Lecture five

1) About handle

$S \underset{rm}{\Rightarrow} aAcBe \underset{rm}{\Rightarrow} aAcde \underset{rm}{\Rightarrow} aAbcde \underset{rm}{\Rightarrow} abbcde$

G: $S \to aAcBe$

$A \to b \mid Ab$

$B \to d$

for a right-sentential form

abbcde ← the last right most derivation.

(1) b is a handle., although we have $B \to d$, d is not a handle.

(2) reduction 1. aAbcde (Abe: handle)

(3) reduction 2 aAcde (now, d is a handle. d: handle)

(4) reduction 3 aAcBe (AcBe: handle.)

(5) reduction 4. S □

the leftmost reductions are

abbcde, aAbcde, aAcde, aAcBe, S

reduction $A \to b$ | reduction $A \to Ab$ | reduction. $B \to d$ | reduction. $S \to aAcBe$.

2. Viable Prefixes

For example, suppose $E \underset{rm}{\overset{*}{\Rightarrow}} F * id \underset{rm}{\Rightarrow} (E) * id$

at various times during the parse. the stack will hold (, (E, and (E), but it must not hold (E)*, since (E) is a handle, which the parser must reduce to F before shifting *.

$A \to \beta_1 \cdot \beta_2$

① if $\beta_2 \neq \varepsilon$. shift

② if $\beta_2 = \varepsilon$ if $A \to \beta_1$ is the handle. we should reduce by this production.

two valid items may tell us to do different things for the same viable prefix.

3. Canonical LR(1) $S \to BB$
$B \to aB \mid b$

(1) rightmost derivation $S \overset{*}{\underset{rm}{\Rightarrow}} aaBab \underset{rm}{\Rightarrow} aaaBab$

$[B \to a \cdot B, a]$ is valid for a viable prefix $\gamma = aaa$

Let $aaa \cdot Ba\ b$
$\gamma\ \ A\ \ w$

(2) rightmost derivation $S \overset{*}{\underset{rm}{\Rightarrow}} BaB \Rightarrow BaaB$

$[B \to a \cdot B, \$]$ is valid for viable prefix Baa.

$Baa \cdot B\ \$$
$\gamma\ \ A\ \ w$

4. I_0: $S \to \cdot S, \$$
$S \to \cdot CC, \$$
$C \to \cdot cC, c/d$
$C \to \cdot d, c/d$

I_1: $S' \to S \cdot, \$$

I_2: $S \to C \cdot C, \$$
$C \to \cdot cC, \$$
$C \to \cdot d, \$$

I_3: $C \to c \cdot C, dd$
$C \to \cdot cC, dd$
$C \to \cdot d, c/d$

I_4: $C \to d \cdot, c/d$

I_5: $S \to CC \cdot, \$$

I_6: $C \to c \cdot C, \$$
$C \to \cdot cC \$$
$C \to \cdot d, \$$

I_7: $C \to d \cdot, \$$

I_8: $C \to cC \cdot, c/d$

I_9: $C \to cC \cdot, \$$