

CPSC 223C: C Programming - Spring 2019

Final Project One, **diff**, due Sunday, 19 May 2019 (at 2355 at the latest, **no** exceptions)

In the real world, we work on teams of developers who many times are thousands of miles apart, working on the same set of files. Occasionally, someone makes a mistake, and one of the files now refuses to compile. Or, we have code that compiles on Windows, but we want it to compile without warnings on macOS and on Linux.

After a minute (hour, day) or so of working on the code, we have found the problem and the code now compiles cleanly. We want to make our version of the changed file available to our colleagues. We could ask them to delete their current file and replace it with our new file, or, we could use diff to create a patch file, that they can

- (1) read to see the changes you had to make, and
- (2) use patch to apply your changes to their original file.

Diff and patch are also frequently used by code review teams, and by version control systems, to make code reviews comprehensive, to the point, and to save memory on servers.

Many of us haven't used diff (and may never even have heard of patch before), so this is an opportunity to raise our level of consciousness, and to add another cool project to our portfolio for those all-important job interviews.

We (you) are going to build a slightly-simplified version of diff, that doesn't work on more than 2 files at a time, nor does it work on directories (although that wouldn't be difficult to add to it). Also, your version of diff doesn't have to do all of the options of standard diff.

It does have to provide the basic elements of diff, though, as listed in the form at the end of this document, including comparing files, printing out lines that are different in a variety of formats (combined, unified, side-by-side, as well as

For those unfamiliar with diff, check out the manual pages for them (`man diff`).

Submission

Turn in the code for this project by uploading all of the source files you created to a single public repository on GitHub. While you may discuss this assignment with other students, work you submit must have been completed on your own. To complete your submission, print the sheet at the back of this file, fill out its spaces, and submit it to the instructor in class by the deadline. Failure to follow the instructions exactly will incur a 10% penalty on the grade for this assignment.

The basic form of using diff is as follows: `diff (options) file1 file2`

Examples of each of the functionalities your version of diff should provide are given below.

left.txt (file1)	right.txt (file2)
This part of the document has stayed the same from version to version. It shouldn't be shown if it doesn't change. Otherwise, that would not be helping to compress the size of the changes.	This is an important notice! It should therefore be located at the beginning of this document!
This paragraph contains text that is outdated. It will be deleted in the near future.	This part of the document has stayed the same from version to version. It shouldn't be shown if it doesn't change. Otherwise, that would not be helping to compress the size of the changes.
It is important to spell check this dokument. On the other hand, a misspelled word isn't	It is important to spell check this document. On the other hand, a

the end of the world. Nothing in the rest of this paragraph needs to be changed. Things can be added after it.	misspelled word isn't the end of the world. Nothing in the rest of this paragraph needs to be changed. Things can be added after it. This paragraph contains important new additions to this document.
--	--

diff -q left.txt right.txt // BRIEF MODE
Files left.txt and right.txt differ

diff -s left.txt left.txt // FILES IDENTICAL MODE
Files left.txt and left.txt are identical

// NORMAL MODE (default)

diff left.txt right.txt	diff right.txt left.txt
0a1,6 > This is an important > notice! It should > therefore be located at > the beginning of this > document! > 11,15d16 < This paragraph contains < text that is outdated. < It will be deleted in the < near future. < 17c18 < check this dokument. On --- > check this document. On 24a26,29 > > This paragraph contains > important new additions > to this document.	1,6d0 < This is an important < notice! It should < therefore be located at < the beginning of this < document! < 16a11,15 > This paragraph contains > text that is outdated. > It will be deleted in the > near future. > 18c17 < check this document. On --- > check this dokument. On 26,29d24 < < This paragraph contains < important new additions < to this document.

diff -y left.txt right.txt // SIDE BY SIDE MODE

	> This is an important > notice! It should > therefore be located at > the beginning of this > document! >
This part of the document has stayed the same from version to version. It shouldn't be shown if it doesn't change. Otherwise, that would not be helping to compress the size of the changes.	This part of the document has stayed the same from version to version. It shouldn't be shown if it doesn't change. Otherwise, that would not be helping to compress the size of the changes.
This paragraph contains text that is outdated. It will be deleted in the near future.	< < < <

```
> This paragraph contains
> important new additions
> to this document.
```

```
diff -version // VERSION
diff (GNU diffutils) 2.8.1
Copyright (C) 2002 Free Software Foundation, Inc.
```

This program comes with NO WARRANTY, to the extent permitted by law.
You may redistribute copies of this program
under the terms of the GNU General Public License.
For more information about these matters, see the file named COPYING.

