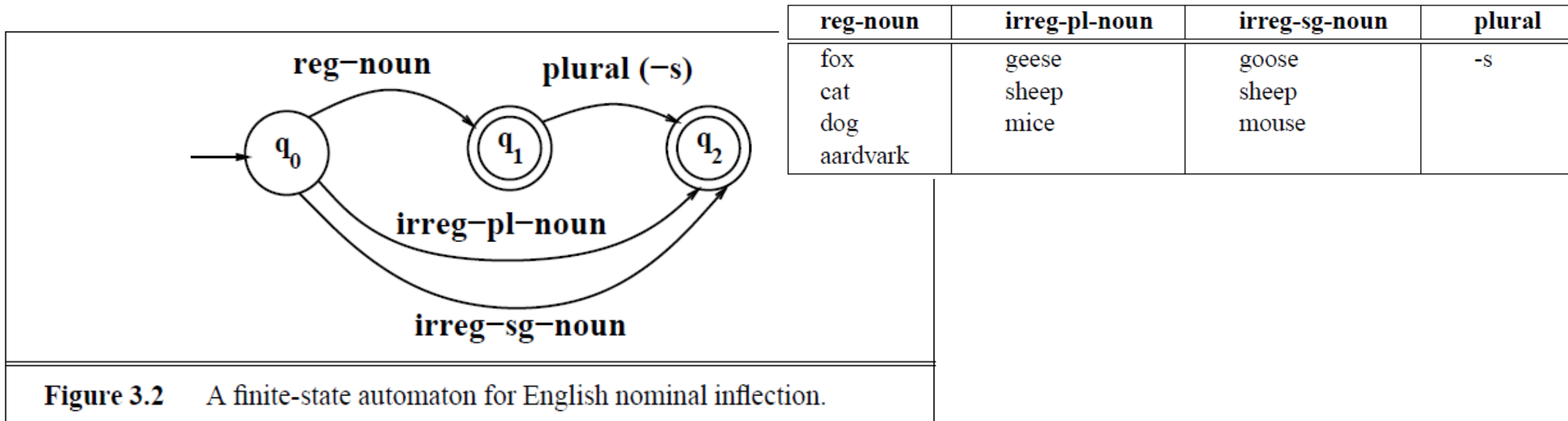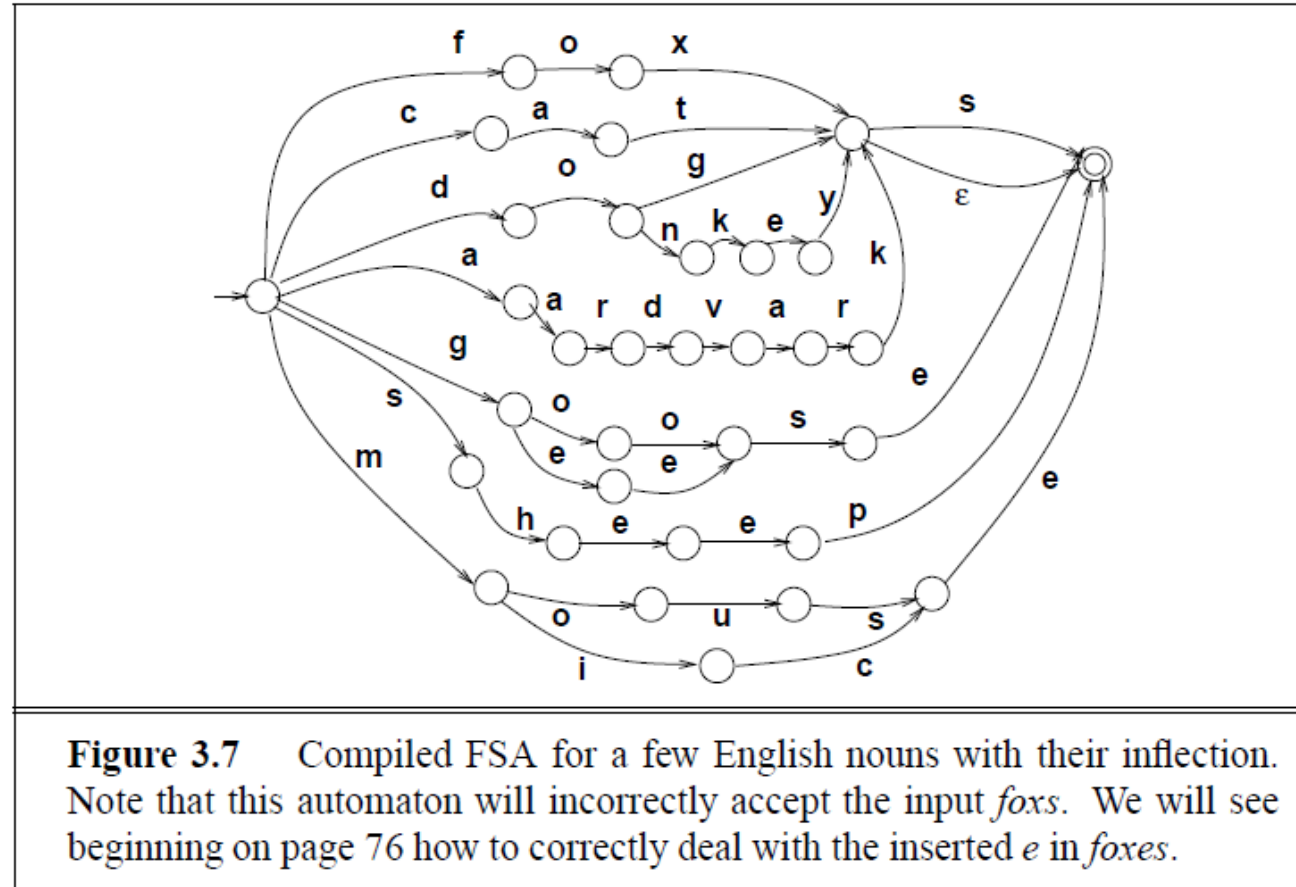# Lecture 16

