Ph.D. Comprehensive Examination

Computer Science Department
University of Miami

August 16, 2019

Student Name: Student Number:

Problem number	Points (10 max)
1	
Total:	

1. **Automata and language theory**

   Consider the following grammar:

   $G \longrightarrow S\ \$\$$
   $S \longrightarrow A\ M$
   $M \longrightarrow S \mid \epsilon$
   $A \longrightarrow a\ E \mid b\ A\ A$
   $E \longrightarrow a\ B \mid b\ A \mid \epsilon$
   $B \longrightarrow b\ E \mid a\ B\ B$

   (a) Describe the language that the grammar generates in English.

   (b) Show a parse tree for the string `a b a a`.

   (c) Is the grammar LL(1)? If so, show the parse table; if not, identify a prediction conflict.