

Midterm Project

我的Token number是完全依照老師slides上的編號, 如下頁

- | | | |
|--------------------------------------|--------------------------------|--------------|
| 1. BEGIN | 13. Comma , | 29. FOR |
| 2. END | 14. Assign Operation := | 30. TO |
| 3. READ | 15. Plus Operation + | 31. ENDFOR |
| 4. WRITE | 16. Minus Operation – | 32. WHILE |
| 5. ID | 17. Multiplication Operation * | 33. ENDWHILE |
| 6. Integer Literal | 18. Division / | 34. DECLARE |
| • Not prefixed with “+” and “-” | 19. Not Equal != | 35. AS |
| 7. Float Point Literal | 20. Greater than > | 36. INTEGER |
| • 12.345, 12.5, 0.1, 123. | 21. Less than < | 37. REAL |
| – Not prefixed with “+” and “-” | 22. Greater or equal >= | 38. ScanEof |
| 8. Exponential Float Point Literal | 23. Less or equal <= | |
| • 0.123E12, 1.23e-3 | 24. Equal == | |
| – Not prefixed with “+” and “-” | 25. IF | |
| 9. String Literal “this is a string” | 26. THEN | |
| 10. Left parenthesis: (| 27. ELSE | |
| 11. Right parenthesis:) | 28. ENDIF | |
| 12. Semicolon ; | | |

首先先測試老師提供的測資:testdata.txt, 如下兩頁, 因為結果有點多, 所以標上了行號

%%the beginning of an test data for Micro/Ex

```
begin
declare A,I as integer;
declare B,C,D,size as real;
declare PI;
declare LLL(100) AS REAL;
```

```
PI:=3.1416;
B:=PI*B*B+C/D+0.345E-6;
```

```
FOR (I:=1 TO 100)
    C:=LLL(I)+B*D-C;
ENDFOR
```

```
IF (C>=10000) THEN
    print("Good!");
ENDIF
```

end

```
1 Token number is 1, value is begin
2 Token number is 5, value is declare
3 Token number is 5, value is A
4 Token number is 13, value is ,
5 Token number is 5, value is I
6 Token number is 5, value is as
7 Token number is 5, value is integer
8 Token number is 12, value is ;
9 Token number is 5, value is declare
10 Token number is 5, value is B
11 Token number is 13, value is ,
12 Token number is 5, value is C
13 Token number is 13, value is ,
14 Token number is 5, value is D
15 Token number is 13, value is ,
16 Token number is 5, value is size
17 Token number is 5, value is as
18 Token number is 5, value is real
19 Token number is 12, value is ;
20 Token number is 5, value is declare
21 Token number is 5, value is PI
22 Token number is 12, value is ;
23 Token number is 5, value is declare
24 Token number is 5, value is LLL
25 Token number is 10, value is (
26 Token number is 6, value is 100
27 Token number is 11, value is )
28 Token number is 5, value is AS
29 Token number is 5, value is REAL
30 Token number is 12, value is ;
31 Token number is 5, value is PI
32 Token number is 14, value is :=
33 Token number is 7, value is 3.1416
34 Token number is 12, value is ;
35 Token number is 5, value is B
36 Token number is 14, value is :=
37 Token number is 5, value is PI
38 Token number is 17, value is *
39 Token number is 5, value is B
40 Token number is 17, value is *
41 Token number is 5, value is B
42 Token number is 15, value is +
43 Token number is 5, value is C
44 Token number is 18, value is /
45 Token number is 5, value is D
46 Token number is 15, value is +
47 Token number is 8, value is 0.345E-6
48 Token number is 12, value is ;
49 Token number is 5, value is FOR
50 Token number is 10, value is (
51 Token number is 5, value is I
52 Token number is 14, value is :=
53 Token number is 6, value is 1
```

%%the beginning of an test data for Micro/Ex

```
begin
declare A,I as integer;
declare B,C,D,size as real;
declare PI;
declare LLL(100) AS REAL;
```

```
PI:=3.1416;
B:=PI*B*B+C/D+0.345E-6;
```

```
FOR (I:=1 TO 100)
  C:=LLL(I)+B*D-C;
ENDFOR
```

```
IF (C>=10000) THEN
  print("Good!");
ENDIF
```

end

```
33 Token number is 7, value is 3.1416
34 Token number is 12, value is ;
35 Token number is 5, value is B
36 Token number is 14, value is :=
37 Token number is 5, value is PI
38 Token number is 17, value is *
39 Token number is 5, value is B
40 Token number is 17, value is *
41 Token number is 5, value is B
42 Token number is 15, value is +
43 Token number is 5, value is C
44 Token number is 18, value is /
45 Token number is 5, value is D
46 Token number is 15, value is +
47 Token number is 8, value is 0.345E-6
48 Token number is 12, value is ;
49 Token number is 5, value is FOR
50 Token number is 10, value is (
51 Token number is 5, value is I
52 Token number is 14, value is :=
53 Token number is 6, value is 1
54 Token number is 5, value is TO
55 Token number is 6, value is 100
56 Token number is 11, value is )
57 Token number is 5, value is C
58 Token number is 14, value is :=
59 Token number is 5, value is LLL
60 Token number is 10, value is (
61 Token number is 5, value is I
62 Token number is 11, value is )
63 Token number is 15, value is +
64 Token number is 5, value is B
65 Token number is 17, value is *
66 Token number is 5, value is D
67 Token number is 16, value is -
68 Token number is 5, value is C
69 Token number is 12, value is ;
70 Token number is 5, value is ENDFOR
71 Token number is 5, value is IF
72 Token number is 10, value is (
73 Token number is 5, value is C
74 Token number is 22, value is >=
75 Token number is 6, value is 10000
76 Token number is 11, value is )
77 Token number is 5, value is THEN
78 Token number is 5, value is print
79 Token number is 10, value is (
80 Token number is 9, value is "Good!"
81 Token number is 11, value is )
82 Token number is 12, value is ;
83 Token number is 5, value is ENDIF
84 Token number is 2, value is end
85 Token number is 38, value is "EOF"
```