Finite State Transducer (FST)

Finite State Automata (NFA : based on regular expression)

- Goal: Start from the initial state and reach any one final state

- Outcome: Recognize strings belonging to a formal language

- NLP task: recognize words in the input text (text classification)

reg-noun	irreg-pl-noun	irreg-sg-noun	plural
fox	geese	goose	-s
cat	sheep	sheep	
dog	mice	mouse	
aardvark			

Figure 3.2   A finite-state automaton for English nominal inflection.

FSA example

Figure 3.7 Compiled FSA for a few English nouns with their inflection. Note that this automaton will incorrectly accept the input *foxs*. We will see beginning on page 76 how to correctly deal with the inserted *e* in *foxes*.

Finite State Transducer

output : input (along each arrow) [In some sources it is input : output]
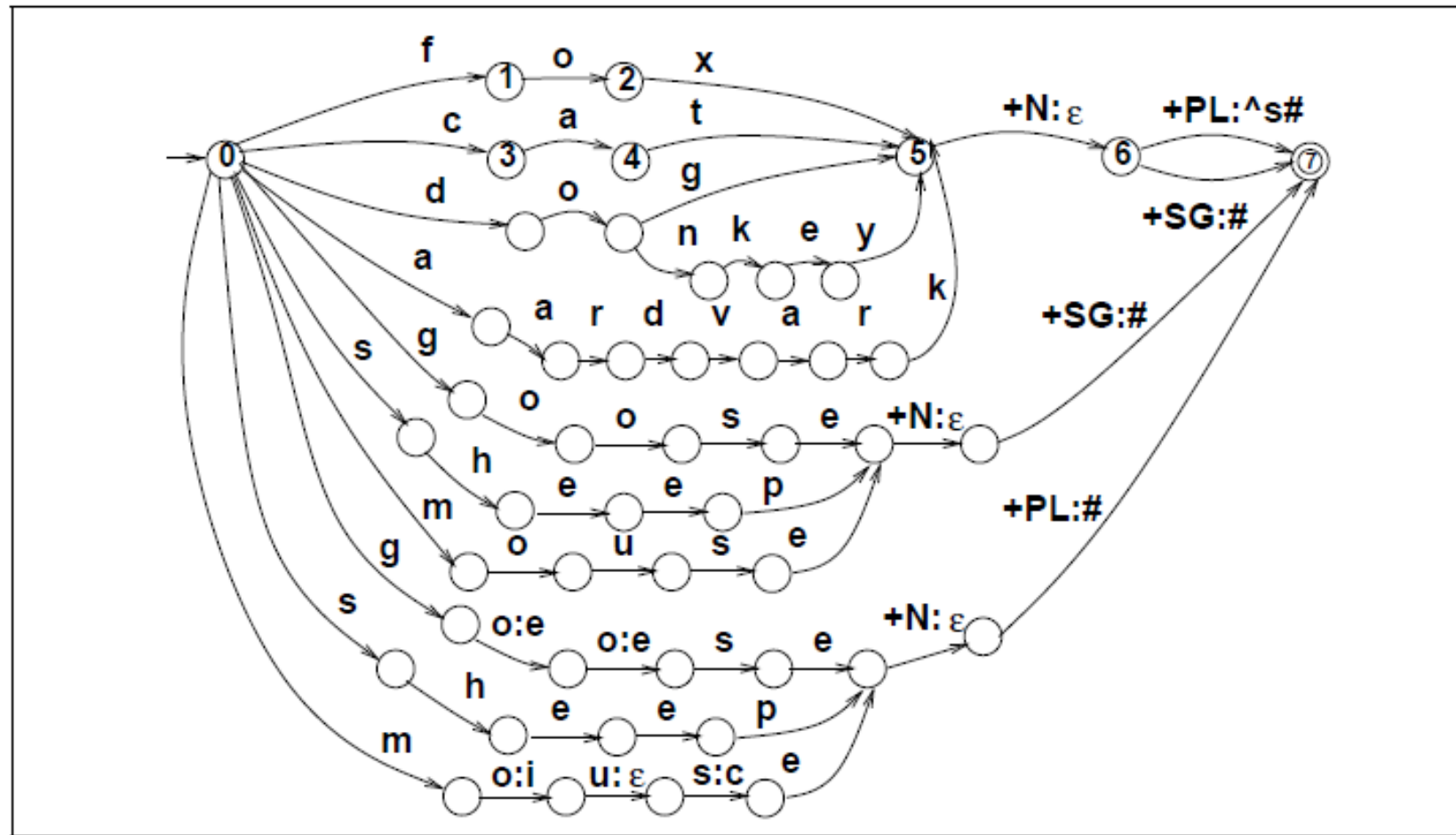
- Goal: Start from the initial state and reach any one final state

