BÁO CÁO THỰC HÀNH XÂY DỰNG CHƯƠNG TRÌNH DỊCH – IT3323

BÀI 1: PHÂN TÍCH TỪ VỰNG

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Mục lục:

Hình ảnh:

1. Nội dung đã sửa

File scanner.c đã sửa:

```
26 Token* getToken(void)
27 {
28   Token *token;
29   switch(state)
30   {
31   case 0:
32     if (currentChar == EOF) state =1;
33     else
34     switch (charCodes[currentChar])
35     {
36       case CHAR_SPACE:
37         state =2;break;
38       case CHAR_LETTER:
39         ln=lineNo;
40       cn=colNo;
41       state =3;
42       break;
43       case CHAR_DIGIT:
44         state =7;
45       break;
46       case CHAR_PLUS:
47         state =9;
48       break;
49       case CHAR_MINUS:
50         state =10;
51       break;
52       case CHAR_TIMES:
```

```
        state =11;
      break;
      case CHAR_SLASH:
        state =12;
      break;
      case CHAR_LT:
        state =13;
      break;
      case CHAR_GT:
        state= 16;
      break;
      case CHAR_EQ:
        state =19;
      break;
      case CHAR_EXCLAIMATION:
        state = 20;
      break;
      case CHAR_COMMA:
        state =23;
      break;
      case CHAR_PERIOD:
        state =24;
      break;
```

```
      case CHAR_SEMICOLON:
        state=27;
      break;
      case CHAR_COLON:
        state =28;
      break;
      case CHAR_SINGLEQUOTE:
        state =31;
      break;
    case CHAR_LPAR:
      state = 35;
      break;
      case CHAR_RPAR:
        state= 42;
      break;
      default:
        state=43;
    }
  return getToken();
  case 1:
    return makeToken(TK_EOF, lineNo, colNo);
  case 2:
    readChar();
    state = 0;
    return getToken();
```

```
case 3:
  ln = lineNo;
  cn = colNo;
  int count = 1;
  str[0] = (char)currentChar;
  readChar();
  while ((currentChar != EOF) && ((charCodes[currentChar] == CHAR_LETTER) || (charCodes[currentChar] == CHAR_DIGIT))) {
    if (count < MAX_IDENT_LEN) str[count++] = (char)currentChar;
    else {
      while ((currentChar != EOF) && ((charCodes[currentChar] == CHAR_LETTER) || (charCodes[currentChar] == CHAR_DIGIT))) {
        readChar();
      }
      error(ERR_IDENTTOOLONG, ln, cn);
      token = makeToken(TK_NONE, ln, cn);
      return token;
    }
    readChar();
  }
  str[count] = '\0';
  state = 4;
  return getToken();
case 4:
  int checkKeyW = checkKeyword(str);
  if (checkKeyW == TK_NONE) state = 5; else state = 6;
  return getToken();
case 5:
  token = makeToken(TK_IDENT, ln, cn);
  strcpy(token->string, str);
  return token;
case 6:
  token = makeToken(checkKeyword(str), ln, cn);
  return token;
```

```
case 7:
  ln = lineNo;
  cn = colNo;
  int idx = 0;
  char string[11];
  while (currentChar == '0') readChar();
  while (currentChar != EOF && charCodes[currentChar] == CHAR_DIGIT) {
    if (idx >= 10) {
      while (currentChar != EOF && charCodes[currentChar] == CHAR_DIGIT) readChar();
      error(ERR_NUMBERTOOLONG, ln, cn);
      return makeToken(TK_NONE, ln, cn);
    }
    string[idx++] = currentChar;
    readChar();
  }
  string[idx] = '\0';
  token = makeToken(TK_NUMBER, ln, cn);
  if (idx == 0) strcpy(token->string, "0");
  else strcpy(token->string, string);
  return token;
case 9:
readChar();
  return makeToken(SB_PLUS, lineNo, colNo-1);
case 10:
  token = makeToken(SB_MINUS, lineNo, colNo);
  readChar();
```

```
    return token;
  case 11:
    token = makeToken(SB_TIMES, lineNo, colNo);
    readChar();
    return token;
  case 12:
    token = makeToken(SB_SLASH, lineNo, colNo);
    readChar();
    return token;
  case 13:
    readChar();
    if (charCodes[currentChar] == CHAR_EQ) state = 14; else state =15;
  return getToken();
  case 14:
  readChar();
  return makeToken(SB_LE, lineNo, colNo-1);
  case 15:
  return makeToken(SB_LT, lineNo, colNo-1);
  case 16:
    readChar();
    if ((currentChar != EOF) && (charCodes[currentChar] == CHAR_EQ)) state = 17; else state = 18;
    return getToken();
  case 17:
    token = makeToken(SB_GE, lineNo, colNo);
    readChar();
    return token;
