CS 2204: Homework #7

Assigned: October 31, 2005
Date Due: November 7, 2005, before class begins

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1. (10 points) Write a `bash` script called `tree` that takes exactly one argument. This one argument must be a directory. The action of `tree` is to recursively navigate this directory and print the names of files and directories that it encounters. These printings must be prefixed as given below so as to reflect the hierarchical structure of the directory tree.

   For instance, consider the following directory tree rooted at `/home/ramakris/test` (directory names end with a `/`):

```
-executive/
   -Bush
   -Cheney
   -secretaries/
    -Rice
-judiciary/
  -federal_appeals_1/
    -Alito
  -supreme/
    -Roberts
    -Scalia
-legislature/
  -house/
    -Delay
  -senate/
    -Schumer
```

   Running `tree` (from any directory; but giving the `test` directory as input), e.g.,

```
tree /home/ramakris/test
```

   causes the following output:

```
+test
++executive
++-Bush
++-Cheney
+++secretaries
+++-Rice
++judiciary
+++federal_appeals_1
+++-Alito
```

```
+++supreme
+++-Roberts
+++-Scalia
++legislature
+++house
+++-Delay
+++senate
+++-Schumer
```

Note that the given directory is indented with one plus sign. Everything immediately below this directory is indented with two signs. All signs except the last must be a plus sign. The last sign is a plus if the information being printed is a directory, or a minus if it is a regular file. As you descend into directories, the number of signs increases, to reflect the depth of recursion. Note also that the files and directories are listed in exactly the same order as you would encounter them if you recursively traversed the directory system using the `ls` command incrementally.

Note that the information being printed on each line is only the name of the directory/file, not the entire path name. Observe that this is true even for the input argument to `tree`, i.e., even though we invoked `tree` with `/home/ramakris/test`, the printing starts with just "`+tree`". We should be able to get the above output *verbatim* even if we had invoked `tree` as:

```
cd /home/ramakris/test
tree .
```

or,

```
cd /home/ramakris/test/executive
tree ..
```

You may assume that you will have permissions to recursively explore the directory given as argument, so you do not have to worry about file permissions and similar issues.

If `tree` is invoked with an improper number of arguments, the following error message must be output onto the standard error stream. In this case you must exit the script with an error code of 1.

```
tree: Improper argument usage.
```

If `tree`'s argument (say it is `u`) is not really a directory, the following error message must be output onto the standard error stream. In this case you must exit the script with an error code of 2.

```
u is not a directory.
```