- Outcome: Map the input symbols into a new set of symbols

- NLP task: language generation, Question-Answering, Morphological parsing of the input word etc. (map input string→output string)
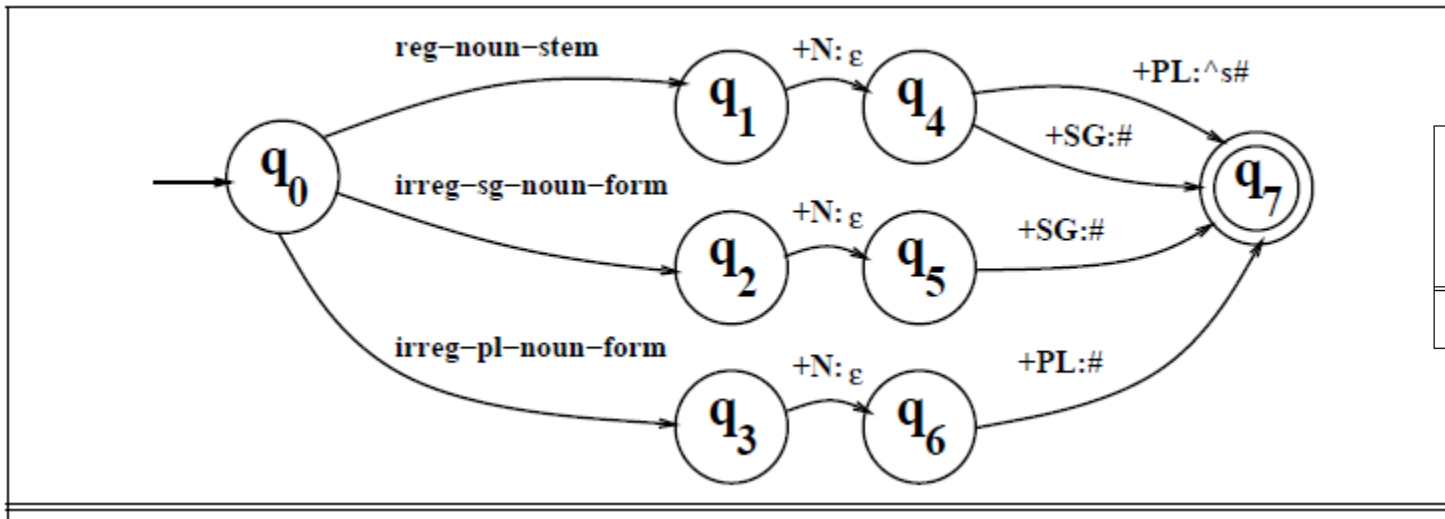
Figure 3.8   Example of the lexical and surface tapes.

FST example

URLs (supplementary material for quiz)

- https://nadesnotes.wordpress.com/2016/04/10/natural-language-processing-nlp-fundamentals-finite-state-transducers-fsts/

- https://www.amazon.science/blog/new-approach-to-language-modeling-reduces-speech-recognition-errors-by-up-to-15

- https://www.amazon.in/b?ie=UTF8&node=14210723031

  (Try out the Alexa Skills Kit (ASK))

- https://developer.amazon.com/en-US/alexa/alexa-skills-kit/asr