CS2123 Program #1 Infix to Postfix (30 points)

Convert queries that are in infix notation to postfix notation. The queries might contain parentheses and these operators: AND, OR, =, NOTANY, ONLY

Examples:

* 1. SMOKING = N AND GENDER = F 🡺   
     SMOKING N = GENDER F = AND
  2. SMOKING = N AND ( EXERCISE = HIKE OR EXERCISE = BIKE ) 🡺  
     SMOKING N = EXERCISE HIKE = EXERCISE BIKE = OR AND
  3. GENDER = F AND EXERCISE NOTANY YOGA 🡺

GENDER F = EXERCISE YOGA NOTANY AND

* 1. SMOKING = N AND EXERCISE = HIKE OR EXERCISE = BIKE 🡺  
     SMOKING N = EXERCISE HIKE = AND EXERCISE BIKE = OR
  2. ( BOOK = SCIFI ) 🡺 BOOK SCIFI =
  3. ( ( ( BOOK ONLY SCIFI ) ) ) 🡺 BOOK SCIFI ONLY

Precedence rules:

* Evaluate contents in () before others - Highest precedence
* =, NOTANY, ONLY
* AND, OR - Lowest precedence

Some Files for your use:

cs2123p1Input.txt - input queries, one per text line.

cs2123p1.h - include file for Program #1.

cs2123p1Driver.c - driver programmer that I provided. It has several useful routines to help reduce your effort. Please review this code.

Your coding:

* Create your code in **cs2123p1.c** (not cs2123p1Driver.c). Based on what the driver calls, you need to create (at least) this function:

int convertToPostFix(char \*pszInfix, Out out)

It returns 0 if it converted successfully. Otherwise, it returns a value which indicates an error in

the infix data (e.g., missing left paren, missing right paren)

It populates the out array using the addOut function (provided in the driver).

* To compile the driver use (producing cs2123p1Driver.o):

gcc -g -c -o cs2123p1Driver.o cs2123p1Driver.c

* To compile your program and link it with the driver, producing the executable named p1:

gcc -g -o p1 cs2123p1Driver.o cs2123p1.c

* To execute your program p1:

./p1 < cs2123p1Input.txt

Requirements:

1. Your code must be written according to my programming standards.
2. You should not have to modify cs2123p1Driver.c. If you want to modify it, please see me before you do that.
3. Turn in your C code, include files, and output generated using the specified input file.
4. The output should show a warning for each poorly formed query, but do not terminate the program (simply skip to the next query).
5. Make certain you free up allocated memory (e.g., stack).
6. Modularity matters.

Hint:

The functions **getToken** and **categorize** are provided in the cs2123p1Driver.c. These can greatly simplify your code.

Meaning of the =, NOTANY, and ONLY Operators

* This information is much more important for program #2.
* The "=" operator is interpretted as "at least one". "EXERCISE = HIKE" means at least one of the EXERCISE traits must be HIKE. There can also be other EXERCISEs that are not HIKE for the customer.
* The NOTANY operator means that the specified trait must not exist for the customer. If a customer had the traits EXERCISE HIKE and EXERCISE YOGA, do not include the customer in the result when the query specifies EXERCISE NOTANY YOGA.
* The ONLY operator means that the specified trait value is the only value allowed for the specified trait type. If the customer has other trait values for the specified trait type, do not include the customer in the result.