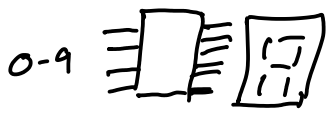
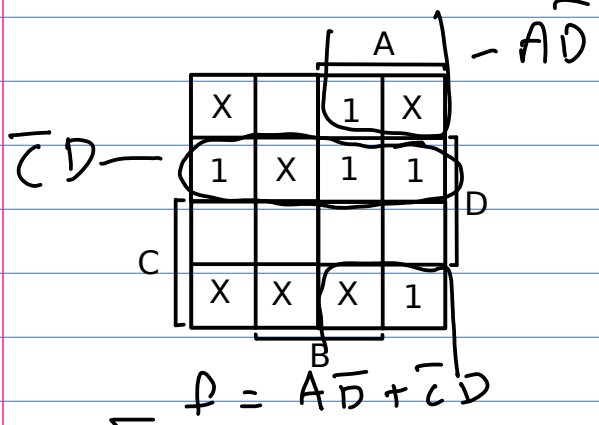
Incompletely Specified Functions (include "don't cares")



Input combinations which don't occur
or you don't car what happens if that input combination does occur

Book uses "d" instead of "X"



"Covering" the don't cares is optional. Cover if it helps making larger prime implicants (fewer literals in the product term). Otherwise ignore them.

$f = \sum m(1,9,10,12,13) + d(0,2,5,6,8,14)$

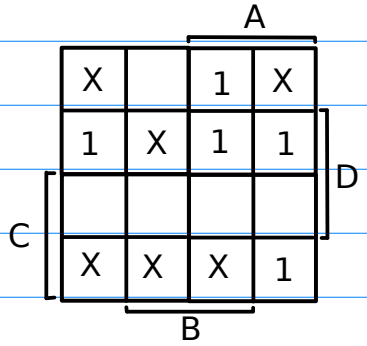
$f = \prod M(3,4,7,11,15) \cdot D(0,2,5,6,8,14)$

Same don't cares

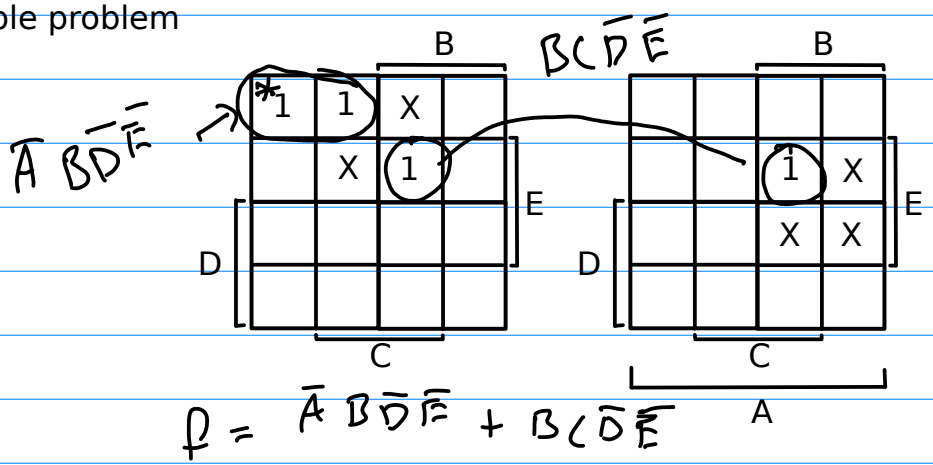
It is sometimes difficult to determine which prime implicants to choose.
None are essential in this problem.

What is the minimal cover?

