ULI101: INTRODUCTION TO UNIX / LINUX AND THE INTERNET

WEEK 8: LESSON 2

EXTENDED REGULAR EXPRESSIONS
LINUX COMMANDS THAT USE REGULAR EXPRESSIONS

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**)

Complete Assignment #2 (Due next Friday at midnight)

Work on Assignment #3 (Section 1: Regular Expressions Using grep)

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:
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

`man` , `more` , `less`

When searching for patterns using the **`man`**, **`more`**, or **`less`** commands, you specify a regular expression with a **forward slash /**

*Example with **man ls** command:*

`/classify`

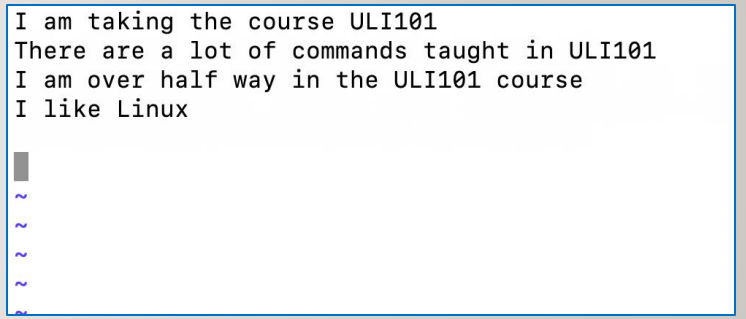
```
-F, --classify
       append indicator (one of */=>@|) to entries

--file-type
       likewise, except do not append '*'

--format=WORD
       across -x, commas -m, horizontal -x, long -l,

--full-time
       like -l --time-style=full-iso
```

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)

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.

REGULAR EXPRESSIONS

Getting Practice

To get practice to help perform **Assignment #3**, perform **Week 9 Tutorial:**

- INVESTIGATION 2: EXTENDED REGULAR EXPRESSIONS
- INVESTIGATION 3: OTHER COMMANDS THAT USE REGULAR EXPRESSIONS
- LINUX PRACTICE QUESTIONS

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

Complete Assignment #2 (Due next Friday at midnight)

Work on Assignment #3 (Section 1: Regular Expressions Using grep)