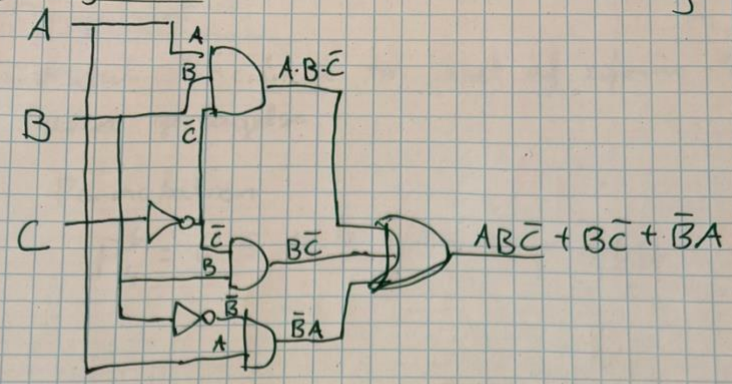
Assignment 1 Løsning Afl. 4



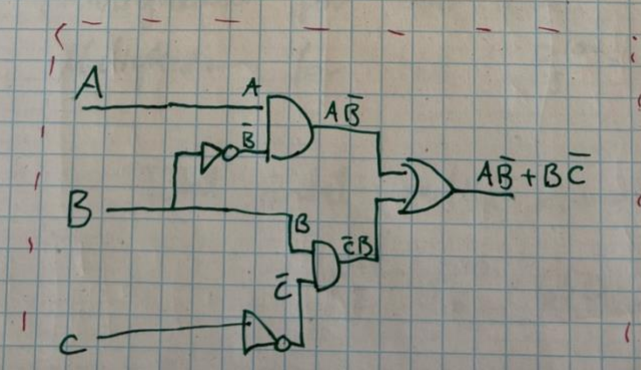
(a) $F(A,B,C) = \boxed{AB\bar{C} + B\bar{C} + \bar{B}A}$

(b) Simplificer

$AB\bar{C} + B\bar{C} + \bar{B}A$ (absorption)

$= \boxed{B\bar{C} + \bar{B}A}$

(c) Tegn det simplere kredsløb



Assignment 2

(a) Antal 4-cifrede tal lavet af cifrene 2, 3, 5, 6, 7, 9 uden gentagelse

Permutation

$$P_4^6 = 6 \cdot 5 \cdot 4 \cdot 3 = 30 \cdot 12 = \boxed{360}$$

(b) Studerende skal besvare 8 ud af 10 spørgsmål til eksamen

Kombination

$$C_8^{10} = \frac{10!}{8!\,2!} = \frac{10 \cdot 9}{2} = 5 \cdot 9 = \boxed{45}$$

(c) Nummerplader m. to forskellige bogstaver (A-Z) herefter 5 forskellige cifre (0-9)

Muligheder for bogstaver $P_2^{26} = 26 \cdot 25 = 650$

Muligheder for tal : $P_5^{10} = 10 \cdot 9 \cdot 8 \cdot 7 \cdot 6 = 30240$

Total antal mulige nummerplader:

$$P_2^{26} \cdot P_5^{10} = 650 \cdot 30240 = \boxed{19656000}$$

(d) Lotto

Rækkefølge ikke vigtig

Kombination

$$C_7^{36} = \frac{36!}{7!(36-7)!} = \frac{36!}{7!\,29!} = \frac{36 \cdot 35 \cdot 34 \cdot 33 \cdot 32 \cdot 31 \cdot 30}{7 \cdot 6 \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1}$$

$$= \boxed{8,347,680}$$

(e) Sandsynlighed for at vinde i Lotto

$$p = \frac{1}{\boxed{8347680}} = 0,00000012$$

Assignment 3

4 forskellige hospitaler i DK.

	1	2	3	4	Total
Total	5292	6991	5640	4329	22,252
LWBS	195	270	246	242	953
Admitted	1277	1558	666	984	4485
Not admitted	3820	5163	4728	3103	16,814

(a) Hændelse A: besøg på hospital 1
Hændelse B: LWBS

$|A \cap B| = \boxed{195}$

$|A^c| = 22252 - 5292 = \boxed{16960}$

$|A \cup B| = |A| + |B| - |A \cap B|$
$= 5292 + 953 - 195$
$= \boxed{6050}$

(b) Hændelse A: besøg på hospital 4
Hændelse B: LWBS

$P(A \cap B) = \frac{242}{22252} = \boxed{0,0109}$

$P(A^c) = \frac{22252 - 4329}{22252} = \boxed{0.805}$

$P(A \cup B) = P(A) + P(B) - P(A \cap B)$
$= \frac{4329 + 953 - 242}{22252}$
$= \boxed{0.226}$

