Quiz 6

1. A grammar G is called ambiguous if

   (a) for every $w \in G$ there are at least two different left-most derivations of w

   (b) for every $w \in G$ there are at least two different derivation trees

   (c) for some $w \in G$ there is a left-most derivation that is different from a right-most derivation

   (d) for some $w \in G$ there are at least two different derivation trees

2. The following grammar is ambiguous:

$$S \rightarrow aSbS|bSaS|\lambda$$

(a) True

(b) False

3. A parser has **input(s):** ... and produces **output(s):** ...

   (a) **inputs:** grammar G, string w; **output:** derivation tree of w, if it exists

   (b) **input:** grammar G; **output:** shortest $w \in L(G)$, if it exists

   (c) **input:** string w; **output:** grammar G such that $G \Rightarrow^* w$

   (d) **input:** grammar G; **output:** grammar G' equivalent to G but without useless productions

4. How many nullable variables are there in the grammar below?

$$S \to aABBC|ABC$$
$$B \to bB|bBc|\lambda$$
$$A \to BBB|aA|D$$
$$D \to dS|ddd$$
$$C \to cC|BA$$

(a) 1

(b) 2

(c) 3

(d) 4

(e) 5

5. Which of the variables in the following grammar are useless?

$$S \to a|aXa|Y|Z$$
$$X \to aY|\lambda$$
$$Y \to bXa$$
$$Z \to cZWa$$
$$W \to dad|dZd$$

(a) S, X, Y

(b) Z, W

(c) Z, Y, W

(d) W

(e) Z