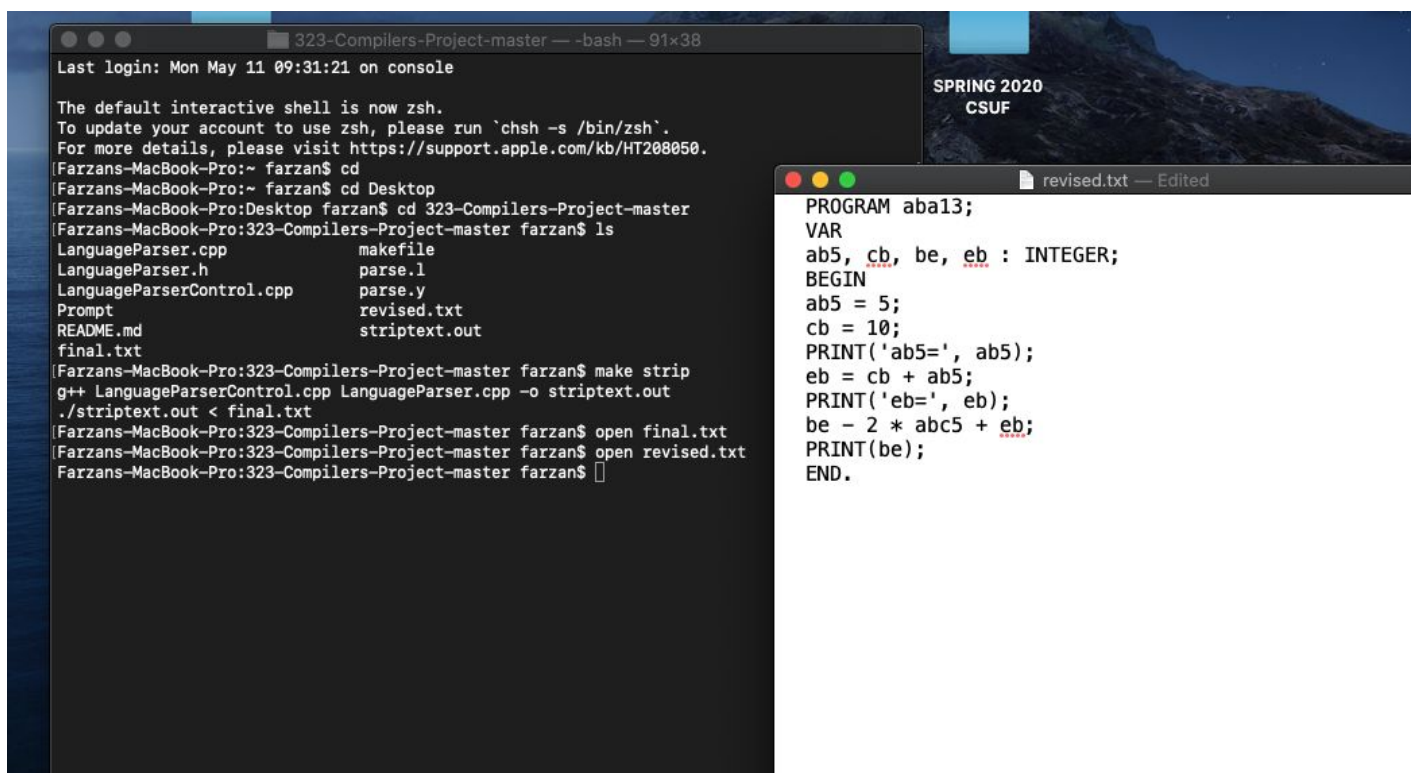


Final Project - 323 Compilers

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The original text file, 'final.txt' is entered into the parser. The command make strip will take the file and delete all of the whitespaces and comments. The resulting text file, "revised.txt", is shown below.



The screenshot shows a terminal window on the left and a text editor on the right. The terminal window is titled "323-Compilers-Project-master" and shows the following commands and output:

```
Last login: Mon May 11 09:31:21 on console

The default interactive shell is now zsh.
To update your account to use zsh, please run `chsh -s /bin/zsh`.
For more details, please visit https://support.apple.com/kb/HT208050.
Farzans-MacBook-Pro:~ farzan$ cd
Farzans-MacBook-Pro:~ farzan$ cd Desktop
Farzans-MacBook-Pro:Desktop farzan$ cd 323-Compilers-Project-master
Farzans-MacBook-Pro:323-Compilers-Project-master farzan$ ls
LanguageParser.cpp      makefile
LanguageParser.h        parse.l
LanguageParserControl.cpp  parse.y
Prompt                  revised.txt
README.md               striptext.out
final.txt
Farzans-MacBook-Pro:323-Compilers-Project-master farzan$ make strip
g++ LanguageParserControl.cpp LanguageParser.cpp -o striptext.out
./striptext.out < final.txt
Farzans-MacBook-Pro:323-Compilers-Project-master farzan$ open final.txt
Farzans-MacBook-Pro:323-Compilers-Project-master farzan$ open revised.txt
Farzans-MacBook-Pro:323-Compilers-Project-master farzan$
```