但學生對於6.7.8覺得有一些模糊, 所以想先和老師說一下, 有些比較模糊的部份, 學生就自己定義了, 如下三張slides

6. Integer Literal

- Not prefixed with “+” and “-”

7. Float Point Literal

- 12.345, 12.5, 0.1, 123.
 - Not prefixed with “+” and “-”

8. Exponential Float Point Literal

- 0.123E12, 1.23e-3
 - Not prefixed with “+” and “-”

6. Integer Literal

- Not prefixed with “+” and “-”

213/231/324/0/1/2/12398/123000/9999.....這些都是合法的Integer

但00/000/0000/00000/01234/00999/000011112321 學生對於這些情況有些模糊, 學生以正常邏輯 在regular expression將這些情況定義為不合法

7. Float Point Literal

- 12.345, 12.5, 0.1, 123.
 - Not prefixed with “+” and “-”

以上面的邏輯出發：

12.345/12.5/0.1/123./0.111/0./222.123/0.00123/999.這些都是合法的 Float Point

但0123.5/00123.5/0.0/0.1100/123.000/0123. 學生對於這些情況有些模糊，學生以正常邏輯 在 regular expression將這些情況定義為不合法 (整數部份最前面不能有多餘的 0, 小數部份最尾端不能有多餘的0)

所以連同前一個slide

0表示integer的0

0.表示float point的0

8. Exponential Float Point Literal

- 0.123E12, 1.23e-3
 - Not prefixed with “+” and “-”

以上面的邏輯及前面float point的規則出發：

12.345e22 / 12.5E550 / 0.001e0 / 123.e100 / 0.111E9000 / 0.E0 / 0.1e-100 / 0.001E0 / 100.e-100 這些都是合法的Exponential Float Point

但0123.5E100 / 00123.5E100 / 0.0E60 / 0.1100E44 / 123.5E044 / 0123.E006 / 099.E00 學生對於這些情況有些模糊，學生以正常邏輯在 regular expression 將這些情況定義為不合法(整數部份最前面不能有多餘的0, 小數部份最尾端不能有多餘的0)

還有一個部份是string, 學生的string的regular expression是寫成可以接受換行(\n)的, 如下情況:

```
“asd sad sadsad  
  saddd fdsd  
  sda”
```

所以我的測資主要是測上述提到的情況, 且因為感覺一個1個lexical error發生即中止lexer, 學生準備了兩個測資檔案(mytestdata1.txt / mytestdata2.txt)

mytestdata1.txt

mytestdata2.txt

```

%abc%def

```

```

begin
  declare X;
    declare Y;
      declare Z;
        declare W as INTEGER;
X:= 0.E0;
Y:= 0.01e-100;
Z:= 0.1E-900000;
W:= 0;
X := 0.;
  Print("thank you teacher, have a nice day\n");
Y:= 0.0666 * 1240.345E-666000 + 0.;
W:= 012345;
end

```

```

1 Token number is 1, value is begin
2 Token number is 5, value is declare
3 Token number is 5, value is X
4 Token number is 12, value is ;
5 Token number is 5, value is declare
6 Token number is 5, value is Y
7 Token number is 12, value is ;
8 Token number is 5, value is declare
9 Token number is 5, value is Z
10 Token number is 12, value is ;
11 Token number is 5, value is declare
12 Token number is 5, value is W
13 Token number is 5, value is as
14 Token number is 5, value is INTEGER
15 Token number is 12, value is ;
16 Token number is 5, value is X
17 Token number is 14, value is :=
18 Token number is 8, value is 0.E0
19 Token number is 12, value is ;
20 Token number is 5, value is Y
21 Token number is 14, value is :=
22 Token number is 8, value is 0.01e-100
23 Token number is 12, value is ;
24 Token number is 5, value is Z
25 Token number is 14, value is :=
26 Token number is 8, value is 0.1E-900000
27 Token number is 12, value is ;
28 Token number is 5, value is W
29 Token number is 14, value is :=
30 Token number is 6, value is 0
31 Token number is 12, value is ;
32 Token number is 5, value is X
33 Token number is 14, value is :=
34 Token number is 7, value is 0.
35 Token number is 12, value is ;
36 Token number is 5, value is Print
37 Token number is 10, value is (
38 Token number is 9, value is "thank you teacher, have a nice day\n"
39 Token number is 11, value is )
40 Token number is 12, value is ;
41 Token number is 5, value is Y
42 Token number is 14, value is :=
43 Token number is 7, value is 0.0666
44 Token number is 17, value is *
45 Token number is 8, value is 1240.345E-666000
46 Token number is 15, value is +
47 Token number is 7, value is 0.
48 Token number is 12, value is ;
49 Token number is 5, value is W
50 Token number is 14, value is :=
51 Lexical error, terminated

```


Thank Teacher~