CS241 Tutorial 7

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June 26th, 2015

Topics:
- Top-Down Parsing
Definitions:

- LL(1): LEft to right scan of input Lefct canonical derivation 1 symbol of lookahead
- Top-down Parser: begins at start symbol and finds a derviation for hte input string
- An LL(1) grammar is a grammar that can be parsed by an LL(1) Parser

Predict Function

Predict(A,a) = {A $\rightarrow \gamma$ | a $\in$First(γ) v ($\gamma \implies *\epsilon$ and a $\in$ Follow(A))}
First(γ) = {b | $\gamma \implies b\beta$ for some β }
Follow(A) = {C | S' $\implies *\alpha$Acβ for some α, β }
- A grammar is LL(1) if $\forall A, a$ |Predict(A,a)| ≤ 1

1. S' $\rightarrow \vdash S \dashv$
2. S $\rightarrow$ a X Y b
3. S $\rightarrow$ XY
4. X $\rightarrow$ pX
5. X $\rightarrow \epsilon$
6. Y $\rightarrow$ q
7. Y $\rightarrow \epsilon$

1) Create Predict Table

First(⊢ S ⊣) = {⊢}
First(aXYb) = {a}
First(XY) = {p,q}
First(pX) = {p}
First(ϵ) = {}
First(q) = {q}

Follow(S') = {} Follow(S) = {⊣}
Follow(X) = {b, ⊣, q }
Follow(Y) = {b, *dashv* }

	⊢	a	b	p	q	⊣
S'	1					
S		2		3	3	3
X			5	4	5	5
Y			7		6	7

2) Parsing Example

Action	Consumed Input	$._{Top}Stack_{Bot}$	Remaining Input
Initialize	ϵ	S'	⊢appqb⊣
Expand 1	ϵ	⊢ S ⊣	⊢appqb⊣
Match ⊢	⊢	S⊣	appqb⊣
Expand 2	⊢	aXYb⊣	appqb⊣
...			