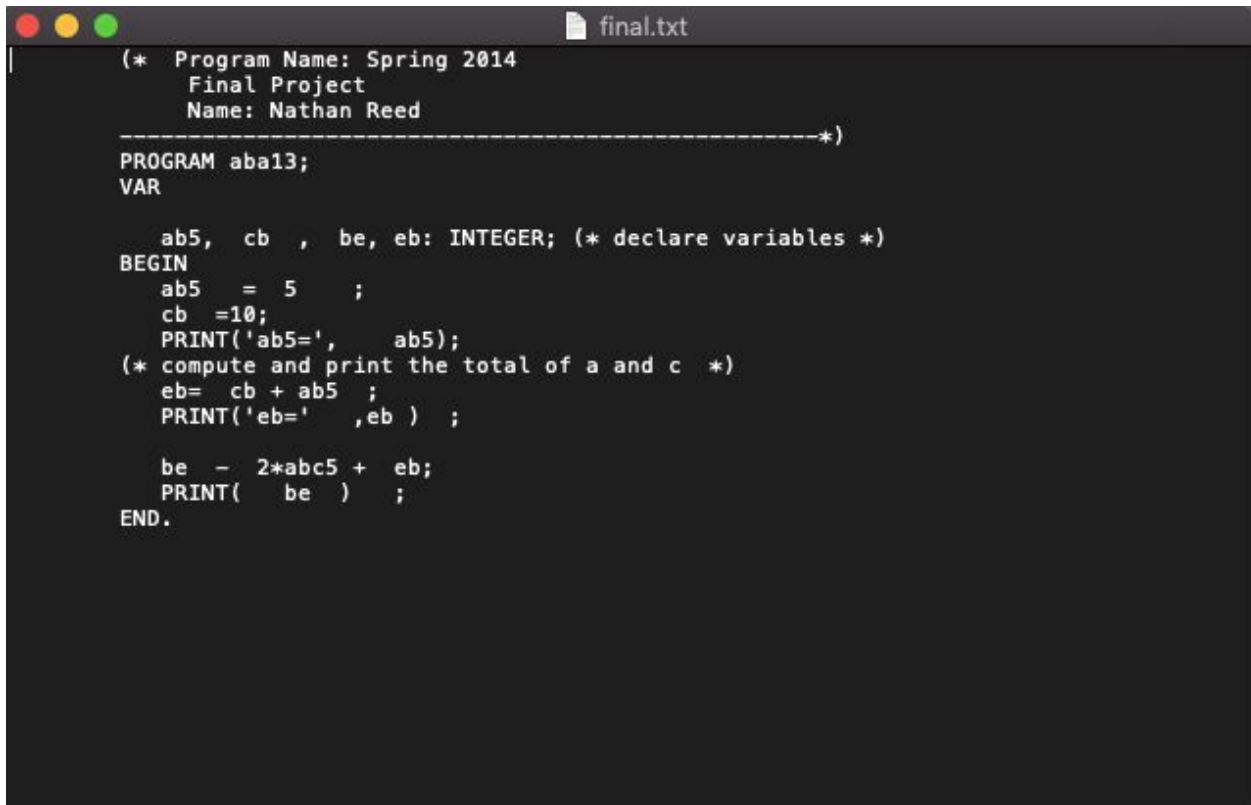


The original input file



```
(* Program Name: Spring 2014
   Final Project
   Name: Nathan Reed
   -----*)
PROGRAM aba13;
VAR

    ab5, cb , be, eb: INTEGER; (* declare variables *)
BEGIN
    ab5 = 5 ;
    cb =10;
    PRINT('ab5=', ab5);
    (* compute and print the total of a and c *)
    eb= cb + ab5 ;
    PRINT('eb=' ,eb ) ;

    be = 2*ab5 + eb;
    PRINT( be ) ;
END.
```

Is entered into the LanguageParser. What is produced is **revised.txt**, appearing as follows:



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

This **revised.txt** is run through Flex/Bison. (Note: this original **revised.txt** purposely has syntax errors)

