形式语言自动机第五次作业

1652262 涂远鹏

6.2

(1)

S->ASS,ASS->ABSS,ABSS->aaBSS,aaBSS->aabbBSS

aabbBSS->aabbεSS,aabbεSS->aabbεbbS,aabbεbbS->aabbεbbε

(2)

由于最左推导，最右推导和由中间开始时的推导三种推导不同，所以对应三种不同的推导

(3)

该语法分析树对应的上下文无关文法为S->aSb

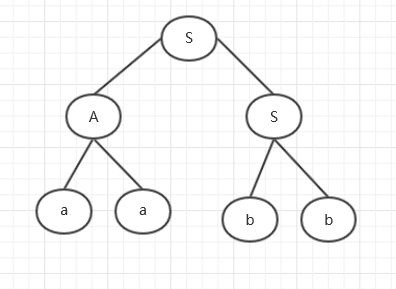
(4)

aabb是CFG的句子，abab不是，因为该上下文无关文法对应的ε最终产生式不包含abab而该CFG产生语句的特点为a，b左右重复出现且对称的原则，abab不满足这个特点

aabb的最右推导为：

S->AS,AS->Abb,Abb->aabb

语法分析树为：



6.9在此文法中只有A->a,B->b符合乔姆斯基范式文法，由于当前文法之中没有ε，所以只需要将不符合要求的产生式进行变化：

S->aB转化为S->C1B,C1->a,

S->Ba转化为S->BC2,C2->a

A->aS转化为A->C3S,C3->a

A->bAA转化为A->C4A,C4->C5A,C5->b

A->a,B->b

B->bS转化为B->C6S,C6->b

B->aBB转化为B->C7B,C7->C8B,C8->a

所以最终转化产生的乔姆斯基范式文法为：

1. >C1B,C1->a,S->BC1,A->C1S,
2. >C4A,C4->C5A,C5->b,A->a,B->b,B->C5S,C5->b,B->C6B,C6->C1B

总结为：

1. >C4A|C1S|a,B->C5S|C6B|b,

S->BC1|C1B,C4->C5A,C5->b,C1->a,C6->C1B

6.10由于当前文法不是乔姆斯基范式文法所以先将其转化为乔姆斯基范式文法，转化之后的结果为：

S->BC,C->a,S->AD,D->b,A->SC,A->AF,F->AD,A->a,

B->SD,B->BG,G->BC,B->b即

首先转化为

第一步:A->BCC|AAD|a|ADC B->BCD|ADD|BBC|b

第二步:A->BB1|AB2|a,B1->aC,B2->AD|bC

B->AB3|BB4|b B3->bD,B4->aD|BC,D->b,C->a

第三步:A->BB1|a|BB1B5|aB5,B5->B2|B2B5

B1->aC,B2->AD|DC

B->AB3|b|AB3B6|bB6

B6->B4|B4B6,B3->bD,B4->aD|BC

第四步:

A->BB1|a|BB1B5|aB5,B5->B2|B2B5

B1->aC,

B->AB3|b|AB3B6|bB6

B6->B4|B4B6,B3->bD,B4->aD|BC

B2->BB1D|aD|BB1B5D|aB5D|bC

5.

A->BB1|a|BB1B5|aB5,B5->B2|B2B5

B1->aC,

B->BB1B3|aB3|BB1B5B3|aB5B3|b|BB1B3B6|aB3B6|BB1B5B3B6|aB5B3B6|bB6

B6->B4|B4B6,B3->bD,B4->aD|BC

B2->BB1D|aD|BB1B5D|aB5D|bC

6.

A->BB1|a|BB1B5|aB5,B5->B2|B2B5

B1->aC,

B->BB7|b|bB6|aB3|aB3B6|aB5B3|aB5B3B6

B7->B1B3|B1B5B3|B1B3B6|B1B5B3B6

B6->B4|B4B6,B3->bD,B4->aD|BC

B2->BB1D|aD|BB1B5D|aB5D|bC

7.

