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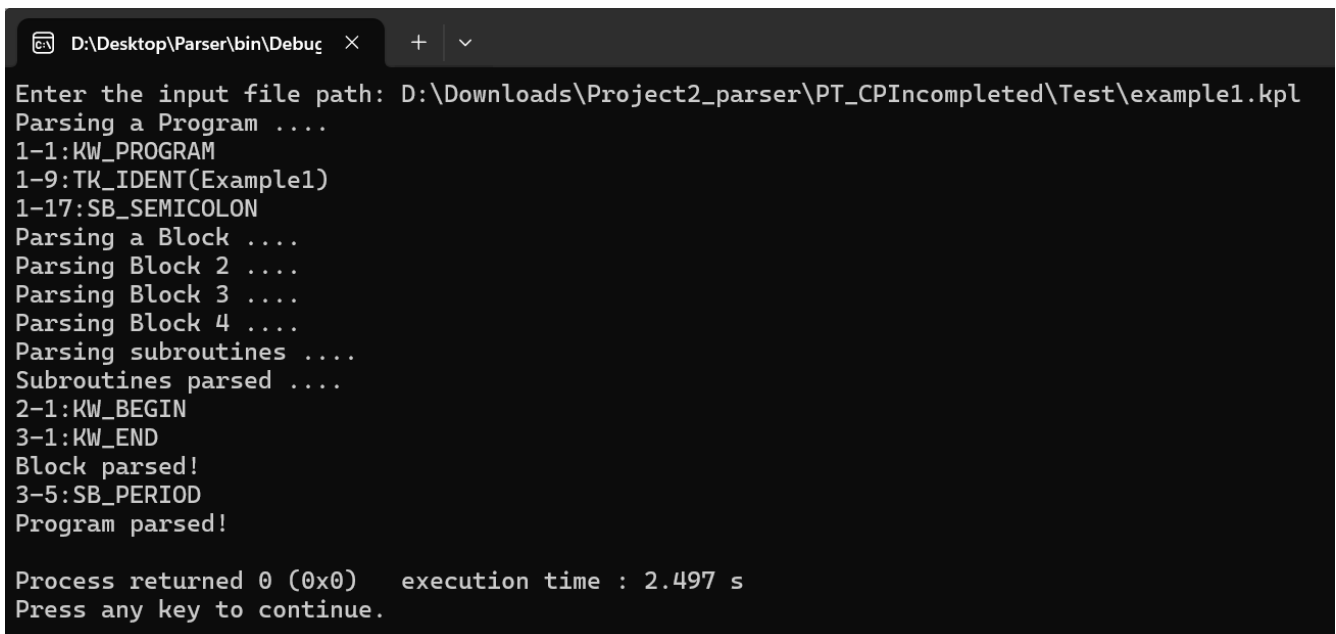
LAB 2. PARSER

This report includes

- A. Results received when executing project with files in folder test
- B. All kinds of errors that can be found by the parser, except "Invalid Expression"

A, Results received when executing project with files in folder test

1. *Example1.kpl*



```
D:\Desktop\Parser\bin\Debug  x  +  v
Enter the input file path: D:\Downloads\Project2_parser\PT_CPIncompleted\Test\example1.kpl
Parsing a Program ....
1-1:KW_PROGRAM
1-9:TK_IDENT(Example1)
1-17:SB_SEMICOLON
Parsing a Block ....
Parsing Block 2 ....
Parsing Block 3 ....
Parsing Block 4 ....
Parsing subroutines ....
Subroutines parsed ....
2-1:KW_BEGIN
3-1:KW_END
Block parsed!
3-5:SB_PERIOD
Program parsed!

Process returned 0 (0x0)   execution time : 2.497 s
Press any key to continue.
```

Results received:

```
Parsing a Program ....
1-1:KW_PROGRAM
1-9:TK_IDENT(Example1)
1-17:SB_SEMICOLON
Parsing a Block ....
Parsing Block 2 ....
Parsing Block 3 ....
Parsing Block 4 ....
Parsing subroutines ....
Subroutines parsed ....
```

2-1:KW_BEGIN

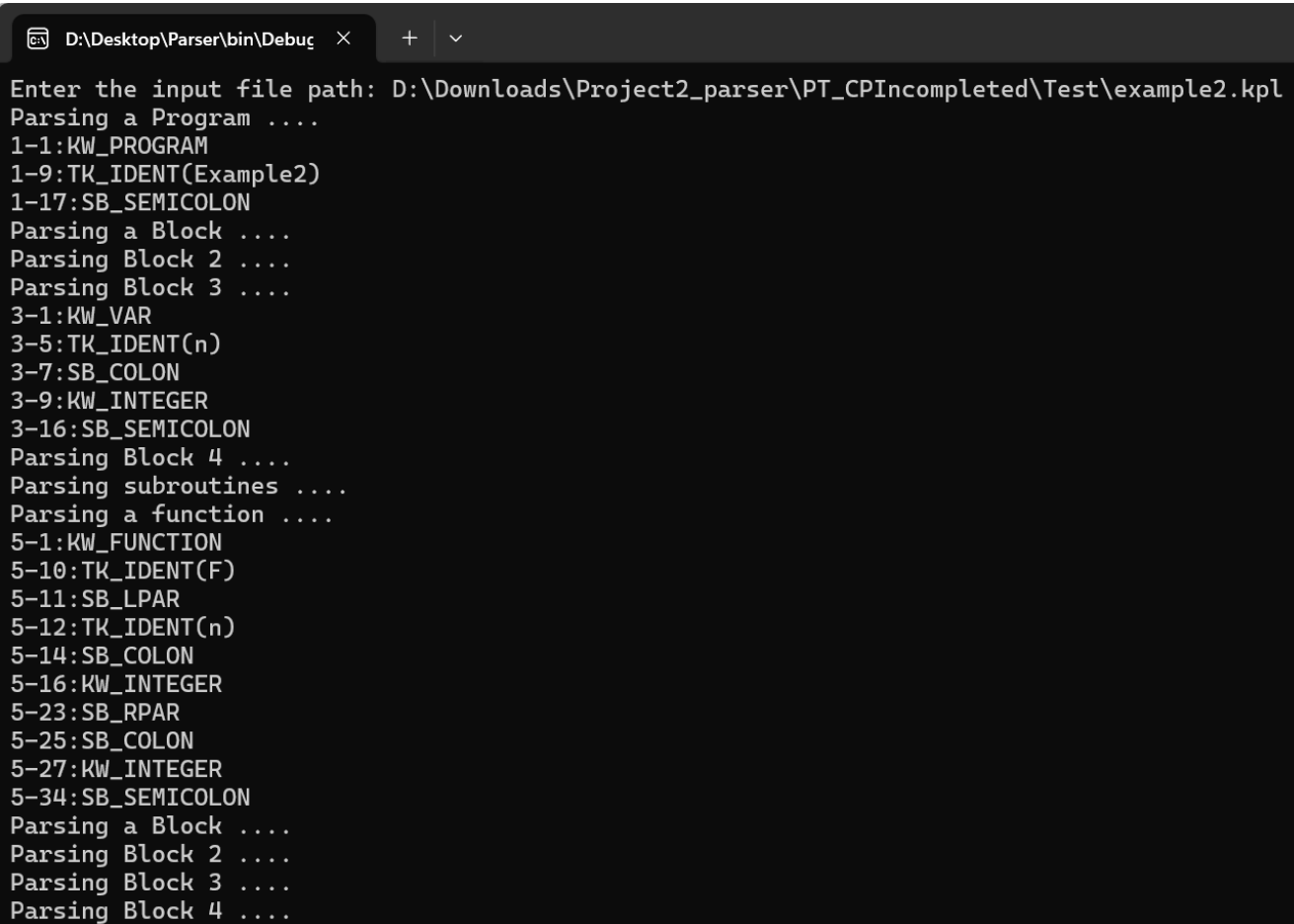
3-1:KW_END

Block parsed!

3-5:SB_PERIOD

Program parsed!

2. Example2.kpl



The screenshot shows a debugger window with a single tab titled 'D:\Desktop\Parser\bin\Debug'. The main text area displays the following output:

```
Enter the input file path: D:\Downloads\Project2_parser\PT_CPIIncompleted\Test\example2.kpl
Parsing a Program ....
1-1:KW_PROGRAM
1-9:TK_IDENT(Example2)
1-17:SB_SEMICOLON
Parsing a Block ....
Parsing Block 2 ....
Parsing Block 3 ....
3-1:KW_VAR
3-5:TK_IDENT(n)
3-7:SB_COLON
3-9:KW_INTEGER
3-16:SB_SEMICOLON
Parsing Block 4 ....
Parsing subroutines ....
Parsing a function ....
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
Parsing a Block ....
Parsing Block 2 ....
Parsing Block 3 ....
Parsing Block 4 ....
```

```
Parsing subroutines ....
Subroutines parsed ....
6-3:KW_BEGIN
Parsing an if statement ....
7-5:KW_IF
Parsing an expression
7-8:TK_IDENT(n)
Expression parsed
7-10:SB_EQ
Parsing an expression
7-12:TK_NUMBER(0)
Expression parsed
7-14:KW_THEN
Parsing an assign statement ....
7-19:TK_IDENT(F)
7-22:SB_ASSIGN
Parsing an expression
7-24:TK_NUMBER(1)
Expression parsed
Assign statement parsed ....
7-26:KW_ELSE
Parsing an assign statement ....
7-31:TK_IDENT(F)
7-34:SB_ASSIGN
Parsing an expression
7-36:TK_IDENT(N)
7-38:SB_TIMES
7-40:TK_IDENT(F)
7-42:SB_LPAR
Parsing an expression
```

```
7-43:TK_IDENT(N)
7-45:SB_MINUS
7-47:TK_NUMBER(1)
Expression parsed
7-48:SB_RPAR
Expression parsed
Assign statement parsed ....
If statement parsed ....
7-49:SB_SEMICOLON
8-3:KW_END
Block parsed!
8-6:SB_SEMICOLON
Function parsed ....
Subroutines parsed ....
10-1:KW_BEGIN
Parsing a for statement ....
11-3:KW_FOR
11-7:TK_IDENT(n)
11-10:SB_ASSIGN
Parsing an expression
11-12:TK_NUMBER(1)
Expression parsed
11-14:KW_TO
Parsing an expression
11-17:TK_NUMBER(7)
Expression parsed
11-19:KW_DO
Parsing a group statement ....
12-5:KW_BEGIN
Parsing a call statement ....
```

```

13-7:KW_CALL
13-12:TK_IDENT(WriteLn)
Call statement parsed ....
13-19:SB_SEMICOLON
Parsing a call statement ....
14-7:KW_CALL
14-12:TK_IDENT(WriteI)
14-18:SB_LPAR
Parsing an expression
14-20:TK_IDENT(F)
14-21:SB_LPAR
Parsing an expression
14-22:TK_IDENT(n)
Expression parsed
14-23:SB_RPAR
Expression parsed
14-24:SB_RPAR
Call statement parsed ....
14-25:SB_SEMICOLON
15-5:KW_END
Group statement parsed ....
For statement parsed ....
15-8:SB_SEMICOLON
16-1:KW_END
Block parsed!
16-5:SB_PERIOD
Program parsed!

Process returned 0 (0x0)   execution time : 1.652 s
Press any key to continue.

