1) Reverse Polish Notation:

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a) Convert the following infix expression to RPN:
- a + b / (c + d) * e
- (a + b) * (c + d)

b) Convert the following expression from RPN to infix:
- a b + c d + *
- a b c d + / e * +

c) Evaluate the following RPN expression :
- a b c + * d e / - ( Where, a = 2, b = 3, c = 4, d = 12, e = 6)
- 2 3 4 + * 12 6 / -

d) What are two advantages of using RPN over infix?
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2) Syntax diagrams and BNF:

Using syntax diagram is given below:

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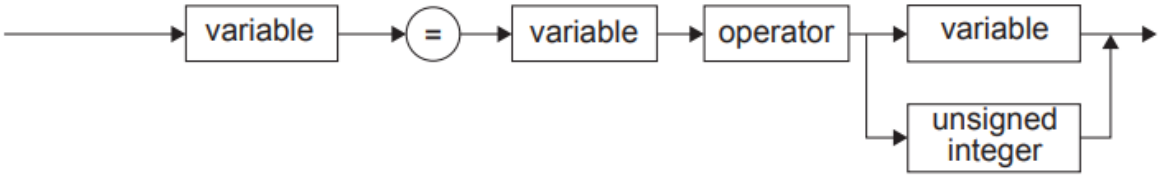
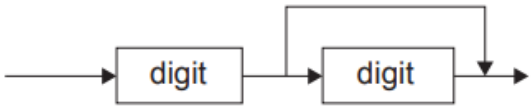
assignment statement

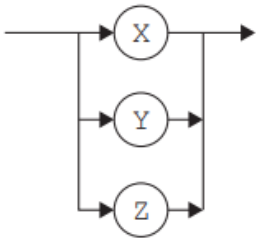


variable

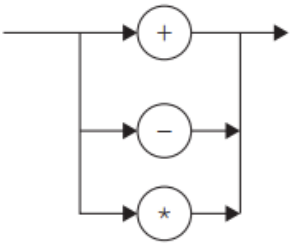
unsigned integer



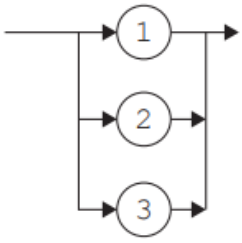
letter



operator



digit



a) Explain why each of these statements are invalid:

- X = XY + 21
- YZ := YZ * 3
- XY = XY - 5

b) Write the Backus-Naur Form (BNF) for the syntax diagrams shown.

c) The syntax diagram of variable has changed to allow one or two letters followed by zero, one or two digits.

- Draw an updated syntax diagram for the variable.
- Give the BNF for the revised variable.

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