```

```
  case 18:
    token = makeToken(SB_GT, lineNo, colNo);
    readChar();
    return token;
  case 19:
    token = makeToken(SB_EQ, lineNo, colNo);
    readChar();
    return token;
  case 20:
    ln = lineNo;
    cn = colNo;
    readChar();
    if ((currentChar != EOF) && (charCodes[currentChar] == CHAR_EQ)) state = 21; else state = 22;
    return getToken();
  case 21:
    readChar();
    return makeToken(SB_NEQ, ln, cn);
  case 22:
    token = makeToken(TK_NONE, lineNo, colNo-1);
    error(ERR_INVALIDSYMBOL, token->lineNo, token->colNo);
    return token;
  case 23:
    token = makeToken(SB_COMMA, lineNo, colNo);
    readChar();
    return token;
  case 24:
```

```
211       readChar();
212       if ((currentChar != EOF) && (charCodes[currentChar] == CHAR_RPAR)) state = 25; else state = 26;
213       return getToken();
214     case 25:
215       token = makeToken(SB_RSEL, lineNo, colNo - 1);
216       readChar();
217       return token;
218     case 26:
219       token = makeToken(SB_PERIOD, lineNo, colNo - 1);
220       readChar();
221       return token;
222     case 27:
223       token = makeToken(SB_SEMICOLON, lineNo, colNo);
224       readChar();
225       return token;
226     case 28:
227       readChar();
228       if ((currentChar != EOF) && (charCodes[currentChar] == CHAR_EQ)) state = 29; else state = 30;
229       return getToken();
230     case 29:
231       token = makeToken(SB_ASSIGN, lineNo, colNo - 1);
232       readChar();
233       return token;
234     case 30:
235       return makeToken(SB_COLON, lineNo, colNo - 1);
236     case 31:
237       ln = lineNo;
```

```
238       cn = colNo;
239       readChar();
240       if (currentChar == EOF)
241         state=34;
242         else
243         if(isprint(currentChar))
244             state =32;
245           else state =34;
246         return getToken();
247      case 32:
248     c= currentChar;
249       readChar();
250       if (charCodes[currentChar] == CHAR_SINGLEQUOTE)
251           state=33;
252       else
253         state =34;
254         return getToken();
255     case 33:
256       token = makeToken(TK_CHAR, ln, cn);
257       token->string[0] =c;
258       token->string[1] ='\0';
259       readChar();
260       return token;
261     case 34:
262       error(ERR_INVALIDCHARCONSTANT, lineNo, colNo-2);
263       return makeToken(TK_NONE, lineNo, colNo-2);
```

```
264     case 35: // tokens begin with lpar, skip comments
265       ln = lineNo;
266       cn = colNo;
267       readChar();
268       if (currentChar == EOF)
269       state=41;
270       else
271         switch (charCodes[currentChar])
272       {
273           case CHAR_PERIOD:
274               state =36;
275           break;
276           case CHAR_TIMES:
277             state =38;
278           break;
279               default:state =41;
280           }
281       return getToken();
282
283     case 36:
284       token = makeToken(SB_LSEL, lineNo, colNo - 1);
285       readChar();
286       return token;
287     case 37:
288       while ((currentChar != EOF) && (charCodes[currentChar] != CHAR_TIMES)) readChar();
289       if (currentChar == EOF) state = 40; else state = 38;
```

```
290       return getToken();
291     case 38:
292       while ((currentChar != EOF) && (charCodes[currentChar] == CHAR_TIMES)) readChar();
293       if (currentChar == EOF) state = 40; else if (charCodes[currentChar] == CHAR_RPAR) state = 39; else state = 37;
294       return getToken();
295     case 39:
296       state = 0;
297       readChar();
298       return getToken();
299     case 40:
300       error(ERR_ENDOFCOMMENT, lineNo, colNo);
301     case 41:return makeToken(SB_LPAR, ln, cn);
302     case 42:
303       token = makeToken(SB_RPAR, lineNo, colNo);
304       readChar();
305       return token;
306   case 43:
307       token = makeToken(TK_NONE, lineNo, colNo);
308       error(ERR_INVALIDSYMBOL, lineNo, colNo);
309       readChar();
310       return token;
311   }
312   }
```

