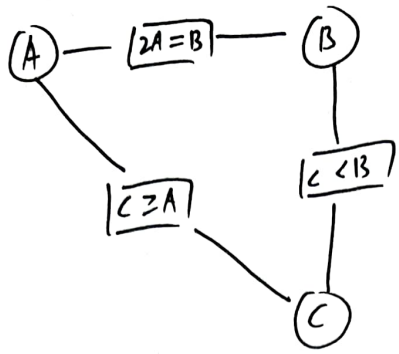
CS3243 Assignment 5

Zhuang Jianning
A0214561M
T03



a) AC-3 Algorithm

Queue

① ~~(A,B)~~, (B,A), (B,C), (C,B), (C,A), (A,C)

D_A reduced to {1,2} since 2×3, 2×4 ∉ D_B

Add (C,A) to queue

② ~~(B,A)~~, (B,C), (C,B), (C,A), (A,C), (C,A)

D_B reduced to {2,4} since $\frac{1}{2}, \frac{3}{2} \notin D_A$

Add (C,B) to queue

③ ~~(B,C)~~, (C,B), (C,A), (A,C), (C,A), (C,B)

D_B not reduced, 2>1 & 4>1, 1,4,3

④ ~~(C,B)~~, (C,A), (A,C), (C,A), (C,B)

D_C reduced to {1,2,3} since 4 ∉ 2,4

Add (A,C) to queue

⑤ ~~(C,A)~~, (A,C), (C,A), (C,B), (A,C)

D_C not reduced, 1≥1, 2≥1,2, 3≥1,2

⑥ ~~(A,C)~~, (C,A), (C,B), (A,C)

D_A not reduced 1≤1,4, 2≤2,3

⑦ ~~(C,A)~~, (C,B), (A,C)

⑧ ~~(C,B)~~, (A,C)

D_C not reduced 1<2,4
2<4
3<4

⑨ ~~(A,C)~~

resultant domain $D_A = \{1,2\}$, $D_B = \{2,4\}$
$D_C = \{1,4,3\}$

	D_A	D_B	D_C
	1,2,3,4	1,2,3,4	1,2,3,4
①	1,2	1,2,3,4	1,2,3,4
②	1,2	2,4	1,4,3,4
④	1,2	2,4	1,2,3

b) after using AC-3 for preprocessing

$D_A = \{1,2\}$, $D_B = \{2,4\}$, $D_C = \{1,2,3\}$

(A) and (C) tie for both MRV and Degree Heuristic

Suppose choose (A) to assign first

LCV for (A) is 1 since it allows all 3 values of D_C to be consistent

(A) = 1, D_B reduced to $\{2\}$, D_C reduced to $\{3\}$

(B) = 2

(C) = 1

A+B+C = 4 ✓

suppose (A) was assigned 2

D_B reduced to $\{4\}$, D_C reduced to $\{2,3\}$

(B) = 4, min A+B+C still 2+4+2 = 8 X

valid assignment of A, B, C such that constraints are satisfied and A+B+C are minimum

is A = 1, B = 2, C = 1