
<code>string1 > string2</code>	True if string1 sorts after string2 lexicographically