**实验三 LR（k）分析器设计**

**一、实验目的**

（1）掌握下推机这一数学模型的结构和理论，并深刻理解下推自动机在LR分析法中的应用（即LR分析器）。

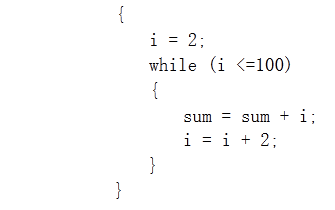
（2）掌握LR分析法的思想，学会特定分析表的构造方法，利用给出的分析表进行LR分析。

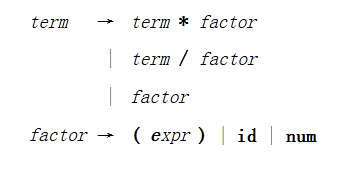
**二、实验内容**

根据课堂讲授的形式化算法，编制程序实现对以下语法进行自底向上语法分析的LR分析器，设计分析表，对给出的输入语句进行语法分析，判断是否符合相应的文法要求。

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输入语句：





**三、实验要求**

要求实现以下功能：

a) 设计分析表和语句的输入；

b) 要实现通用的LR分析思想的源代码；

c) 输出对语句的语法分析判断结果，如果可能给出错误的信息提示。

**四、实现方法**

根据课本的LR分析器模型和LR分析算法，完成LR分析。对要求中的错误信息提示，指的是对应分析表中的空白处，每一个空白的地方都应该有对应的错误情况，因而有相应的错误信息。注意这里的语法分析，是在词法分析的基础上进行的。

1. 构造识别文法所有可归活前缀的DFA
2. 构造LR(1)分析表

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| 状态 |  |  | Action | | | | | | | | | | | Goto | | | | | |
| { | } | ( | ) | + | = | <= | >= | ; | id | num | while | # | block | stmts | stmt | bool | E | T |
| S0 | S2 |  |  |  |  |  |  |  |  |  |  |  |  | 1 |  |  |  |  |  |
| S1 |  |  |  |  |  |  |  |  |  |  |  |  | acc |  |  |  |  |  |  |
| S2 | S2 | r4 |  |  |  |  |  |  |  |  | S8 |  | S12 | 7 | 3 | 5 |  |  |  |
| S3 |  | r4 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| S4 | r2 | r2 |  |  |  |  |  |  |  | r2 |  | r2 | r2 |  |  |  |  |  |  |
| S5 | S2 | r4 |  |  |  |  |  |  |  | S8 |  | S12 |  | 7 | 6 | 5 |  |  |  |
| S6 |  | r3 |  |  |  |  |  |  |  |  |  |  |  |  | S8 |  |  |  |  |
| S7 | r7 | r7 |  |  |  |  |  |  |  | r7 |  | r7 | r7 |  |  |  |  |  |  |
| S8 |  |  |  |  |  | S9 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| S9 |  |  |  |  |  |  |  |  |  | S18 | S19 |  |  |  |  |  |  | 10 | 20 |
| S10 |  |  |  |  | S15 |  |  |  | S11 |  |  |  |  |  |  |  |  |  |  |
| S11 | r5 | r5 |  |  |  |  |  |  |  | r5 |  | r5 |  |  |  |  |  |  |  |
| S12 |  |  | S13 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| S13 |  |  |  |  |  |  |  |  |  | S18 | S19 |  |  |  |  |  | 17 | 14 | 20 |
| S14 |  |  |  |  | S15 | S23 | S22 |  |  |  |  |  |  |  |  |  |  |  |  |
| S15 |  |  |  |  |  |  |  |  |  | S18 | S19 |  |  |  |  |  |  |  | 16 |
| S16 |  |  |  | r10 | r10 |  | r10 | r10 | r10 |  |  |  |  |  |  |  |  |  |  |
| S17 |  |  |  | S21 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| S18 |  |  |  | r12 | r12 |  | r12 | r12 | r12 |  |  |  |  |  |  |  |  |  |  |
| S19 |  |  |  | r13 | r13 |  | r13 | r13 | r13 |  |  |  |  |  |  |  |  |  |  |
| S20 |  |  |  | r11 | r11 |  | r11 | r11 | r11 |  |  |  |  |  |  |  |  |  |  |
| S21 | S2 |  |  |  |  |  |  |  |  | S8 |  | S12 |  | 7 |  | 24 |  |  |  |
| S22 |  |  |  |  |  |  |  |  |  | S18 | S19 |  |  |  |  |  |  | 25 | 20 |
| S23 |  |  |  |  |  |  |  |  |  | S18 | S19 |  |  |  |  |  |  | 26 | 20 |
| S24 | r6 | r6 |  |  |  |  |  |  |  | r6 |  | r6 |  |  |  |  |  |  |  |
| S25 |  |  |  | r9 | S15 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| S26 |  |  |  | r8 | S15 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |