

Southeast University Examination Paper (C)

Course Name Compiling Methodology Examination Term 24-25-2 Score _____
Related Major Mid-Term Self Test Examination Form Close test Test Duration 120 Mins

There are 5 problems in this paper. You can write the answers in English on the attached paper sheets.

1. Please construct a context-free grammar **with ϵ -free productions** for the following language (20%).

$L = \{a^{2m} \omega b^{2n} \mid m \geq n \geq 0, \omega \in (c,d,e)^* \text{ and } \omega \text{ does not contain substring "cdd"}\}$

2. Please construct a **DFA with minimum states** for the following regular expression. (20%)

$((aa^*|bb^*)^*(a|b))^*(a|b^*)$

3. Please **eliminate the left recursions (if there are)** and **extract maximum common left factors (if there are)** from the following context free grammar, and then decide **the resulted grammar** is whether a LL(1) grammar by **constructing the related LL(1) parsing table.**(20%)

$S \rightarrow Sa | Ab$

$A \rightarrow Ac | Bd$

$B \rightarrow Se|f|Cg$

$C \rightarrow Bh|j$

4. Please **construct a LR(1) parsing table for the following ambiguous grammar with the additional conditions(You determine the required additional conditions by yourself).(20%)**

$S \rightarrow \text{if } E \text{ then } S | \text{if } E \text{ then } S \text{ else } S | a$

$E \rightarrow E \text{ and } E | \text{not } E | b$

5. Please justify that if a context-free grammar G is a LL(1) grammar, then it must be a LR(1) grammar.(20%)