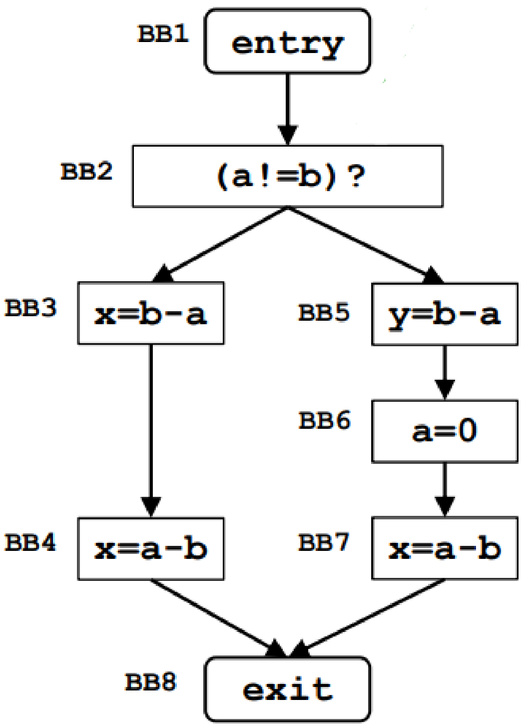
Very Busy Expression



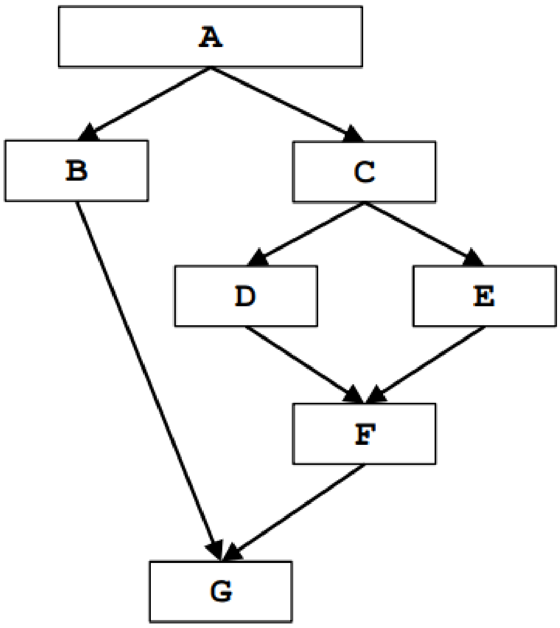
	Framework VBE
Domain	$D = \{b - a, a - b, a \neq b\}$
Direction	Backward: $\text{IN}_B = f_b(\text{OUT}_B)$ $\text{OUT}_B = \wedge\text{IN}(\text{succ}_B)$
Transfer Function	$f_b(x) = \text{Gen}_B \cup (x - \text{Kill}_B)$
Meet Operator	Intersezione $\cap$
Boundary Condition	$\text{OUT}[Exit] = \emptyset$
Initial Interior Points	$\text{IN}_B = \mathcal{U}$

	IN_B	OUT_B
BB1	$a \neq b, b - a$	$a \neq b, b - a$
BB2	$a \neq b, b - a$	$b - a$
BB3	$b - a, a - b$	$a - b$
BB4	$a - b$	$\emptyset$
BB5	$b - a$	$\emptyset$

	IN_B	OUT_B
BB6	$\emptyset$	$a - b$
BB7	$a - b$	$\emptyset$
BB8	$\emptyset$	$\emptyset$

Perciò possiamo dire che le VBE di questo pezzo di codice sono $a \neq b$ e $b - a$, poiché vengono valutate almeno una volta prima di essere ridefinite.

