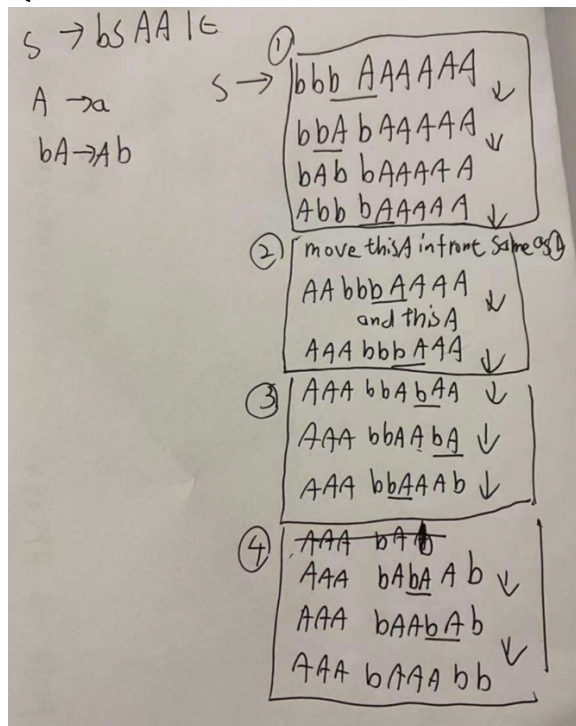


Q1



Q2

1	S, N					
2	N, S	N, S				
3		N, S	N, P			
4	N		P, N	N		
5	N	N		N	N	
6	A	N	N, V	A	N	N, V

the trainer trains the students team

Q3

$$A ::= 0A1 \mid BB$$

$$B ::= \epsilon \mid 2B$$

Remove $\rightarrow \epsilon$

\rightarrow useless

\rightarrow unit production

$$\begin{cases} A_0 \rightarrow A \\ A \rightarrow 0A1 \mid BB \mid B \\ B \rightarrow 2B \mid 2 \end{cases}$$

$$\begin{cases} A_0 \rightarrow S_0 X \mid BB \\ A \rightarrow S_0 X \mid BB \mid B \\ B \rightarrow 2B \mid B \\ X \rightarrow A1 \\ S_0 \rightarrow 0 \end{cases}$$

$$\begin{cases} A_0 \rightarrow A \\ A \rightarrow 0X \mid BB \mid B \\ X \rightarrow A1 \\ B \rightarrow 2B \mid 2 \end{cases}$$

Q4

(i) $S ::= \text{if } 0 \cdot E \cdot \text{ then } \cdot S \cdot \text{ else } \cdot S$ Yes

string: if 0 5 then if 0 5 then 5 else 5

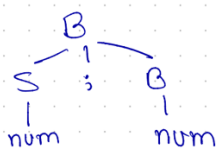
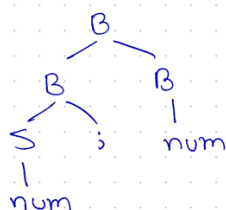
① $\text{if } 0 \ E \ \text{then } S \ \text{else } S$

② $\text{if } 0 \ E \ \text{then } S$

(ii) $B ::= B \cdot B$ Yes

string: num; num

$$B ::= S ; \mid S ; \cdot B \mid B \cdot B \mid \text{num}$$



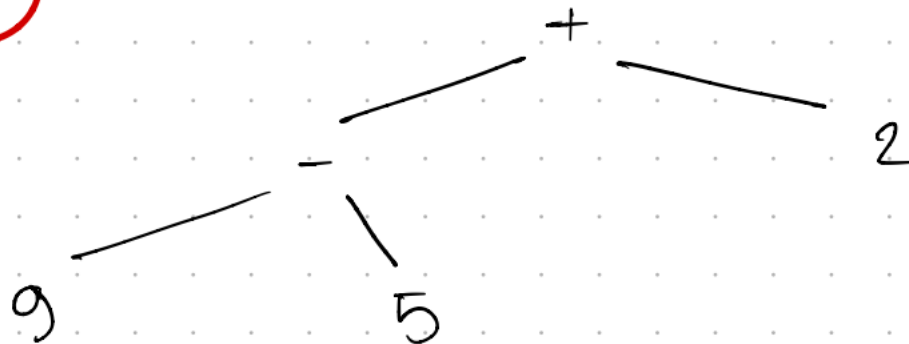
(iii) $E ::= (\cdot E \cdot)$ No

(iv) $E ::= E \cdot + \cdot E$ No

Q5

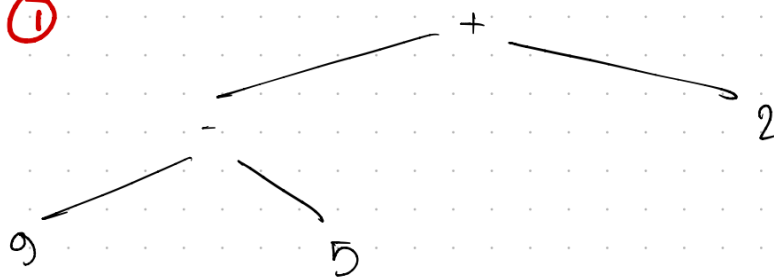
Grammar : 1

①



Grammar : 2

①



②

