

ULI101: INTRODUCTION TO UNIX / LINUX AND THE INTERNET

WEEK 9: LESSON 2

EXTENDED REGULAR EXPRESSIONS

LINUX COMMANDS THAT USE REGULAR EXPRESSIONS

PHOTOS AND ICONS USED IN THIS SLIDE SHOW ARE LICENSED UNDER [CC BY-SA](#)

LESSON 2 TOPICS

Extended Regular Expressions

- Definition / Purpose
- Extended Regular Expressions Symbols
- Instructor Demonstration

Other Linux Commands That Use Regular Expressions

- `man` , `more` , `less` , `vi` , `sed` , `awk`

Perform Week 9 Tutorial

- Investigation 2
- Review Questions (Extended Regular Expressions, Parts **A** and **B**)

EXTENDED REGULAR EXPRESSIONS

Extended Regular Expressions

Extended Regular Expressions consist of additional special characters that “**extend**” the capability of regular expressions.



We will discuss three types of **extended regular expressions**:

Repetition: `{min, max}` , `?` , `+`

Grouping: `()`

Or Condition: `|`

EXTENDED REGULAR EXPRESSIONS

AAAA

Repetition

The extended regular expression symbol consists of the **minimum** and/or **maximum** number of repetitions contained within braces { }

Usage:

`{min,max}`

Examples:

`a{2,5}` **2 to 5** occurrences of the character **a**

`[0-9]{1,}` **1 or more** occurrences of a **number**
`[0-9]+` (shortcut method)

`[a-z]{0,1}` **zero or 1** occurrence of a **lowercase letter**
`[a-z]?` (shortcut method)

EXTENDED REGULAR EXPRESSIONS

AAAA

Repetition Extended Regular Expression Example

If you issue the **grep** command without options with **extended** regular expressions, the command **will NOT work**.

When using the **grep** command with extended regular expressions you *need to use* **egrep** or **grep -E**

Examples:

```
egrep "^ [0-9]{1,}$" data.txt
egrep "^ [+ -]{0,1} [0-9]{1,}$" data.txt
egrep "^ [0-9]{1,} [.] {0,1} [0-9]{0,}$" data.txt

grep -E "^ [0-9]{1,}$" data.txt
grep -E "^ [+ -]{0,1} [0-9]{1,}$" data.txt
grep -E "^ [0-9]{1,} [.] {0,1} [0-9]{0,}$" data.txt
```

```
cat data.txt
123
+45
+++37
-67.89
--57.6
-78...4
12.6
+26.887

egrep "^ [0-9]{1,}$" data.txt
123

egrep "^ [+ -]{0,1} [0-9]{1,}$" data.txt
123
+45

egrep "^ [0-9]{1,} [.] {0,1} [0-9]{0,}$" data.txt
123
12.6
```

EXTENDED REGULAR EXPRESSIONS

(pattern)

Grouping

If you want to search for repetition for a **group** of **characters**, a **word**, or a **phase**, you can enclose them within brackets ()

Examples:

```
egrep "(the ){2,}" data.txt
```

```
egrep "(lazy fox ){2,3}" data.txt
```

```
cat data.txt
The lazy fox jumped over dog
Time to go to the the store
I like to go to the movies
I act like a lazy fox lazy fox lazy fox
Don't be a lazy fox

egrep "(the ){2,}" data.txt
Time to go to the the store

egrep "(lazy fox ){2,3}" data.txt
I act like a lazy fox lazy fox lazy fox
```

REGULAR EXPRESSIONS

(this |that)

Or Condition

The `|` symbol is used as the “or” symbol to provide **alternatives** within a **group**.

Examples:

```
egrep "(this | that ){1,}" data.txt
```

```
egrep "(a|b|c){3,}" data.txt
```

```
cat data.txt
I know this is the day
Because that is correct
We don't know that it is sunny
I know how to cccamp
I waaaaant a tissue
Can a bbborrow a cup of sugar?

egrep "(this | that ){1,}" data.txt
I know this is the day
Because that is correct
We don't know that it is sunny

egrep "(a|b|c){3,}" data.txt
I know how to cccamp
I waaaaant a tissue
Can a bbborrow a cup of sugar?
```

REGULAR EXPRESSIONS

Instructor Demonstration

Your instructor will demonstrate examples of using **Extended Regular expressions** with the **egrep** command.



REGULAR EXPRESSIONS



Other Linux Commands that Use Extended Regular Expressions

There are other Linux commands / utilities in addition to *grep* or *egrep* that use regular expressions.

You have already used a few of these commands like: *man*, *more*, *less*, and *vi*.

Other commands like *sed* and *awk* will be taught in a future lesson.

REGULAR EXPRESSIONS

Other Linux Commands that Use Extended Regular Expressions



`vi`

The `vi` text editor use regular expressions to search and manipulate (edit) text within a text document.

Examples:

`/pattern` – search for pattern in text file
`:%s/uli101/ULI101/g` – search and replace text globally (all lines)

```
I am taking the course ULI101
There are a lot of commands taught in ULI101
I am over half way in the ULI101 course
I like Linux
```

```
█
~
~
~
~
```

REGULAR EXPRESSIONS

Using Regular Expressions with Linux Commands other than grep

`awk` , `sed`

The `awk` and `sed` Linux utilities are used to **manipulate** text, from files or via Linux pipeline commands.

You will learn how to use these commands in a **later** lesson.



REGULAR EXPRESSIONS

Instructor Demonstration

Your instructor will demonstrate examples of using **Extended Regular Expressions** with the **man**, **more**, **less** and **vi** utilities.



HOMEWORK

Getting Practice

Perform **Week 9 Tutorial**:

(**Due: Friday Week 10 @ midnight for a 2% grade**):

- [INVESTIGATION 2: EXTENDED REGULAR EXPRESSIONS](#)
- [INVESTIGATION 3: OTHER COMMANDS THAT USE REGULAR EXPRESSIONS](#)
- [LINUX PRACTICE QUESTIONS](#)

(**Extended Regular Expressions, Parts **A** and **B**)**)