COE 561, Term 111

Digital System Design and Synthesis

HW# 2 Solution

# Consider the function *F(A,B,C,D)* with the following ON-set and DC-set:

# *FON*= ∑m(0, 2, 3, 4, 5, 7, 8, 10, 12, 13, 15)

# *FDC*= ∑m(1, 11)

## Apply the EXPAND procedure on the given cover using Espresso heuristics and show the obtained expanded cover. Compare your solution with the result obtained by ESPRESSO tool.

# Consider the function F(A, B, C, D) with **ON-SET=Σm(0, 4, 5, 7, 8, 12, 13, 15)** and **DC-SET=Σm(1, 3, 9, 14)**.

## A cover of the function is given by F = C’ + BD. **Reduce** the cube **C’** using Theorem 7.4.1.

## Use Corollary 7.4.1 to check if the implicant **BD** is an **essential** prime implicant.

# Consider the following cover of a function F*(A,B,C,D)*

# 

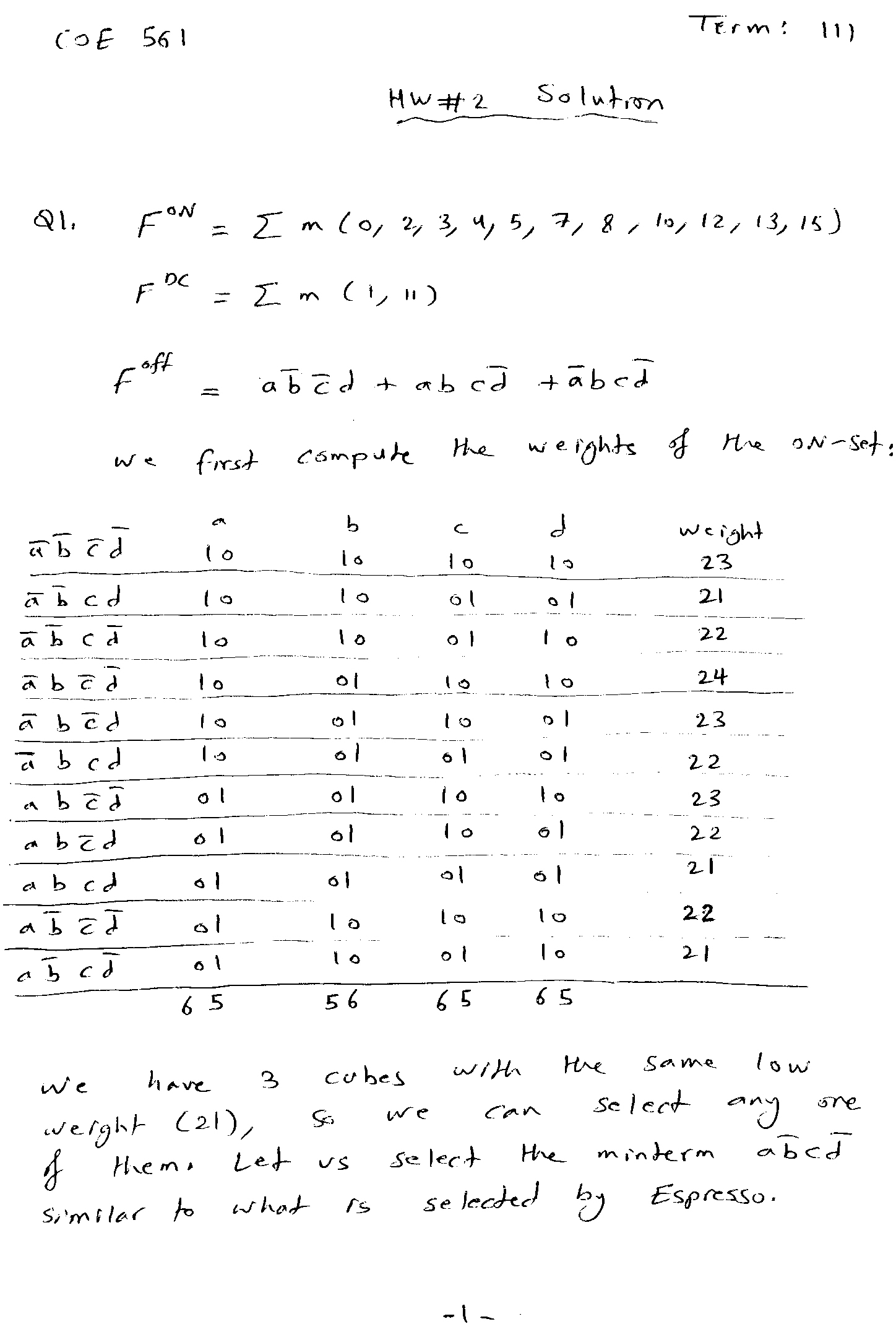
# 

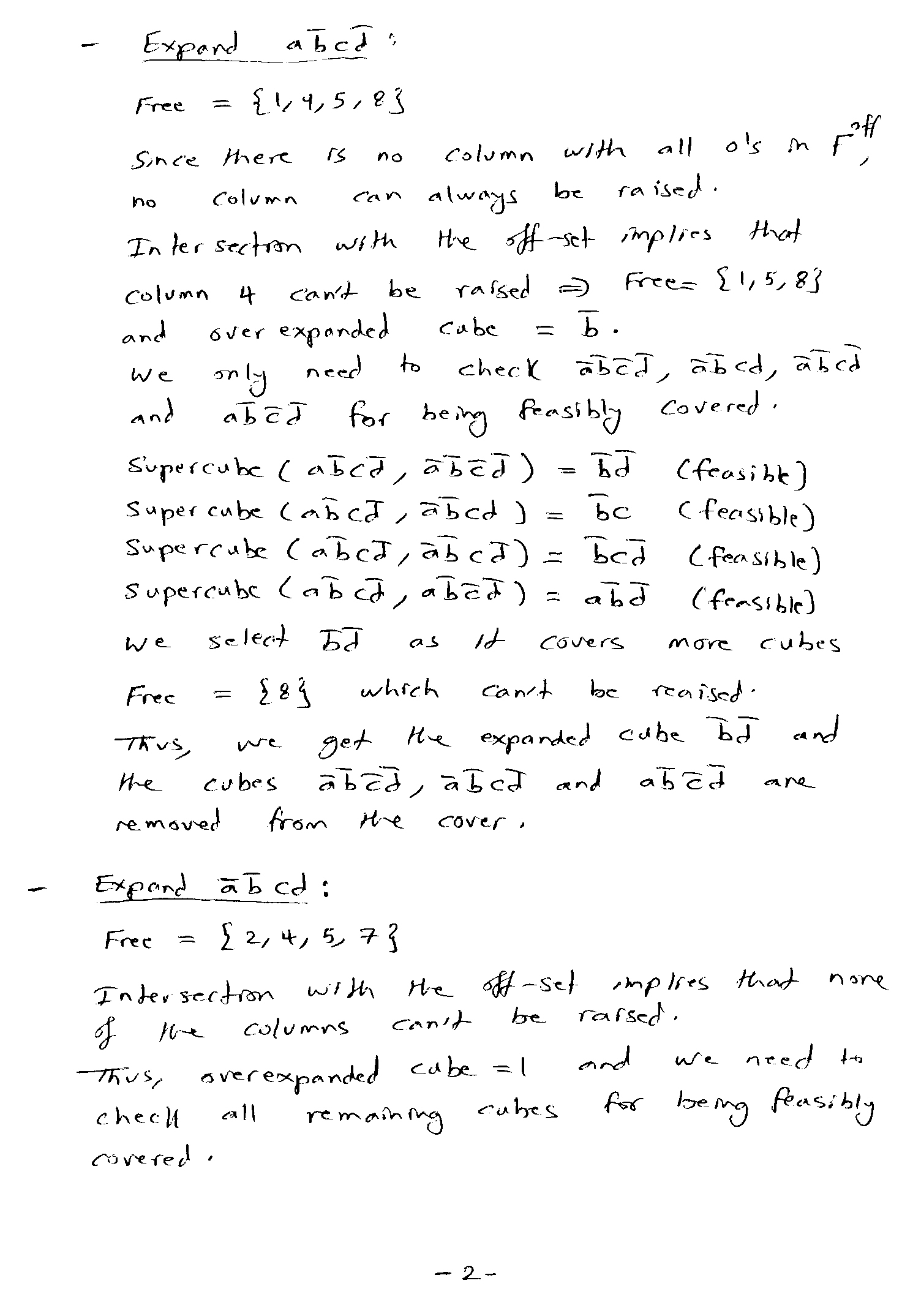
## Determine the relatively essential set of cubes, Er.

