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Principles of Programming Languages

2. (a)

(b) 1 and 4 are in the language

baab:

S ::= AaBb

Goes to baBb because A -> b

Goes to baab because B -> a

bbaab:

S ::= AaBb

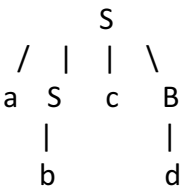
Goes to AbaBb because A -> Ab | b

Goes to bbaBb because A -> Ab | b

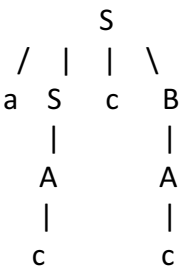
Goes to bbaab because B -> aB | a

(c) 1 and 5 are in the language

abcd:



accc:



(d) A :: = a | b | A (+) A

(e) A ⇓ n

3. (a)

i. The first grammar is left associative while the other one is right associative. They both do the same thing.

ii. They both generate the same expression, but one is left associative while the other is right associative.

(b)

1 -3 = -2

1 << 2 = 4

10 – 9 << 2 = 4

(1 << 3) – 8 = 0

2 – (1 << 2) = -2

Therefore, - takes precedence over <<

(c)

n = any number where 0 <= n < infinity

z = zero

exponent ::= z.nEn | -z.nen | n.nEn | -n.nEn | n.zEn | -n.zEn