Same problem

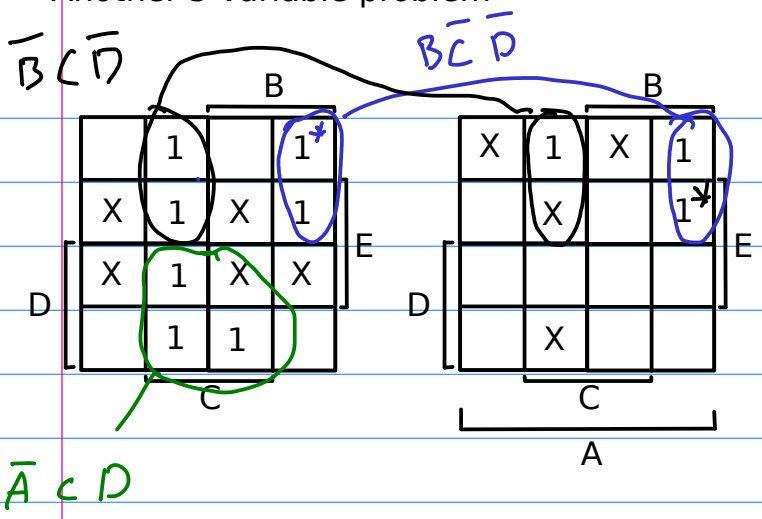


5-variable problem

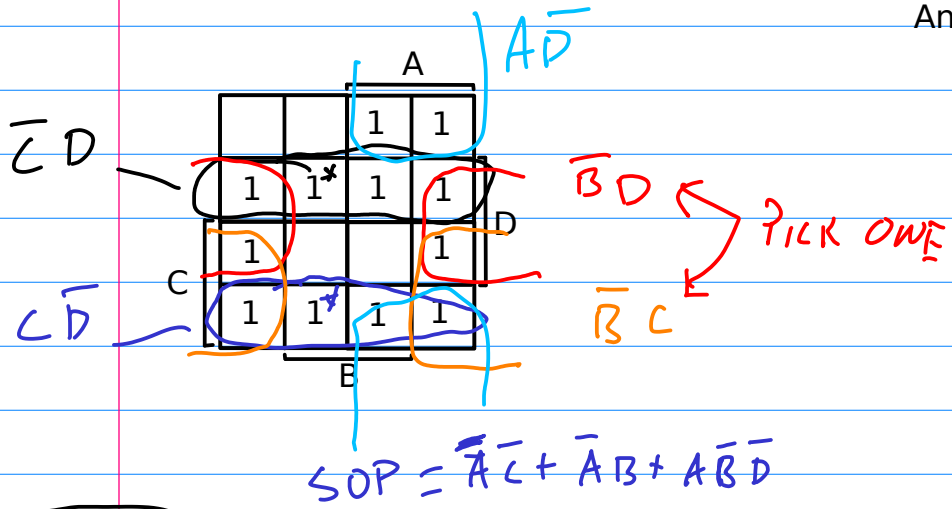


don't always pick the biggest groups

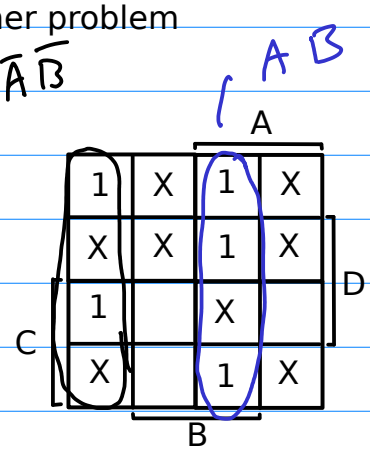
Another 5-variable problem



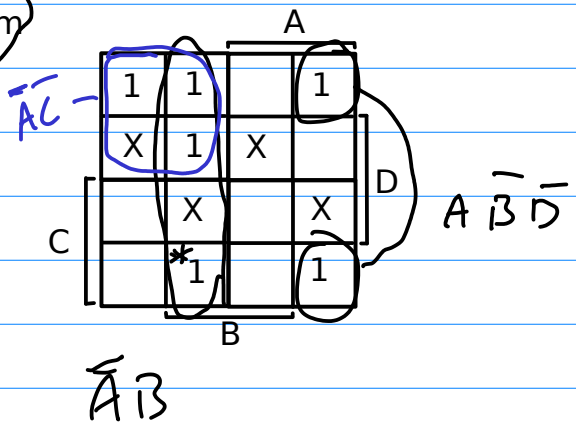
$$f = \bar{B}C\bar{D} + B\bar{C}\bar{D} + \bar{A}CD$$



