

LR Parsing Example (Solution)

Computer Science 426

August 30, 2007

Grammar

1	goal	→	expr
2	expr	→	term - expr
3			term
4	term	→	factor * term
5			factor
6	factor	→	id

Algorithm

```

push '$'
push s0
token ← next_token()
repeat forever
  s ← top of stack
  if ACTION[s,token] = "reduce A → β" then
    pop 2 * |β| symbols
    s ← top of stack    /* not a pop() */
    push A
    push GOTO[s,A]
  else if ACTION[s,token] = "shift si" then
    push token
    push si
    token ← next_token()
  else if ACTION[s, token] = "accept" and
    token = eof then
    report success
  else report a syntax error

```

Action and Goto Tables

	ACTION				GOTO		
	id	-	*	eof	expr	term	factor
S ₀	s4	—	—	—	1	2	3
S ₁	—	—	—	acc	—	—	—
S ₂	—	s5	—	r3	—	—	—
S ₃	—	r5	s6	r5	—	—	—
S ₄	—	r6	r6	r6	—	—	—
S ₅	s4	—	—	—	7	2	3
S ₆	s4	—	—	—	—	8	3
S ₇	—	—	—	r2	—	—	—
S ₈	—	r4	—	r4	—	—	—

Stack	Input	Action
s ₀	id — id eof	shift 4
s ₀ id s ₄	— id eof	reduce 6
s ₀ factor s ₃	— id eof	reduce 5
s ₀ term s ₂	— id eof	shift 5
s ₀ term s ₂ — s ₅	id eof	shift 4
s ₀ term s ₂ — s ₅ id s ₄	eof	reduce 6
s ₀ term s ₂ — s ₅ factor s ₃	eof	reduce 5
s ₀ term s ₂ — s ₅ term s ₂	eof	reduce 3
s ₀ term s ₂ — s ₅ expr s ₇	eof	reduce 2
s ₀ expr s ₁	eof	accept