Compiler
Assignment 4
Context-Free Grammars

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1 Question 1

a)

Terminals: or, and, not, true, false, (,)
Non-terminals: bexpr, bterm, bfactor
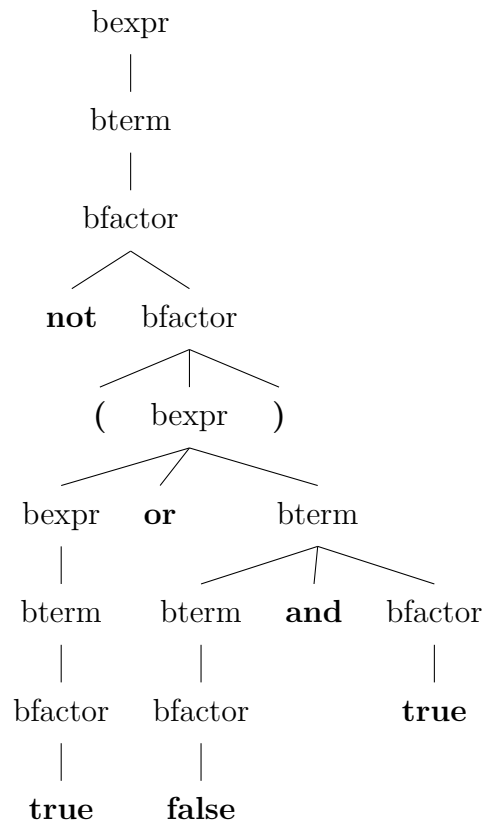Start symbols: bexpr

b)

1. bexpr

2. bterm

3. bfactor

4. **not** bfactor

5. **not** (bexpr)

6. **not** (bexpr **or** bterm)

7. **not** (btrem **or** bterm)

8. **not** (bfactor **or** bterm)

9. **not** (**true or** bterm)

10. **not** (**true or** bterm **and** bfactor)

11. **not** (**true or** bfactor **and** bfactor)

12. **not** (**true or false and** bfactor)

13. **not** (**true or false and true**)

c)

1. bexpr
2. bterm
3. bfactor
4. **not** bfactor
5. **not** (bexpr)
6. **not** (bexpr **or** bterm)
7. **not** (bexpr **or** bterm **and** bfactor)
8. **not** (bexpr **or** bterm **and true**)
9. **not** (bexpr **or** bfactor **and true**)
10. **not** (bexpr **or false and true**)
11. **not** (bterm **or false and true**)
12. **not** (bfactor **or false and true**)
13. **not** (**true or false and true**)

d)

Using leftmost deviation

```
                    bexpr
                      |
                    bterm
                      |
                   bfactor
                   /      \
                 not      bfactor
                         /   |   \
                        (  bexpr  )
                          /    \
                   bexpr   or    bterm
                     |          /   |   \
                   bterm    bterm  and  bfactor
                     |        |            |
                  bfactor  bfactor       true
                     |        |
                   true     false
```

2 Question 2

以 **true or false and true** *來看*

Tree 1

```
                    bexpr
            ┌─────────┼─────────┐
        bexpr        or        bexpr
          │                 ┌────┼────┐
        true             bexpr   and   bexpr
                           │             │
                         false         true
```

Tree 2

```
                         bexpr
                   ┌───────┼───────┐
               bexpr      and     bexpr
            ┌────┼────┐              │
        bexpr   or   bexpr         true
          │            │
        true         false
```
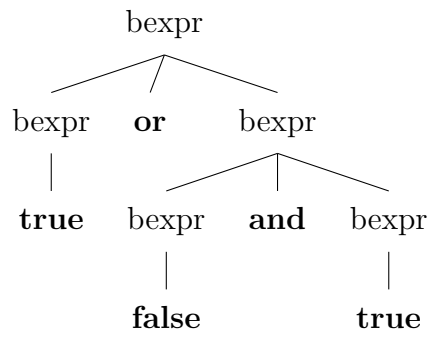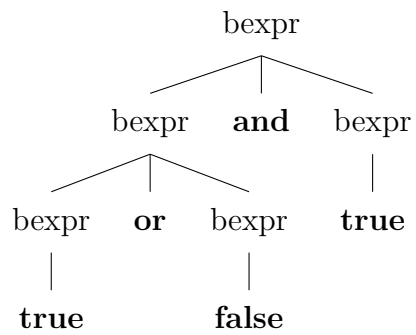
3　Question 3

a)

Rules are:

1. $expr \rightarrow \epsilon$

2. $expr \rightarrow 1expr$

3. $expr \rightarrow 01expr$

b)

Rules are:

1. $expr \rightarrow \epsilon$

2. $expr \rightarrow 1expr$

3. $expr \rightarrow 01expr$