The text editor on the right is titled "revised.txt" and shows the following code:

```
PROGRAM aba13;
VAR
  ab5, cb, be, eb : INTEGER;
BEGIN
  ab5 = 5;
  cb = 10;
  PRINT('ab5=', ab5);
  eb = cb + ab5;
  PRINT('eb=', eb);
  be = 2 * abc5 + eb;
  PRINT(be);
END.
```

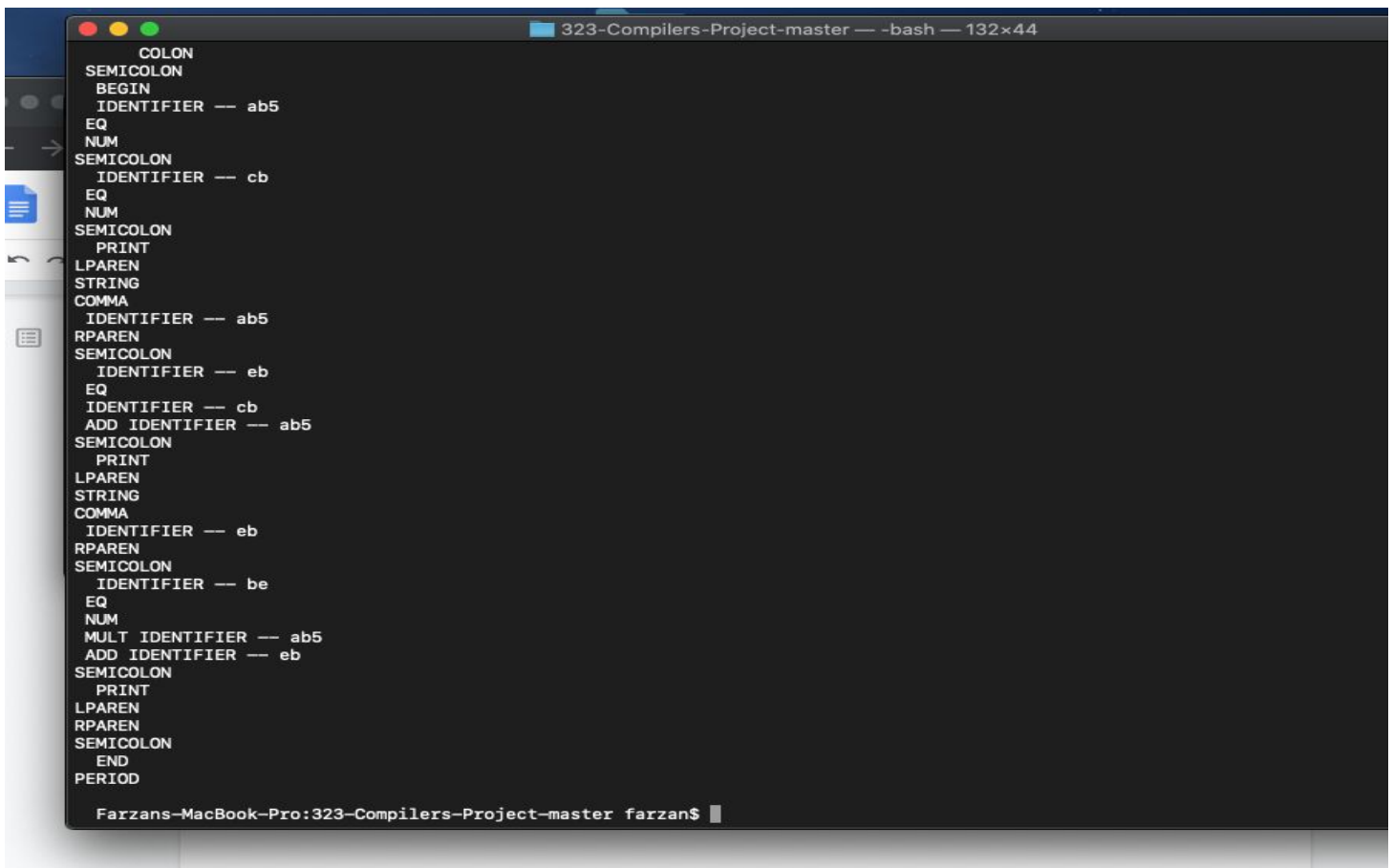
We then run the command 'make parse' to run the 'revised.txt' through flex/bison. It is shown below that 'revised.txt' originally had syntax errors. Below, it is determined that the first error encountered is at the 10th line that starts with "be - 2". Below is the output

```
323-Compilers-Project-master — -bash — 132x44
parse.y:85.1-3: warning: useless nonterminal: div
parse.y:79.17-40: warning: useless rule: add: ADD
parse.y:81.17-42: warning: useless rule: subtr: SUBT
parse.y:83.17-42: warning: useless rule: mult: mult
parse.y:85.17-40: warning: useless rule: div: DIV
parse.y: conflicts: 24 shift/reduce
gcc lex.yy.c parse.tab.c -o parse.out
./parse.out < revised.txt
PROGRAM Program name aba13 SEMICOLON
VAR
    COLON
SEMICOLON
BEGIN
    IDENTIFIER -- ab5
EQ
    NUM
SEMICOLON
    IDENTIFIER -- cb
EQ
    NUM
SEMICOLON
    PRINT
LPAREN
    STRING
    COMMA
    IDENTIFIER -- ab5
    RPAREN
SEMICOLON
    IDENTIFIER -- eb
EQ
    IDENTIFIER -- cb
    ADD IDENTIFIER -- ab5
SEMICOLON
    PRINT
LPAREN
    STRING
    COMMA
    IDENTIFIER -- eb
    RPAREN
SEMICOLON
    IDENTIFIER -- be
Error! EQ = is missing
make: *** [parse] Error 1
Farzans-MacBook-Pro:323-Compilers-Project-master farzan$
```