```

Results received:

```

Parsing a Program ....
1-1:KW_PROGRAM
1-9:TK_IDENT(Example2)
1-17:SB_SEMICOLON
Parsing a Block ....
Parsing Block 2 ....
Parsing Block 3 ...
3-1:KW_VAR
3-5:TK_IDENT(n)
3-7:SB_COLON
3-9:KW_INTEGER
3-16:SB_SEMICOLON
Parsing Block 4 ....
Parsing subroutines ....
Parsing a function ....
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
Parsing a Block
Parsing Block 2
Parsing Block 3
Parsing Block 4
Parsing subroutines
Subroutines parsed
F6-3:KW_BEGIN
Parsing an if statement
7-5:KW_IF
Parsing an expression
7-8:TK_IDENT(n)
Expression parsed
7-10:SB_EQ
Parsing an expression
7-12:TK_NUMBER(0)
Expression parsed
7-14:KW_THEN
Parsing an assign statement
7-19:TK_IDENT(F)
7-22:SB_ASSIGN
Parsing an expression
7-24:TK_NUMBER(1)
Expression parsed
Assign statement parsed
7-26:KW_ELSE
Parsing an assign statement
7-31:TK_IDENT(F)
7-34:SB_ASSIGN

Parsing an expression

7-36:TK_IDENT(N)

7-38:SB_TIMES

7-40:TK_IDENT(F)

7-42:SB_LPAR

Parsing an expression

7-43:TK_IDENT(N)

7-45:SB_MINUS

7-47:TK_NUMBER(1)

Expression parsed

7-48:SB_RPAR

Expression parsed

Assign statement parsed

If statement parsed

7-49:SB_SEMICOLON

8-3:KW_END

Block parsed!

8-6:SB_SEMICOLON

Function parsed

Subroutines parsed

F10-1:KW_BEGIN

Parsing a for statement

11-3:KW_FOR

11-7:TK_IDENT(n)

11-10:SB_ASSIGN

Parsing an expression

11-12:TK_NUMBER(1)

Expression parsed

11-14:KW_TO

Parsing an expression

11-17:TK_NUMBER(7)

Expression parsed

11-19:KW_DO

Parsing a group statement

12-5:KW_BEGIN

Parsing a call statement

13-7:KW_CALL
13-12:TK_IDENT(WriteLn)
Call statement parsed
13-19:SB_SEMICOLON
Parsing a call statement
14-7:KW_CALL
14-12:TK_IDENT(WriteI)
14-18:SB_LPAR
Parsing an expression
14-20:TK_IDENT(F)
14-21:SB_LPAR
Parsing an expression
14-22:TK_IDENT(n)
Expression parsed
14-23:SB_RPAR
Expression parsed
14-24:SB_RPAR
Call statement parsed
14-25:SB_SEMICOLON
15-5:KW_END
Group statement parsed
For statement parsed
15-8:SB_SEMICOLON
16-1:KW_END
Block parsed!
16-5:SB_PERIOD
Program parsed!

3. Example3.kpl

```
D:\Desktop\Parser\bin\Debug X + v
Enter the input file path: D:\Downloads\Project2_parser\PT_CPIincompleted\Test\example3.kpl
Parsing a Program ....
1-1:KW_PROGRAM
1-10:TK_IDENT(EXAMPLE3)
1-18:SB_SEMICOLON
Parsing a Block ....
Parsing Block 2 ....
Parsing Block 3 ....
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
Parsing Block 4 ....
```

```
Parsing subroutines ....
Parsing a procedure ....
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
Parsing a Block ....
Parsing Block 2 ....
Parsing Block 3 ....
Parsing Block 4 ....
Parsing subroutines ....
Subroutines parsed ....
9-1:KW_BEGIN
Parsing an if statement ....
10-3:KW_IF
Parsing an expression
10-7:TK_IDENT(N)
Expression parsed
```



```
10-10:SB_NEQ
Parsing an expression
10-12:TK_NUMBER(0)
Expression parsed
10-15:KW_THEN
Parsing a group statement ....
11-5:KW_BEGIN
Parsing a call statement ....
12-7:KW_CALL
12-13:TK_IDENT(HANOI)
12-18:SB_LPAR
Parsing an expression
12-19:TK_IDENT(N)
12-20:SB_MINUS
12-21:TK_NUMBER(1)
Expression parsed
12-22:SB_COMMA
Parsing an expression
12-23:TK_IDENT(S)
Expression parsed
12-24:SB_COMMA
Parsing an expression
12-25:TK_NUMBER(6)
12-26:SB_MINUS
12-27:TK_IDENT(S)
12-28:SB_MINUS
12-29:TK_IDENT(Z)
Expression parsed
12-30:SB_RPAR
Call statement parsed ....
```

```
12-31:SB_SEMICOLON
Parsing an assign statement ....
13-7:TK_IDENT(I)
13-9:SB_ASSIGN
Parsing an expression
13-10:TK_IDENT(I)
13-11:SB_PLUS
13-12:TK_NUMBER(1)
Expression parsed
Assign statement parsed ....
13-13:SB_SEMICOLON
Parsing a call statement ....
14-7:KW_CALL
14-13:TK_IDENT(WRITELN)
Call statement parsed ....
14-20:SB_SEMICOLON
Parsing a call statement ....
15-7:KW_CALL
15-13:TK_IDENT(WRITEI)
15-19:SB_LPAR
Parsing an expression
15-20:TK_IDENT(I)
Expression parsed
15-21:SB_RPAR
Call statement parsed ....
15-22:SB_SEMICOLON
Parsing a call statement ....
16-7:KW_CALL
16-13:TK_IDENT(WRITEI)
16-19:SB_LPAR
```

```
Parsing an expression
16-20:TK_IDENT(N)
Expression parsed
16-21:SB_RPAR
Call statement parsed ....
16-22:SB_SEMICOLON
Parsing a call statement ....
17-7:KW_CALL
17-13:TK_IDENT(WRITEI)
17-19:SB_LPAR
Parsing an expression
17-20:TK_IDENT(S)
Expression parsed
17-21:SB_RPAR
Call statement parsed ....
17-22:SB_SEMICOLON
Parsing a call statement ....
18-7:KW_CALL
18-13:TK_IDENT(WRITEI)
18-19:SB_LPAR
Parsing an expression
18-20:TK_IDENT(Z)
Expression parsed
18-21:SB_RPAR
Call statement parsed ....
18-22:SB_SEMICOLON
Parsing a call statement ....
19-7:KW_CALL
19-13:TK_IDENT(HANOI)
19-18:SB_LPAR
```

```
Parsing an expression
19-19:TK_IDENT(N)
19-20:SB_MINUS
19-21:TK_NUMBER(1)
Expression parsed
19-22:SB_COMMA
Parsing an expression
19-23:TK_NUMBER(6)
19-24:SB_MINUS
19-25:TK_IDENT(S)
19-26:SB_MINUS
19-27:TK_IDENT(Z)
Expression parsed
19-28:SB_COMMA
Parsing an expression
19-29:TK_IDENT(Z)
Expression parsed
19-30:SB_RPAR
Call statement parsed ....
20-5:KW_END
Group statement parsed ....
If statement parsed ....
21-1:KW_END
Block parsed!
21-4:SB_SEMICOLON
Procedure parsed ....
Subroutines parsed ....
23-1:KW_BEGIN
Parsing a for statement ....
24-3:KW_FOR
```

```
24-8:TK_IDENT(N)
24-11:SB_ASSIGN
Parsing an expression
24-13:TK_NUMBER(1)
Expression parsed
24-16:KW_TO
Parsing an expression
24-20:TK_NUMBER(4)
Expression parsed
24-23:KW_DO
Parsing a group statement ....
25-5:KW_BEGIN
Parsing a for statement ....
26-7:KW_FOR
26-12:TK_IDENT(I)
26-14:SB_ASSIGN
Parsing an expression
26-15:TK_NUMBER(1)
Expression parsed
26-18:KW_TO
Parsing an expression
26-22:TK_NUMBER(4)
Expression parsed
26-25:KW_DO
Parsing a call statement ....
27-9:KW_CALL
27-15:TK_IDENT(WRITEC)
27-21:SB_LPAR
Parsing an expression
27-23:TK_CHAR(' ')
```

```
Expression parsed
27-25:SB_RPAR
Call statement parsed ....
For statement parsed ....
27-26:SB_SEMICOLON
Parsing an assign statement ....
28-7:TK_IDENT(C)
28-10:SB_ASSIGN
Parsing an expression
28-13:TK_IDENT(READC)
Expression parsed
Assign statement parsed ....
28-18:SB_SEMICOLON
Parsing a call statement ....
29-7:KW_CALL
29-13:TK_IDENT(WRITEC)
29-19:SB_LPAR
Parsing an expression
29-20:TK_IDENT(C)
Expression parsed
29-21:SB_RPAR
Call statement parsed ....
30-5:KW_END
Group statement parsed ....
For statement parsed ....
30-8:SB_SEMICOLON
Parsing an assign statement ....
31-3:TK_IDENT(P)
31-5:SB_ASSIGN
Parsing an expression
```

```
31-6:TK_NUMBER(1)
Expression parsed
Assign statement parsed ....
31-7:SB_SEMICOLON
Parsing an assign statement ....
32-3:TK_IDENT(Q)
32-5:SB_ASSIGN
Parsing an expression
32-6:TK_NUMBER(2)
Expression parsed
Assign statement parsed ....
32-7:SB_SEMICOLON
Parsing a for statement ....
33-3:KW_FOR
33-8:TK_IDENT(N)
33-10:SB_ASSIGN
Parsing an expression
33-11:TK_NUMBER(2)
Expression parsed
33-14:KW_TO
Parsing an expression
33-18:TK_NUMBER(4)
Expression parsed
33-21:KW_DO
Parsing a group statement ....
34-5:KW_BEGIN
Parsing an assign statement ....
35-7:TK_IDENT(I)
35-9:SB_ASSIGN
Parsing an expression
```

```
35-10:TK_NUMBER(0)
Expression parsed
Assign statement parsed ....
35-11:SB_SEMICOLON
Parsing a call statement ....
36-7:KW_CALL
36-13:TK_IDENT(HANOI)
36-18:SB_LPAR
Parsing an expression
36-19:TK_IDENT(N)
Expression parsed
36-20:SB_COMMA
Parsing an expression
36-21:TK_IDENT(P)
Expression parsed
36-22:SB_COMMA
Parsing an expression
36-23:TK_IDENT(Q)
Expression parsed
36-24:SB_RPAR
Call statement parsed ....
36-25:SB_SEMICOLON
Parsing a call statement ....
37-7:KW_CALL
37-13:TK_IDENT(WRITELN)
Call statement parsed ....
38-5:KW_END
Group statement parsed ....
For statement parsed ....
39-1:KW_END
```