The first error encountered is at the line "**be - 2 * abc5 + eb;**" and is found. This is the output:

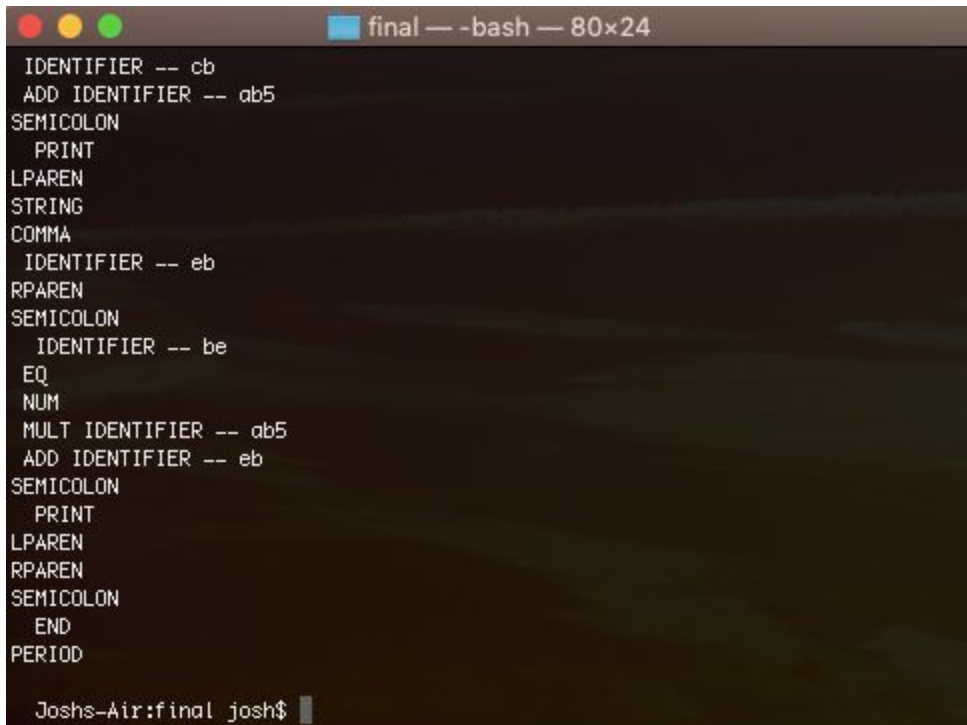
```
final — -bash — 80x24
SEMICOLON
  PRINT
LPAREN
STRING
COMMA
  IDENTIFIER -- ab5
RPAREN
SEMICOLON
  IDENTIFIER -- eb
EQ
  IDENTIFIER -- cb
  ADD IDENTIFIER -- ab5
SEMICOLON
  PRINT
LPAREN
STRING
COMMA
  IDENTIFIER -- eb
RPAREN
SEMICOLON
  IDENTIFIER -- be
Error! EQ = is missing
make: *** [parse] Error 1
Josh-Air:final josh$
```

This is because what was expected begins with "**be =**" rather than "**be -**".

After changing the line to "**be = 2 * abc5 + eb;**", this is the next error caught:

```
final — -bash — 80x24
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
Josh-Air:final josh$
```