This error occurred because in that line, rather than “b - 2” it expected “b = 2”. After changing it, the next error encountered is shown below.

```
parse.y:85:17: 40: warning: useless rule: div: DIV
parse.y: conflicts: 24 shift/reduce
gcc lex.yy.c parse.tab.c -o parse.out
./parse.out < revised.txt
PROGRAM Program name aba13 SEMICOLON
VAR
    COLON
SEMICOLON
BEGIN
    IDENTIFIER -- ab5
EQ
NUM
SEMICOLON
    IDENTIFIER -- cb
EQ
NUM
SEMICOLON
    PRINT
LPAREN
STRING
COMMA
    IDENTIFIER -- ab5
RPAREN
SEMICOLON
    IDENTIFIER -- eb
EQ
    IDENTIFIER -- cb
    ADD IDENTIFIER -- ab5
SEMICOLON
    PRINT
LPAREN
STRING
COMMA
    IDENTIFIER -- eb
RPAREN
SEMICOLON
    IDENTIFIER -- be
EQ
NUM
MULT UNKNOWN IDENTIFIER
make: *** [parse] Error 1
Farzans-MacBook-Pro:323-Compilers-Project-master farzan$
```

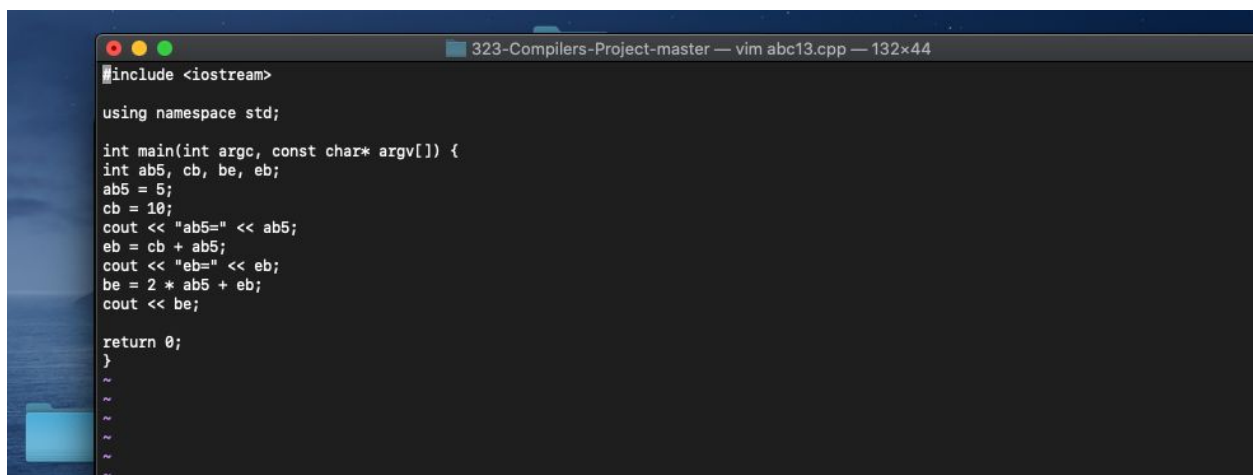
Because the **identifier** “abc5” in the same line was not declared earlier, it is unknown. Instead, it should be “ab5”. After changing it, the results are shown below, resulting in no errors, therefore the parse is complete with the last token accepted being a **PERIOD**.



```
COLON
SEMICOLON
BEGIN
IDENTIFIER -- ab5
EQ
NUM
SEMICOLON
IDENTIFIER -- cb
EQ
NUM
SEMICOLON
PRINT
LPAREN
STRING
COMMA
IDENTIFIER -- ab5
RPAREN
SEMICOLON
IDENTIFIER -- eb
EQ
IDENTIFIER -- cb
ADD IDENTIFIER -- ab5
SEMICOLON
PRINT
LPAREN
STRING
COMMA
IDENTIFIER -- eb
RPAREN
SEMICOLON
IDENTIFIER -- be
EQ
NUM
MULT IDENTIFIER -- ab5
ADD IDENTIFIER -- eb
SEMICOLON
PRINT
LPAREN
RPAREN
SEMICOLON
END
PERIOD

Farzans-MacBook-Pro:323-Compilers-Project-master farzan$
```

