HW5

Monday, April 10, 2023 4:28 PM

LHS		RHS
S	->	a|XbY
X	->	e|aZ|Y
Y	->	b|XX
Z	->	ab|SS
		as S appears on RHS, we can create new production rule S0->S
S0	->	S
S	->	a|XbY
X	->	e|aZ|Y
Y	->	b|XX
Z	->	ab|SS
		Because the grammar contains null production, we remove X-|e, so:
S0	->	S
S	->	a|XbY|bY
X	->	aZ|Y
Y	->	b|XX|e
Z	->	ab|SS
		We remove the null production Y->e, so:
S0	->	S
S	->	a|XbY|Xb|bY|b
X	->	aZ|b|XX
Y	->	b|XX
Z	->	ab|SS
		We remove the unit production S0->S, so:
S0	->	a|XbY|Xb|bY|b
S	->	a|XbY|Xb|bY|b
X	->	aZ|b|XX
Y	->	b|XX
Z	->	ab|SS
		In production rule S0, S, X, terminals a and b exist on RHS with non-terminates, so we remove:
S0	->	a|XBY|XB|BY|b
S	->	a|XBY|XB|bY|b
X	->	AZ|b|XX
Y	->	b|XX
Z	->	ab|XX
B	->	a
A	->	b
		We remove Z->ab because it can't be part of CNF
S0	->	a|XBY|XB|BY|b
S	->	a|XBY|XB|BY|b
X	->	AZ|b|XX
Y	->	b|XX
Z	->	VW|SS
B	->	b
A	->	a
V	->	a
W	->	b
		In production rule S0->XBY, RHS has more than 2 symbols, so by removing them:
S0	->	a|PY|XB|BY|b
S	->	a|XBY|XB|BY|b
X	->	AZ|b|XX

Y	->	b|XX
Z	->	VW|SS
B	->	b
A	->	a
V	->	a
W	->	b
P	->	XB
		Similarly S->XBY has more than2 symbols, and by removing them:
S0	->	a|PY|XB|BY|b
S	->	a|QY|XB|BY|b
X	->	AZ|b|XX
Y	->	b|XX
Z	->	VW|SS
B	->	b
A	->	a
V	->	a
W	->	b
P	->	XB
Q	->	xb
		This is the final result