Syntax Analysis Backus Naur Form.	Every single statement should be written according to the syntax of that particular programming Language. It is duty of the compiler to make sure that written syntax is correct through the parser's work of Backus Naur Form. Parser receives tokens from Lexer as an output of Lexical Analysis and as input for itself.

Expectations in CS9608 are to check
a. Variable naming conventions
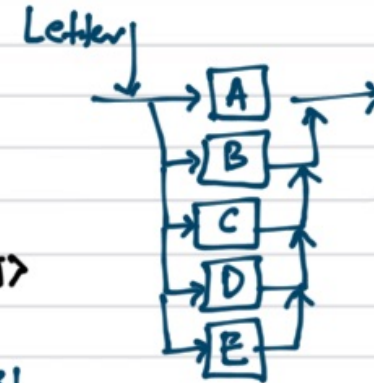b. Assignments, and
c. constitution of literals.

Syntax Diagram	All that can be represented in Backus Naur Form can also be represented using graphical syntax Diagrams.

Backus Naur Form | Syntax Diagram Examples:

Letter

$\langle Letter \rangle ::= A | B | C | D | E$

Is Defined As   Pipe (OR)

$\langle Address \rangle ::= \langle Letter \rangle [":"] \langle Letter \rangle \langle DIGIT \rangle$

AND

A : C 9   is correct

A : 99   is incorrect

Any number of digits.

Can be repeated any number of times. INT

An ← $\langle INT \rangle ::= \langle DIGIT \rangle | \langle DIGIT \rangle \langle INT \rangle$

integer is
defined as   When a definition contains it's name
a digit   inside it's body, it is suppose to be
OR any   "RECURSION" and means whatever by
number of   it can be repeated any number of
digits.   times.

1
12
253

39568
3986

These all are
correct integers.

Zak
ZAFAR ALI KHAN

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4. Describe what happens during the syntax analysis stage of compilation.   [5]

7. 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> [4]

(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.

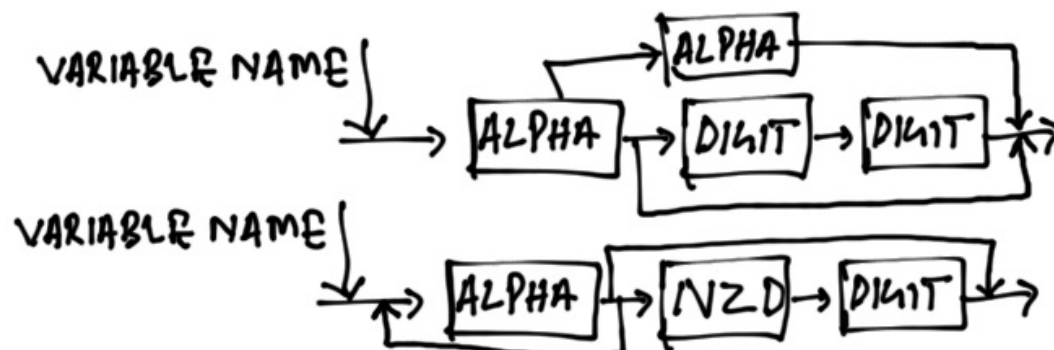Write new rules in BNF that will define the new <VARIABLE NAME>.   [4]

(a)

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

(b)

```
<VARIABLE NAME> ::= <ALPHA> | <ALPHA> <NZD> <DIGIT> | <ALPHA><VARIABLE NAME>
<NZD> ::= 1|2|3|4|5|6|7|8|9
```
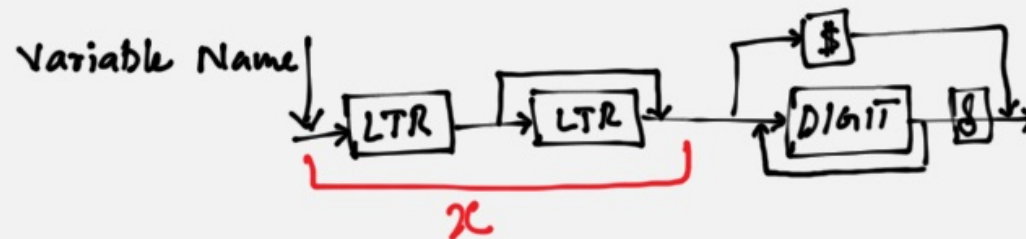
10. A variable name is defined in a particular system as:

- one or two letters, followed by
- any number of digits(including zero) followed by either a
  - $ sign if there are no digits,
  - & sign if there are any digits.

Draw a syntax diagram which describes a variable name.

$\langle VARIABLE\ NAME \rangle ::= \langle x \rangle \langle y \rangle\ "\&"\ |\ \langle x \rangle\ "\$"$

$\langle x \rangle ::= \langle LTR \rangle\ |\ \langle LTR \rangle \langle LTR \rangle$

$\langle y \rangle ::= \langle DIG \rangle\ |\ \langle DIG \rangle \langle y \rangle$