Week 4 Clicker Question 1

$S \to AB$

where A,B are in turn context free languages, is which construct?

A union

B intersection

C concatenation

D Kleene star

E None of the above

Week 4 Clicker Question 2

$S \to A \mid B$
where A,B are in turn context free languages, is which construct?

- A union
- B intersection
- C concatenation
- D Kleene star
- E None of the above

Week 4 Clicker Question 3

Σ is the alphabet
$a \in \Sigma$
$S \rightarrow As$
$As \rightarrow As \cdot a \mid a \mid \epsilon$
where A,B are in turn context free languages, is which construct?

- A union
- B intersection
- C concatenation
- D Kleene star
- E None of the above

Week 4 Clicker Question 4

Σ is the alphabet
$0 \in \Sigma$
$1 \in \Sigma$
$S \to 0S1 \mid \epsilon$
is what language?

- A $\{0^n 1^n, n \in \mathbb{N}\}$
- B $\{0^i 1^j, i, j \in \mathbb{N}\}$
- C $\{0^i 1^j, i < j, i, j \in \mathbb{N}\}$
- D $\{0^j 1^i, i < j, i, j \in \mathbb{N}\}$
- E None of the above

Week 4 Clicker Question 5

Σ is the alphabet
$0 \in \Sigma$
$1 \in \Sigma$
$S \to 0S0 \mid 1S1 \mid \epsilon$
is what language?

- A all palindromes
- B palindromes with an even number of symbols
- C palindromes with an odd number of symbols
- D $\{0^j 1^i, i < j, i, j \in \mathbb{N}\}$
- E None of the above

Week 4 Clicker Question 6

With the following hypothesis:
Context free grammars can construct the empty string, single tokens, unions, concatenations and Kleene stars.
Context free grammars can construct the language $\{0^n1^n\}$ and $\{ww^{\mathcal{R}}\}$.
The class of context free grammars is closed under union, concatenation and Kleene star.
What can we conclude from this?

- A Some context free languages are infinite.
- B Some context free languages are regular languages.
- C Some context free languages are not regular languages.
- D B and C but not A.
- E A, B and C and not D.

Stop for a while

Week 4 Clicker Question 7

Can this rule be found in a context free grammar?
$R_i \to A_i B_i i \geq 0$

A True

B False

Week 4 Clicker Question 8

Can these rules be found in a context free grammar?

$A \to BC$

$B \to CA$

$C \to AB$

A True

B False

Week 4 Clicker Question 9

Is this a context free grammar?

$\Sigma = \{a, b, c\}$

$S \to \epsilon \mid A$

$A \to BC \mid a$

$B \to CA \mid b$

$C \to AB \mid c$

A True

B False

Week 4 Clicker Question 10

Consider this grammar:

$\Sigma = \{a, b\}$

$S \rightarrow AsAndBs$

$AsAndBs \rightarrow As \cdot AsAndBs \cdot Bs \mid a \mid b \mid \epsilon$

$As \rightarrow As \cdot a \mid a \mid \epsilon$

$Bs \rightarrow Bs \cdot b \mid b \mid \epsilon$

Can you tell which sequence of substitutions generated *aaaab*?

A Yes

B No

stop here for a while

Week 4 Clicker Question 11

Let A and B be a context free languages, on Σ_A and Σ_B, respectively.
Let the start variable for a grammar for A be S_A, and the start variable for a grammar for B be S_B. Define
$T = \{w_A w_b | w_A \in A \wedge w_B \in B\}$.
Is T a context free language?

A Yes

B No

Week 4 Clicker Question 12

Can this grammar generate strings longer than any given positive integer, m?

$\Sigma = \{a, b, c\}$
$S \to \epsilon \mid A$
$A \to BC \mid a$
$B \to CA \mid b$
$C \to AB \mid c$

A Yes

B No

Week 4 Clicker Question 13

Consider this grammar:
$\Sigma = \{a, b, c\}$
$S \rightarrow \epsilon \mid A$
$A \rightarrow BC \mid a$
$B \rightarrow CA \mid b$
$C \rightarrow AB \mid c$
Suppose you could use each rule at most once. What is the longest string you could generate?

A 1

B 2

C 3

D > 3

Week 4 Clicker Question 14

If there is a length of string such that longer strings have to have been generated by using at least one rule more than once, are we going to get a pumping lemma from this?

A True

B False

stop for a while