```
Block parsed!
39-5:SB_PERIOD
Program parsed!
```

```
Process returned 0 (0x0)   execution time : 2.571 s
```

Results received:

Parsing a Program

1-1:KW_PROGRAM

1-10:TK_IDENT(EXAMPLE3)

1-18:SB_SEMICOLON

Parsing a Block

Parsing Block 2

Parsing Block 3

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

Parsing Block 4

Parsing subroutines

Parsing a procedure

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
Parsing a Block
Parsing Block 2
Parsing Block 3
Parsing Block 4
Parsing subroutines
Subroutines parsed
9-1:KW_BEGIN
Parsing an if statement
10-3:KW_IF
Parsing an expression
10-7:TK_IDENT(N)
Expression parsed
10-10:SB_NEQ
Parsing an expression
10-12:TK_NUMBER(0)
Expression parsed
10-15:KW_THEN
Parsing a group statement
11-5:KW_BEGIN
Parsing a call statement
12-7:KW_CALL
12-13:TK_IDENT(HANOI)
12-18:SB_LPAR
Parsing an expression

12-19:TK_IDENT(N)
12-20:SB_MINUS
12-21:TK_NUMBER(1)
Expression parsed
12-22:SB_COMMA
Parsing an expression
12-23:TK_IDENT(S)
Expression parsed
12-24:SB_COMMA
Parsing an expression
12-25:TK_NUMBER(6)
12-26:SB_MINUS
12-27:TK_IDENT(S)
12-28:SB_MINUS
12-29:TK_IDENT(Z)
Expression parsed
12-30:SB_RPAR
Call statement parsed
12-31:SB_SEMICOLON
Parsing an assign statement
13-7:TK_IDENT(I)
13-9:SB_ASSIGN
Parsing an expression
13-10:TK_IDENT(I)
13-11:SB_PLUS
13-12:TK_NUMBER(1)
Expression parsed
Assign statement parsed
13-13:SB_SEMICOLON
Parsing a call statement
14-7:KW_CALL
14-13:TK_IDENT(WRITELN)
Call statement parsed
14-20:SB_SEMICOLON
Parsing a call statement
15-7:KW_CALL

15-13:TK_IDENT(WRITEI)
15-19:SB_LPAR
Parsing an expression
15-20:TK_IDENT(I)
Expression parsed
15-21:SB_RPAR
Call statement parsed
15-22:SB_SEMICOLON
Parsing a call statement
16-7:KW_CALL
16-13:TK_IDENT(WRITEI)
16-19:SB_LPAR
Parsing an expression
16-20:TK_IDENT(N)
Expression parsed
16-21:SB_RPAR
Call statement parsed
16-22:SB_SEMICOLON
Parsing a call statement
17-7:KW_CALL
17-13:TK_IDENT(WRITEI)
17-19:SB_LPAR
Parsing an expression
17-20:TK_IDENT(S)
Expression parsed
17-21:SB_RPAR
Call statement parsed
17-22:SB_SEMICOLON
Parsing a call statement
18-7:KW_CALL
18-13:TK_IDENT(WRITEI)
18-19:SB_LPAR
Parsing an expression
18-20:TK_IDENT(Z)
Expression parsed
18-21:SB_RPAR

Call statement parsed
18-22:SB_SEMICOLON
Parsing a call statement
19-7:KW_CALL
19-13:TK_IDENT(HANOI)
19-18:SB_LPAR
Parsing an expression
19-19:TK_IDENT(N)
19-20:SB_MINUS
19-21:TK_NUMBER(1)
Expression parsed
19-22:SB_COMMA
Parsing an expression
19-23:TK_NUMBER(6)
19-24:SB_MINUS
19-25:TK_IDENT(S)
19-26:SB_MINUS
19-27:TK_IDENT(Z)
Expression parsed
19-28:SB_COMMA
Parsing an expression
19-29:TK_IDENT(Z)
Expression parsed
19-30:SB_RPAR
Call statement parsed
20-5:KW_END
Group statement parsed
If statement parsed
21-1:KW_END
Block parsed!
21-4:SB_SEMICOLON
Procedure parsed
Subroutines parsed
23-1:KW_BEGIN
Parsing a for statement
24-3:KW_FOR

24-8:TK_IDENT(N)
24-11:SB_ASSIGN
Parsing an expression
24-13:TK_NUMBER(1)
Expression parsed
24-16:KW_TO
Parsing an expression
24-20:TK_NUMBER(4)
Expression parsed
24-23:KW_DO
Parsing a group statement
25-5:KW_BEGIN
Parsing a for statement
26-7:KW_FOR
26-12:TK_IDENT(I)
26-14:SB_ASSIGN
Parsing an expression
26-15:TK_NUMBER(1)
Expression parsed
26-18:KW_TO
Parsing an expression
26-22:TK_NUMBER(4)
Expression parsed
26-25:KW_DO
Parsing a call statement
27-9:KW_CALL
27-15:TK_IDENT(WRITEC)
27-21:SB_LPAR
Parsing an expression
27-23:TK_CHAR(' ')
Expression parsed
27-25:SB_RPAR
Call statement parsed
For statement parsed
27-26:SB_SEMICOLON
Parsing an assign statement

28-7:TK_IDENT(C)
28-10:SB_ASSIGN
Parsing an expression
28-13:TK_IDENT(READC)
Expression parsed
Assign statement parsed
28-18:SB_SEMICOLON
Parsing a call statement
29-7:KW_CALL
29-13:TK_IDENT(WRITEC)
29-19:SB_LPAR
Parsing an expression
29-20:TK_IDENT(C)
Expression parsed
29-21:SB_RPAR
Call statement parsed
30-5:KW_END
Group statement parsed
For statement parsed
30-8:SB_SEMICOLON
Parsing an assign statement
31-3:TK_IDENT(P)
31-5:SB_ASSIGN
Parsing an expression
31-6:TK_NUMBER(1)
Expression parsed
Assign statement parsed
31-7:SB_SEMICOLON
Parsing an assign statement
32-3:TK_IDENT(Q)
32-5:SB_ASSIGN
Parsing an expression
32-6:TK_NUMBER(2)
Expression parsed
Assign statement parsed
32-7:SB_SEMICOLON

Parsing a for statement

33-3:KW_FOR

33-8:TK_IDENT(N)

33-10:SB_ASSIGN

Parsing an expression

33-11:TK_NUMBER(2)

Expression parsed

33-14:KW_TO

Parsing an expression

33-18:TK_NUMBER(4)

Expression parsed

33-21:KW_DO

Parsing a group statement

34-5:KW_BEGIN

Parsing an assign statement

35-7:TK_IDENT(I)

35-9:SB_ASSIGN

Parsing an expression

35-10:TK_NUMBER(0)

Expression parsed

Assign statement parsed

35-11:SB_SEMICOLON

Parsing a call statement

36-7:KW_CALL

36-13:TK_IDENT(HANOI)

36-18:SB_LPAR

Parsing an expression

36-19:TK_IDENT(N)

Expression parsed

36-20:SB_COMMA

Parsing an expression

36-21:TK_IDENT(P)

Expression parsed

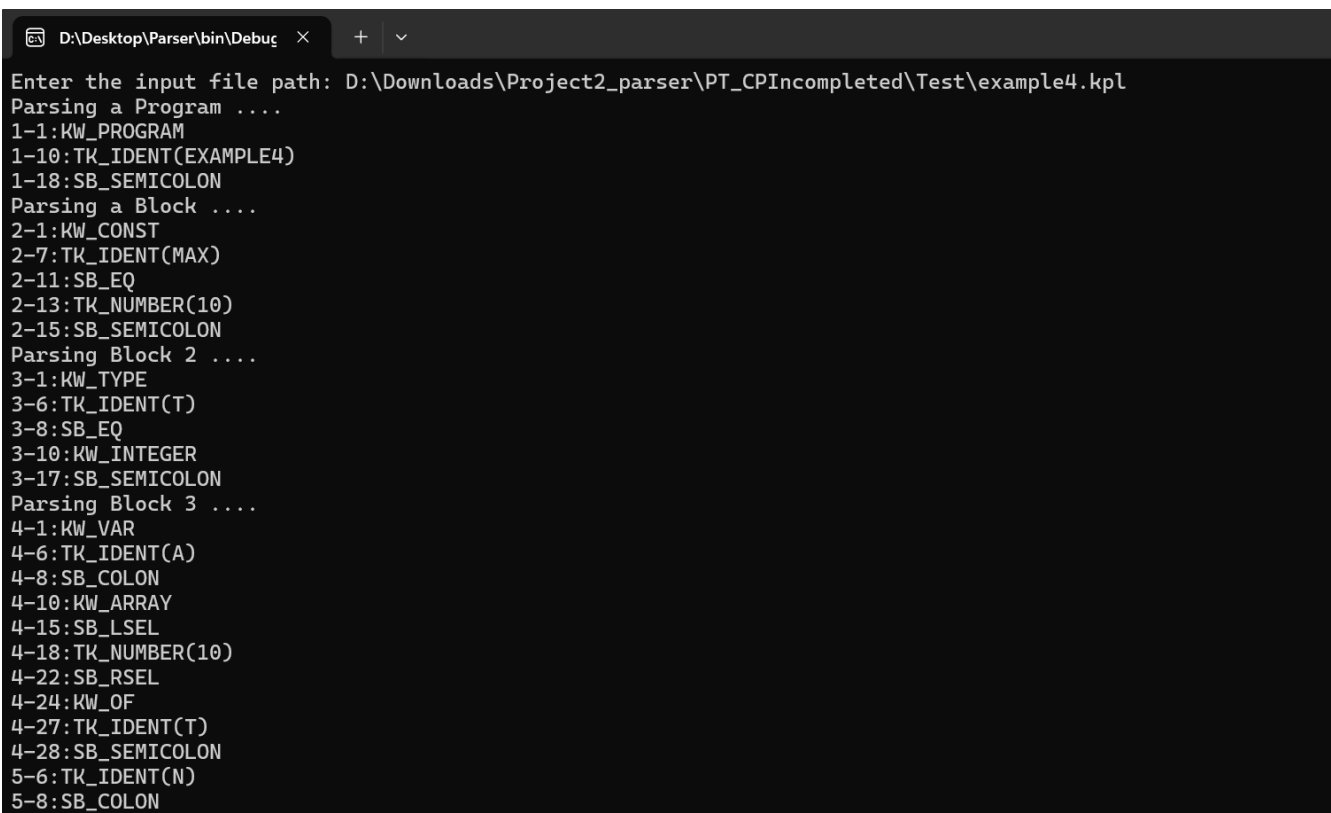
36-22:SB_COMMA

Parsing an expression

36-23:TK_IDENT(Q)

Expression parsed
36-24:SB_RPAR
Call statement parsed
36-25:SB_SEMICOLON
Parsing a call statement
37-7:KW_CALL
37-13:TK_IDENT(WRITELN)
Call statement parsed
38-5:KW_END
Group statement parsed
For statement parsed
39-1:KW_END
Block parsed!
39-5:SB_PERIOD
Program parsed!

4. *Example4.kpl*