Figure 1: File "scanner.c" đã chỉnh sửa

2. Kết quả thực hiện với example1, example2, example3

- *Kết quả thực hiện với example1.kpl:*

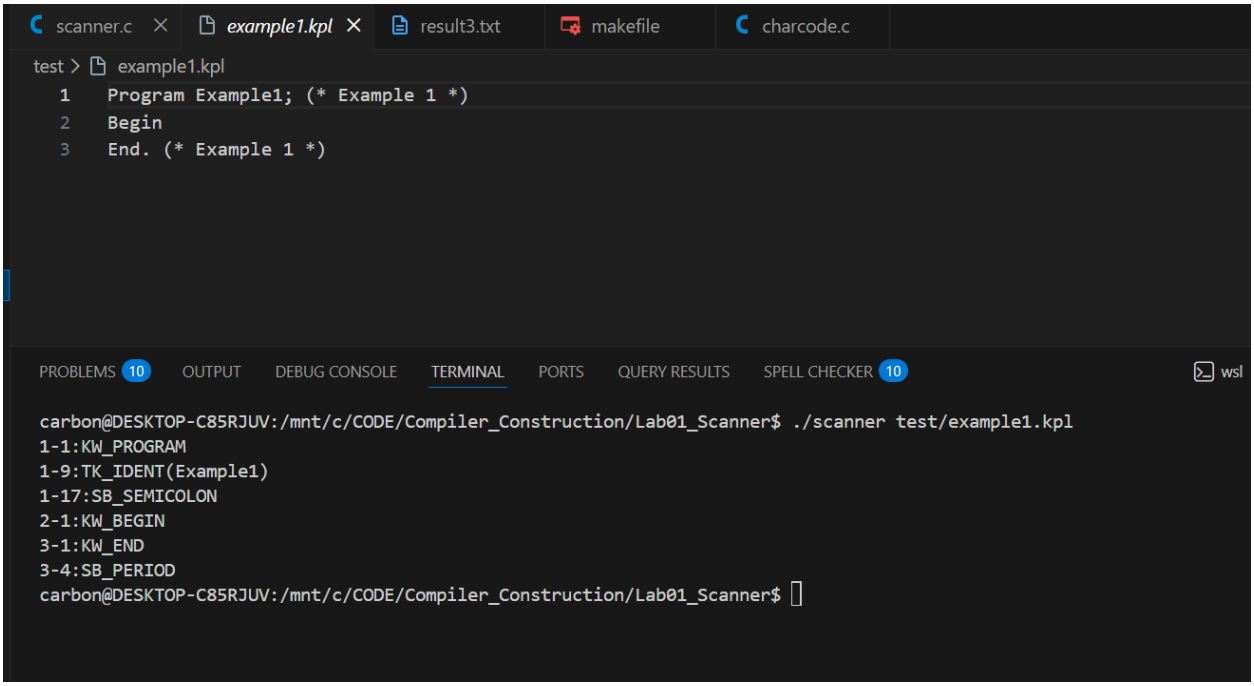


Figure 2: Kết quả thực hiện với example1.kpl

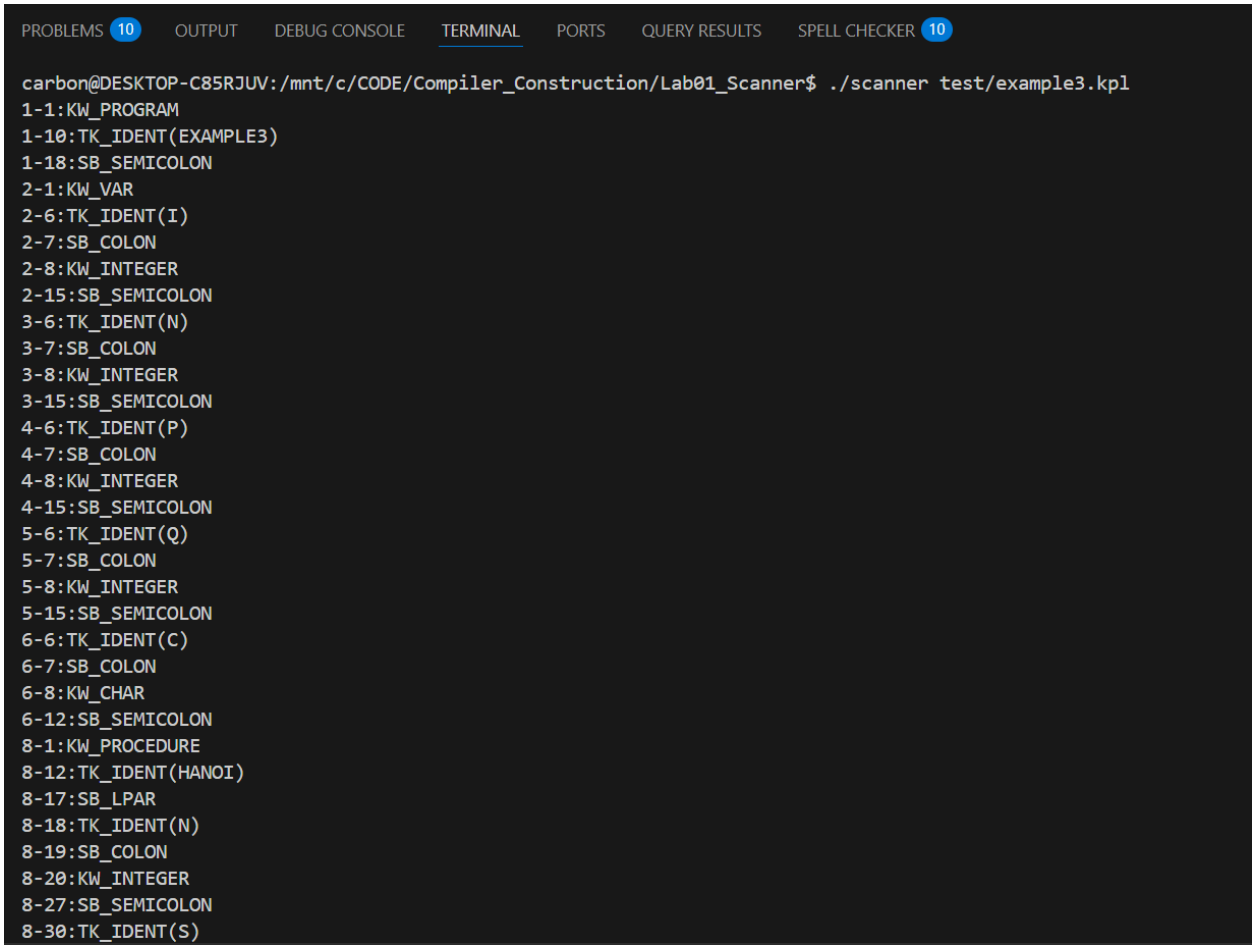
- *Kết quả thực hiện với example2.kpl:*

```
carbon@DESKTOP-C85RJUV:/mnt/c/CODE/Compiler_Construction/Lab01_Scanner$ ./scanner test/example2.kpl
1-1:KW_PROGRAM
1-9:TK_IDENT(Example2)
1-17:SB_SEMICOLON
3-1:KW_VAR
3-5:TK_IDENT(n)
3-7:SB_COLON
3-9:KW_INTEGER
3-16:SB_SEMICOLON
5-1:KW_FUNCTION
5-10:TK_IDENT(F)
5-11:SB_LPAR
5-12:TK_IDENT(n)
5-14:SB_COLON
5-16:KW_INTEGER
5-23:SB_RPAR
5-25:SB_COLON
5-27:KW_INTEGER
5-34:SB_SEMICOLON
6-3:KW_BEGIN
7-5:KW_IF
7-8:TK_IDENT(n)
7-10:SB_EQ
7-12:TK_NUMBER(0)
