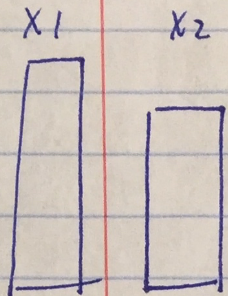
The Basic Case when it does not work.



$$\forall y_1, y_2$$

$$\frac{Pr[M(X_1)=y_1, \; M(X_2)=y_2]}{Pr[M(alt(X_1)=y_1, \; M(alt(X_2))=y_2]}$$

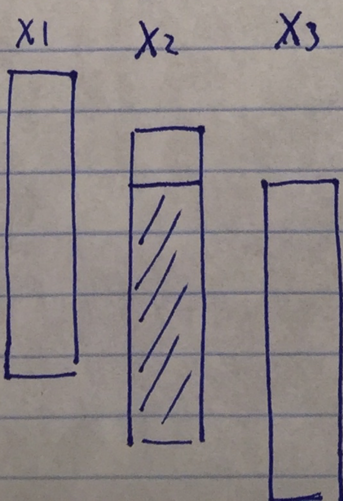
$$= \frac{\sum_z Pr[M(X_1)=y_1 \mid X_2 = z] \cdot \underline{Pr[M(X_2)=y_2 \mid X_2=z]} \cdot Pr[X_2 = z]}{\sum_z Pr[M(alt(X_1))=y_1 \mid X_2 = z] \cdot \underline{Pr[M(alt(X_2))=y_2 \mid X_2=z]} \cdot Pr[X_2 = z]}$$

As long as $\dfrac{Pr[M(X_2)=y_2 \mid X_2 = z]}{Pr[M(alt(X_2))=y_2 \mid X_2 = z]}$ does not

have a bound, the ratio does not have one either.

This requires M have randomness.

The general case.

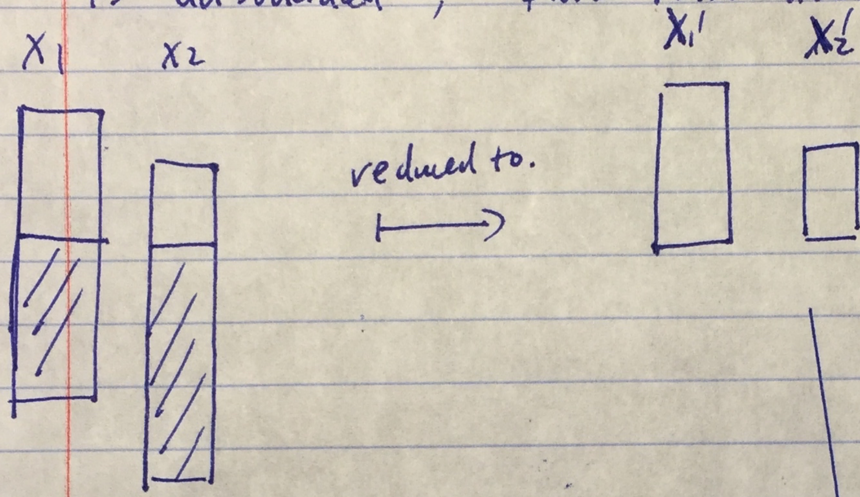


$$\frac{\sum_z \underbrace{Pr[M(X_1)=y_1, \; M(X_2)=y_2 \mid X_2 = z]} \cdot Pr[M(X_3)=y_3 \mid X_2\downarrow = z] \cdot Pr[X_2\downarrow = z]}{\sum_z \underbrace{Pr[M(alt(X_1))=y_1, \; M(alt(X_2))=y_2 \mid X_2 = z]} \cdot Pr[M(alt(X_3))=y_3 \mid X_2\downarrow = z] \cdot Pr[X_2\downarrow = z]}$$

As long as

$$\frac{Pr[M(X_1)=y_1, M(X_2)=y_2 \mid X_2 = Z]}{Pr[M(alt(X_1))=y_1, M(alt(X_2))=y_2 \mid X_2 = Z]}$$

is unbounded, this ratio does not have one bound.



But ↓ problem can be reduced to ↓ problem, which is our base case.

<u>Conclusion:</u> Since DP and CW-P can be seen as a uniform expression interms of a markov Matrix, we are studying the composition theorem of DP without independent randomness.