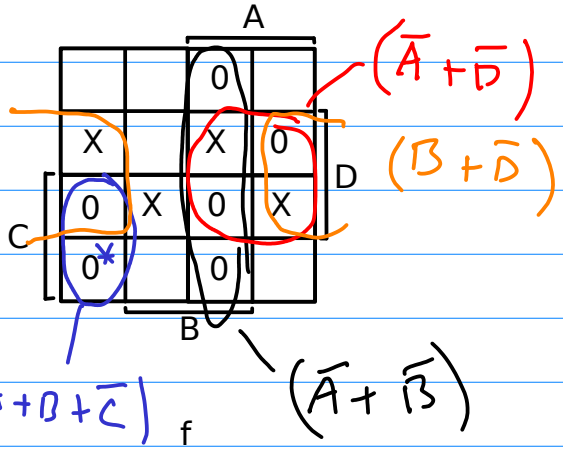
Another problem



POS problem

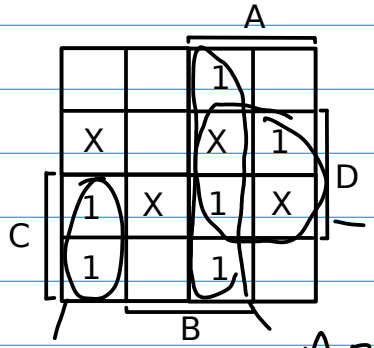


cover zeros of f



$$f = (A+B+\bar{C})(\bar{A}+\bar{B})(\bar{A}+\bar{D})(B+\bar{D})$$

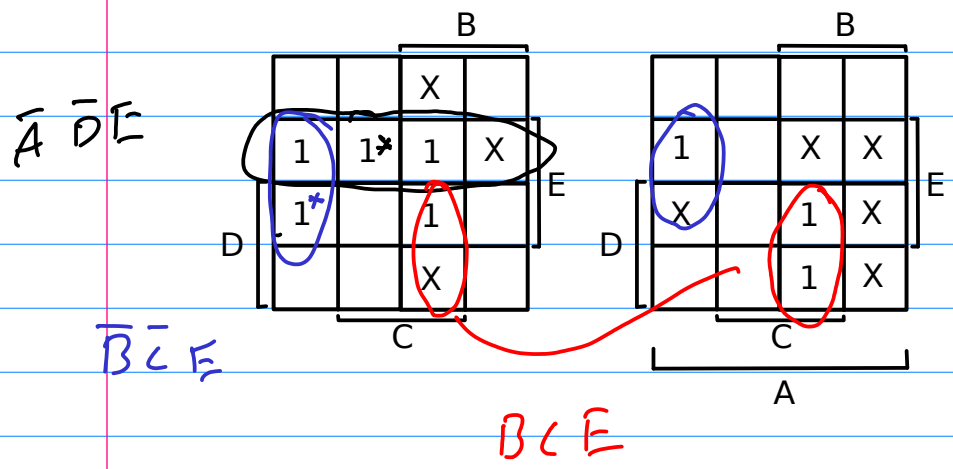
cover ones of $\bar{f}$



$A\bar{B}$ AD

$$\bar{f} = \bar{A}\bar{B}C + A\bar{B} + AD$$

5-variable problem

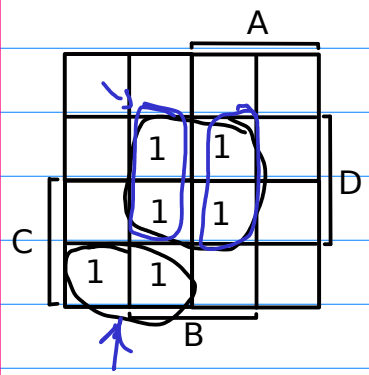


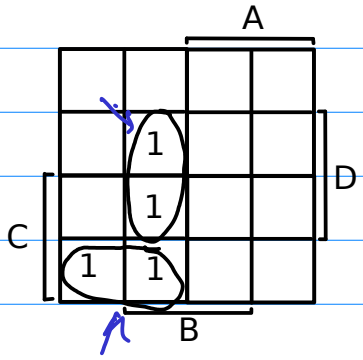
$\bar{A}\,\bar{D}\,\bar{E}$

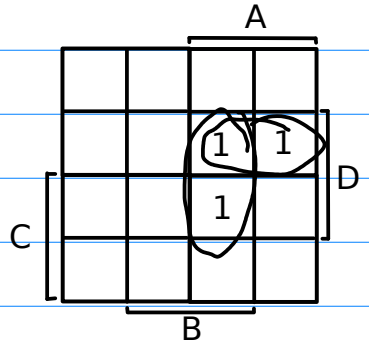
$\bar{B}\,\bar{C}\,\bar{E}$

$B\,C\,\bar{E}$

Multiple-output Networks

