CS 502 – Fall 2012

Programming Assignment 2 (Homework 3)

Deadline: Wednesday, September 19, 2012, 11:59 pm

1. Write a YACC program to answer "YES" or "NO" for each simple query. The requirement is as follows.

a. A simple text file named "database.txt" will be provided. In this file, each line is a **nonnegative integer**, and there are at most **20** lines. Students' YACC program should first read those integers from this file and store it in an array.

b. The YACC program will then parse **ANY** number of **queries** (defined in the next bullet) entered from the terminal, until meeting the end of file, i.e. control D (ctrl+D). For each query, if it evaluates to true, then the YACC program will print **YES**. Otherwise the YACC program should print **NO**.

c. **A query** is in the form of a boolean expression as listed below, where $ denotes end of file:

Q -> bexpr $
bexpr -> bexpr **or** bterm | bterm
bterm -> bterm **and** bfactor | bfactor
bfactor -> **not** bfactor | **(** bexpr **)** | E relop E
relop -> > | < | == | >= | <= | **!=**
E -> INT | **line** INT | **(**E**)** | E **+** E | E **–** E| E ***** E| E / E

Note 1: The above is a grammar only for **ONE** query. When you write your YACC program, you need to modify it to accept an arbitrary number of queries. Different queries are separated by newlines. That is, one line for each query.

Note 2: The grammar shown above has terminals listed below (quoted)

"or", "and", "not", "(", ")", ">", "<","==" , ">=" , "<=" , "!=","+","-" , "*" , "/",and "line".

Note 3: "or", "and", "not" are Boolean operators.

Note 4: "INT" is any nonnegative integer, that is, a sequence of decimal digits.

Note 5: "line INT" represents the number which originally appears in the INTth line in "database.txt" file. For example, the number in the first line should be represented by "line 1", and "line 10" represents the number in the 10th line. That is, there is **NO** "line 0".

Note 6: If needed, to remove parsing conflicts, e.g., the production rules for E can be modified without changing the set of queries to be accepted.

2. Submission instruction

1) No offline submission will be accepted.

2) Use the following command at XINU machines (i.e., xinu01.cs ~ xinu20.cs) to submit your homework.

turnin –c cs502 –p pa2 [your working directory]

3) You **MUST** provide 'Makefile' for every programming question.

a. For example, your 'Makefile' of this assignment **may** look like

```
hw2:y.tab.c lex.yy.c
        gcc y.tab.c lex.yy.c -o hw2 -lfl
y.tab.c : hw2.y
        bison -y -d -g --verbose hw2.y
lex.yy.c:hw2.l
        lex hw2.l
clean:
        rm -f lex.yy.c y.tab.c
```

4) Your program **MUST** compile and run without any error at XINU machines. Please make sure your Makefile and program runs properly at XINU machines.

5) Any special instruction (if needed) for running your program should be included in the file named 'README'. By default, TA assumes your program could be run like this:

> ./hw2 database.txt

Where hw2 is your excusable file after compilation, and "database.txt" is the file name which is mentioned in Part 1, section a.

You may find information on the following links useful:

http://ds9a.nl/lex-yacc/cvs/lex-yacc-howto.html