```
D:\Desktop\Parser\bin\Debug x + v
Enter the input file path: D:\Downloads\Project2_parser\PT_CPIcompleted\Test\example4.kpl
Parsing a Program ...
1-1:KW_PROGRAM
1-10:TK_IDENT(EXAMPLE4)
1-18:SB_SEMICOLON
Parsing a Block ...
2-1:KW_CONST
2-7:TK_IDENT(MAX)
2-11:SB_EQ
2-13:TK_NUMBER(10)
2-15:SB_SEMICOLON
Parsing Block 2 ....
3-1:KW_TYPE
3-6:TK_IDENT(T)
3-8:SB_EQ
3-10:KW_INTEGER
3-17:SB_SEMICOLON
Parsing Block 3 ....
4-1:KW_VAR
4-6:TK_IDENT(A)
4-8:SB_COLON
4-10:KW_ARRAY
4-15:SB_LSEL
4-18:TK_NUMBER(10)
4-22:SB_RSEL
4-24:KW_OF
4-27:TK_IDENT(T)
4-28:SB_SEMICOLON
5-6:TK_IDENT(N)
5-8:SB_COLON
```

```
5-10:KW_INTEGER
5-17:SB_SEMICOLON
6-6:TK_IDENT(CH)
6-9:SB_COLON
6-11:KW_CHAR
6-15:SB_SEMICOLON
Parsing Block 4 ....
Parsing subroutines ....
Parsing a procedure ....
8-1:KW_PROCEDURE
8-11:TK_IDENT(INPUT)
8-16:SB_SEMICOLON
Parsing a Block ....
Parsing Block 2 ....
Parsing Block 3 ....
9-1:KW_VAR
9-5:TK_IDENT(I)
9-7:SB_COLON
9-9:KW_INTEGER
9-16:SB_SEMICOLON
10-5:TK_IDENT(TMP)
10-9:SB_COLON
10-11:KW_INTEGER
10-18:SB_SEMICOLON
Parsing Block 4 ....
Parsing subroutines ....
Subroutines parsed ....
11-1:KW_BEGIN
Parsing an assign statement ....
12-3:TK_IDENT(N)
```

```
12-6:SB_ASSIGN
Parsing an expression
12-8:TK_IDENT(READI)
Expression parsed
Assign statement parsed ....
12-13:SB_SEMICOLON
Parsing a for statement ....
13-3:KW_FOR
13-7:TK_IDENT(I)
13-10:SB_ASSIGN
Parsing an expression
13-12:TK_NUMBER(1)
Expression parsed
13-14:KW_TO
Parsing an expression
13-17:TK_IDENT(N)
Expression parsed
13-19:KW_DO
Parsing an assign statement ....
14-6:TK_IDENT(A)
14-7:SB_LSEL
Parsing an expression
14-9:TK_IDENT(I)
Expression parsed
14-11:SB_RSEL
14-14:SB_ASSIGN
Parsing an expression
14-16:TK_IDENT(READI)
Expression parsed
Assign statement parsed ....
```

```
For statement parsed ....
14-21:SB_SEMICOLON
15-1:KW_END
Block parsed!
15-4:SB_SEMICOLON
Procedure parsed ....
Parsing a procedure ....
17-1:KW_PROCEDURE
17-11:TK_IDENT(OUTPUT)
17-17:SB_SEMICOLON
Parsing a Block ....
Parsing Block 2 ....
Parsing Block 3 ....
18-1:KW_VAR
18-5:TK_IDENT(I)
18-7:SB_COLON
18-9:KW_INTEGER
18-16:SB_SEMICOLON
Parsing Block 4 ....
Parsing subroutines ....
Subroutines parsed ....
19-1:KW_BEGIN
Parsing a for statement ....
20-3:KW_FOR
20-7:TK_IDENT(I)
20-10:SB_ASSIGN
Parsing an expression
20-12:TK_NUMBER(1)
Expression parsed
20-14:KW_TO
```

```
Parsing an expression
20-17:TK_IDENT(N)
Expression parsed
20-19:KW_DO
Parsing a group statement ....
21-6:KW_BEGIN
Parsing a call statement ....
22-8:KW_CALL
22-13:TK_IDENT(WRITEI)
22-19:SB_LPAR
Parsing an expression
22-20:TK_IDENT(A)
22-21:SB_LSEL
Parsing an expression
22-23:TK_IDENT(I)
Expression parsed
22-25:SB_RSEL
Expression parsed
22-26:SB_RPAR
Call statement parsed ....
22-27:SB_SEMICOLON
Parsing a call statement ....
23-8:KW_CALL
23-13:TK_IDENT(WRITELN)
Call statement parsed ....
23-20:SB_SEMICOLON
24-6:KW_END
Group statement parsed ....
For statement parsed ....
25-1:KW_END
```

```
Block parsed!
25-4:SB_SEMICOLON
Procedure parsed ....
Parsing a function ....
27-1:KW_FUNCTION
27-10:TK_IDENT(SUM)
27-14:SB_COLON
27-16:KW_INTEGER
27-23:SB_SEMICOLON
Parsing a Block ....
Parsing Block 2 ....
Parsing Block 3 ....
28-1:KW_VAR
28-5:TK_IDENT(I)
28-6:SB_COLON
28-8:KW_INTEGER
28-15:SB_SEMICOLON
29-5:TK_IDENT(S)
29-7:SB_COLON
29-9:KW_INTEGER
29-16:SB_SEMICOLON
Parsing Block 4 ....
Parsing subroutines ....
Subroutines parsed ....
30-1:KW_BEGIN
Parsing an assign statement ....
31-5:TK_IDENT(S)
31-8:SB_ASSIGN
Parsing an expression
31-10:TK_NUMBER(0)
```

```
Expression parsed
Assign statement parsed ....
31-11:SB_SEMICOLON
Parsing an assign statement ....
32-5:TK_IDENT(I)
32-8:SB_ASSIGN
Parsing an expression
32-10:TK_NUMBER(1)
Expression parsed
Assign statement parsed ....
32-11:SB_SEMICOLON
Parsing a while statement ....
33-5:KW_WHILE
Parsing an expression
33-11:TK_IDENT(I)
Expression parsed
33-14:SB_LE
Parsing an expression
33-16:TK_IDENT(N)
Expression parsed
33-18:KW_DO
Parsing a group statement ....
34-6:KW_BEGIN
Parsing an assign statement ....
35-8:TK_IDENT(S)
35-11:SB_ASSIGN
Parsing an expression
35-13:TK_IDENT(S)
35-15:SB_PLUS
35-17:TK_IDENT(A)
```



```
35-18:SB_LSEL
Parsing an expression
35-20:TK_IDENT(I)
Expression parsed
35-22:SB_RSEL
Expression parsed
Assign statement parsed ....
35-23:SB_SEMICOLON
Parsing an assign statement ....
36-8:TK_IDENT(I)
36-11:SB_ASSIGN
Parsing an expression
36-13:TK_IDENT(I)
36-15:SB_PLUS
36-17:TK_NUMBER(1)
Expression parsed
Assign statement parsed ....
36-18:SB_SEMICOLON
37-6:KW_END
Group statement parsed ....
While statement parsed ....
38-1:KW_END
Block parsed!
38-4:SB_SEMICOLON
Function parsed ....
Subroutines parsed ....
40-1:KW_BEGIN
Parsing an assign statement ....
41-4:TK_IDENT(CH)
41-8:SB_ASSIGN
```

```
Parsing an expression
41-11:TK_CHAR('y')
Expression parsed
Assign statement parsed ....
41-13:SB_SEMICOLON
Parsing a while statement ....
42-4:KW_WHILE
Parsing an expression
42-10:TK_IDENT(CH)
Expression parsed
42-13:SB_EQ
Parsing an expression
42-16:TK_CHAR('y')
Expression parsed
42-19:KW_DO
Parsing a group statement ....
43-6:KW_BEGIN
Parsing a call statement ....
44-8:KW_CALL
44-13:TK_IDENT(INPUT)
Call statement parsed ....
44-18:SB_SEMICOLON
Parsing a call statement ....
45-8:KW_CALL
45-13:TK_IDENT(OUTPUT)
Call statement parsed ....
45-19:SB_SEMICOLON
Parsing a call statement ....
46-8:KW_CALL
46-13:TK_IDENT(WRITEI)
```

```
46-19:SB_LPAR
Parsing an expression
46-20:TK_IDENT(SUM)
Expression parsed
46-23:SB_RPAR
Call statement parsed ....
46-24:SB_SEMICOLON
Parsing an assign statement ....
47-8:TK_IDENT(CH)
47-12:SB_ASSIGN
Parsing an expression
47-14:TK_IDENT(READC)
Expression parsed
Assign statement parsed ....
47-19:SB_SEMICOLON
48-6:KW_END
Group statement parsed ....
While statement parsed ....
49-1:KW_END
Block parsed!
49-5:SB_PERIOD
Program parsed!

Process returned 0 (0x0)   execution time : 1.896 s
Press any key to continue.
```

Results received:

