

## CS698O: Quiz-3

Name: \_\_\_\_\_ Roll No.: \_\_\_\_\_

$\text{forward}(i, c_k) := P(Y_i = c_k, X_1 = x_1, \dots, X_i = x_i)$

$\text{forward}(i, c_k) = \left( \sum_{c_l} P(Y_i = c_k \mid Y_{i-1} = c_l) \times \text{forward}(i-1, c_l) \right) \times P(X_i \mid Y_i = c_k)$

	STUDY ( $x_1$ )	SHOP ( $x_2$ )	PLAY ( $x_3$ )
SUNNY ( $c_1$ )	0.2	0.4	0.4
RAIN ( $c_2$ )	0.5	0.4	0.1

	SUNNY ( $c_1$ )	RAIN ( $c_2$ )
SUNNY ( $c_1$ )	0.6	0.4
RAIN ( $c_2$ )	0.5	0.5

	SUNNY ( $c_1$ )	RAIN ( $c_2$ )
START	0.8	0.2

	STOP
SUNNY ( $c_1$ )	0.8
RAIN ( $c_2$ )	0.2

**Calculate the forward probabilities for the sequence:  
PLAY, STUDY, PLAY**

	SUNNY ( $c_1$ )	RAIN ( $c_2$ )
$\text{fwd}(1, c_l)$		
$\text{fwd}(2, c_l)$		
$\text{fwd}(3, c_l)$		