

Quiz 5

1. The following grammar is regular:

$$S \rightarrow A|B|AB$$

$$A \rightarrow aA|\lambda$$

$$B \rightarrow Bb|\lambda$$

(a) True

(b) False

2. The language of the following grammar is regular:

$$S \rightarrow A|B|AB$$

$$A \rightarrow aA|\lambda$$

$$B \rightarrow Bb|\lambda$$

(a) True

(b) False

3. The language $L = \{(aaa)^n(bbb)^n : n \geq 0\}$ is

- (a) regular and context-free
- (b) regular but not context-free
- (c) context-free but not regular
- (d) neither context-free nor regular

4. What is the language of the following grammar?

$$S \rightarrow aaaSbbb|S_1|S_2$$

$$S_1 \rightarrow aabb$$

$$S_2 \rightarrow ab$$

(a) $\{a^n b^n : n \geq 0\}$

(b) $\{a^n b^n : n \geq 1\}$

(c) $\{a^n b^n : n \text{ is a multiple of } 3\}$

(d) $\{a^n b^n : n \text{ is not a multiple of } 3\}$

(e) none of the above

5. Let G_1 be a context-free grammar with start symbol S_1 for L_1 . Let G_2 be a context-free grammar with start symbol S_2 for L_2 . What does the following grammar generate?

$$S \rightarrow S_1 | S_2$$

productions of G_1

productions of G_2

(a) $L_1 \setminus L_2$

(b) $L_2 \setminus L_1$

(c) $L_1 \cap L_2$

(d) $L_1 \cup L_2$