

Compiler 5-1.

1. $S \rightarrow ABc$

*2. $A \rightarrow a$

*3. $A \rightarrow \lambda$

#4. $B \rightarrow b$

#5. $B \rightarrow \lambda$

$\text{First}(S) = \text{First}(A) = \{a, \lambda\} = \{a\} \cup \text{First}(B) = \{a\} \cup \{b, \lambda\} = \{a, b, c\}$

$\text{First}(B) = \{b, \lambda\}$

P 代表 Predict set.

1. $P(S \rightarrow ABc) = \text{First}(A) = \{a, \lambda\} = \{a\} \cup \text{First}(B)$
 $= \{a\} \cup \{b\} \cup \{c\} = \{a, b, c\}$

*2. $P(A \rightarrow a) = \{a\}$

*3. $P(A \rightarrow \lambda) = \text{Follow}(A) = \text{First}(B) = \{b, \lambda\}$
 $= \{b\} \cup \text{First}(c) = \{b, c\}$

#4. $P(B \rightarrow b) = \{b\}$

#5. $P(B \rightarrow \lambda) = \text{Follow}(B) = \{c\}$

因為 (2, 3) 之 predict set 沒交集。

而 (4, 5) 之 predict set 也沒交集。

所以為 LL(1).

Compiler 課本題目 5-2

1. $S \rightarrow Ab$

*2. $A \rightarrow a$

*3. $A \rightarrow B$

*4. $A \rightarrow \lambda$

#5. $B \rightarrow b$

#6. $B \rightarrow \lambda$

$\text{First}(S) = \text{First}(A) = \{a\} \cup \text{First}(B)$

$= \{a, b\} \cup \{b\} = \{a, b\}$

1. $P(S \rightarrow Ab) = \text{First}(A) = \{a, b\}$

*2. $P(A \rightarrow a) = \{a\}$

*3. $P(A \rightarrow B) = \text{First}(B) = \{b, \lambda\}$

$= \{b\} \cup \text{Follow}(B)$

$= \{b\} \cup \text{Follow}(A)$

$= \{b\} \cup \{b\} = \{b\}$

*4. $P(A \rightarrow \lambda) = \text{Follow}(A) = \{b\}$

#5. $P(B \rightarrow b) = \text{First}(b) = \{b\}$

#6. $P(B \rightarrow \lambda) = \text{Follow}(B) = \text{Follow}(A) = \{b\}$

因為 (3, 4) 之 predict set 有交集。(No)

(5, 6) 之 predict set 也有交集。(No)

所以非 LL(1).

Compiler 課本題目 5-3

1. $S \rightarrow ABBA$

*2. $A \rightarrow a$

*3. $A \rightarrow \lambda$

#4. $B \rightarrow b$

#5. $B \rightarrow \lambda$

$\text{First}(S) = \text{First}(A) = \{a, \lambda\} = \{a\} \cup \text{First}(B)$

$= \{a, b, \lambda\}$

$\text{First}(A) = \{a, \lambda\}$

$\text{First}(B) = \{b, \lambda\}$

$\text{Follow}(A) = \text{First}(B) = \{b, \lambda\} = \{b\} \cup \text{First}(A)$

$= \{b, a, \lambda\} = \{b, a\} \cup \text{Follow}(S) = \{b, a, \$\}$

$\text{Follow}(B) = \text{First}(B) = \{b, \lambda\} = \{b\} \cup \text{First}(A)$

$= \{b\} \cup \{a, \lambda\} = \{b, a\} \cup \text{Follow}(S)$

$= \{b, a\} \cup \{\$\} = \{a, b, \$\}$

1. $P(S \rightarrow ABBA) = \{a, b, \$\}$

*2. $P(A \rightarrow a) = \{a\}$

*3. $P(A \rightarrow \lambda) = \text{Follow}(A) = \{a, b, \$\}$

#4. $P(B \rightarrow b) = \{b\}$

#5. $P(B \rightarrow \lambda) = \text{Follow}(B) = \{a, b, \$\}$

(2,3)有交集 $\rightarrow$ No! (4,5)有交集 $\rightarrow$ No!

所以非 LL(1).

Compiler 課本題目 5-4

*1. $S \rightarrow aSe$

*2. $S \rightarrow B$

#3. $B \rightarrow bBe$

#4. $B \rightarrow C$

&5. $C \rightarrow cCe$

&6. $C \rightarrow d$

...

*1. $P(S \rightarrow aSe) = \{a\}$

*2. $P(S \rightarrow B) = \text{First}(B) = \{b\} \cup \text{First}(C) = \{b\} \cup \{c, d\} = \{b, c, d\}$

#3. $P(B \rightarrow bBe) = \{b\}$

#4. $P(B \rightarrow C) = \text{First}(C) = \{c, d\}$

&5. $P(C \rightarrow cCe) = \{c\}$

&6. $P(C \rightarrow d) = \{d\}$

(1,2)沒交集。(3,4)沒交集。(5,6)沒交集。

所以，是 LL(1).