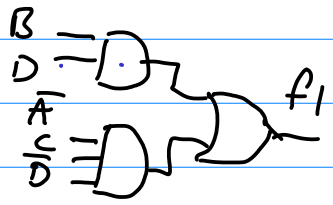






f1

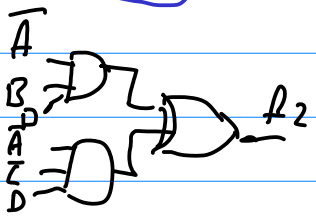
$f1 = BD + \bar{A}C\bar{D}$



cost = 3 + 7 = 10

f2

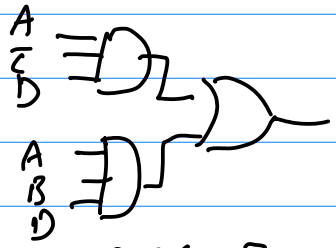
$f2 = \bar{A}BD + \bar{A}\bar{C}D$



cost = 3 + 8 = 11

f3

$f3 = A\bar{C}D + ABD$

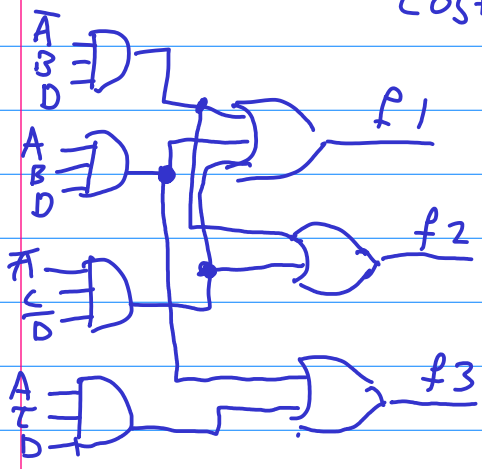


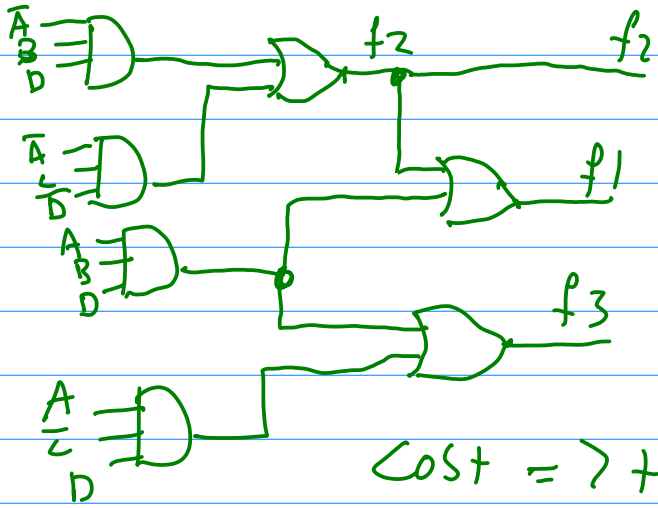
cost = 3 + 8 = 11

total cost = 32

$f1 = \bar{A}BD + ABD + \bar{A}C\bar{D} = f2 + ABD$

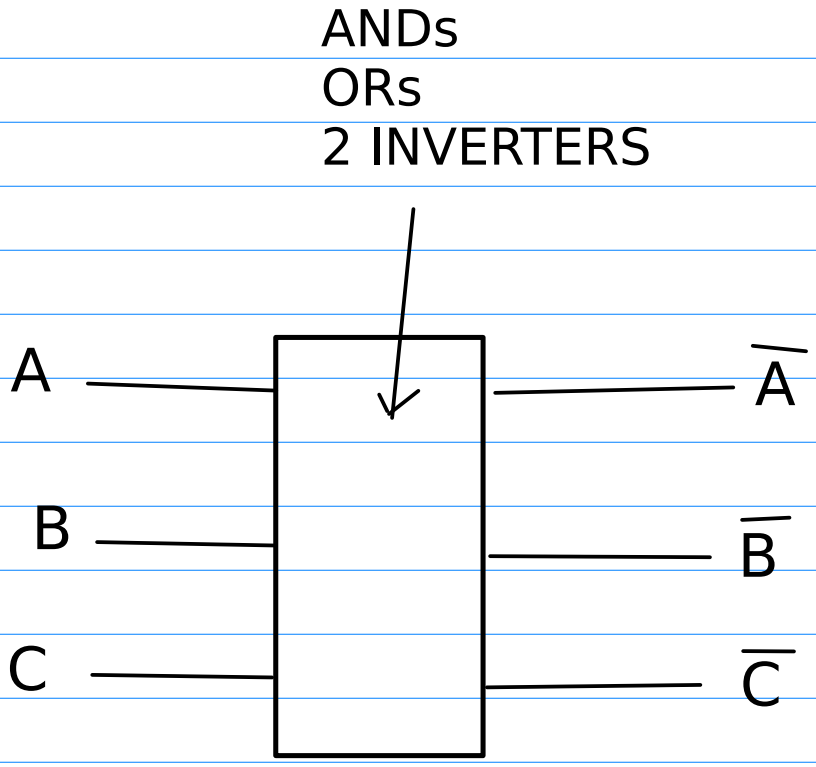
cost = 7 + 19 = 26





cost = 7 + 18 = 25

PUZZLE



HINT: The answer is "symmetric"