Written by Paul Eggert, Mike Haertel, David Hayes,
Richard Stallman, and Len Tower.

```
diff -c left.txt right.txt // COMBINED MODE
```

```
*** left.txt 2019-05-03 10:43:35.000000000 -0700
--- right.txt 2019-05-03 10:43:47.000000000 -0700
*****
```

```
*** 1,3 ***
```

```
--- 1,9 ---
```

```
+ This is an important
+ notice! It should
+ therefore be located at
+ the beginning of this
+ document!
+
```

```
  This part of the
  document has stayed the
  same from version to
```

```
*****
```

```
*** 8,20 ***
```

```
  compress the size of the
  changes.
```

```
- This paragraph contains
- text that is outdated.
- It will be deleted in the
- near future.
-
```

```
  It is important to spell
! check this dokument. On
  the other hand, a
  misspelled word isn't
  the end of the world.
```

```
--- 14,21 ---
```

```
  compress the size of the
  changes.
```

```
  It is important to spell
! check this document. On
  the other hand, a
  misspelled word isn't
  the end of the world.
```

```
*****
```

```
*** 22,24 ***
```

```
--- 23,29 ---
```

```
  this paragraph needs to
  be changed. Things can
  be added after it.
```

```
+
+ This paragraph contains
+ important new additions
+ to this document.
```

```
diff -u left.txt right.txt // UNIFIED MODE
```

```
--- left.txt 2019-05-03 10:43:35.000000000 -0700
```

```
+++ right.txt 2019-05-03 10:43:47.000000000 -0700
```

```
@@ -1,3 +1,9 @@
```

```
+This is an important
+notice! It should
+therefore be located at
+the beginning of this
+document!
+
+  This part of the
+  document has stayed the
+  same from version to
@@ -8,13 +14,8 @@
+  compress the size of the
+  changes.

-This paragraph contains
-text that is outdated.
-It will be deleted in the
-near future.
-
-  It is important to spell
-check this dokument. On
+check this document. On
+the other hand, a
+misspelled word isn't
+the end of the world.
@@ -22,3 +23,7 @@
+  this paragraph needs to
+  be changed. Things can
+  be added after it.
+
+This paragraph contains
+important new additions
+to this document.
```

CPSC 223C Project 1 – diff (from ed), due Wednesday, 20 Mar 2019

Your name and company name: _____

Repository <https://github.com/>_____ / _____

Verify each of the following items with a corresponding checkmark. Incorrect items will incur a 5% penalty on the grade.

Complete	Incomplete	diff
<input type="checkbox"/>	<input type="checkbox"/>	Researched <code>diff</code> on the Unix man page (<code>type man diff</code>)
<input type="checkbox"/>	<input type="checkbox"/>	Researched <code>diff</code> on (wikipedia https://en.wikipedia.org/wiki/Diff)
<input type="checkbox"/>	<input type="checkbox"/>	Researched <code>regex</code> (regular expressions), and have experimented with using them in <code>ed</code> .
<input type="checkbox"/>	<input type="checkbox"/>	<code>diff -v</code> aka <code>--version</code> (prints version, license, and author (you))
<input type="checkbox"/>	<input type="checkbox"/>	<code>diff -q</code> aka <code>--brief</code> (reports only whether files are different; silent if they are not)
<input type="checkbox"/>	<input type="checkbox"/>	<code>diff -s</code> aka <code>--report-identical-files</code> (reports if files are the same; usual out if they are not)
<input type="checkbox"/>	<input type="checkbox"/>	<code>diff file1 file2</code> aka <code>--normal</code> (default behavior)
<input type="checkbox"/>	<input type="checkbox"/>	<code>diff -y</code> aka <code>--side-by-side</code> (side by side format && prints common lines)
<input type="checkbox"/>	<input type="checkbox"/>	<code>diff -y --left-column</code> (..., prints only the left column of common lines)
<input type="checkbox"/>	<input type="checkbox"/>	<code>diff -y --suppress-common-lines ...</code> (side-by-side but doesn't show common lines)
<input type="checkbox"/>	<input type="checkbox"/>	<code>diff -c NUM</code> aka <code>--context=NUM</code> (shows NUM default 3 lines of copied context)
<input type="checkbox"/>	<input type="checkbox"/>	<code>diff -u NUM</code> aka <code>--unified=NUM</code> (shows NUM default 3 lines of unified context)
<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	Used a header file to prototype all functions in <code>diff.h</code>
<input type="checkbox"/>	<input type="checkbox"/>	Project directory pushed to new GitHub repository listed above using GitHub client.

Your comments