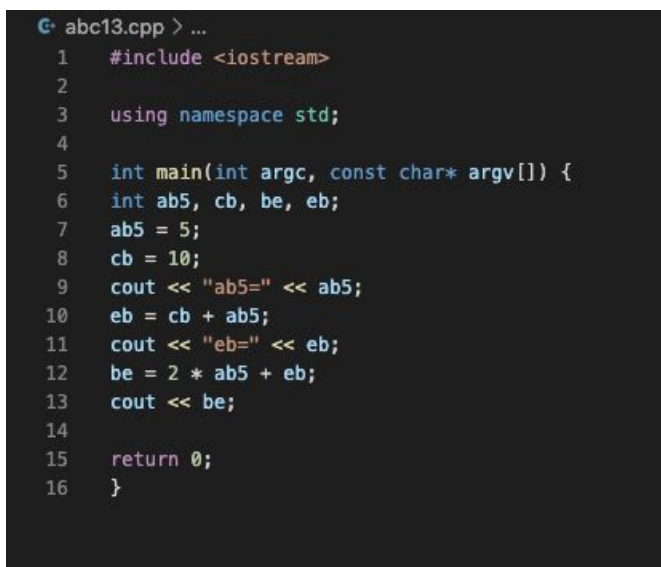
This is because the identifier **abc5** in "**be = 2 * abc5 + eb**" is **unknown** – it was not declared earlier in the identifier declaration list. What it *should* be is **ab5** rather than **abc5**. After changing it, this is what is produced:



```
final — -bash — 80x24
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

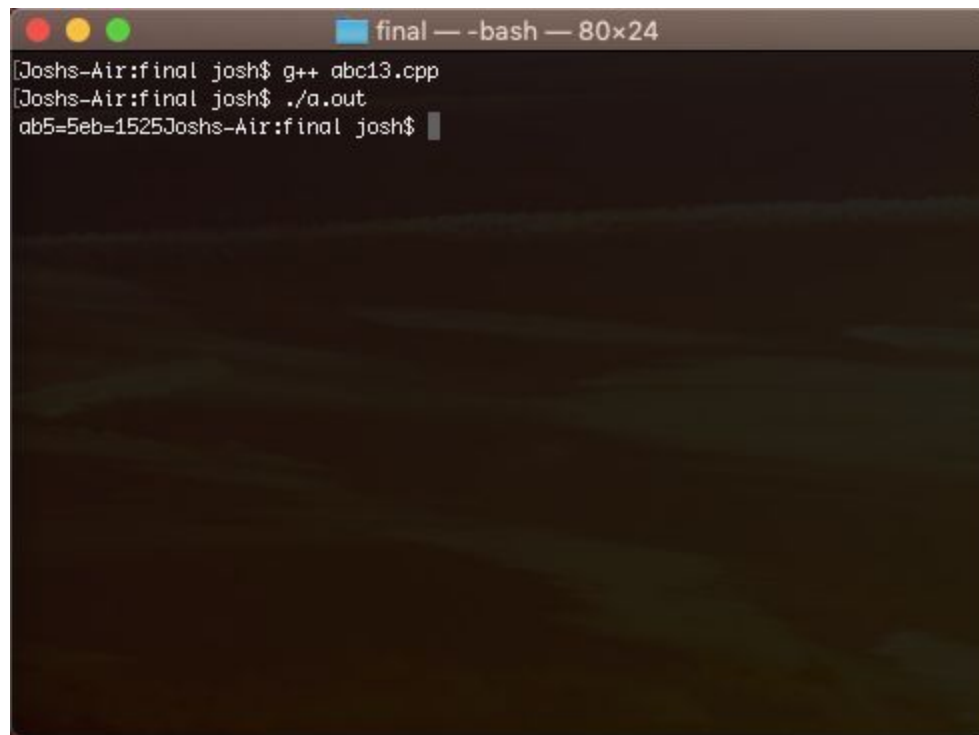
Joshs-Air:final josh$
```

The last token accepted is a **PERIOD** (the last line the grammar accepts is "**END.**"), thus indicating that the parse is complete and no errors are found. Since there are no errors, the file **abc13.cpp** is produced, and appears as follows:



```
abc13.cpp > ...
1  #include <iostream>
2
3  using namespace std;
4
5  int main(int argc, const char* argv[]) {
6  int ab5, cb, be, eb;
7  ab5 = 5;
8  cb = 10;
9  cout << "ab5=" << ab5;
10 eb = cb + ab5;
11 cout << "eb=" << eb;
12 be = 2 * ab5 + eb;
13 cout << be;
14
15 return 0;
16 }
```

Compiling and running this code will appear as follows:

A terminal window titled "final — -bash — 80x24" with standard macOS window controls (red, yellow, green buttons). The terminal shows the following commands and output:

```
[Josh-Air:final josh$ g++ abc13.cpp  
[Josh-Air:final josh$ ./a.out  
ab5=5eb=1525Josh-Air:final josh$ ]
```