The following cpp program, “abc13.cpp” is produced.



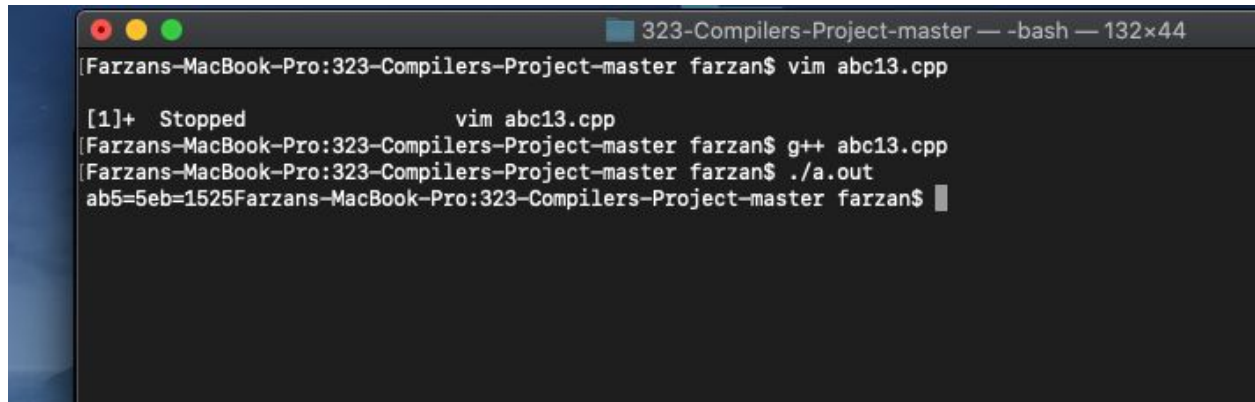
```
#include <iostream>

using namespace std;

int main(int argc, const char* argv[]) {
    int ab5, cb, be, eb;
    ab5 = 5;
    cb = 10;
    cout << "ab5=" << ab5;
    eb = cb + ab5;
    cout << "eb=" << eb;
    be = 2 * ab5 + eb;
    cout << be;

    return 0;
}
```

After compiling and running the code through command line, the following output is produced

A terminal window titled "323-Compilers-Project-master — -bash — 132x44" is shown. The prompt is "Farzans-MacBook-Pro:323-Compilers-Project-master farzan\$". The user enters "vim abc13.cpp", which opens the file in vim. The user presses [1]+ to stop vim, then enters "g++ abc13.cpp" to compile the program. Finally, the user enters "./a.out" to run the program, which outputs "ab5=5eb=1525" to the terminal.

```
Farzans-MacBook-Pro:323-Compilers-Project-master farzan$ vim abc13.cpp
[1]+  Stopped                  vim abc13.cpp
Farzans-MacBook-Pro:323-Compilers-Project-master farzan$ g++ abc13.cpp
Farzans-MacBook-Pro:323-Compilers-Project-master farzan$ ./a.out
ab5=5eb=1525Farzans-MacBook-Pro:323-Compilers-Project-master farzan$
```

Incase it is hard to see it is :

ab5=5eb=1525