$$P(A \cup B^c) = P(A) + P(B^c) - P(A \cap B^c)$$

"$P(A - B) = P(A) - P(A \cap B)$

$$= P(A) + P(B^c) - P(A) + P(A \cap B)$$

$$= P(B^c) + P(A \cap B)$$

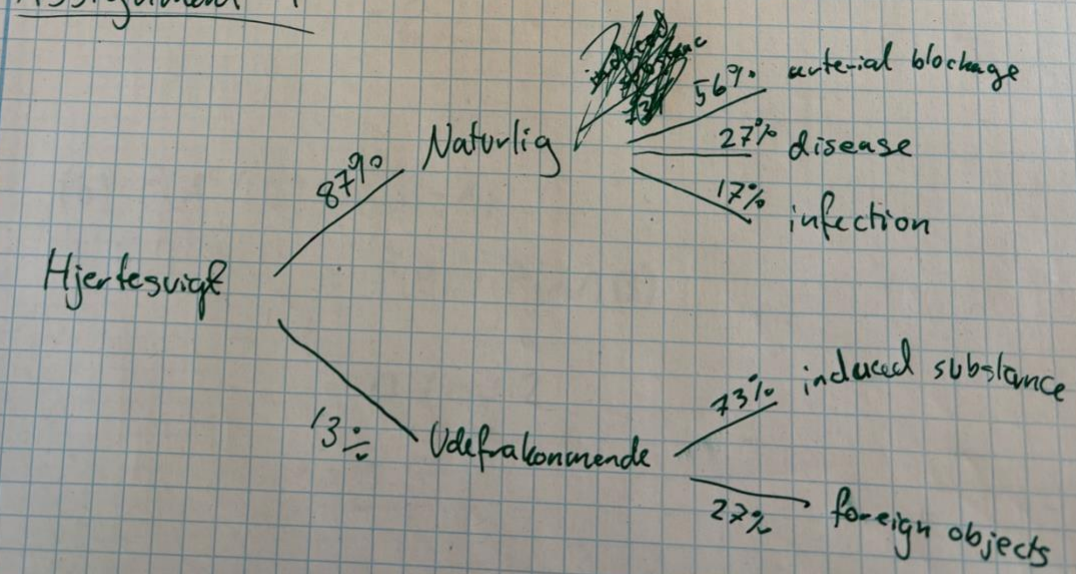
$$= \frac{22252 - 953 + 242}{22252} = \boxed{0,968}$$

$$P(A^c \cap B^c) = 1 - P(A \cup B)$$

$$= 1 - 0.226$$

$$= \boxed{0.774}$$

Assignment 4



(a) $P(\text{induced substance}) = 0.13 \cdot 0.73$

$= \boxed{0.0949}$

(b) $P(\text{disease or infection}) = 0.87 \cdot (0.27 + 0.17)$

$= 0.87 \cdot 0.44$

$= \boxed{0.3828}$

Assignment 5

$P(A) = 0.4, \quad P(B) = 0.7, \quad P(A \cup B) = 0.9$

(a) $P(A \cap B) = P(A) + P(B) - P(A \cup B)$

$= 0.4 + 0.7 - 0.9$

$= \boxed{0.2}$

(b) $P(A^c \cap B) = P(B - A)$

$= P(B) - P(A \cap B)$

$= 0.7 - 0.2$

$= \boxed{0.5}$

(c) $P(A-B) = P(A) - P(A \cap B)$

$= 0.4 - 0.2$

$= \boxed{0.2}$

(d) $P(A^c - B) = P(A^c) - P(A^c \cap B)$

$= 1 - P(A) - P(A^c \cap B)$

$= 1 - 0.4 - 0.5$

$= \boxed{0.1}$

(e) $P(A^c \cup B) = P(A^c) + P(B) - P(A^c \cap B)$

$= P(A^c) - P(A^c \cap B) + P(B)$

$= P(A^c - B) + P(B)$

$= 0.1 + 0.7$

$= \boxed{0.8}$

(f) $P(A \cap (B \cup A^c)) = P(A) + P(A^c \cup B) - P(A \cup \overset{"1}{A^c} \cup B)$

$= 0.4 + 0.8 - 1$

$= \boxed{0.2}$

Assignment 6

A, B, C, D hold i en turnering

$P(A) = P(B)$

$P(C) = 2 \cdot P(D)$

$P(A \cup C) = 0.6$

Da kun ét hold kan vinde

$$P(A \cup C) = P(A) + P(C) = 0.6$$

$$P(B \cup D) = P(B) + P(D) = P(\overline{A \cup C}) = 1 - 0.6 = 0.4$$

$$P(D) = 0.4 - P(B) = 0.4 - P(A)$$

$$P(C) = 0.6 - P(A) = 2 \cdot P(D)$$

$$0.6 - P(A) = 2 \cdot (0.4 - P(A))$$

$$0.6 - P(A) = 0.8 - 2P(A)$$

$$P(A) = 0.8 - 0.6 = 0.2$$

$P(A) = P(B) = \boxed{0.2}$

$P(C) = 0.6 - P(A) = \boxed{0.4}$

$P(D) = \frac{1}{2} \cdot P(A) = \boxed{0.2}$

$$P(A) + P(B) + P(C) + P(D) = 0.2 + 0.2 + 0.4 + 0.2 = 1$$