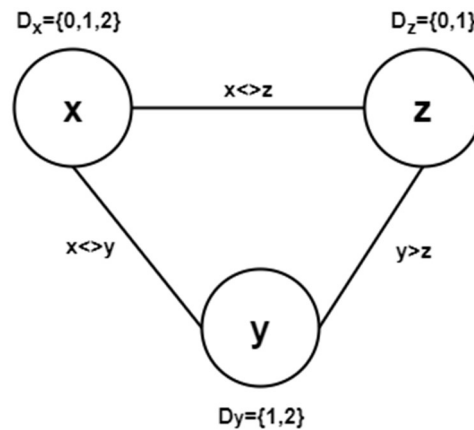


Problem 6.3 CSP Formalization

Answer:

According to the problem description the constraint graph will be as follows,



1. Pairs (v, w) of variables such that v is arc-consistent relative to w ,

Pair (v, w)	Domain (D_v, D_w)	Constraint (C_{vw})	Arc-consistent
(x, y)	$D_x = \{0, 1, 2\}, D_y = \{1, 2\}$	$x \neq y$	Yes
(y, x)	$D_y = \{1, 2\}, D_x = \{0, 1, 2\}$	$y \neq x$	Yes
(y, z)	$D_y = \{1, 2\}, D_z = \{0, 1\}$	$y > z$	Yes
(z, y)	$D_z = \{0, 1\}, D_y = \{1, 2\}$	$z < y$	Yes
(x, z)	$D_x = \{0, 1, 2\}, D_z = \{0, 1\}$	$x \neq z$	Yes
(z, x)	$D_z = \{0, 1\}, D_x = \{0, 1, 2\}$	$z \neq x$	Yes

Therefore, (v, w) of variables such that v is arc-consistent relative to w : $(x, y), (y, x), (y, z), (z, y), (x, z), (z, x)$

2. Assignment Table:

x	y	z	$x \neq y$	$x \neq z$	$y > z$	Partial or Total	Consistent or Inconsistent	Solution
***						P	C	No
0	2	1	T	T	T	T	C	Yes
***						T	IC	No
1	2	0	T	T	T	T	C	Yes
***						T	IC	No
2	1	0	T	T	T	T	C	Yes
***						T	IC	No

Therefore, all solutions (x, y, z) are: $(0, 2, 1), (1, 2, 0), (2, 1, 0)$

3. After assigning $y = 1$, if we apply forward checking, updated domain will be as follows,

$D_x = \{0, 2\}$, 1 is excluded as $y = 1$

$D_y = \{1\}$, since 1 is assigned to y

$D_z = \{0\}$, 1 is excluded as $y = 1$