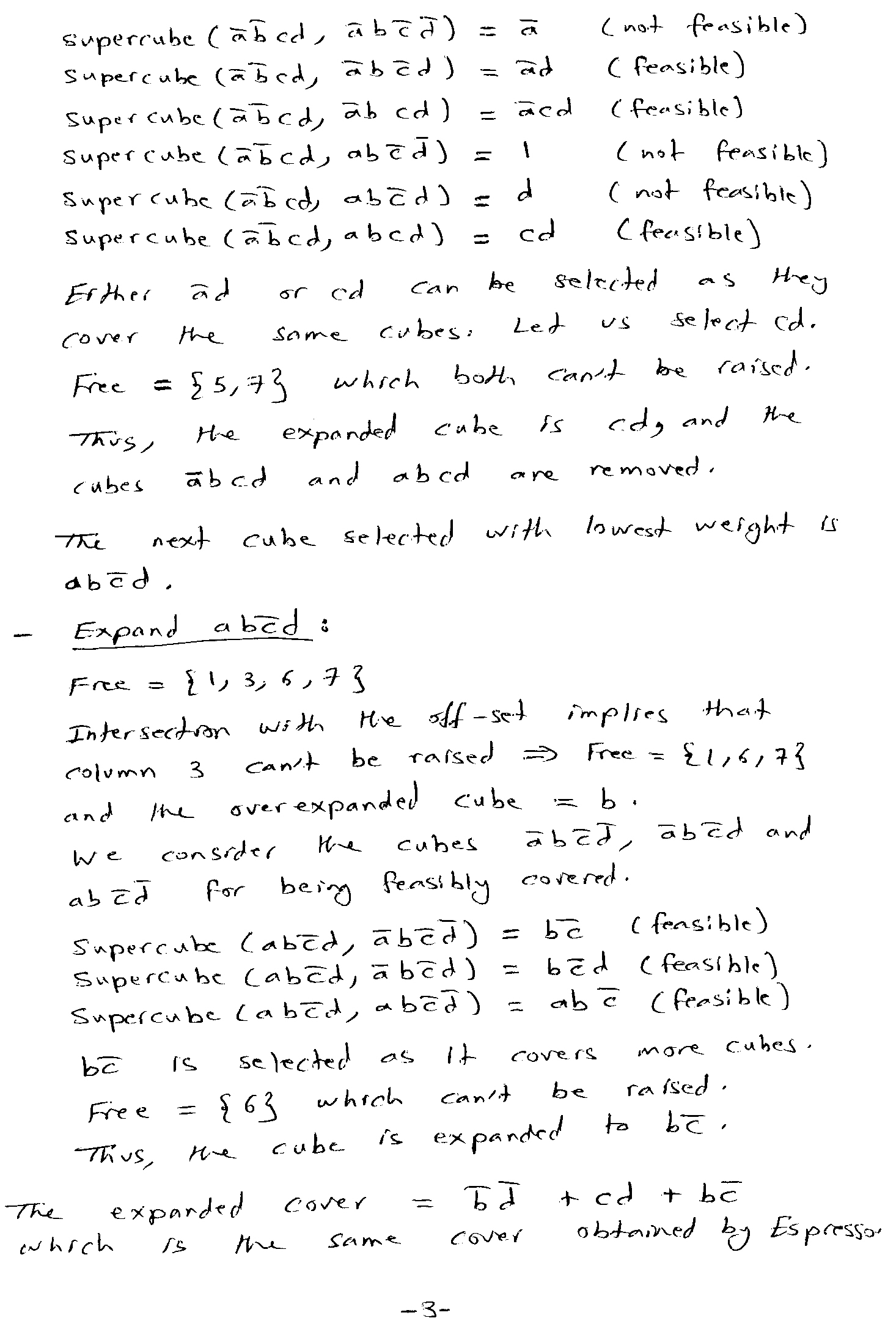
## Determine the totally redundant, Rt, and partially redundant, Rp, sets of cubes.