Dominator Analysis



DOM[F] = {A,C,F}

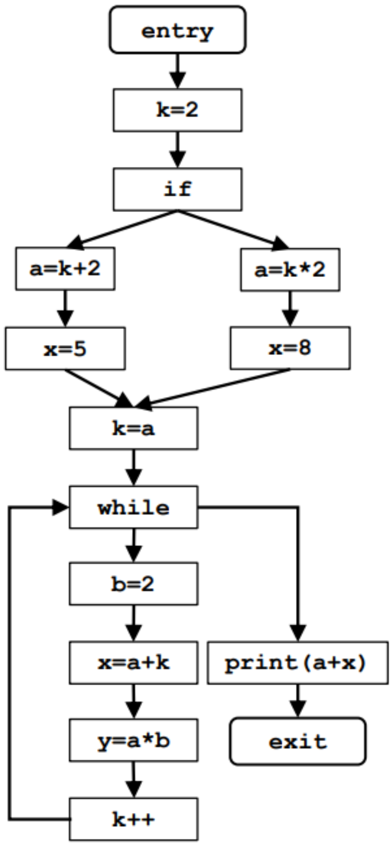
	Framework Dominators
Domain	$D = \{A, B, C, D, E, F, G\}$
Direction	Forward: $\text{OUT}_B = f_b(\text{IN}_B)$ $\text{IN}_B = \wedge\text{OUT}(\text{pred}_B)$
Transfer Function	$f_b(x) = B \cup x$
Meet Operator	Intersezione $\cap$
Boundary Condition	$\text{OUT}_A = A$

	Framework Dominators
Initial Interior Points	$\text{OUT}_B = \mathcal{U}$

	IN_B	OUT_B
A	$\emptyset$	A
B	A	B, A
C	A	C, A
D	C, A	D, C, A
E	C, A	E, C, A
F	C, A	F, C, A
G	A	G, A

NOTA: la boundary condition serve posta così poiché l'intersezione di un insieme vuoto NON è un insieme vuoto.

Constant Propagation



	Framework CP
Domain	$D = \{[x, c]\}$ dove $[x, c]$ sono le coppie
Direction	Forward: $\text{OUT}_B = f_b(\text{IN}_B)$ $\text{IN}_B = \wedge \text{OUT}(\text{pred}_B)$
Transfer Function	$f_b(x) = \text{Gen}_B \cup (x - \text{Kill}_B)$
Meet Operator	Intersezione $\cap$
Boundary Condition	$\text{OUT}[Entry] = \emptyset$
Initial Interior Points	$\text{OUT}_B = \mathcal{U}$

BB	**I1**	**I1**
	IN_B	OUT_B
Entry	$\emptyset$	$\emptyset$
k=2	$\emptyset$	$[k, 2]$
if	$[k, 2]$	$[k, 2]$
a=k+2	$[k, 2]$	$[k, 2][a, 4]$
x=5	$[k, 2][a, 4]$	$[k, 2][a, 4][x, 5]$
a=k*2	$[k, 2]$	$[k, 2][a, 4]$
x=8	$[k, 2][a, 4]$	$[k, 2][a, 4][x, 8]$
k=a	$[k, 2][a, 4]$	$[a, 4][k, 4]$
while	$[a, 4][k, 4]$	$[a, 4][k, 4]$
b=2	$[a, 4][k, 4]$	$[a, 4][k, 4][b, 2]$
x=a+k	$[a, 4][k, 4][b, 2]$	$[a, 4][k, 4][b, 2][x, 8]$
y=a*b	$[a, 4][k, 4][b, 2][x, 8]$	$[a, 4][k, 4][b, 2][x, 8][y, 8]$
k++	$[a, 4][k, 4][b, 2][x, 8][y, 8]$	$[a, 4][b, 2][x, 8][y, 8][k, 5]$
print(a+x)	$[a, 4][k, 4]$	$[a, 4][k, 4]$
Exit	$[a, 4][k, 4]$	$[a, 4][k, 4]$

BB	**I2**	**I2**
	In_B	Out_B

BB	I2	I2
Entry	$\emptyset$	$\emptyset$
k=2	$\emptyset$	$[k,2]$
if	$[k,2]$	$[k,2]$
a=k+2	$[k,2]$	$[k,2][a,4]$
x=5	$[k,2][a,4]$	$[k,2][a,4][x,5]$
a=k*2	$[k,2]$	$[k,2][a,4]$
x=8	$[k,2][a,4]$	$[k,2][a,4][x,8]$
k=a	$[k,2][a,4]$	$[a,4][k,4]$
while	$[a,4]$	$[a,4]$
b=2	$[a,4]$	$[a,4][b,2]$
x=a+k	$[a,4][b,2]$	$[a,4][b,2]$
y=a*b	$[a,4][b,2]$	$[a,4][b,2][y,8]$
k++	$[a,4][b,2][y,8]$	$[a,4][b,2][y,8]$
print(a+x)	$[a,4]$	$[a,4]$
Exit	$[a,4]$	$[a,4]$

Dalla terza in poi le iterazioni convergono.