Problem 1

Given the Boolean function $F$:

$$F = c'd' + ac'd + a'b'c'd + a'bcd + cd' + acd$$

(a) Draw the min-terms on the cube.

(b) List all the primes (also on the cube).

(c) List all the essential primes.

Problem 2

(a) Check if $F$ is negative/positive unate in variables $a, b, c, d$.

(b) Is $F$ negative/positive unate?

Problem 3

Given $F$:

(a) Find a minimum cover using McCluskey’s method (prime implicant table, branch and bound).

(b) Find a minimum cover using Petrick’s method (primes in pos, transform in sop).

(c) Show the obtained cover on the cube.
**Problem 4**

Given the Boolean function $F$, suppose the variable $b$ is in the *don’t care* (DC) set ($b$ does not affect the functionality of $F$ due to internal flexibilities in the logic network embedding $F$).

(a) What value for $b$ (0 or 1) is the most convenient to reduce the $F$ cover complexity? In other words, which value for $b$ allows us to find the smallest implicant cover? Show why this is the case.

(b) Find a minimum cover (visually from the cube graphical representation).