Components of syntax

1 True or false: Punctuation such as semi-colons and commas is ignored in a syntax definition.

- True
- False

```
Which of the following are the lexemes in the code below?
SUM = 0.0
N = 1
WHILE N < 10
READ ITEM
SUM = SUM + ITEM
N = N + 1 WEND
PRINT SUM
```

1. WEND
2. N + 1
3. ITEM
4. PRINT SUM

- 1 and 2
- 2 and 3
- 1 and 3
- 3 and 4

3 Are reserved words tokens?

- Yes
- No

4 How many tokens does the following code fragment have?

```
while (x >= 0) {
  if (x == 3) break;
  x = analyze();
}
```

- 19
- 20
- 22

5 True or false. Whitespace characters, such as space, tab and linefeed can be safely ignored in computer languages.

- True
- False

Types of grammar, BNF.

1 True or false. A token is called a non-terminal symbol in BNF.

- True
- False

2 True or false. Terminal symbols are surrounded by diamond brackets (<>).

- True
- False

3 True or false. The order of elements on the right-hand side of a rule is unimportant.

- True
- False

4 True or false. BNF allows only one non-terminal on the left-hand side of a rule.

- True
- False

5 True or false. Recursion between rules is allowed in BNF. e.g.

```
<nt1> ::= ... <nt2> ...
<nt2> ::= ... <nt1> ...
```

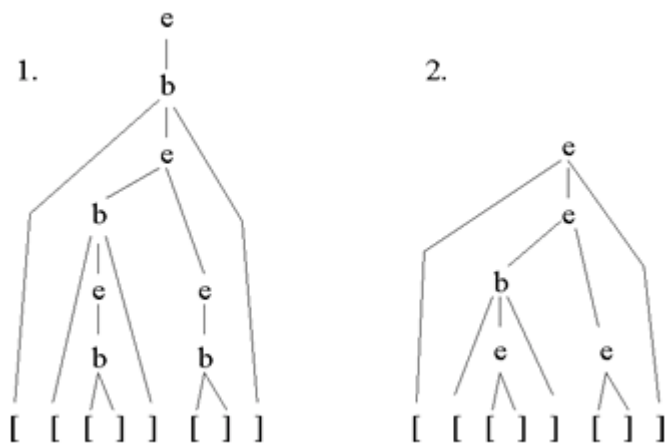
- True
- False

Parse trees.

1 Given the grammar:

```
<e> ::= <b> | <b><e>
<b> ::= [ <e> ] | []
```

which of the following trees show the correct structure for the sentence `[[[]][]]`



?

- 1
- 2

2 Given the grammar rule:

```
<expr> ::= <num> | <expr> + <expr>
```

Which of the following are correct derivations for `<expr> + <num>` ?

- `<num> + <expr> + <num>`
- `<expr> + <expr> + <num>`
- `<num> + <num> + <num>`
- `<expr> + <expr> + <expr>`

3 True or false. A parse tree can be infinitely big for a given finite sentence.

- True
- False

4 True or false. There is only one possible grammar for integers with given finite range of values.

- True

- False

5 True or false. A parse tree can only have one root node.

- True
- False

Ambiguity in grammars.

1 True or false. Does the ambiguity in the following rule matter semantically?

```
<expr> <num> | <expr> + <expr>
```

- True
- False

2 True or false. C allows expressions like x = y = 0 where the assignment operator is right associative. Is the following grammar ambiguous?

```
<expr> ::= <assign> | <id> | ...
<assign> ::= <id> = <expr>
```

- True
- False

Syntax: EBNF

1 Which of the following EBNF forms removes the recursion in
`<par-list> ::= <par> | <par> , <par-list>`

- `par-list = {',' par}`
- `par-list = par {par ','}`
- `par-list = par ',' {par}`
- `par-list = par {',' par}`

2 Which of the following EBNF forms can replace the alternatives in
`<end-tag> ::= end | end <id>`

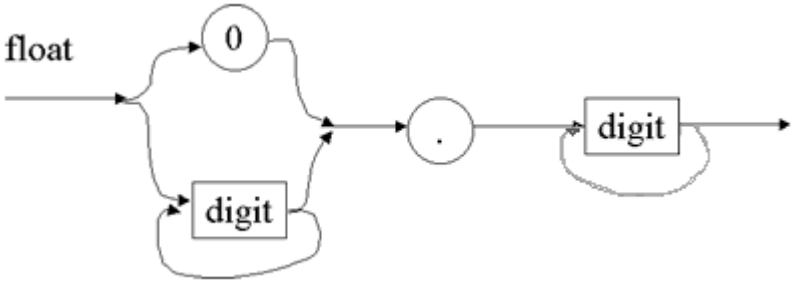
- `end-tag = ['end' id]`
- `end-tag = ['end'] id`
- `end-tag = 'end' [id]`
- `end-tag = 'end' ['end' id]`

3 True or false. Can the repetition in the following EBNF rule be replaced by recursion in a single BNF rule?
`block = 'begin' {stmt ';'} stmt 'end'`

- True
- False

Syntax diagrams

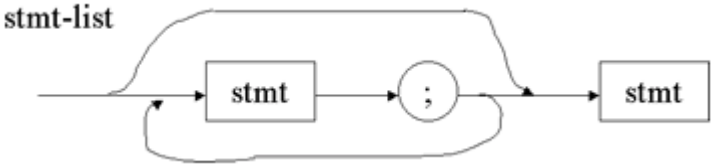
1 Which EBNF rule is the equivalent of the diagram

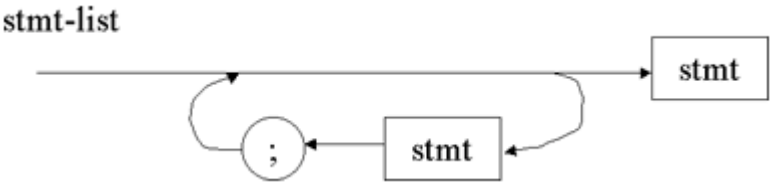


- `float = ('0' | {digit}+) '.' {digit}+`
- `float = '0' | {digit}+ '.' {digit}+`
- `float = ('0' {digit}+) '.' {digit}+`
- `float = ('0' | {digit}) '.' {digit}`

---

2 True or false. Are the following diagrams equivalent?\

1. 

2. 

- True
- False