Atharva Prashant Pawar (9427) — BE Comps — A

NLP Assignment 1 Part 2　　①

Q1

⇒ Transition Probability :

	Noun	Pron	Aux	Verb
Start	0.4	0.4	0.2	0
Noun	0.1	0	0	0.2
Pron	0.001	0	0.2	0
Aux	0.001	0	0	0.5
Verb	0.5	0	0	0

Emission Probability :

	She	can	run
Noun	0	0.001	0.001
Pron	0.1	0	0
Verb	0	0	0.2
Aux	0	0.2	0

① Start $\xrightarrow{0.4}$ She $\xrightarrow{0.001}$ can $\xrightarrow{0.1}$ run
　　　　0.1　　　　0.001　　　　0.001

　　　Pron　　　Noun　　　Noun

P(She|Pron , can|Noun, run|Noun)
= 0.4 × 0.1 × 0.001 × 0.001 × 0.1 × 0.001
= 4×10^{-12}

Sundaram®

(2) Start — she — can $\overset{0.5}{—}$ run
$\quad\quad\underset{0.4}{} \quad \underset{0.1}{} \quad \underset{0.2}{} \quad \big|\underset{0.2}{} \quad \big|\underset{0.2}{}$

$\quad\quad\quad$ Pron $\quad\quad$ Aux $\quad\quad$ Verb

$= 0.4 \times 0.1 \times 0.2 \times 0.2 \times 0.5 \times 0.2$

$= 16 \times 10^{-5}$

∴ The probability of 2nd sentence, is more than the 1st, it has more chances of occurring.
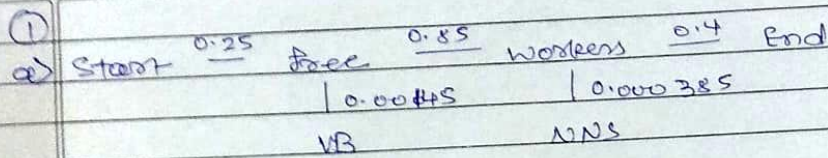
Q2)

⇒ Transition Probabilities:

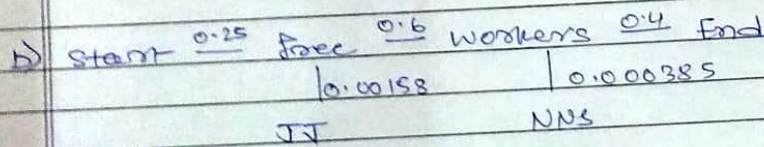|	VB	VBP	JJ	NNS	VBZ	END
Start	0.25	0.25	0.25	0.25	0	0
VB	0	0	0	0.85	0	0.15
VBP	0	0	0	0.45	0	0.45
JJ	0	0	0.2	0.6	0	0.2
NNS	0	0.6	0	0	0	0.4
VBZ	0.2	0	0	0.6	0	0.2
END	0	0	0	0	0	0

Emission Probabilities:

	free	who	workers.
JJ	0.00158		0
NNS	0		0.000385
VB	0.00145		0
VBP	0.00081		0
VBZ	0.		0.00005

① a) Start $\xrightarrow{0.25}$ free $\xrightarrow{0.85}$ workers $\xrightarrow{0.4}$ End

| 0.00145 | 0.000385 |
| VB | NNS |

$$P(\text{free} \mid \text{workers}) = 0.25 \times 0.00145 \times 0.85$$
$$\times 0.000385 \times 0.4$$
$$= 4.745 \times 10^{-8}$$

b) Start $\xrightarrow{0.25}$ free $\xrightarrow{0.6}$ workers $\xrightarrow{0.4}$ End

| 0.00158 | 0.000385 |
| JJ | NNS |

$$P(\text{free} \mid \text{workers}) = 0.25 \times 0.00158 \times 0.6$$
$$\times 0.000385 \times 0.4$$
$$= 3.649 \times 10^{-8}$$

② ∴ The probability of (a) > (b)

∴ (a) is the correct POS.