TD 2

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1 Constant Propagation

Latice de départ : (Z U $\{\bot, \top\}$,$\sqsubseteq, \sqcap, \sqcup$)
a $\sqsubseteq$ b si a $\sqcup$ b =b
a $\sqsubseteq$ b si a $\sqcap$ b =a
f1,f2 [A$\rightarrow$X]
$\forall x\epsilon$ A (f1 $\sqcup$ f2)(x)=f1(x)$\sqcup$f2(x)
([A$\rightarrow$X],$\sqsubseteq, \sqcap, \sqcup$)
([Vars$\rightarrow$(Z$\cup\{\bot, \top\}$)],$\sqsubseteq, \sqcap, \sqcup$)

C'est une analyse forward(En avant).

Equation:
In(B)=$\sqcup_{B' \in Pred(B)}$Out(B')
Out(B)=F$_B$(In(B))
Initialisation
$\forall$B In(b)=$\lambda x \in$Var .$\bot$

Variante de L'initialisation :
$\forall BIn(B) = \forall x \in Vars\lambda \rightarrow \bot$

2 Exercise 75

1.
B1: x=5
Y:=0

B2: z:=x+y
x:=z

B3: z:=x-y
x:=z

B4: t:=z+x

On crée un vecteur de forme (v1,v2,v3,v4) avec $x \rightarrow v1, y \rightarrow v2, z \rightarrow v3, t \rightarrow v4$

Bloc	In()	Out()	In()	Out()	In()	Out()	In()
B1	(⊥,⊥,⊥,⊥)	(5,0,⊥,⊥)	(⊥,⊥,⊥,⊥)	(5,0,⊥,⊥)	(⊥,⊥,⊥,⊥)	(5,0,⊥,⊥)	(⊥,⊥,⊥,⊥)
B2	(⊥,⊥,⊥,⊥)	(⊥,⊥,⊥,⊥)	(5,0,⊥,⊥)	(5,0,5,⊥)	(5,0,⊥,⊥)	(5,0,5,⊥)	(5,0,⊥,⊥)
B3	(⊥,⊥,⊥,⊥)	(⊥,⊥,⊥,⊥)	(5,0,⊥,⊥)	(5,0,5,⊥)	(5,0,⊥,⊥)	(5,0,5,⊥)	(5,0,⊥,⊥)
B4	(⊥,⊥,⊥,⊥)	(⊥,⊥,⊥,⊥)	(⊥,⊥,⊥,⊥)	(⊥,⊥,⊥,⊥)	(5,0,5,⊥)	(5,0,5,10)	(5,0,5,⊥)

Optimisation:
B2: z:=5
x:=5

B3: z:=5
x:=5

B4: t:=10

2.
B1: x=5
Y:=1

B2: z:=x+y
x:=z

B3: z:=x-y
x:=z

B4: t:=z+x

Bloc	In()	Out()	In()	Out()	In()	Out()	In()
B1	(⊥,⊥,⊥,⊥)	(5,1,⊥,⊥)	(⊥,⊥,⊥,⊥)	(5,1,⊥,⊥)	(⊥,⊥,⊥,⊥)	(5,1,⊥,⊥)	(⊥,⊥,⊥,⊥)
B2	(⊥,⊥,⊥,⊥)	(⊥,⊥,⊥,⊥)	(5,1,⊥,⊥)	(6,1,6,⊥)	(5,1,⊥,⊥)	(6,1,6,⊥)	(5,1,⊥,⊥)
B3	(⊥,⊥,⊥,⊥)	(⊥,⊥,⊥,⊥)	(5,1,⊥,⊥)	(4,1,4,⊥)	(5,1,⊥,⊥)	(4,1,4,⊥)	(5,1,⊥,⊥)
B4	(⊥,⊥,⊥,⊥)	(⊥,⊥,⊥,⊥)	(⊥,⊥,⊥,⊥)	(⊥,⊥,⊥,⊥)	(⊤,1,⊤,⊥)	(⊤,1,⊤,⊤)	(⊤,1,⊤,⊥)

Optimisation:
B2: z:=6
x:=6

B3: z:=4
x:=4

3 Exercise 76

1.

B1: x=4
y:=0
i:=0;

B2:

B3: z:=x
t:=z+y
i:=i+1

B4:

On crée un vecteur de forme (v1,v2,v3,v4,v5) avec $x \to v1, y \to v2, z \to v3, t \to v4, i, , t \to v5$

Bloc	In()	Out()	In()	Out()	In()
B1	($\bot$,$\bot$,$\bot$,$\bot$,$\bot$)	(4,0,$\bot$,$\bot$,0)	($\bot$,$\bot$,$\bot$,$\bot$,$\bot$	(4,0,$\bot$,$\bot$,0)	($\bot$,$\bot$,$\bot$,$\bot$,$\bot$)
B2	($\bot$,$\bot$,$\bot$,$\bot$,$\bot$)	($\bot$,$\bot$,$\bot$,$\bot$,$\bot$)	(4,0,$\bot$,$\bot$,0)	(4,0,$\bot$,$\bot$,0)	(4,0,$\bot$,$\bot$,0)
B3	($\bot$,$\bot$,$\bot$,$\bot$,$\bot$)	($\bot$,$\bot$,$\bot$,$\bot$,$\bot$)	($\bot$,$\bot$,$\bot$,$\bot$,$\bot$)	($\bot$,$\bot$,$\bot$,$\bot$,$\bot$)	(4,0,$\bot$,$\bot$,0)
B4	($\bot$,$\bot$,$\bot$,$\bot$,$\bot$)	($\bot$,$\bot$,$\bot$,$\bot$,$\bot$)	($\bot$,$\bot$,$\bot$,$\bot$,$\bot$)	($\bot$,$\bot$,$\bot$,$\bot$,$\bot$)	(4,0,$\bot$,$\bot$,0)

Out()	In()	Out()	In()	Out()	In()
(4,0,$\bot$,$\bot$,0)	($\bot$,$\bot$,$\bot$,$\bot$,$\bot$)	(4,0,$\bot$,$\bot$,0)	($\bot$,$\bot$,$\bot$,$\bot$,$\bot$)	(4,0,$\bot$,$\bot$,0)	($\bot$,$\bot$,$\bot$,$\bot$,$\bot$)
(4,0,$\bot$,$\bot$,0)	(4,0,4,4,$\top$)	(4,0,4,4,$\top$)	(4,0,4,4,$\top$)	(4,0,4,4,$\top$)	(4,0,4,4,$\top$)
(4,0,4,4,1)	(4,0,$\bot$,$\bot$,0)	(4,0,4,4,1)	(4,0,4,4,$\top$)	(4,0,4,4,$\top$)	(4,0,4,4,$\top$)
(4,0,$\bot$,$\bot$,0)	(4,0,$\bot$,$\bot$,0)	(4,0,$\bot$,$\bot$,0)	(4,0,4,4,$\top$)	(4,0,4,4,$\top$)	(4,0,4,4,$\top$)

Optimisation:

B3: z:=4
t:=4