Converting PDAs to CFGs

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Announcements

- Handout
  - "Bottom-Up" parsing
  - Example of PDA to CFG conversion
  - H/W #6 if you did not pick up one last class
- No puzzle today

Last lecture

- Converting CFGs into PDAs
- A “shorthand”

PDA for a grammar $G = \langle V, \Sigma, R, S \rangle$

An example

- $S \rightarrow 0S1 | \epsilon$

An accepting path for 0011

- 0011
An accepting path for 0011

A → B → C → D → E → S

ε, ε → S
ε, S → ε, 0, 0 → ε, 1, 1 → ε

A → B → C → D → E → S

ε, ε → S
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ε, ε → S
ε, S → ε, 0, 0 → ε, 1, 1 → ε
Questions?

Top-down vs Bottom-up parsing
- What we have seen is top-down parsing
  - Start from $S$ and get to the string
- Bottom-up parsing
  - Start from the string and get $S$
  - “Reverse” derivation
  - See the handout for details

So we have shown

Up next…
- Converting PDAs to CFGs

Proof of correctness
- We won’t have time to go through all of the proof
- Reading Assignment:
  - Read from Sipser
  - Claim 2.30, 2.31 in Sipser, Pgs 121-122.