**Backus Naur Form and Syntax Diagrams**

1. VARIABLE NAME is defined in a particular language as an alphabetic character which may be followed by two digits or another alphabetic character.  
   Given that, in Backus-Naur Form (BNF), an alphabetic character is called an ALPHA and is defined as  
   <ALPHA> ::= A|B|C|D|E|F|G|H|I|J|K|L|M|N|O|P|Q|R|S|T|U|V|W|X|Y|Z  
   and a digit is defined as  
   <DIGIT> ::= 0|1|2|3|4|5|6|7|8|9  
     
   *(a)* Use BNF and the above definitions (that do not need to be written out again), to define <VARIABLE NAME>

<VARIABLE NAME> ::= <ALPHA> | <ALPHA><DIGIT><DIGIT> | <ALPHA><ALPHA>

*(b)* The definition of a variable name is altered.A variable name is now defined as either

* an alpha followed by two digits, where the first digit must not be zero,

OR

* an unlimited set of alpha characters.

Write new rules in BNF that will define the new <VARIABLE NAME>.

     <VARIABLE NAME> ::= <ALPHA><Non-Zero><DIGIT> | <STRING>

<STRING> ::= <ALPHA> | <STRING><ALPHA>

<Non-Zero> ::= 1|2|3|4|5|6|7|8|9

1. An amount of money can be defined as

* A$ sign followed by either
  + A positive integer or
  + A positive integer, a point, and a two digit number or
  + A point and a two digit number

A positive integer has been defined as <INTEGER>

A digit is defined as <DIGIT>::= 0/1/2/3/4/5/6/7/8/9.

*(a)* Define, using Backus Naur form, the variable <AMOUNT OF MONEY>

     <AMOUNT OF MONEY> ::= $<INTEGER> | $<INTEGER>.<DIGIT><DIGIT> | $.<DIGIT><DIGIT>

1. A palindrome is defined a word that reads the same backwards as it does forwards.

LETTER and is defined as  
<LETTER>:: = A|B|C|D|E|F|G|H|I|J|K|L|M|N|O|P|Q|R|S|T|U|V|W|X|Y|Z

Using the <LETTER> definition above, write a definition for a <PALINDROME> using BNF

<PALINDROME> ::= <LETTER>|AA|BB|CC|… ZZ | A<PALINDROME>A | B<PALINDROME>B|… Z<PALINDROME>Z

1. Backus-Naur Form (BNF) can be used to define the rules of a language.