7-14:KW_THEN
7-19:TK_IDENT(F)
7-21:SB_ASSIGN
7-24:TK_NUMBER(1)
7-26:KW_ELSE
7-31:TK_IDENT(F)
7-33:SB_ASSIGN
7-36:TK_IDENT(N)
7-38:SB_TIMES
```

```
7-40:TK_IDENT(F)
7-42:SB_LPAR
7-43:TK_IDENT(N)
7-45:SB_MINUS
7-47:TK_NUMBER(1)
7-48:SB_RPAR
7-49:SB_SEMICOLON
8-3:KW_END
8-6:SB_SEMICOLON
10-1:KW_BEGIN
11-3:KW_FOR
11-7:TK_IDENT(n)
11-9:SB_ASSIGN
11-12:TK_NUMBER(1)
11-14:KW_TO
11-17:TK_NUMBER(7)
11-19:KW_DO
12-5:KW_BEGIN
13-7:KW_CALL
13-12:TK_IDENT(WriteLn)
13-19:SB_SEMICOLON
14-7:KW_CALL
14-12:TK_IDENT(WriteI)
14-18:SB_LPAR
14-20:TK_IDENT(F)
14-21:SB_LPAR
14-22:TK_IDENT(i)
14-23:SB_RPAR
14-24:SB_RPAR
14-25:SB_SEMICOLON
15-5:KW_END
15-8:SB_SEMICOLON
16-1:KW_END
16-4:SB_PERIOD
carbon@DESKTOP-C85RJUV:/mnt/c/CODE/Compiler_Construction/Lab01_Scanner$
```

