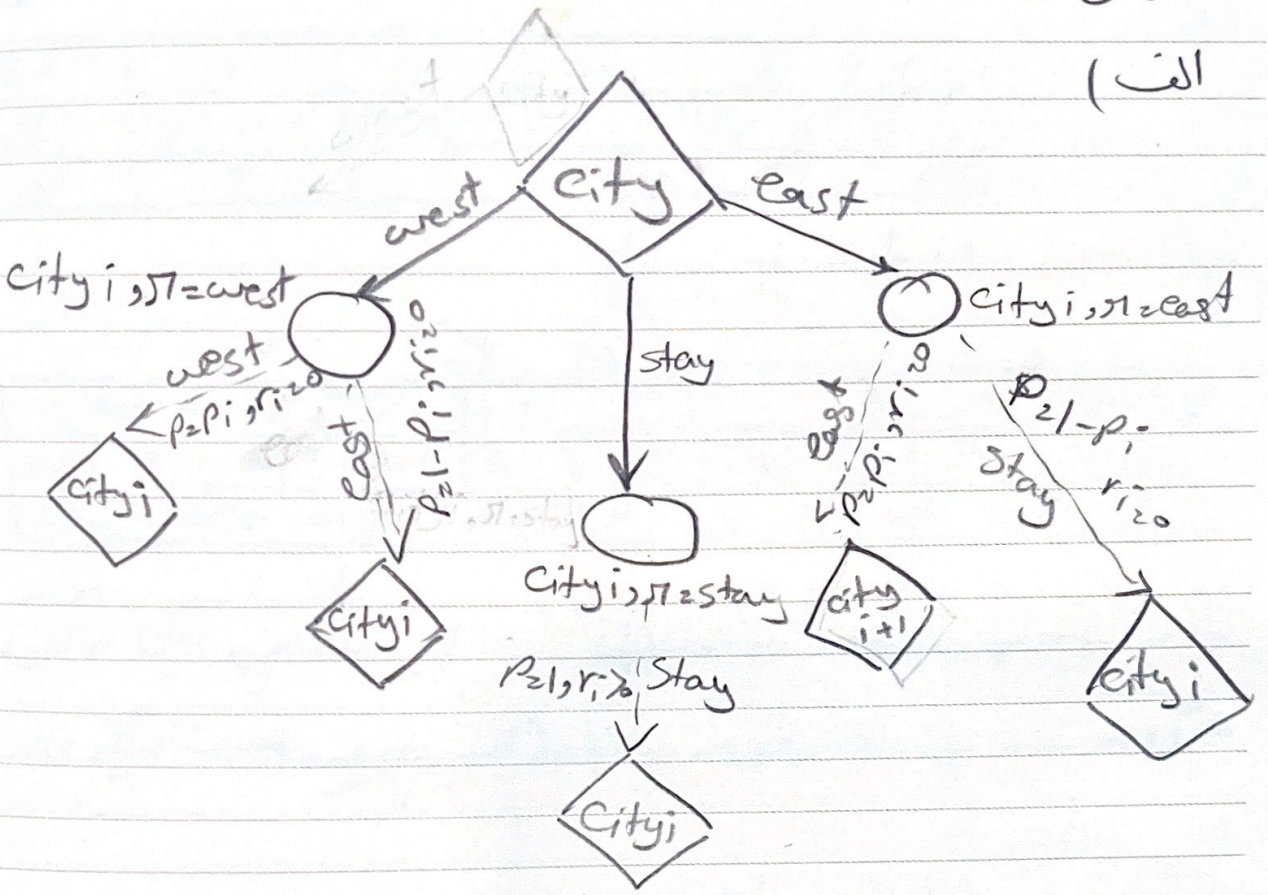
سوال ①:

الف)



ب)

$$V_0^{stay}(1) = 0$$

$$V_1^{stay}(1) = \sum T(S, stay, S) \times [R(S, stay, S) + \frac{1}{2} V_0^{stay}(S)]$$

$$\Rightarrow V_1^{stay}(1) = 1 \times (1 + \frac{1}{2} \times 0) = 1$$

$$V_2^{stay}(1) = 1 \times (1 + \frac{1}{2} \times 1) = \frac{3}{2}$$

$$V_{K+1}^{stay}(1) = 1 \times (1 + \frac{1}{2} V_K^{stay}(1))$$

حد در بی نهایت $\rightarrow V^{stay}(1) = 2$

$$V^*_{k+1}(1) = \max \sum T(s,a,s')\left[R(s,a,s') + \gamma V^*_k(s')\right]$$

$a = stay$ $\quad V_1^{stay}(1) = 1 \times (1 + \frac{1}{2} \times 0) = 1$

$a = R$ $\quad V_1^{R}(1) = 1 \times (1 + \frac{1}{2} \times 0) = 1$

$V_1^*(1) = 1 \;,\; V_2^*(1) = \frac{3}{2} \;,\; \dots \;,\; V_k^*(1) = 2 - \frac{1}{2^k}$

$k \to \infty \Rightarrow V^*(1) = 2$

(ب)

(s,a,r,s')	Q_1, stay	Q_1, east	Q_2, west	Q_2, stay
initial	0	0	0	0
$(1, stay, 0, 1)$	$\frac{1}{2}\times 0 + \frac{1}{2}(0 + \frac{1}{2}\times 0) = \frac{1}{2}$	$\frac{1}{2}\times 0 + \frac{1}{2}(0 + \frac{1}{2}\times 0) = \frac{1}{2}$	0	0
$(1, east, 0, 2)$	$\frac{1}{2}\times 2 + \frac{1}{2}(0 + \frac{1}{2}\times 0) = 1$	$\frac{1}{2}\times 2 + \frac{1}{2}(0 + 0) = 1$	0	0
$(2, stay, 0, 2)$	1	1	3	3
$(2, west, 0, 1)$	1	1	$\frac{7}{4}$	$\frac{7}{4}$
$(1, stay, 0, 1)$	$\frac{11}{8}$	$\frac{11}{8}$	$\frac{7}{4}$	$\frac{7}{4}$