```
Parsing a Program ....
1-1:KW_PROGRAM
1-10:TK_IDENT(EXAMPLE4)
1-18:SB_SEMICOLON
Parsing a Block ....
2-1:KW_CONST
2-7:TK_IDENT(MAX)
2-11:SB_EQ
2-13:TK_NUMBER(10)
2-15:SB_SEMICOLON
Parsing Block 2 ....
3-1:KW_TYPE
3-6:TK_IDENT(T)
3-8:SB_EQ
3-10:KW_INTEGER
3-17:SB_SEMICOLON
Parsing Block 3 ....
4-1:KW_VAR
4-6:TK_IDENT(A)
4-8:SB_COLON
4-10:KW_ARRAY
```

4-15:SB_LSEL
4-18:TK_NUMBER(10)
4-22:SB_RSEL
4-24:KW_OF
4-27:TK_IDENT(T)
4-28:SB_SEMICOLON
5-6:TK_IDENT(N)
5-8:SB_COLON
5-10:KW_INTEGER
5-17:SB_SEMICOLON
6-6:TK_IDENT(CH)
6-9:SB_COLON
6-11:KW_CHAR
6-15:SB_SEMICOLON
Parsing Block 4
Parsing subroutines
Parsing a procedure
8-1:KW_PROCEDURE
8-11:TK_IDENT(INPUT)
8-16:SB_SEMICOLON
Parsing a Block
Parsing Block 2
Parsing Block 3
9-1:KW_VAR
9-5:TK_IDENT(I)
9-7:SB_COLON
9-9:KW_INTEGER
9-16:SB_SEMICOLON
10-5:TK_IDENT(TMP)
10-9:SB_COLON
10-11:KW_INTEGER
10-18:SB_SEMICOLON
Parsing Block 4
Parsing subroutines
Subroutines parsed
11-1:KW_BEGIN

Parsing an assign statement
12-3:TK_IDENT(N)
12-6:SB_ASSIGN
Parsing an expression
12-8:TK_IDENT(READI)
Expression parsed
Assign statement parsed
12-13:SB_SEMICOLON
Parsing a for statement
13-3:KW_FOR
13-7:TK_IDENT(I)
13-10:SB_ASSIGN
Parsing an expression
13-12:TK_NUMBER(1)
Expression parsed
13-14:KW_TO
Parsing an expression
13-17:TK_IDENT(N)
Expression parsed
13-19:KW_DO
Parsing an assign statement
14-6:TK_IDENT(A)
14-7:SB_LSEL
Parsing an expression
14-9:TK_IDENT(I)
Expression parsed
14-11:SB_RSEL
14-14:SB_ASSIGN
Parsing an expression
14-16:TK_IDENT(READI)
Expression parsed
Assign statement parsed
For statement parsed
14-21:SB_SEMICOLON
15-1:KW_END
Block parsed!

15-4:SB_SEMICOLON
Procedure parsed
Parsing a procedure
17-1:KW_PROCEDURE
17-11:TK_IDENT(OUTPUT)
17-17:SB_SEMICOLON
Parsing a Block
Parsing Block 2
Parsing Block 3
18-1:KW_VAR
18-5:TK_IDENT(I)
18-7:SB_COLON
18-9:KW_INTEGER
18-16:SB_SEMICOLON
Parsing Block 4
Parsing subroutines
Subroutines parsed
19-1:KW_BEGIN
Parsing a for statement
20-3:KW_FOR
20-7:TK_IDENT(I)
20-10:SB_ASSIGN
Parsing an expression
20-12:TK_NUMBER(1)
Expression parsed
20-14:KW_TO
Parsing an expression
20-17:TK_IDENT(N)
Expression parsed
20-19:KW_DO
Parsing a group statement
21-6:KW_BEGIN
Parsing a call statement
22-8:KW_CALL
22-13:TK_IDENT(WRITEI)
22-19:SB_LPAR

Parsing an expression
22-20:TK_IDENT(A)
22-21:SB_LSEL
Parsing an expression
22-23:TK_IDENT(I)
Expression parsed
22-25:SB_RSEL
Expression parsed
22-26:SB_RPAR
Call statement parsed
22-27:SB_SEMICOLON
Parsing a call statement
23-8:KW_CALL
23-13:TK_IDENT(WRITELN)
Call statement parsed
23-20:SB_SEMICOLON
24-6:KW_END
Group statement parsed
For statement parsed
25-1:KW_END
Block parsed!
25-4:SB_SEMICOLON
Procedure parsed
Parsing a function
27-1:KW_FUNCTION
27-10:TK_IDENT(SUM)
27-14:SB_COLON
27-16:KW_INTEGER
27-23:SB_SEMICOLON
Parsing a Block
Parsing Block 2
Parsing Block 3
28-1:KW_VAR
28-5:TK_IDENT(I)
28-6:SB_COLON
28-8:KW_INTEGER

28-15:SB_SEMICOLON
29-5:TK_IDENT(S)
29-7:SB_COLON
29-9:KW_INTEGER
29-16:SB_SEMICOLON
Parsing Block 4
Parsing subroutines
Subroutines parsed
30-1:KW_BEGIN
Parsing an assign statement
31-5:TK_IDENT(S)
31-8:SB_ASSIGN
Parsing an expression
31-10:TK_NUMBER(0)
Expression parsed
Assign statement parsed
31-11:SB_SEMICOLON
Parsing an assign statement
32-5:TK_IDENT(I)
32-8:SB_ASSIGN
Parsing an expression
32-10:TK_NUMBER(1)
Expression parsed
Assign statement parsed
32-11:SB_SEMICOLON
Parsing a while statement
33-5:KW_WHILE
Parsing an expression
33-11:TK_IDENT(I)
Expression parsed
33-14:SB_LE
Parsing an expression
33-16:TK_IDENT(N)
Expression parsed
33-18:KW_DO
Parsing a group statement

34-6:KW_BEGIN

Parsing an assign statement

35-8:TK_IDENT(S)

35-11:SB_ASSIGN

Parsing an expression

35-13:TK_IDENT(S)

35-15:SB_PLUS

35-17:TK_IDENT(A)

35-18:SB_LSEL

Parsing an expression

35-20:TK_IDENT(I)

Expression parsed

35-22:SB_RSEL

Expression parsed

Assign statement parsed

35-23:SB_SEMICOLON

Parsing an assign statement

36-8:TK_IDENT(I)

36-11:SB_ASSIGN

Parsing an expression

36-13:TK_IDENT(I)

36-15:SB_PLUS

36-17:TK_NUMBER(1)

Expression parsed

Assign statement parsed

36-18:SB_SEMICOLON

37-6:KW_END

Group statement parsed

While statement parsed

38-1:KW_END

Block parsed!

38-4:SB_SEMICOLON

Function parsed

Subroutines parsed

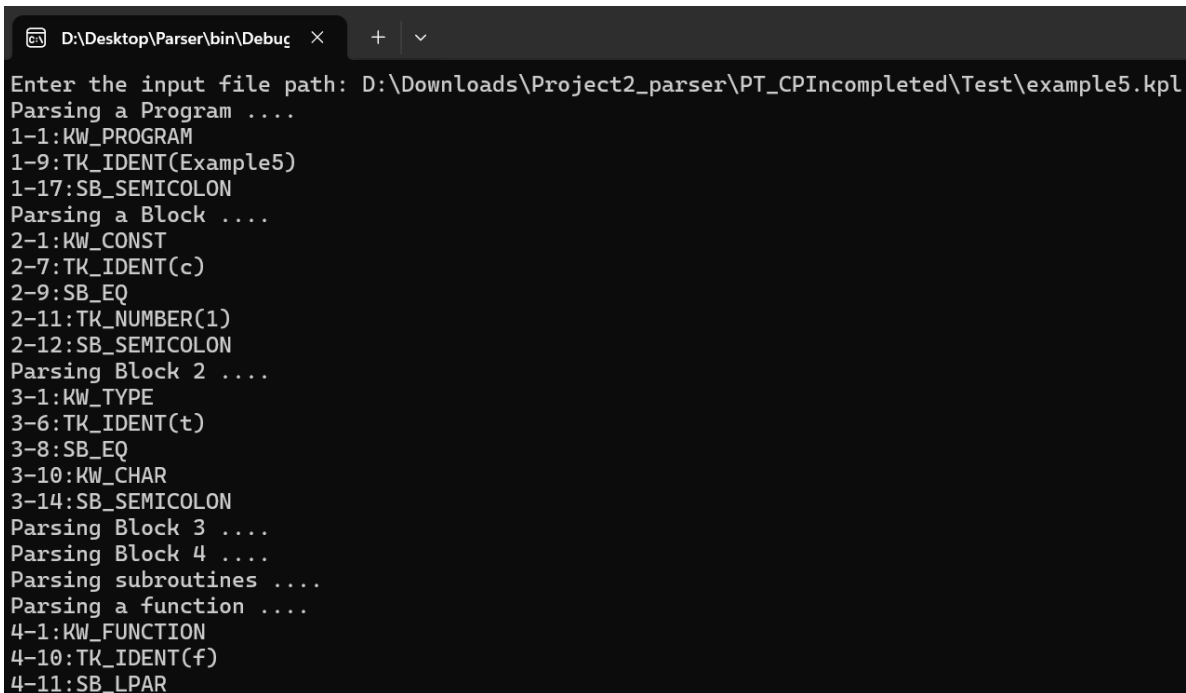
40-1:KW_BEGIN

Parsing an assign statement

41-4:TK_IDENT(CH)
41-8:SB_ASSIGN
Parsing an expression
41-11:TK_CHAR('y')
Expression parsed
Assign statement parsed
41-13:SB_SEMICOLON
Parsing a while statement
42-4:KW_WHILE
Parsing an expression
42-10:TK_IDENT(CH)
Expression parsed
42-13:SB_EQ
Parsing an expression
42-16:TK_CHAR('y')
Expression parsed
42-19:KW_DO
Parsing a group statement
43-6:KW_BEGIN
Parsing a call statement
44-8:KW_CALL
44-13:TK_IDENT(INPUT)
Call statement parsed
44-18:SB_SEMICOLON
Parsing a call statement
45-8:KW_CALL
45-13:TK_IDENT(OUTPUT)
Call statement parsed
45-19:SB_SEMICOLON
Parsing a call statement
46-8:KW_CALL
46-13:TK_IDENT(WRITEI)
46-19:SB_LPAR
Parsing an expression
46-20:TK_IDENT(SUM)
Expression parsed

46-23:SB_RPAR
Call statement parsed
46-24:SB_SEMICOLON
Parsing an assign statement
47-8:TK_IDENT(CH)
47-12:SB_ASSIGN
Parsing an expression
47-14:TK_IDENT(READC)
Expression parsed
Assign statement parsed
47-19:SB_SEMICOLON
48-6:KW_END
Group statement parsed
While statement parsed
49-1:KW_END
Block parsed!
49-5:SB_PERIOD
Program parsed!

5. *Example5.kpl*



```
D:\Desktop\Parser\bin\Debug  X + v
Enter the input file path: D:\Downloads\Project2_parser\PT_CPIincompleted\Test\example5.kpl
Parsing a Program ....
1-1:KW_PROGRAM
1-9:TK_IDENT(Example5)
1-17:SB_SEMICOLON
Parsing a Block ....
2-1:KW_CONST
2-7:TK_IDENT(c)
2-9:SB_EQ
2-11:TK_NUMBER(1)
2-12:SB_SEMICOLON
Parsing Block 2 ....
3-1:KW_TYPE
3-6:TK_IDENT(t)
3-8:SB_EQ
3-10:KW_CHAR
3-14:SB_SEMICOLON
Parsing Block 3 ....
Parsing Block 4 ....
Parsing subroutines ....
Parsing a function ....
4-1:KW_FUNCTION
4-10:TK_IDENT(f)
4-11:SB_LPAR
```

```
4-12:TK_IDENT(i)
4-14:SB_COLON
4-16:KW_INTEGER
4-23:SB_RPAR
4-24:SB_COLON
4-25:KW_CHAR
4-29:SB_SEMICOLON
Parsing a Block ....
5-1:KW_CONST
5-7:TK_IDENT(b)
5-9:SB_EQ
5-11:TK_IDENT(c)
5-12:SB_SEMICOLON
Parsing Block 2 ....
6-1:KW_TYPE
6-6:TK_IDENT(a)
6-8:SB_EQ
6-10:KW_ARRAY
6-15:SB_LSEL
6-17:TK_NUMBER(5)
6-19:SB_RSEL
6-21:KW_OF
6-24:TK_IDENT(t)
6-25:SB_SEMICOLON
Parsing Block 3 ....
Parsing Block 4 ....
Parsing subroutines ....
Subroutines parsed ....
7-1:KW_BEGIN
8-1:KW_END
```

```
Block parsed!
8-4:SB_SEMICOLON
Function parsed ....
Subroutines parsed ....
9-1:KW_BEGIN
10-1:KW_END
Block parsed!
10-5:SB_PERIOD
Program parsed!