A->BB1|a|BB1B5|aB5,B5->B2|B2B5

B1->aC,

B->b|bB6|aB3|aB3B6|aB5B3|aB5B3B6|bB8|bB6B8|aB3B8|aB3B6B8|aB5B3B8|aB5B3B6B8

B7->B1B3|B1B5B3|B1B3B6|B1B5B3B6

B8->B7|B7B8

B6->B4|B4B6,B3->bD,B4->aD|BC

B2->BB1D|aD|BB1B5D|aB5D|bC

8.最终得到结果

A->aB5|bB1|bB6B1|aB3B1|aB3B6B1|aB5B3B1|aB5B3B6B1|bB8B1|bB6B8B1|aB3B8B1|aB3B6B8B1|aB5B3B8B1|aB5B3B6B8B1|bB1B5|bB6B1B5|aB3B1B5|aB3B6B1B5|aB5B3B1B5|aB5B3B6B1B5|bB8B1B5|bB6B8B1B5|aB3B8B1B5|aB3B6B8B1B5|aB5B3B8B1B5|aB5B3B6B8B1B5

B->b|bB6|aB3|aB3B6|aB5B3|aB5B3B6|bB8|bB6B8|aB3B8|aB3B6B8|aB5B3B8|aB5B3B6B8

B1->aC,

B2->aD|aB5D|bC|bB1B5D|bB6B1B5D|aB3B1B5D|aB3B6B1B5D|aB5B3B1B5D|aB5B3B6B1B5D|bB8B1B5D|bB6B8B1B5D|aB3B8B1B5D|aB3B6B8B1B5D|aB5B3B8B1B5D|aB5B3B6B8B1B5D|bB1D|bB6B1D|aB3B1D|aB3B6B1D|aB5B3B1D|aB5B3B6B1D|bB8B1D|bB6B8B1D|aB3B8B1D|aB3B6B8B1D|aB5B3B8B1D|aB5B3B6B8B1D

B3->bD

B4->aD|bC|bB6C|aB3C|aB3B6C|aB5B3C|aB5B3B6C|bB8C|bB6B8C|aB3B8C|aB3B6B8C|aB5B3B8C|aB5B3B6B8C

B5->aD|aB5D|bC|bB1B5D|bB6B1B5D|aB3B1B5D|aB3B6B1B5D|aB5B3B1B5D|aB5B3B6B1B5D|bB8B1B5D|bB6B8B1B5D|aB3B8B1B5D|aB3B6B8B1B5D|aB5B3B8B1B5D|aB5B3B6B8B1B5D|bB1D|bB6B1D|aB3B1D|aB3B6B1D|aB5B3B1D|aB5B3B6B1D|bB8B1D|bB6B8B1D|aB3B8B1D|aB3B6B8B1D|aB5B3B8B1D|aB5B3B6B8B1D|aDB5|aB5DB5|bCB5|bB1B5DB5|bB6B1B5DB5|aB3B1B5DB5|aB3B6B1B5DB5|aB5B3B1B5DB5|aB5B3B6B1B5DB5|bB8B1B5DB5|bB6B8B1B5DB5|aB3B8B1B5DB5|aB3B6B8B1B5DB5|aB5B3B8B1B5DB5|aB5B3B6B8B1B5DB5|bB1DB5|bB6B1DB5|aB3B1DB5|aB3B6B1DB5|aB5B3B1DB5|aB5B3B6B1DB5|bB8B1DB5|bB6B8B1DB5|aB3B8B1DB5|aB3B6B8B1DB5|aB5B3B8B1DB5|aB5B3B6B8B1DB5

B6->aD|bC|bB6C|aB3C|aB3B6C|aB5B3C|aB5B3B6C|bB8C|bB6B8C|aB3B8C|aB3B6B8C|aB5B3B8C|aB5B3B6B8C|aDB6|bCB6|bB6CB6|aB3CB6|aB3B6CB6|aB5B3CB6|aB5B3B6CB6|bB8CB6|bB6B8CB6|aB3B8CB6|aB3B6B8CB6|aB5B3B8CB6|aB5B3B6B8CB6

B7->aCB3|aCB5B3|aCB3B6|aCB5B3B6

B8->aCB3|aCB5B3|aCB3B6|aCB5B3B6|aCB3B8|aCB5B3B8|aCB3B6B8|aCB5B3B6B8

7.4由于产生式中不包含ε，所以不需要进行消除文法操作，已经是GNF，从而有PDA M=({q},{a,b},{S,A},Ϭ,q,S,Φ),

Ϭ(q,a,S)={(q,AA)}

Ϭ(q,a,A)={(q,S)}

Ϭ(q,b,A)={(q,S)}

Ϭ(q,a,A)={(q,a)}

从而N(M)=L(G)