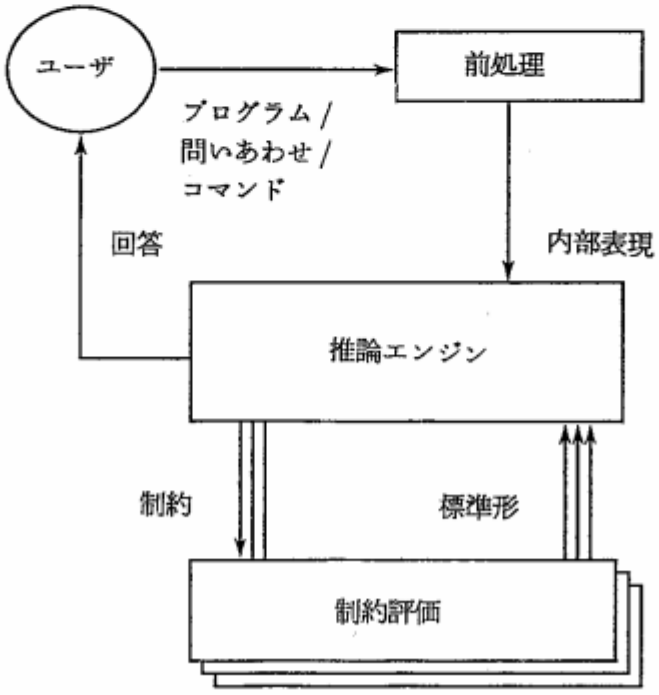
題　名	制約論理プログラミング言語実験システム
目　的	(1) より書きやすく、読みやすいプログラム (2) より抽象度の高いプログラミング (3) より効率の良い問題解決技法の研究
概要及び特徴	(1) 論理型言語の制約パラダイムの融合 (2) 複数制約評価系の共存 (3) 非線形代数方程式、およびブール方程式の求解機能 (4) Prolog の自然な拡張
構　成	

デ　　モ　　内　　容　（1／3）

代数 CAL の例

```
CAL ver0.1
?- ['ham.cal'].
"ham.obj" is generated.

 yes

?- ham:horse_and_man(m,h,4,10).
m = 3 .
h = 1 .

 yes
?-
```

(1) 鶴亀算

```
CAL ver0.1
?- ['lag.cal'].
"lag.obj" is generated.

 yes

?- lag:ex(x^2+y^2,[x+y=a],[x,y]).
y = 1/2*a .
x = 1/2*a .

 yes
?-
```

(2) 条件付き極値問題

```
:- public horseandman/4.

horseandman(Men, Horses, Heads, Legs) :-
    Heads = Men + Horses,
    Legs  = 2*Men + 4*Horses.
```

```
:- public ex/3.
:- public lag/2.

ex(F, Constraint, Vars) :-
        lag(Constraint, Lag),
        difs(Vars, F, Lag).

lag([], 0) :- !.
lag([L=R|Cs], Mult*(L-R)+Lag) :-
        L=R:alg, !,
        lag(Cs, Lag).

difs([], _, _) :- !.
difs([Var|Vars], F, Lag) :- !,
        dif(F, Var)=dif(Lag, Var):alg, !,
        difs(Vars, F, Lag).
```

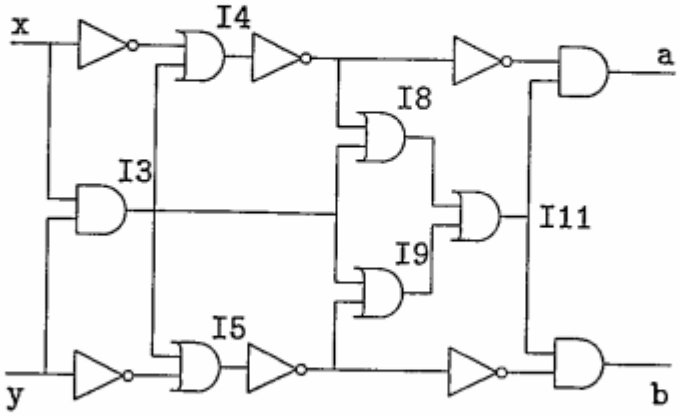
デ　　モ　　内　　容　(2／3)

ブール CAL の例

```
CAL ver0.1
?- ['cross.cal'].
"cross.obj" is generated.

 yes

?- cross:cross(a,b,x,y).
y = a .
x = b .

 yes
?-
```

(3) 交差回路

```
:- public cross/4.

cross(X,Y,A,B) :-
        I3 = X & Y:bool,     I4 = ~X \/ I3:bool, I5 = ~Y \/ I3:bool,
        I8 = ~I4 \/ I3:bool, I9 = ~I5 \/ I3:bool,
        A = I4 & I11:bool,   I11 = I8 \/ I9:bool, B = I5 & I11:bool.
```



デ　　モ　　内　　容　（3／3）

```
CAL ver0.1
?- [-'count.cal'].
"count.obj" is generated.

 yes

?- count:circuit(1,0,1,1,0,y1,y2,y3).
y1 = 0 .
y2 = 1 .
y3 = 1 .

 yes
?- count:circuit(x1,x2,x3,x4,x5,1,0,1).
x1 = 1 .
x2 = 1 .
x3 = 1 .
x4 = 1 .
x5 = 1 .

 yes
?-
```

(4) 入力の１の個数を数える回路

```
:- public circuit/8.

circuit(X1,X2,X3,X4,X5,Y1,Y2,Y3) :-
    I1=X1&X2:bool,     I2=X1\/X2:bool,    I3=X3&X4:bool,
    I4=X3\/X4:bool,    I5= ~I1:bool,       I6= ~I2:bool,
    I7= ~I3:bool,       I8= ~I4:bool,      I9=I1\/I3:bool,
    I10=I1&I3:bool,    I11=I6\/I8:bool,   I12=I6&I8:bool,
    I13= ~X5:bool,      I14=I5&I2:bool,    I15=I7&I4:bool,
    I16= ~I14:bool,     I17= ~I15:bool,     I18=I15\/I16:bool,
    I19=I14\/I17:bool, I20=I14\/I15:bool, I21=I16\/I17:bool,
    I22=I9&I4&I2&X5:bool,
    I23=I11&I7&I5&I13:bool,
    I24=X5&I18&I19:bool,
    I25=I13&I20&I21:bool,
    I26=I22\/I10:bool, I27=I26\/I23\/I2:bool,
    Y1=I26:bool,       Y2= ~I27:bool,          Y3=I24\/I25:bool.
```