Figure 3: Kết quả thực hiện với example2.kpl

- *Kết quả thực hiện với example3.kpl:*


PROBLEMS 10
OUTPUT
DEBUG CONSOLE
TERMINAL
PORTS
QUERY RESULTS
SPELL CHECKER 10
carbon@DESKTOP-C85RJUV:/mnt/c/CODE/Compiler_Construction/Lab01_Scanner$ ./scanner test/example3.kpl
1-1:KW_PROGRAM
1-10:TK_IDENT(EXAMPLE3)
1-18:SB_SEMICOLON
2-1:KW_VAR
2-6:TK_IDENT(I)
2-7:SB_COLON
2-8:KW_INTEGER
2-15:SB_SEMICOLON
3-6:TK_IDENT(N)
3-7:SB_COLON
3-8:KW_INTEGER
3-15:SB_SEMICOLON
4-6:TK_IDENT(P)
4-7:SB_COLON
4-8:KW_INTEGER
4-15:SB_SEMICOLON
5-6:TK_IDENT(Q)
5-7:SB_COLON
5-8:KW_INTEGER
5-15:SB_SEMICOLON
6-6:TK_IDENT(C)
6-7:SB_COLON
6-8:KW_CHAR
6-12:SB_SEMICOLON
8-1:KW_PROCEDURE
8-12:TK_IDENT(HANOI)
8-17:SB_LPAR
8-18:TK_IDENT(N)
8-19:SB_COLON
8-20:KW_INTEGER
8-27:SB_SEMICOLON
8-30:TK_IDENT(S)

```
8-31:SB_COLON
8-32:KW_INTEGER
8-39:SB_SEMICOLON
8-42:TK_IDENT(Z)
8-43:SB_COLON
8-44:KW_INTEGER
8-51:SB_RPAR
8-52:SB_SEMICOLON
9-1:KW_BEGIN
10-3:KW_IF
10-7:TK_IDENT(N)
10-9:SB_NEQ
10-12:TK_NUMBER(0)
10-15:KW_THEN
11-5:KW_BEGIN
12-7:KW_CALL
12-13:TK_IDENT(HANOI)
12-18:SB_LPAR
12-19:TK_IDENT(N)
12-20:SB_MINUS
12-21:TK_NUMBER(1)
12-22:SB_COMMA
12-23:TK_IDENT(S)
12-24:SB_COMMA
12-25:TK_NUMBER(6)
12-26:SB_MINUS
12-27:TK_IDENT(S)
12-28:SB_MINUS
12-29:TK_IDENT(Z)
12-30:SB_RPAR
12-31:SB_SEMICOLON
13-7:TK_IDENT(I)
```

```
13-8:SB_ASSIGN
13-10:TK_IDENT(I)
13-11:SB_PLUS
13-12:TK_NUMBER(1)
13-13:SB_SEMICOLON
14-7:KW_CALL
14-13:TK_IDENT(WRITELN)
14-20:SB_SEMICOLON
15-7:KW_CALL
15-13:TK_IDENT(WRITEI)
15-19:SB_LPAR
15-20:TK_IDENT(I)
15-21:SB_RPAR
15-22:SB_SEMICOLON
16-7:KW_CALL
16-13:TK_IDENT(WRITEI)
16-19:SB_LPAR
16-20:TK_IDENT(N)
16-21:SB_RPAR
16-22:SB_SEMICOLON
17-7:KW_CALL
17-13:TK_IDENT(WRITEI)
17-19:SB_LPAR
17-20:TK_IDENT(S)
17-21:SB_RPAR
17-22:SB_SEMICOLON
18-7:KW_CALL
18-13:TK_IDENT(WRITEI)
18-19:SB_LPAR
18-20:TK_IDENT(Z)
18-21:SB_RPAR
```

```
18-22:SB_SEMICOLON
19-7:KW_CALL
19-13:TK_IDENT(HANOI)
19-18:SB_LPAR
19-19:TK_IDENT(N)
19-20:SB_MINUS
19-21:TK_NUMBER(1)
19-22:SB_COMMA
19-23:TK_NUMBER(6)
19-24:SB_MINUS
19-25:TK_IDENT(S)
19-26:SB_MINUS
19-27:TK_IDENT(Z)
19-28:SB_COMMA
19-29:TK_IDENT(Z)
19-30:SB_RPAR
20-5:KW_END
21-1:KW_END
21-4:SB_SEMICOLON
23-1:KW_BEGIN
24-3:KW_FOR
24-8:TK_IDENT(N)
24-10:SB_ASSIGN
24-13:TK_NUMBER(1)
24-16:KW_TO
24-20:TK_NUMBER(4)
24-23:KW_DO
25-5:KW_BEGIN
26-7:KW_FOR
26-12:TK_IDENT(I)
26-13:SB_ASSIGN
26-15:TK_NUMBER(1)
```

```
26-18:KW_TO
26-22:TK_NUMBER(4)
26-25:KW_DO
27-9:KW_CALL
27-15:TK_IDENT(WRITEC)
27-21:SB_LPAR
27-22:TK_CHAR(' ')
27-25:SB_RPAR
27-26:SB_SEMICOLON
28-7:KW_CALL
28-13:TK_IDENT(READC)
28-18:SB_LPAR
28-19:TK_IDENT(C)
28-20:SB_RPAR
28-21:SB_SEMICOLON
29-7:KW_CALL
29-13:TK_IDENT(WRITEC)
29-19:SB_LPAR
29-20:TK_IDENT(C)
29-21:SB_RPAR
30-5:KW_END
30-8:SB_SEMICOLON
31-3:TK_IDENT(P)
31-4:SB_ASSIGN
31-6:TK_NUMBER(1)
31-7:SB_SEMICOLON
32-3:TK_IDENT(Q)
32-4:SB_ASSIGN
32-6:TK_NUMBER(2)
32-7:SB_SEMICOLON
33-3:KW_FOR
33-8:TK_IDENT(N)
```

```
33-9:SB_ASSIGN
33-11:TK_NUMBER(2)
33-14:KW_TO
33-18:TK_NUMBER(4)
33-21:KW_DO
34-5:KW_BEGIN
35-7:TK_IDENT(I)
35-8:SB_ASSIGN
35-10:TK_NUMBER(0)
35-11:SB_SEMICOLON
36-7:KW_CALL
36-13:TK_IDENT(HANOI)
36-18:SB_LPAR
36-19:TK_IDENT(N)
36-20:SB_COMMA
36-21:TK_IDENT(P)
36-22:SB_COMMA
36-23:TK_IDENT(Q)
36-24:SB_RPAR
36-25:SB_SEMICOLON
37-7:KW_CALL
37-13:TK_IDENT(WRITELN)
38-5:KW_END
39-1:KW_END
39-4:SB_PERIOD
carbon@DESKTOP-C85RJUV:/mnt/c/CODE/Compiler_Construction/Lab01_Scanner$
```

