Assignment 2: sed

CS3423 - Systems Programming — Steve O'Hara - UTSA

For this assignment, you will use **sed** and **bash** to create a program for formatting C code. Your program should take a source code file as input and apply the following:

- No more than one space between tokens.
- No trailing whitespace after a line.
- Binary operators should always surrounded by a single space on either side (including assignment and Boolean operators). Only the following operators must be accounted for: `+`, `-`, `*`, `/`, `!=`, `=`, `==`, `<=`, `>=`, `<`, `>`, `&&`, `||`, and `^`.
- Conditions should not have whitespace immediately inside of either the opening or closing parentheses. Further, a parenthetical condition should not possess any whitespace preceding it.
- The program should *not* modify spaces which are leading, expanded tabs.
- The program should ensure that each opening curly brace, that does not begin the line it is on (excluding existing whitespace), should have at least one space character preceding it.
- The contents of comments should be left alone. You may behave as though comments (either single- or multi-line) will not appear on lines with source code.

Note: Do to the use of the "<" and ">" "operators" in preprocessor directives, ignore all lines consisting of preprocessor directives (e.g., lines beginning with zero or more whitespace, followed by a hash ("#") character).

Note: Do not be concerned with changes in strings; if any such replacement changes the contents of a string, this need not be corrected for, nor will it be considered an issue.

Hint: All of the above does not need to be done in a single pass.

This assignment requires only sed and bash. **Do not** use awk, Python, or any other languages/utilities.

Example

In the code below, underscores (_) represent spaces in the source code. Note that there are no changes to comments or pre-processor directives (i.e. #include) lines.

Input (inputProgram.c):

```
1  /**
2  author:_____some_student
3  **/
4  #include_<stdio.h>
5
6  int_main()_{
7  ____int_numberIn;
8
9  ____printf("Enter_a_number:_");
10
11 ____scanf("%d",_&numberIn);__
12
13 ____if_(_numberIn_>_10_)_{
14 ____//____add__two
15 ________return_numberIn_+__2;
16 ____}_else___if____(numberIn<___5){
17 ____//____subtract_two___
18 ________return__numberIn_-_2;
19
20 ____int____isNumOdd__=_numberIn__%__2;
21
22 ____return__numberIn*2;
23 }
```

Output (outputProgram.c):

```
/**
author:_____some_student
**/
#include_<stdio.h>

int_main()_{
____int_numberIn;

____printf("Enter_a_number:_");

____scanf("%d",_&numberIn);

____if(numberIn_>_10)_{
____//____add__two
________return_numberIn_+_2;
____}_else_if(numberIn_<_5)_{
____//____subtract_two___
________return_numberIn_-_2;

____int_isNumOdd_=_numberIn_%_2;

____return_numberIn_*_2;
}
```

Script Execution

Your program should be invoked through a single bash file (see below) with the path to the input program as the argument. The resulting output file should be printed directly to stdout.

```
$ assign2.bash /path/to/input.txt
```

Assignment Data

A sample input file can be found in:
`/usr/local/courses/ssilvestro/cs3423/Spring20/assign2`.

Script Files

Your program should consist of *at least* two files:

- **`assign2.bash`** - the main file which is initially invoked
- *At least* one **`.sed`** file which is used for a sed invocation run in **`assign2.bash`**. Each sed invocation should have its own **`.sed`** file which may contain multiple sed commands.

For example, your submission may include **`assign2.bash`**, **`command1.sed`**, **`command2.sed`**, ..., **`command`**N**`.sed`** where each **`.sed`** file correspond to sed invocations within **`assign2.bash`**.

Verifying Your Program

Your program must work for *any arbitrary input files* by applying the rules above. You can test your program with the input provided in **`inputProgram.c`** and compare the output with **`outputProgram.c`** using **`diff`** (check the man-pages on how to use the **`diff`** command to your requirements).

Submission

Turn your assignment in via Blackboard. Your zip file, named **`a2-`***`abc123`***`.zip`** should contain only your bash and sed files.