

CS3240 Homework 4  
Due: Wed, April 5 by 5pm

Guidelines:

1. Work on the homework individually. Do not collaborate or copy from others
2. The homework is due on Wed, April 5 by 5pm. No late submissions will be entertained
3. Submit your homework in the box outside Prof. Pande's office at CCB 222 (College of Computing building)
4. Do not email your answers to either the Professor or the TA. Emailed answers will not be considered for evaluation

Question 1: (50 Points)

Consider the grammar

```
lexp      → atom | list
atom      → number | identifier
list      → ( lexp-seq )
lexp-seq  → lexp-seq lexp | lexp
```

- I. Remove the left recursion
- II. Construct the first and follow sets for the nonterminals of the resulting grammar
- III. Show that the resulting grammar is LL(1)
- IV. Construct a LL(1) parsing table for this grammar
- V. Show the actions of the corresponding LL(1) parser, given the input  
(a (b (2) ) (c) )  
Note that a,b,c are identifiers and 2 is a number

Question 2: (50 points)

Consider the following grammar

```
lexp      → atom | list
atom      → number | identifier
list      → ( lexp-seq )
lexp-seq  → lexp, lexp-seq | lexp
```

- I. Left factor this grammar
- II. Construct the first and follow sets for the nonterminals of the resulting grammar
- III. Show that the resulting grammar is LL(1)
- IV. Construct a LL(1) parsing table for this grammar
- V. Show the actions of the corresponding LL(1) parser, given the input  
(a, (b, (2)), (c))  
Note that a,b,c are identifiers and 2 is a number