Formal definition of PDAs

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Announcements

- Turn in your H/W #5
- Pick up a copy of H/W #6

A request

- If you do not understand something in class, ASK a question
- Even if it is a doubt in the slides
  - Where I *am* thinking of going a bit fast

Puzzle for the day

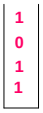
- Design a PDA for the following language
- $\{ xy \mid x,y \in \{0,1\}^*$ and $|x|=|y|$ but $x \neq y \}$

Last Lecture

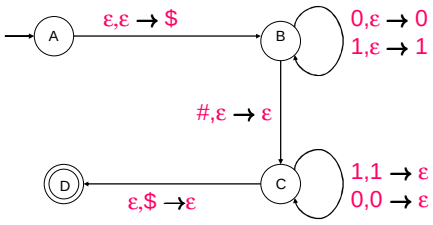
- Designed a few Push Down Automatons
  - PDA = DFA + stack
- Let's recap by another example
- $\{ w \# w^R \mid w \in \{0,1\}^* \}$

Let's look at a string in the language

- 1101 # 1011
- How does 1101 look when it is pushed onto a stack ?
  - It looks the same as the stuff after the #
  - Just "match" off the rest



$\{ w \# w^R \mid w \in \{0,1\}^* \}$



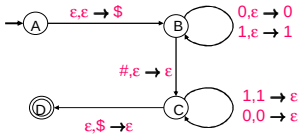
Questions ?

Formal definition of a PDA

- PDA M = $\langle Q,\Sigma,\Gamma,\delta,s,F \rangle$
- Q : set of states
- Σ : input alphabet
- Γ : stack alphabet
  - Symbols that can be pushed and popped
- $\delta : Q \times \Sigma \cup \{\varepsilon\} \times \Gamma \cup \{\varepsilon\} \rightarrow 2^{Q \times \Gamma \cup \{\varepsilon\}}$
  - Transition function
- $s \in Q$: start state
- $F \subseteq Q$: final states

Using the previous example

- Q = {A,B,C,D}
- Σ= {0,1,#}
- Γ= {0,1,$,#}
- s = A
- F = { D }
- The transition from C to D
  - (D,ε) ∈ δ(C,ε,$)



Up next…

- Use non-determinism more critically
- $\{ ww^R \mid w \in \{0,1\}^* \}$

In other words…