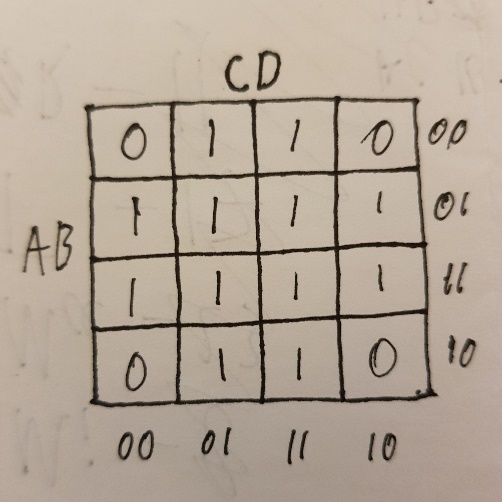
CL Tutorial 6

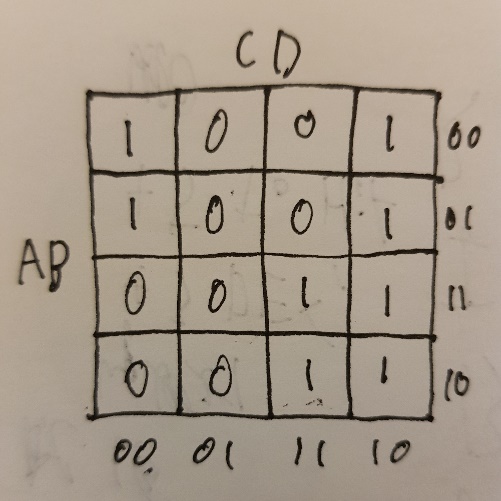
# Exercise 1



There are two clauses in this expression, B and D.

The Karnaugh map of this expression is on the right:

The block of zeros for D is in orange, the block of zeros for B is blue.



There are two clauses in this expression, and .

The Karnaugh map of this expression is on the right:

The block of zeros for is in orange, the block of zeros for is blue.

# Exercise 2

X1:

Y1:

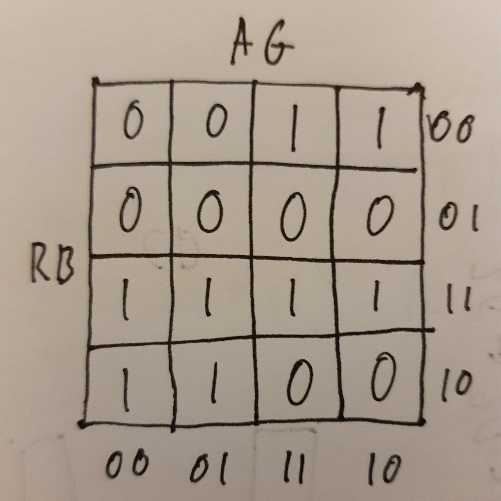
X2:

Y2:

# Exercise 3

Karnaugh map:

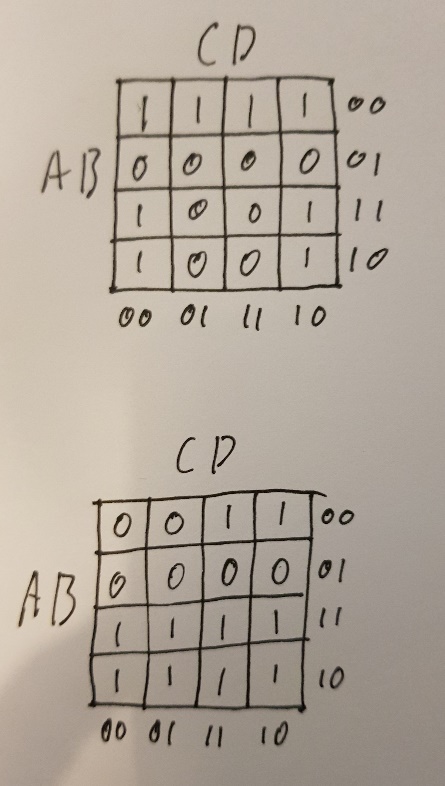
CNF from map:

Karnaugh map:

CNF from map:

# Exercise 4

For each of the following pairs of clauses, draw a Karnaugh map and show the two blocks of zero states corresponding to the two clauses:



1. 𝐴 ∨ ¬𝐵, ¬𝐴 ∨ ¬𝐷

2. 𝐴 ∨ ¬𝐵, 𝐴 ∨ 𝐵 ∨ 𝐶

Use these Karnaugh maps to identify new clauses Δ1 and Δ2, different from both premises, such that the following sequents are valid:

1. 𝐴 ∨ ¬𝐵, ¬𝐴 ∨ ¬𝐷 ⊧ Δ1

Δ1 = ¬𝐵 ∨ ¬𝐷

1. 𝐴 ∨ ¬𝐵, 𝐴 ∨ 𝐵 ∨ 𝐶 ⊧ Δ2

Δ2 = 𝐴 ∨ 𝐶

How many different solutions can you find for clauses Δ1 and Δ2?

As solutions will always form contiguous blocks of zeroes in the shapes [1x1, 1x2, 2x1, 2x2, 4x1, 1x4, 2x4, 4x2, 4x4], 1. has 19 valid clauses total, of which two are already excluded, so there are 17. For 2. there are 14, of which two are already excluded, so there are 12.