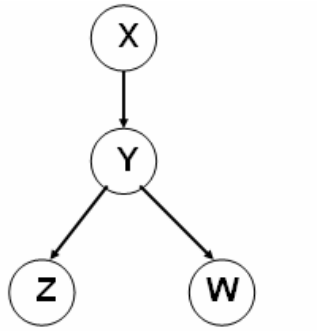
SYST684/IT 888: Fall 2004

Assignment #3
Issued: 11/1/2004
Due: 11/15/2004

Note: Project presentation is on 11/29. Final exam will be given on 12/6 and due on 12/13. The project report is due on 12/13.

1. In the following Bayesnet, P(X), P(Y|X), P(Z|Y), and P(W|Y) are assumed to be given.



To compute P(X|Z,W), one suggestion is to do the following:
(1) Compute P(X|Z)=1/c Σ_Y P(Z|Y)P(Y|X)P(X), P(X|W)=1/c Σ_Y P(W|Y)P(Y|X)P(X)
(2) Compute P(X|Z,W)= 1/c P(X|Z)P(X|W), where P(X|Z) and P(X|W) are obtained in (1)

Is this a good suggestion? If not, what is your way of doing it?

2. For the network given above and the following probability tables,
(a) Compute $P(x \mid z = z_1, w = w_1)$ using the forward sampling simulation method.
(b) Compare that with the analytical results you obtained from problem 1 using both the suggested method and your own method.
(c) Discuss the results.

$P(x_1)$	$P(x_2)$
0.3	0.7

$P(y \mid x)$	y_1	y_2
x_1	.25	.75
x_2	.67	.33

$P(z \mid y)$	z_1	z_2
y_1	.80	.20
y_2	.60	.40

$P(w \mid y)$	w_1	w_2
y_1	.70	.30
y_2	.10	.90