Figure 4: Kết quả thực hiện với example3.kpl

3. Kết quả thực hiện hiển thị lỗi

- Thêm vào folder /test file “error.kpl”:

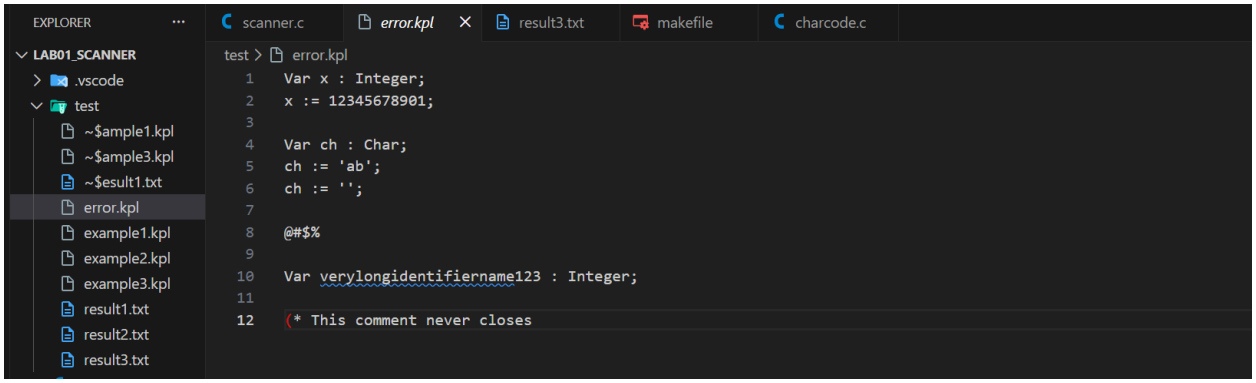


Figure 5: Thêm file "error.kpl"

- Sau khi thực hiện chạy kết quả với fiel “error.kpl”, thu được kết quả như màn hình sau với 5 lỗi được ghi nhận:

```
-  Value of integer number exceeds the range!
-  Invalid const char!
-  Invalid symbol!
-  Identification too long!
-  End of comment expected!
```

