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CSC410, Fall 2016 - Homework 3

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Lecture: Tuesday

I am the sole author of this homework. Signature: Siyuan Zheng

Grace day tokens usage: 1

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Problem 1,

(a) Four.

(1) 1, 2, 3, 6, 7, 8, 11

(2) 1, 2, 3, 6, 9, 10 ,11

(3) 1 ,4 ,5 ,6 , 7, 8, 11

(4) 1, 4, 5 ,6 ,9, 10 ,11

(b)(c)(d)

(1)

Statements	PV	PC
	X <- x, Y <- y	true
1,2,3	X <- x-1, Y <-y + 2	x+y>10 && true =x+y > 10
6,7,8,11	X<-2(x-1) = 2x-2 Y<-2(y+2)=2y+4	2(x-1+y+2)<20 && x + y > 10 =x + y + 1 < 10 && x + y > 10 =x+y<9 && x +y > 10

P = 1,2,3,6,7,8,11

D[P] = {(x,y)|x + y < 9 and x + y > 10}

C[P] = {}

Infeasible

(2)

Statements	PV	PC
	X<-x, Y <-y	true
1,2,3	X = x -1 , Y <- y + 2	true && x + y > 10 =x + y > 10
6,9,10,11	X<- 4(x-1) = 4x-4 Y<- 4(y+2) = 4y +8	2(x-1+y+2)>=20 && x + y > 10 = x + y + 1 >= 10 && x + y > 10 =x + y >=9 && x + y > 10 = x+y > 10

P=1,2,3,6,9,10,11

D[P] = {(x,y)| x + y >10}

C[P] = {}

Feasible

Example : x = 1, y = 10

(3)

Statements	PV	PC
	X<-x, Y<-y	true
1,4,5	Y<-y-1, X <- x +2	true && x + y <= 10 =x + y < = 10
6,7,8,11	X <- 2(x+2) = 2x+4 Y<-2(y-1)=2y-2	2(x+2+y-1)<20 && x +y <= 10 =2(x+y+1)<20&& x+y <= 10 =x+y+<9 && x+y<=10

=x+y <9

P=1,4,5,6,7,8,11

D[P] = {(x,y)| x +y <9}

C[P] = {}

Feasible

Example: x =1, y= 2

(4)

Statements	PC	PV
	X<-x, Y<-y	true
1,4,5	Y<- y -1 X <- x + 2	true && x + y < =10 = x + y <= 10
6,9,10,11	Y<- 4(y-1) = 4y-4 X<-4(x+2) = 4x + 8	2(y-1+x+2) >= 20 && x + y <= 10 =2(x+y+1)>=20 && x + y <= 10 = x + y >= 9 && x + y <= 10

P=1,4,5,6,9,10,11

D[P] = {(x,y)|x +y >= 9 and x + y <= 10}

C[P] = {}

Feasible

Example: x=1， y = 9

Problem 2

(a) Path 1

Statements	PV	PC
	A<-a, X <-x	true
1,2	found <- false, i <- a.length -1	true && true = true
3,4,5,6	found<-true , i <-a.length-2	!false && a.length -1 >= 0 && a[a.length -1] ==x =a.length >=1 && a[a.length-1] == x
3,4,5	found<-true	! true && a.length -2 >=0 && a[a.length -2]==x = false

P=1,2,3,4,5,6,3,4,5

D[P] = {(a,x)|false}

C[P]={}

Infeasible

Path 2

Statements	PV	PC
	A <- a, X<-x	true
1,2	found<-false, i<-a.length -1	true && true = true
3,4,6	i<- a.length -2	!false && a.length-1>=0 && a[a.length-1] != x =a.length >=1 && a[a.length-1]!=x

3,7		!(true && a.length -2 >=0) && a.length >=1 &&a[a.length-1] != x =false &&a.length>=2 && a.length >=1 && a[a.length-1]!=x OR = false && a.length <2 && a.length >= 1 && a[a.length-1]!=x OR=true && a.length<2 &&a.length >=1 &&a[a.length-1]!=x = false OR false OR a.length<2 && a.length>=1 &&a[a.length -1]!= x =a.length == 1&& a[a.length-1] != x = a.length == 1 && a[0] != x

P = 1,2,3,4,6,3,7

D[P] = {(a,x)|a.length ==1 && a[0] != x}

C[P] = {}

Feasible

Example: a = [5] , x = 1

Path 3

Statements	PV	PC
	A <- a, X<-x	true
1,2	found<-false, i <- a.length -1	true && true = true
3,4,5,6	found<-true , i <-a.length-2	!false && a.length -1 >= 0 && a[a.length -1] ==x = true && a.length >=1 &&a[a.length-1] ==x =a.length >=1 &&

a[a.length-1] ==x

3,7

a[a.length-1] ==x &&
a.length >=1 &&
!(false && a.length-2>=0)
=a[a.length-1] ==x&&
a.length > =1 &&
true && a.length >=2
OR = a[a.length -1]==x
&& a.length >= 1
&& true && a.length <2
Or = a[a.length-1]==x
&7a.length>=1
&&false && a.length<2
=a[a.length-1] ==x &&
a.length >= 2
OR a[a.length-1] ==x &&
a.length == 1
=a[a.length-1] == x && a.length >= 1

P = 1,2,3,4,5,6,3,7

D[P]= {(a,x)|a.length >=1 , a[a.length-1] ==x}

C[P] = {}

Feasible

Example: a = [2,3,4] ,x =4

Path 4

Statements	PV	PC
	A<-a , X <- x	true

1,2	found<-false, i<-a.length-1	true && true = true
3,7		true && !(true && a.length-1>=0) =!(true && a.length >=1) =false && a.length >=1 OR false && a.length < 1 OR true && a.length < 1 = a.length < 1

P= 1,2,3,7

D[P]={(a,x)| a.length<1}

C[P] = {}

Feasible

Example : a = [ ] , x = 5