Name:

Student ID:

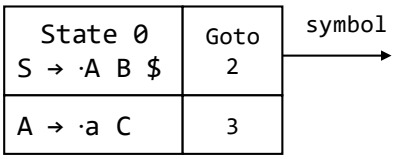
Compiler Construction, Spring 2017
Quiz 3

Given the context-free grammar (CFG), please build the transition diagram (i.e., characteristic finite-state machine, CFSM) and the parse table using the proper LR table construction method (e.g., LR(0) if applicable). Please state the method you used for parse table construction.

Context-free grammar:

```
1| S -> E $
2| E -> T
3|    | E + T
4| T -> id
5|    | ( E )
```

Example of a transition diagram node:



Note: reducible states are **double-boxed** nodes.

Example of the (simplified) parse table:

State	*S*	*E*	*T*
0	**s1**		**Accept**
1		**r2**	
2			

Note:

1. Table entry should use ***s*** or ***r*** to indicate it is a **shift** or **reduce** operation, where the ***s*** or ***r*** should be followed by a state or rule number, e.g., s1 or r2.
2. In addition, an ***Accept*** entry means a successful parsing, whereas an empty entry means a syntax error.

Ans:

State	*id*	*+*	*(*	*)*	*$*	*S*	*E*	*T*
0	**s5**		**s7**			**Accept**	**s1**	**s6**
1		**s3**			**s2**			
2	**r1**							
3	**s5**		**s7**					**s4**
4	**r3**							
5	**r4**							
6	**r2**							
7	**s5**		**s7**				**s8**	**s6**
8		**s3**		**s9**				
9	**r5**							

States:

State	Items
0	S -> •E$ E -> •T E -> •E + T T -> •id T -> •(E)
1	S -> E•$ E -> E•+ T
2	S -> E$•
3	E -> E+•T T -> •id T -> •(E)
4	E -> E + T•
5	T -> id•
6	E -> T•
7	T -> (•E) E -> •T E -> •E + T T -> •id T -> •(E)
8	T -> (E•) E -> E•+T
9	T -> (E) •