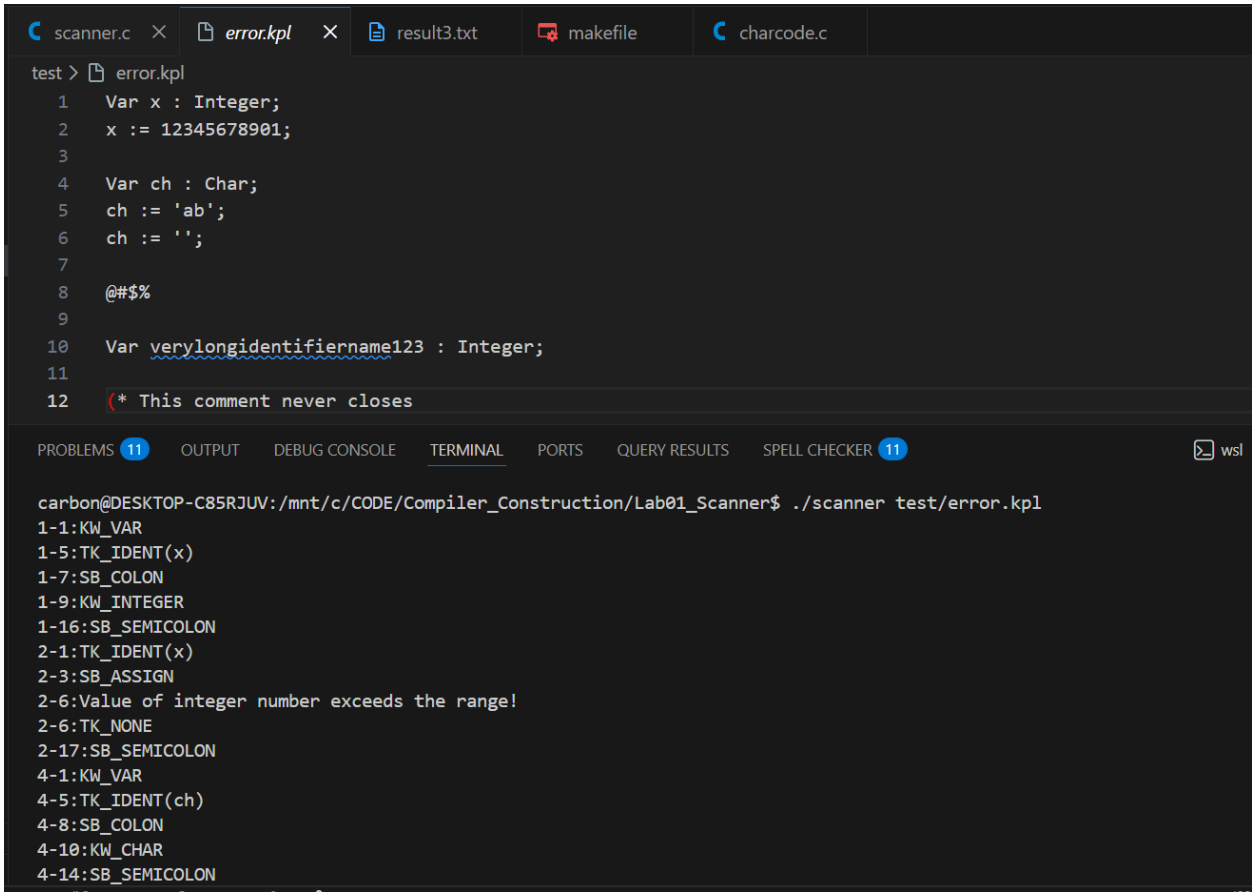


Figure 6: Lỗi "Value of integer number exceeds the range!"

