Computer Science 330 Language Implementation

Test Information

6.20-8.00pm Thursday 8th April 2004 Library B28

Start reading 6.20p.m. Write your name on all sheets of your answer book. Start writing your answers at 6.30pm. Stop writing at 8.00p.m.

Remove the staple fastening the question sheets to the answer book, but do not remove the staples from the answer book. Read the questions carefully. Hand in your answer book at the front of the class. Always show your working - most marks are for showing you know what you are doing, rather than just getting the right answer. Attempt all questions. Questions total 100 marks. The test counts for 20% of the total mark.

Question 1   15 Marks

Write JFlex rules to match the following tokens, and where appropriate return a value, or perform some appropriate action.
(a)   (2 marks)
(b)   (2 marks)
(c)   (2 marks)
(d)   (2 marks)
(e)   (7 marks)

Question 2   65 marks

Consider the following CUP grammar.

(a)   Using the information provided in the appendix, perform a shift-reduce LALR(1) parse of the input

        …

        Show both the symbols and states on the stack, the current token, and the action performed at each stage.

                                                                                           (20 marks)

(b)   Draw the full parse tree, showing all rules used in the above shift-reduce LALR(1) parse.   (8 marks)

(c)   (i)   Note that … is nullable.

        (ii)   Draw the first graph, and compute the first sets for this grammar.

        (iii)   Draw the follow graph, and compute the follow sets for this grammar.   (27 marks)

(d)   State … is

        Write down the set of items for goto(state …, …). Make sure you take the closure.

                                                                                           (10 marks)

Question 3   20 marks

Write a grammar to parse …, with the specified syntax.   You do not have to write any actions.

Preparation for the test

The test is closely related to the kind of topics in the assignments. The main preparation should be to **Do and Understand The Assignments**!

Also, **try designing little grammars for things**. For example, grammars for variable declarations, method declarations, statements, grammars, regular expressions, etc. Make sure you know how to write grammar rules for sequences, etc.

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