

# As7

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1)

a) Since  $X_t = X_{t-1} + \epsilon_t$  and  $\epsilon_t = e_t + \beta e_{t-1}e_{t-2}$

$$E(\epsilon_t \epsilon_{t+s}) = E(e_t e_{t+s} + \beta e_{t-1} e_{t-2} e_{t+s} + \beta e_t e_{t+s-1} e_{t+s-2} + \beta^2 e_{t-1} e_{t-2} e_{t+s-1} e_{t+s-2})$$

Since  $e_t$ 's are strictly white noise,  $e_t$ 's are uncorrelated. Thus  $E(\epsilon_t \epsilon_{t+s}) = 0$ ,  $\epsilon$  is a white noise process and not linear predictable.

Therefore,  $E(X_{t+1}|x_t, \dots, x_1, \dots) = E(x_t|x_t, \dots, x_1, \dots) + E(\epsilon_{t+1}|x_t, \dots, x_1, \dots)$   
 $x_t$