Process returned 0 (0x0)   execution time : 2.131 s
Press any key to continue.
```

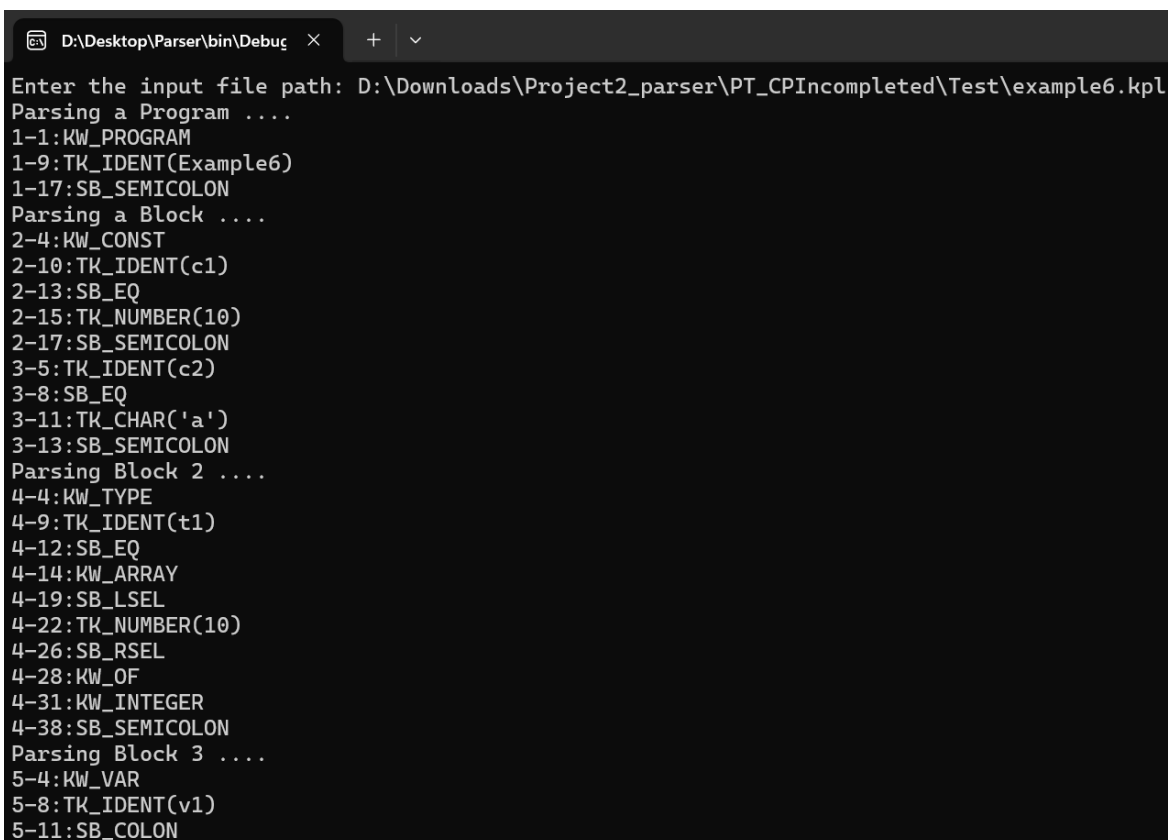
Results received:

```
Parsing a Program ....
1-1:KW_PROGRAM
1-9:TK_IDENT(Example5)
1-17:SB_SEMICOLON
Parsing a Block ....
2-1:KW_CONST
2-7:TK_IDENT(c)
2-9:SB_EQ
2-11:TK_NUMBER(1)
2-12:SB_SEMICOLON
Parsing Block 2 ....
```

3-1:KW_TYPE
3-6:TK_IDENT(t)
3-8:SB_EQ
3-10:KW_CHAR
3-14:SB_SEMICOLON
Parsing Block 3
Parsing Block 4
Parsing subroutines
Parsing a function
4-1:KW_FUNCTION
4-10:TK_IDENT(f)
4-11:SB_LPAR
4-12:TK_IDENT(i)
4-14:SB_COLON
4-16:KW_INTEGER
4-23:SB_RPAR
4-24:SB_COLON
4-25:KW_CHAR
4-29:SB_SEMICOLON
Parsing a Block
5-1:KW_CONST
5-7:TK_IDENT(b)
5-9:SB_EQ
5-11:TK_IDENT(c)
5-12:SB_SEMICOLON
Parsing Block 2
6-1:KW_TYPE
6-6:TK_IDENT(a)
6-8:SB_EQ
6-10:KW_ARRAY
6-15:SB_LSEL
6-17:TK_NUMBER(5)
6-19:SB_RSEL
6-21:KW_OF
6-24:TK_IDENT(t)
6-25:SB_SEMICOLON

Parsing Block 3
Parsing Block 4
Parsing subroutines
Subroutines parsed
7-1:KW_BEGIN
8-1:KW_END
Block parsed!
8-4:SB_SEMICOLON
Function parsed
Subroutines parsed
9-1:KW_BEGIN
10-1:KW_END
Block parsed!
10-5:SB_PERIOD
Program parsed!

6. *Example6.kpl*



```
D:\Desktop\Parser\bin\Debug × + ▾
Enter the input file path: D:\Downloads\Project2_parser\PT_CPIIncompleted\Test\example6.kpl
Parsing a Program ....
1-1:KW_PROGRAM
1-9:TK_IDENT(Example6)
1-17:SB_SEMICOLON
Parsing a Block ....
2-4:KW_CONST
2-10:TK_IDENT(c1)
2-13:SB_EQ
2-15:TK_NUMBER(10)
2-17:SB_SEMICOLON
3-5:TK_IDENT(c2)
3-8:SB_EQ
3-11:TK_CHAR('a')
3-13:SB_SEMICOLON
Parsing Block 2 ....
4-4:KW_TYPE
4-9:TK_IDENT(t1)
4-12:SB_EQ
4-14:KW_ARRAY
4-19:SB_LSEL
4-22:TK_NUMBER(10)
4-26:SB_RSEL
4-28:KW_OF
4-31:KW_INTEGER
4-38:SB_SEMICOLON
Parsing Block 3 ....
5-4:KW_VAR
5-8:TK_IDENT(v1)
5-11:SB_COLON
```

```
5-13:KW_INTEGER
5-20:SB_SEMICOLON
6-8:TK_IDENT(v2)
6-11:SB_COLON
6-13:KW_ARRAY
6-18:SB_LSEL
6-21:TK_NUMBER(10)
6-25:SB_RSEL
6-27:KW_OF
6-30:TK_IDENT(t1)
6-32:SB_SEMICOLON
Parsing Block 4 ....
Parsing subroutines ....
Parsing a function ....
8-4:KW_FUNCTION
8-13:TK_IDENT(F)
8-14:SB_LPAR
8-15:TK_IDENT(p1)
8-18:SB_COLON
8-20:KW_INTEGER
8-27:SB_SEMICOLON
8-29:KW_VAR
8-33:TK_IDENT(p2)
8-36:SB_COLON
8-38:KW_CHAR
8-42:SB_RPAR
8-44:SB_COLON
8-46:KW_INTEGER
8-53:SB_SEMICOLON
Parsing a Block ....
```

```
Parsing Block 2 ....
Parsing Block 3 ....
Parsing Block 4 ....
Parsing subroutines ....
Subroutines parsed ....
9-6:KW_BEGIN
Parsing an assign statement ....
10-8:TK_IDENT(f)
10-11:SB_ASSIGN
Parsing an expression
10-13:TK_IDENT(c1)
Expression parsed
Assign statement parsed ....
10-15:SB_SEMICOLON
11-6:KW_END
Block parsed!
11-9:SB_SEMICOLON
Function parsed ....
Parsing a procedure ....
13-4:KW_PROCEDURE
13-14:TK_IDENT(p)
13-15:SB_LPAR
13-16:TK_IDENT(v1)
13-19:SB_COLON
13-21:KW_INTEGER
13-28:SB_RPAR
13-29:SB_SEMICOLON
Parsing a Block ....
14-6:KW_CONST
14-12:TK_IDENT(c1)
```

```
14-15:SB_EQ
14-18:TK_CHAR('a')
14-20:SB_SEMICOLON
15-12:TK_IDENT(c3)
15-15:SB_EQ
15-17:TK_NUMBER(10)
15-19:SB_SEMICOLON
Parsing Block 2 ....
16-6:KW_TYPE
16-11:TK_IDENT(t1)
16-14:SB_EQ
16-16:KW_INTEGER
16-23:SB_SEMICOLON
17-11:TK_IDENT(t2)
17-14:SB_EQ
17-16:KW_ARRAY
17-21:SB_LSEL
17-24:TK_NUMBER(10)
17-28:SB_RSEL
17-30:KW_OF
17-33:TK_IDENT(t1)
17-35:SB_SEMICOLON
Parsing Block 3 ....
18-6:KW_VAR
18-10:TK_IDENT(v2)
18-13:SB_COLON
18-15:TK_IDENT(t2)
18-17:SB_SEMICOLON
19-10:TK_IDENT(v3)
19-13:SB_COLON
```

```
19-15:KW_CHAR
19-19:SB_SEMICOLON
Parsing Block 4 ....
Parsing subroutines ....
Subroutines parsed ....
20-6:KW_BEGIN
Parsing an assign statement ....
21-2:TK_IDENT(v3)
21-6:SB_ASSIGN
Parsing an expression
21-9:TK_CHAR('a')
Expression parsed
Assign statement parsed ....
21-11:SB_SEMICOLON
Parsing an assign statement ....
22-9:TK_IDENT(v1)
22-13:SB_ASSIGN
Parsing an expression
22-15:TK_IDENT(f)
22-16:SB_LPAR
Parsing an expression
22-17:TK_IDENT(c3)
Expression parsed
22-19:SB_COMMA
Parsing an expression
22-20:TK_IDENT(v3)
Expression parsed
22-22:SB_RPAR
Expression parsed
Assign statement parsed ....
```

```

22-23:SB_SEMICOLON
23-6:KW_END
Block parsed!
23-9:SB_SEMICOLON
Procedure parsed ....
Subroutines parsed ....
25-1:KW_BEGIN
Parsing a call statement ....
26-6:KW_CALL
26-11:TK_IDENT(p)
26-12:SB_LPAR
Parsing an expression
26-13:TK_IDENT(c1)
Expression parsed
26-15:SB_RPAR
Call statement parsed ....
26-16:SB_SEMICOLON
27-1:KW_END
Block parsed!
27-5:SB_PERIOD
Program parsed!