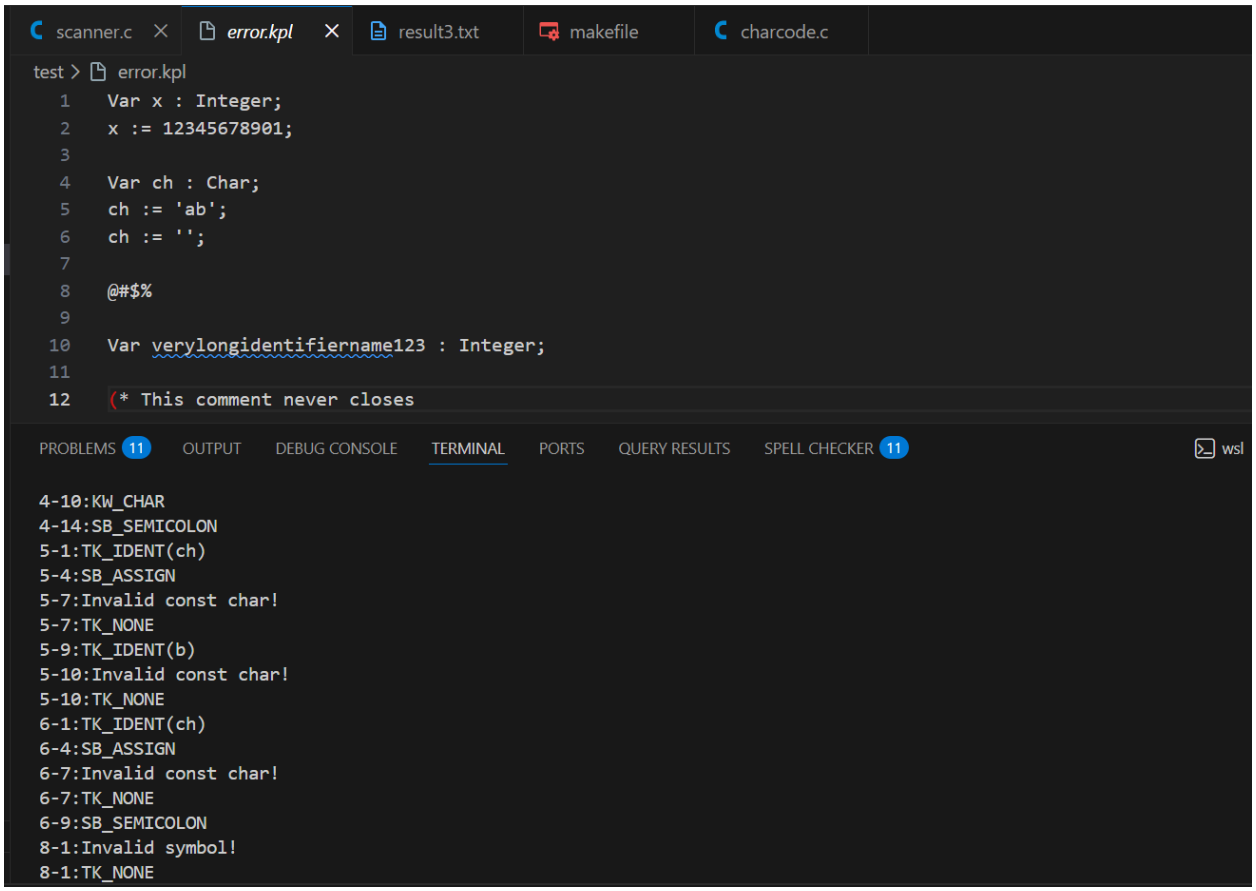


Figure 7: Lỗi "Invalid const char!" và lỗi "Invalid symbol!"

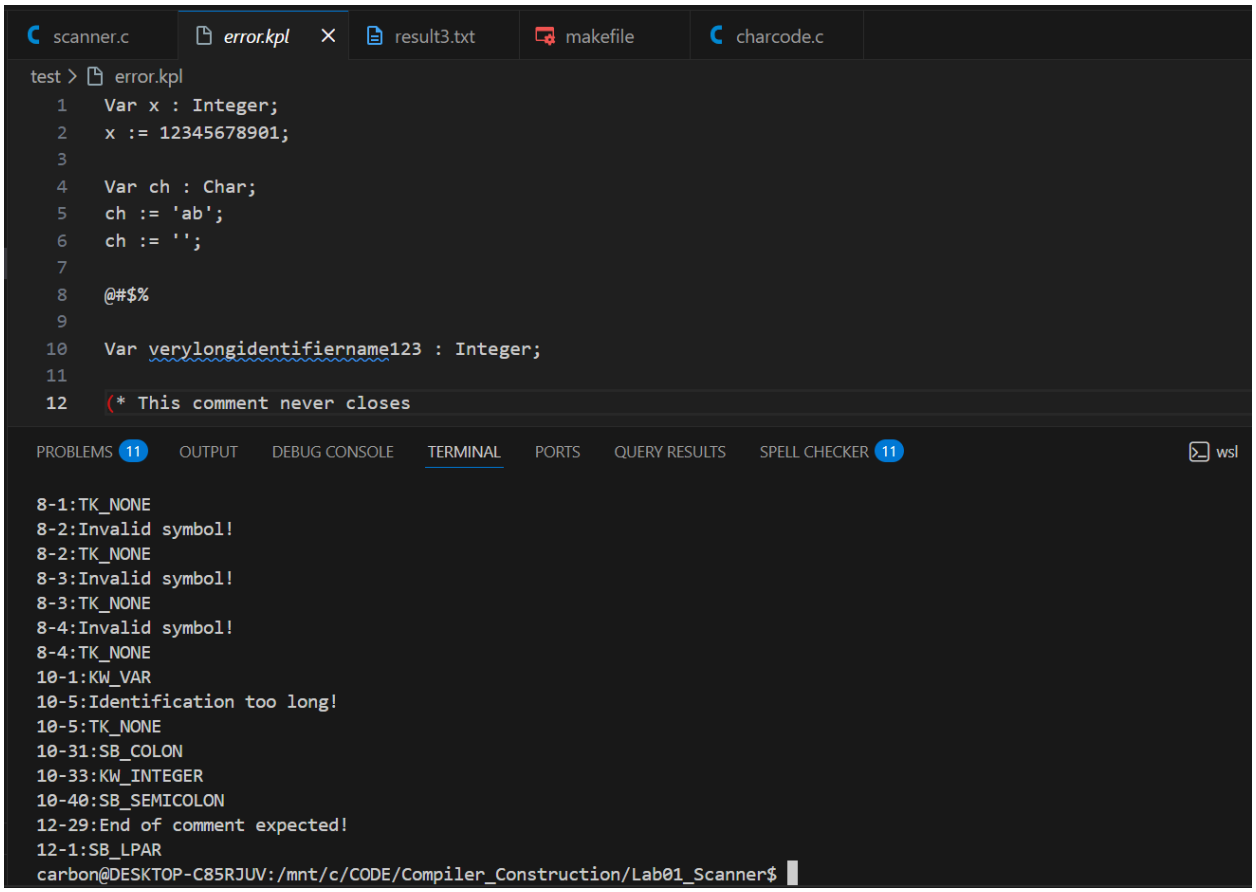


Figure 8: Lỗi "Identification too long!" và lỗi "End of comment expected!"