(7) A circuit is required which has three inputs. It produces 0 if all three inputs are 1, otherwise it produces 1.

(7a) One possibility for this circuit is based on the following expression:

```
If  (NOT A)  or  (NOT B)  or  (NOT C)  then
      Result = 1
   else
      Result = 0
end if
```

Draw and test the corresponding circuit.

(7b) Another possibility is based on the following logic:

```
If  A = 1  AND  B = 1  AND  C = 1  then
      Result = 0
   else
      Result = 1
end if
```

(8) The **Associative Law** states that **(A or B) or C** is equivalent to **A or (B or C)**.
In other words, in a string of ORs, it is irrelevant which one is evaluated first.
The same is true for AND: **(A and B) and C** is equivalent to **A and (B and C)**

For each of the gates XOR , NAND, and NOR, decide whether the Associative Law holds.

(9) The **Distributive Law** works as follows: **A and (B or C) == (A and B) or (A and C)**
Since AND is similar to multiplication in math, and OR is similar to addition, we would expect the distributive law to be correct. But there is no guarantee.

(9a) Build and compare two circuits to check whether AND is distributive over OR.

(9b) Build and compare two circuits to check whether the following are equivalent:
A or (B and C) == (A or B) and (A or C)

(10) DeMorgan's laws state that the following are equivalent:
not A and not B == not(A or B) **not A or not B == not(A and B)**

(10a) Construct circuits to show that DeMorgan's laws are correct.