Process returned 0 (0x0)   execution time : 2.225 s
Press any key to continue.

```

Results received:

```

Parsing a Program ....
1-1:KW_PROGRAM
1-9:TK_IDENT(Example6)
1-17:SB_SEMICOLON
Parsing a Block ....
2-4:KW_CONST
2-10:TK_IDENT(c1)
2-13:SB_EQ
2-15:TK_NUMBER(10)
2-17:SB_SEMICOLON
3-5:TK_IDENT(c2)
3-8:SB_EQ
3-11:TK_CHAR('a')
3-13:SB_SEMICOLON
Parsing Block 2 ....
4-4:KW_TYPE
4-9:TK_IDENT(t1)
4-12:SB_EQ
4-14:KW_ARRAY
4-19:SB_LSEL
4-22:TK_NUMBER(10)

```


4-26:SB_RSEL
4-28:KW_OF
4-31:KW_INTEGER
4-38:SB_SEMICOLON
Parsing Block 3
5-4:KW_VAR
5-8:TK_IDENT(v1)
5-11:SB_COLON
5-13:KW_INTEGER
5-20:SB_SEMICOLON
6-8:TK_IDENT(v2)
6-11:SB_COLON
6-13:KW_ARRAY
6-18:SB_LSEL
6-21:TK_NUMBER(10)
6-25:SB_RSEL
6-27:KW_OF
6-30:TK_IDENT(t1)
6-32:SB_SEMICOLON
Parsing Block 4
Parsing subroutines
Parsing a function
8-4:KW_FUNCTION
8-13:TK_IDENT(F)
8-14:SB_LPAR
8-15:TK_IDENT(p1)
8-18:SB_COLON
8-20:KW_INTEGER
8-27:SB_SEMICOLON
8-29:KW_VAR
8-33:TK_IDENT(p2)
8-36:SB_COLON
8-38:KW_CHAR
8-42:SB_RPAR
8-44:SB_COLON
8-46:KW_INTEGER

8-53:SB_SEMICOLON

Parsing a Block

Parsing Block 2

Parsing Block 3

Parsing Block 4

Parsing subroutines

Subroutines parsed

9-6:KW_BEGIN

Parsing an assign statement

10-8:TK_IDENT(f)

10-11:SB_ASSIGN

Parsing an expression

10-13:TK_IDENT(c1)

Expression parsed

Assign statement parsed

10-15:SB_SEMICOLON

11-6:KW_END

Block parsed!

11-9:SB_SEMICOLON

Function parsed

Parsing a procedure

13-4:KW_PROCEDURE

13-14:TK_IDENT(p)

13-15:SB_LPAR

13-16:TK_IDENT(v1)

13-19:SB_COLON

13-21:KW_INTEGER

13-28:SB_RPAR

13-29:SB_SEMICOLON

Parsing a Block

14-6:KW_CONST

14-12:TK_IDENT(c1)

14-15:SB_EQ

14-18:TK_CHAR('a')

14-20:SB_SEMICOLON

15-12:TK_IDENT(c3)

15-15:SB_EQ
15-17:TK_NUMBER(10)
15-19:SB_SEMICOLON
Parsing Block 2
16-6:KW_TYPE
16-11:TK_IDENT(t1)
16-14:SB_EQ
16-16:KW_INTEGER
16-23:SB_SEMICOLON
17-11:TK_IDENT(t2)
17-14:SB_EQ
17-16:KW_ARRAY
17-21:SB_LSEL
17-24:TK_NUMBER(10)
17-28:SB_RSEL
17-30:KW_OF
17-33:TK_IDENT(t1)
17-35:SB_SEMICOLON
Parsing Block 3
18-6:KW_VAR
18-10:TK_IDENT(v2)
18-13:SB_COLON
18-15:TK_IDENT(t2)
18-17:SB_SEMICOLON
19-10:TK_IDENT(v3)
19-13:SB_COLON
19-15:KW_CHAR
19-19:SB_SEMICOLON
Parsing Block 4
Parsing subroutines
Subroutines parsed
20-6:KW_BEGIN
Parsing an assign statement
21-2:TK_IDENT(v3)
21-6:SB_ASSIGN
Parsing an expression

21-9:TK_CHAR('a')
Expression parsed
Assign statement parsed
21-11:SB_SEMICOLON
Parsing an assign statement
22-9:TK_IDENT(v1)
22-13:SB_ASSIGN
Parsing an expression
22-15:TK_IDENT(f)
22-16:SB_LPAR
Parsing an expression
22-17:TK_IDENT(c3)
Expression parsed
22-19:SB_COMMA
Parsing an expression
22-20:TK_IDENT(v3)
Expression parsed
22-22:SB_RPAR
Expression parsed
Assign statement parsed
22-23:SB_SEMICOLON
23-6:KW_END
Block parsed!
23-9:SB_SEMICOLON
Procedure parsed
Subroutines parsed
25-1:KW_BEGIN
Parsing a call statement
26-6:KW_CALL
26-11:TK_IDENT(p)
26-12:SB_LPAR
Parsing an expression
26-13:TK_IDENT(c1)
Expression parsed
26-15:SB_RPAR
Call statement parsed

26-16:SB_SEMICOLON

27-1:KW_END

Block parsed!

27-5:SB_PERIOD

Program parsed!

B, All kinds of errors that can be found by the parser, except “Invalid Expression”

1. MissingToken

```
Program Err1 (* Missing ";" here *)  
Begin  
End. (* Err1 *)
```

err1.kpl

```
Enter the input file path: D:\Downloads\Project2_parser\PT_CPIIncompleted\Test\err1.kpl  
Parsing a Program ....  
1-1:KW_PROGRAM  
1-9:TK_IDENT(Err1)  
2-1:Missing ';' 
```

```
Process returned 0 (0x0)   execution time : 2.026 s  
Press any key to continue.
```

2. Invalid constant! (ERR_INVALID_CONSTANT)

```
PROGRAM Err2;  
CONST X = 'abc';  
BEGIN  
END. (* Err2 *)
```

err2.kpl

```
Enter the input file path: D:\Downloads\Project2_parser\PT_CPIIncompleted\Test\err2.kpl  
Parsing a Program ....  
1-1:KW_PROGRAM  
1-9:TK_IDENT(Err2)  
1-13:SB_SEMICOLON  
Parsing a Block ....  
2-1:KW_CONST  
2-7:TK_IDENT(X)  
2-9:SB_EQ  
2-11:Invalid constant!
```

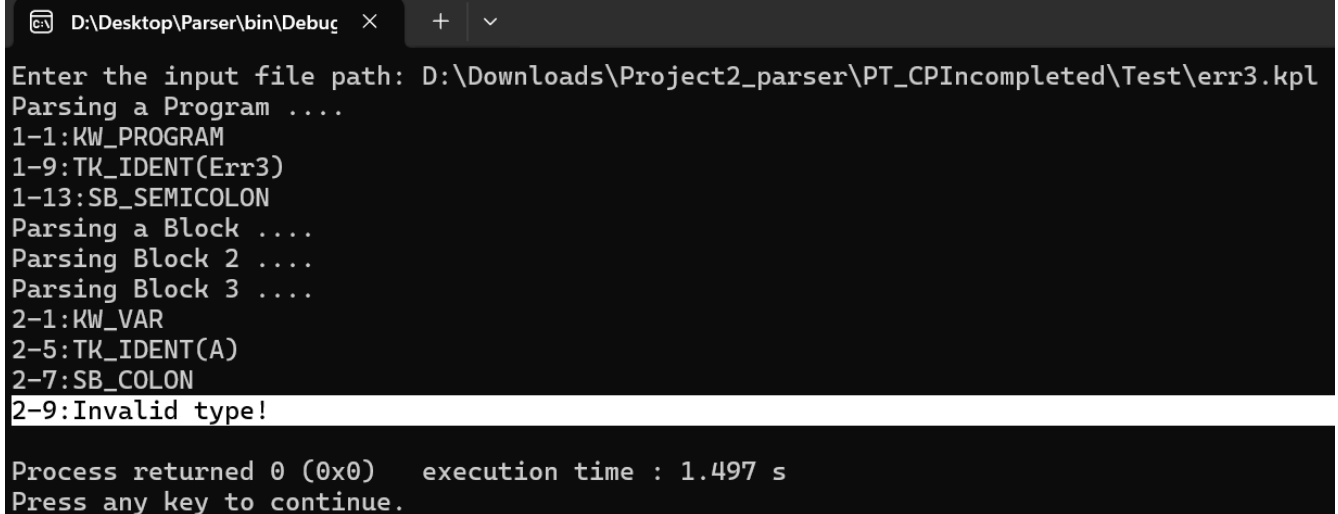
```
Process returned 0 (0x0)   execution time : 1.786 s  
Press any key to continue.
```

3. Invalid type! (ERR_INVALIDTYPE)

```
PROGRAM Err3;  
VAR A : 8386; (*Invalid Type*)
```

```
BEGIN
  A := 2;
END. (* Err3 *)
```

err3.kpl



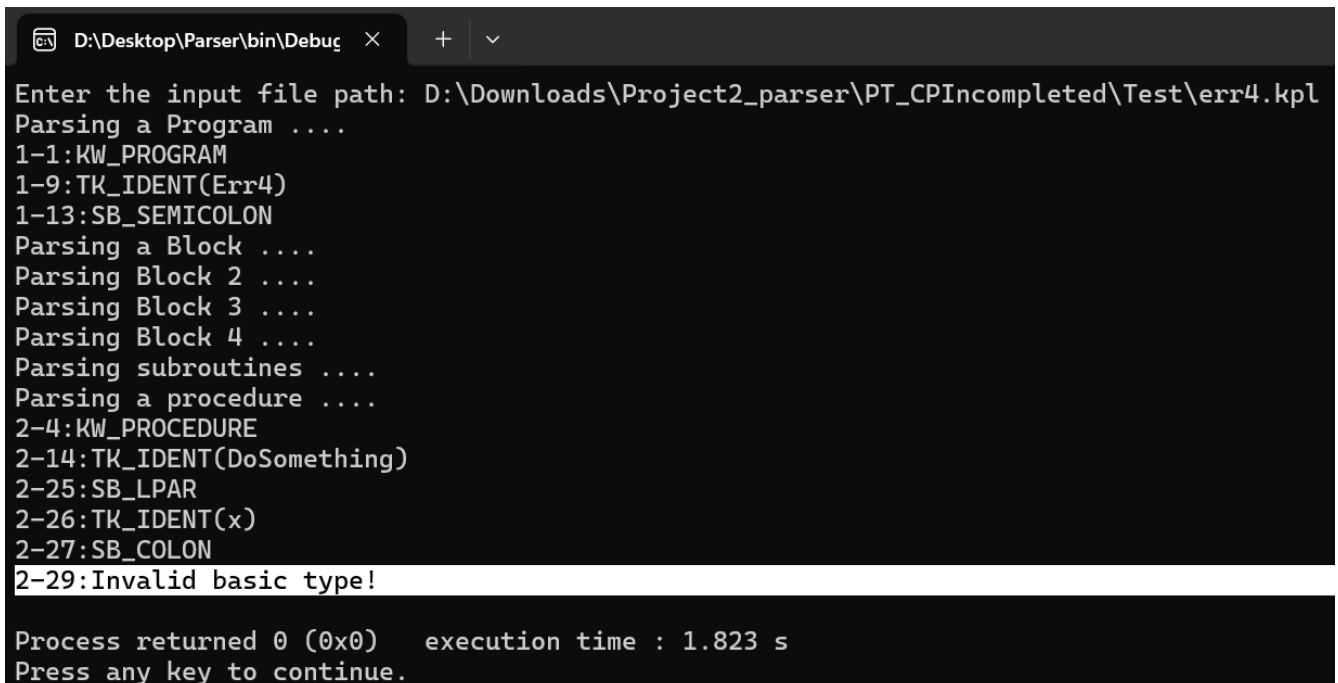
```
D:\Desktop\Parser\bin\Debug
Enter the input file path: D:\Downloads\Project2_parser\PT_CPIIncompleted\Test\err3.kpl
Parsing a Program ....
1-1:KW_PROGRAM
1-9:TK_IDENT(Err3)
1-13:SB_SEMICOLON
Parsing a Block ....
Parsing Block 2 ....
Parsing Block 3 ....
2-1:KW_VAR
2-5:TK_IDENT(A)
2-7:SB_COLON
2-9:Invalid type!

