## 选题

1. Tseitin编码

在选用的编程语言中定义布尔表达式的数据结构（布尔表达式定义为父类Expr，原子变量和布尔连接符定义为Expr的子类）

实现Tseitin编码算法，将任何布尔表达式转换为3-CNF表达式

使用以下案例测试Tseitin编码：

((x\_1→x\_2)∨¬((¬x\_1↔x\_3)∨x\_4))∧¬x\_2

(x\_1∨x\_2∨x\_3∨x\_4∨x\_5)∧(x\_2∨x\_3∨x\_4∨x\_5∨x\_6)∧(x\_3∨x\_4∨x\_5∨x\_6∨x\_7)

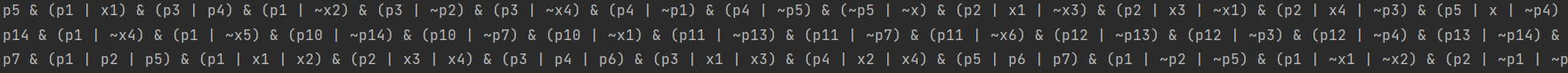
((x\_1↔x\_2)↔(x\_3↔x\_4))↔((x\_1↔x\_3)↔(x\_2↔x\_4))

## 代码

实验代码为Tseitin.py文件

## 结果

截图



Tseitin(((x\_1→x\_2)∨¬((¬x\_1↔x\_3)∨x\_4))∧¬x\_2) =

p5 & (p1 | x1) & (p3 | p4) & (p1 | ~x2) & (p3 | ~p2) & (p3 | ~x4) & (p4 | ~p1) & (p4 | ~p5) & (~p5 | ~x) & (p2 | x1 | ~x3) & (p2 | x3 | ~x1) & (p2 | x4 | ~p3) & (p5 | x | ~p4) & (x1 | x3 | ~p2) & (p1 | ~p3 | ~p4) & (x2 | ~p1 | ~x1) & (~p2 | ~x1 | ~x3)

Tseitin((x\_1∨x\_2∨x\_3∨x\_4∨x\_5)∧(x\_2∨x\_3∨x\_4∨x\_5∨x\_6)∧(x\_3∨x\_4∨x\_5∨x\_6∨x\_7)) =

p14 & (p1 | ~x4) & (p1 | ~x5) & (p10 | ~p14) & (p10 | ~p7) & (p10 | ~x1) & (p11 | ~p13) & (p11 | ~p7) & (p11 | ~x6) & (p12 | ~p13) & (p12 | ~p3) & (p12 | ~p4) & (p13 | ~p14) & (p2 | ~x5) & (p2 | ~x6) & (p3 | ~x6) & (p3 | ~x7) & (p4 | ~p1) & (p4 | ~x3) & (p5 | ~p1) & (p5 | ~x6) & (p6 | ~p2) & (p6 | ~x7) & (p7 | ~p4) & (p7 | ~x2) & (p8 | ~p4) & (p8 | ~x6) & (p9 | ~p1) & (p9 | ~p3) & (p1 | p3 | ~p9) & (p1 | x3 | ~p4) & (p1 | x6 | ~p5) & (p2 | x7 | ~p6) & (p3 | p4 | ~p12) & (p4 | x2 | ~p7) & (p4 | x6 | ~p8) & (p7 | x1 | ~p10) & (p7 | x6 | ~p11) & (x4 | x5 | ~p1) & (x5 | x6 | ~p2) & (x6 | x7 | ~p3) & (p13 | ~p11 | ~p12) & (p14 | ~p10 | ~p13)

Tseitin(((x\_1↔x\_2)↔(x\_3↔x\_4))↔((x\_1↔x\_3)↔(x\_2↔x\_4))) =

p7 & (p1 | p2 | p5) & (p1 | x1 | x2) & (p2 | x3 | x4) & (p3 | p4 | p6) & (p3 | x1 | x3) & (p4 | x2 | x4) & (p5 | p6 | p7) & (p1 | ~p2 | ~p5) & (p1 | ~x1 | ~x2) & (p2 | ~p1 | ~p5) & (p2 | ~x3 | ~x4) & (p3 | ~p4 | ~p6) & (p3 | ~x1 | ~x3) & (p4 | ~p3 | ~p6) & (p4 | ~x2 | ~x4) & (p5 | ~p1 | ~p2) & (p5 | ~p6 | ~p7) & (p6 | ~p3 | ~p4) & (p6 | ~p5 | ~p7) & (p7 | ~p5 | ~p6) & (x1 | ~p1 | ~x2) & (x1 | ~p3 | ~x3) & (x2 | ~p1 | ~x1) & (x2 | ~p4 | ~x4) & (x3 | ~p2 | ~x4) & (x3 | ~p3 | ~x1) & (x4 | ~p2 | ~x3) & (x4 | ~p4 | ~x2)