Process returned 0 (0x0)   execution time : 1.497 s
Press any key to continue.
```

4. *Invalid basic type! (ERR_INVALIDBASICTYPE)*

```
PROGRAM Err4;
  PROCEDURE DoSomething(x: BOOLEAN); (* Invalid basic type *)
BEGIN
END. (* Err4 *)
```

err4.kpl



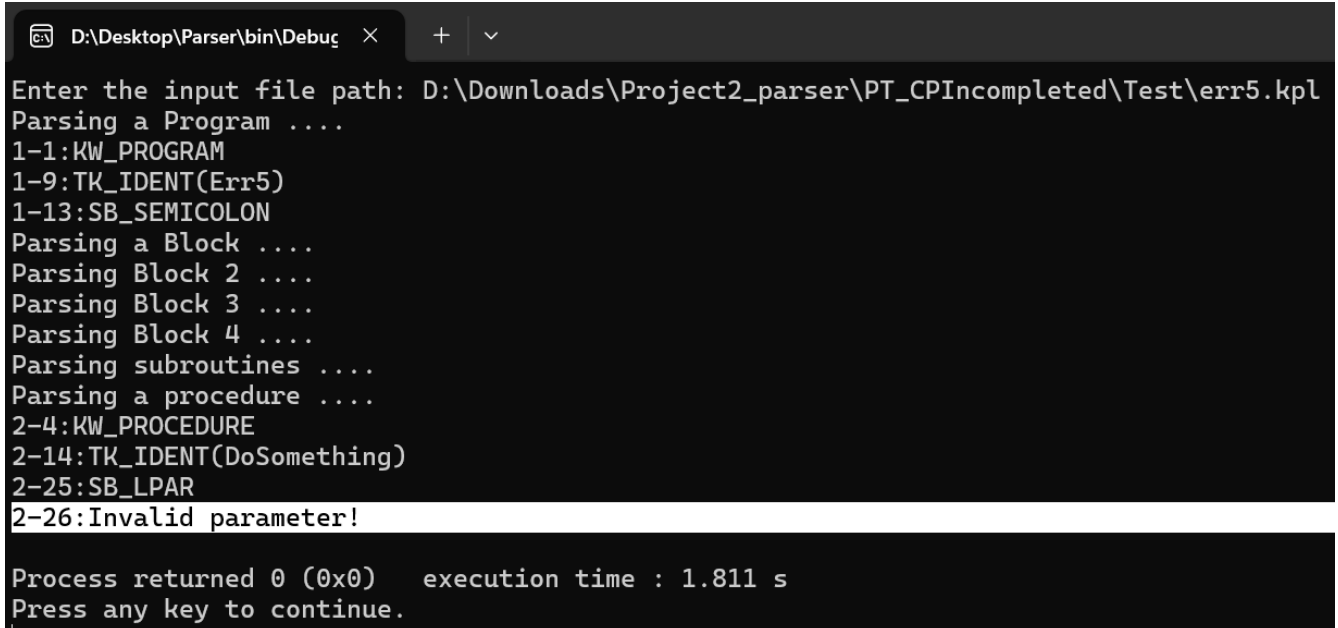
```
D:\Desktop\Parser\bin\Debug
Enter the input file path: D:\Downloads\Project2_parser\PT_CPIIncompleted\Test\err4.kpl
Parsing a Program ....
1-1:KW_PROGRAM
1-9:TK_IDENT(Err4)
1-13:SB_SEMICOLON
Parsing a Block ....
Parsing Block 2 ....
Parsing Block 3 ....
Parsing Block 4 ....
Parsing subroutines ....
Parsing a procedure ....
2-4:KW_PROCEDURE
2-14:TK_IDENT(DoSomething)
2-25:SB_LPAR
2-26:TK_IDENT(x)
2-27:SB_COLON
2-29:Invalid basic type!

Process returned 0 (0x0)   execution time : 1.823 s
Press any key to continue.
```

5. Invalid parameter! (ERR_INVALIDPARAM)

```
PROGRAM Err5;  
    PROCEDURE DoSomething(123x: INTEGER);  
BEGIN  
END. (* Err5 *)
```

err5.kpl

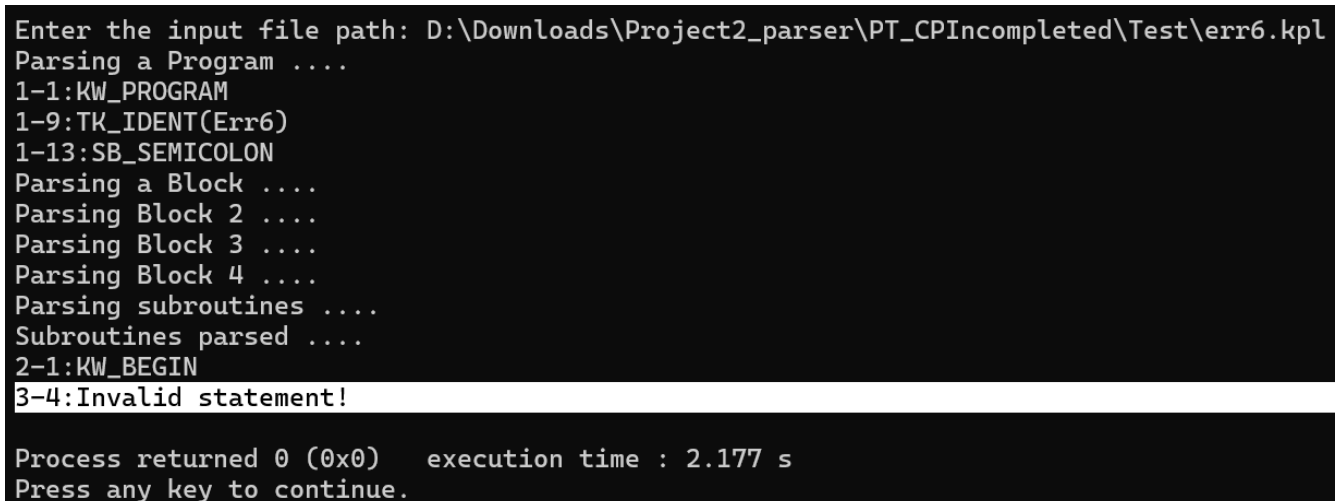


```
Enter the input file path: D:\Downloads\Project2_parser\PT_CPIIncompleted\Test\err5.kpl  
Parsing a Program ....  
1-1:KW_PROGRAM  
1-9:TK_IDENT(Err5)  
1-13:SB_SEMICOLON  
Parsing a Block ....  
Parsing Block 2 ....  
Parsing Block 3 ....  
Parsing Block 4 ....  
Parsing subroutines ....  
Parsing a procedure ....  
2-4:KW_PROCEDURE  
2-14:TK_IDENT(DoSomething)  
2-25:SB_LPAR  
2-26:Invalid parameter!  
  
Process returned 0 (0x0)   execution time : 1.811 s  
Press any key to continue.
```

6. Invalid statement! (ERR_INVALIDSTATEMENT)

```
PROGRAM Err6;  
BEGIN  
    123 := 456;  
END. (* Err6 *)
```

err6.kpl



```
Enter the input file path: D:\Downloads\Project2_parser\PT_CPIIncompleted\Test\err6.kpl  
Parsing a Program ....  
1-1:KW_PROGRAM  
1-9:TK_IDENT(Err6)  
1-13:SB_SEMICOLON  
Parsing a Block ....  
Parsing Block 2 ....  
Parsing Block 3 ....  
Parsing Block 4 ....  
Parsing subroutines ....  
Subroutines parsed ....  
2-1:KW_BEGIN  
3-4:Invalid statement!  
  
Process returned 0 (0x0)   execution time : 2.177 s  
Press any key to continue.
```

7. Invalid arguments! (ERR_INVALIDARGUMENTS)

```
PROGRAM Err7;

PROCEDURE Test(a: INTEGER; b: INTEGER);
BEGIN
END;

BEGIN
    CALL Test (a,); (* Invalid arguments! *)
END. (* Err7 *)
```

err7.kpl

```
Block parsed!
5-4:SB_SEMICOLON
Procedure parsed ....
Subroutines parsed ....
7-1:KW_BEGIN
Parsing a call statement ....
8-4:KW_CALL
8-9:TK_IDENT(Test)
8-14:SB_LPAR
Parsing an expression
8-15:TK_IDENT(a)
Expression parsed
8-16:SB_COMMA
8-17:Invalid arguments!
```

```
Process returned 0 (0x0)   execution time : 14.969 s
Press any key to continue.
```

8. Invalid comparator! (ERR_INVALIDCOMPARATOR)

```
PROGRAM Err8;
    VAR I : INTEGER;
BEGIN
    IF x - 3 THEN I := 1; (* Invalid comparator here *)
END. (* Err8 *)
```

err8.kpl

```
4-3:KW_IF
Parsing an expression
4-6:TK_IDENT(x)
4-8:SB_MINUS
4-10:TK_NUMBER(3)
Expression parsed
4-12:Invalid comparator!
```

```
Process returned 0 (0x0)   execution time : 1.776 s
Press any key to continue.
```


9. Invalid term! (ERR_INVALIDTERM)

```
PROGRAM Err9;  
  VAR I : INTEGER;  
BEGIN  
  I := (1+2(/3 ;  
END. (* Err9 *)
```

err9.kpl

```
Parsing an assign statement ....  
4-4:TK_IDENT(I)  
4-7:SB_ASSIGN  
Parsing an expression  
4-9:SB_LPAR  
Parsing an expression  
4-10:TK_NUMBER(1)  
4-11:SB_PLUS  
4-12:TK_NUMBER(2)  
4-13:Invalid term!
```

```
Process returned 0 (0x0)   execution time : 1.674 s  
Press any key to continue.
```

10. Invalid factor! (ERR_INVALIDFACTOR)

```
PROGRAM Err10;  
  VAR I : INTEGER;  
BEGIN  
  I := 2/ ;  
END. (* Err10 *)
```

err10.kpl

```
4-4:TK_IDENT(I)  
4-7:SB_ASSIGN  
Parsing an expression  
4-9:TK_NUMBER(2)  
4-10:SB_SLASH  
4-12:Invalid factor!
```

```
Process returned 0 (0x0)   execution time : 11.031 s  
Press any key to continue.
```