## Find a subset of Rp that, together with Er, covers the function by solving a covering problem.

## Compare your solution with the result obtained by ESPRESSO tool.







# espresso -d -t -Dexpand hw2q1.pla

# UC Berkeley, Espresso Version #2.3, Release date 01/31/88

.olb y

# READ Time was 0.00 sec, cost is c=11(11) in=44 out=11 tot=55

# COMPL Time was 0.00 sec, cost is c=2(2) in=7 out=2 tot=9

# PLA is hw2q1.pla with 4 inputs and 1 outputs

# ON-set cost is c=11(11) in=44 out=11 tot=55

# OFF-set cost is c=2(2) in=7 out=2 tot=9

# DC-set cost is c=2(2) in=8 out=2 tot=10

EXPAND: 1010 1 (covered 3)

EXPAND: 0011 1 (covered 2)

EXPAND: 1101 1 (covered 3)

# EXPAND Time was 0.00 sec, cost is c=3(0) in=6 out=3 tot=9

# READ 1 call(s) for 0.00 sec ( 0.0%)

# COMPL 1 call(s) for 0.00 sec ( 0.0%)

# EXPAND 1 call(s) for 0.00 sec ( 0.0%)

# expand Time was 0.00 sec, cost is c=3(0) in=6 out=3 tot=9

.i 4

.o 1

.ilb a b c d

.p 3

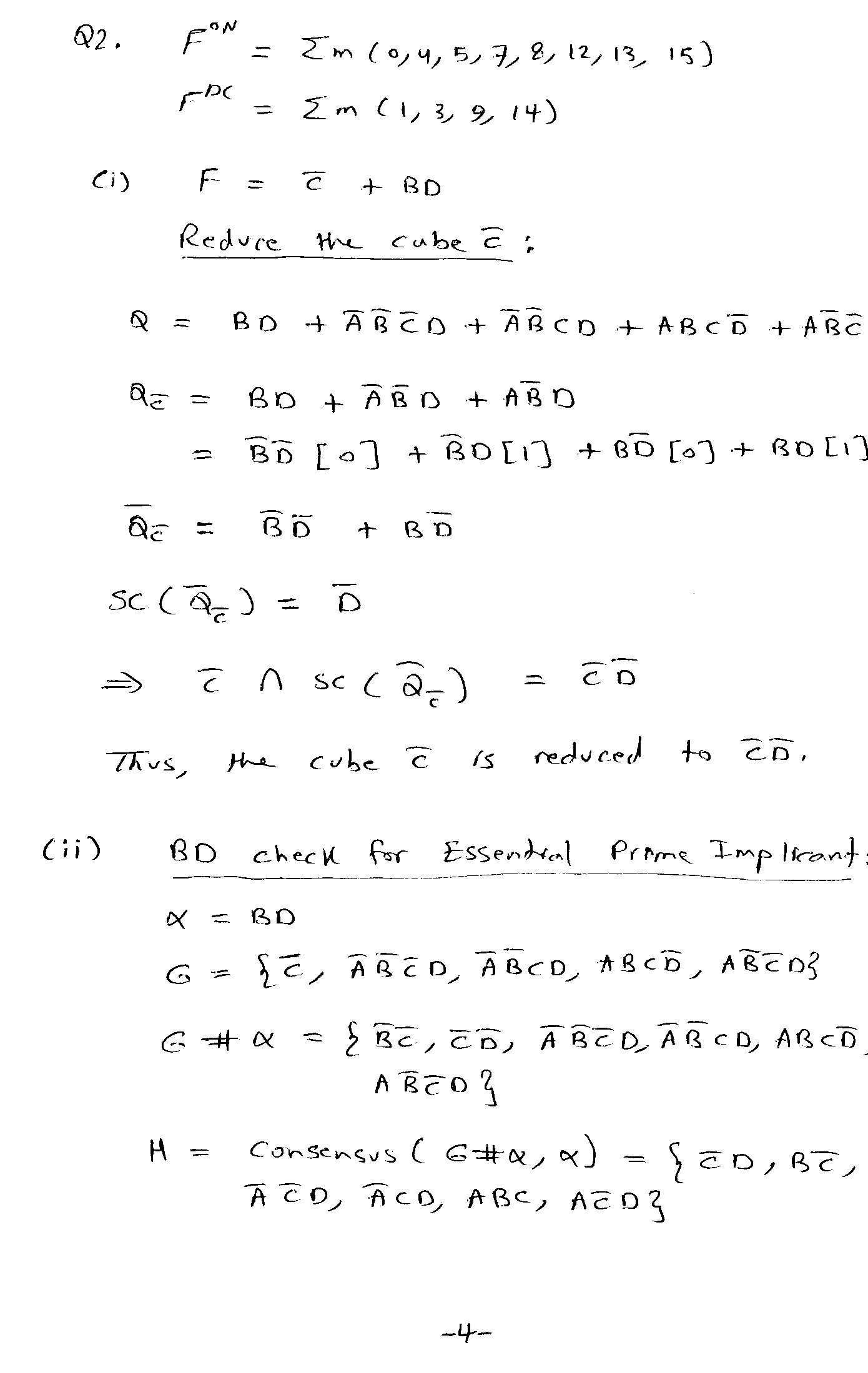
-0-0 1

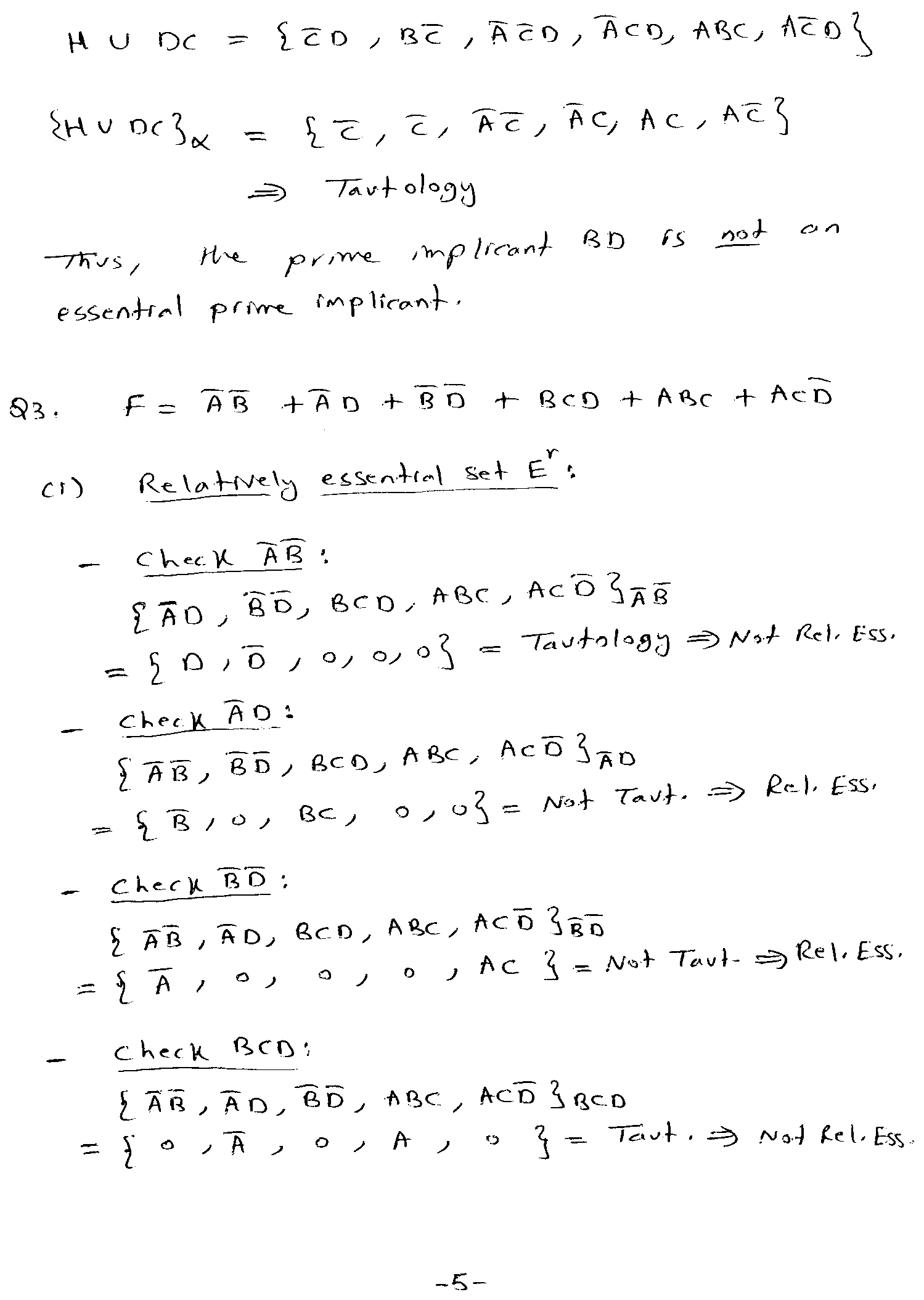
--11 1

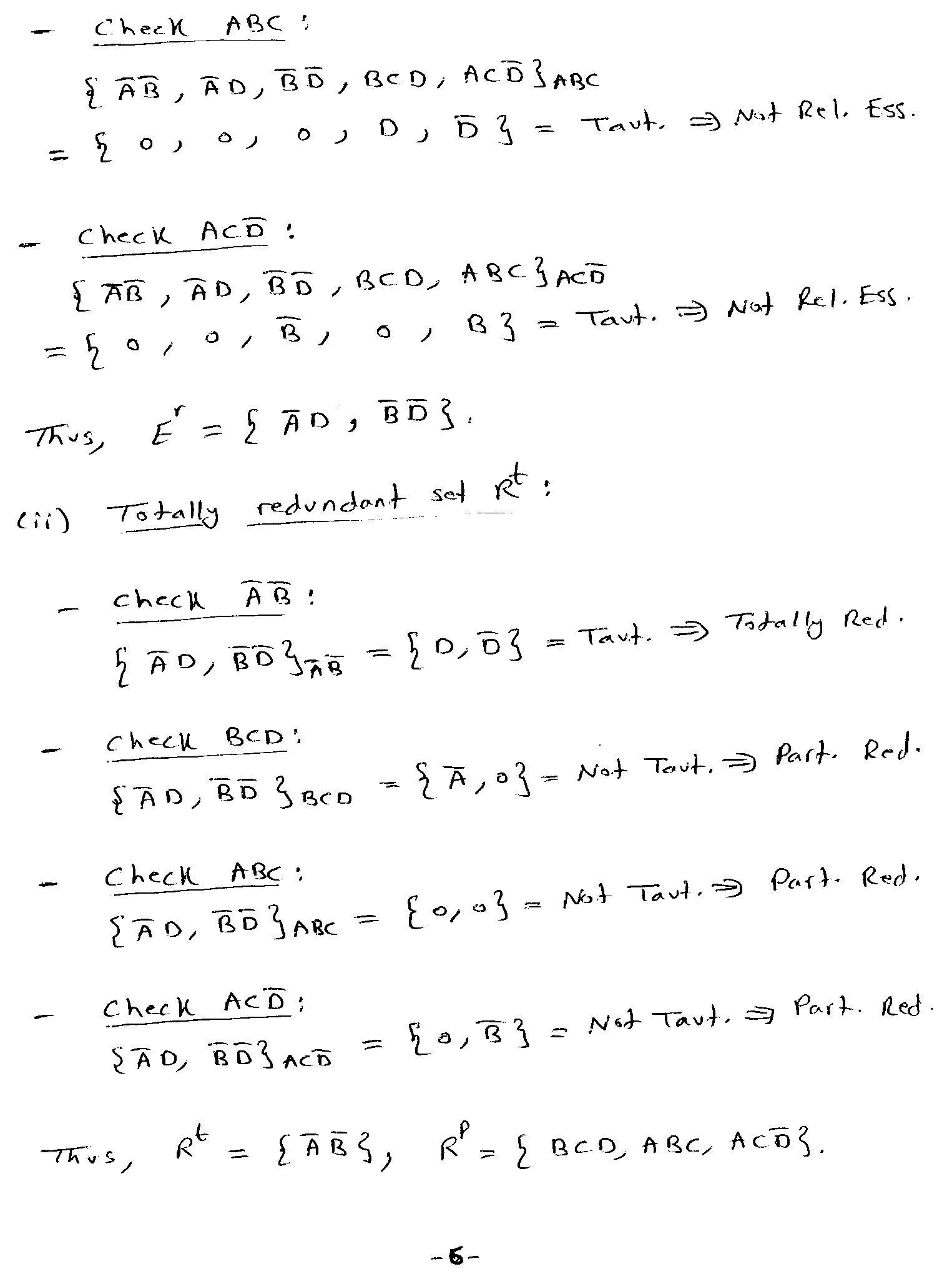
-10- 1

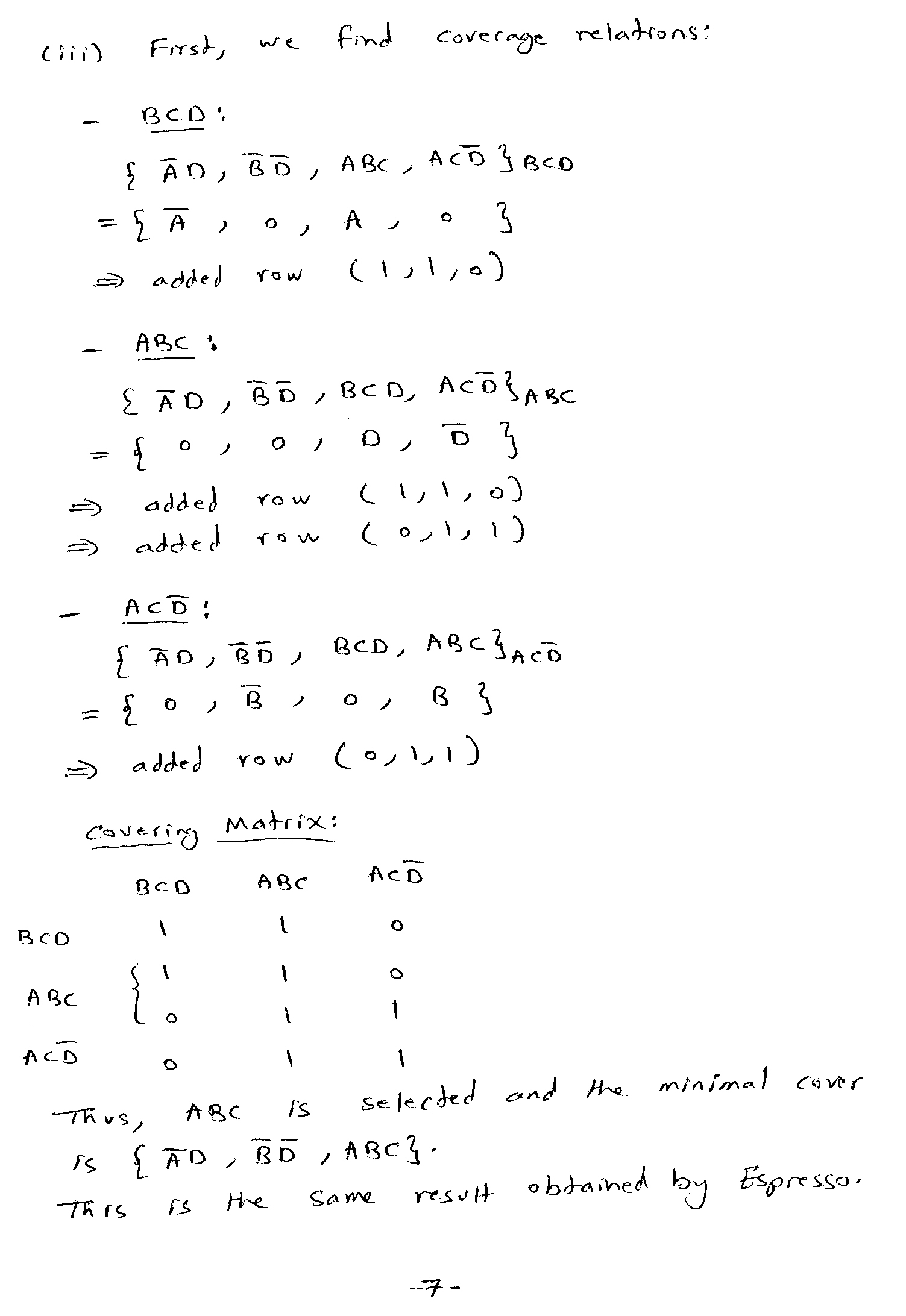
.e

# WRITE Time was 0.00 sec, cost is c=3(0) in=6 out=3 tot=9









# espresso -Dirred -t -d hw2q3.pla

# UC Berkeley, Espresso Version #2.3, Release date 01/31/88

.olb y

# READ Time was 0.00 sec, cost is c=6(6) in=15 out=6 tot=21

# COMPL Time was 0.00 sec, cost is c=0(0) in=0 out=0 tot=0

# PLA is hw2q3.pla with 4 inputs and 1 outputs

# ON-set cost is c=6(6) in=15 out=6 tot=21

# OFF-set cost is c=0(0) in=0 out=0 tot=0

# DC-set cost is c=0(0) in=0 out=0 tot=0

# IRRED: F=6 E=2 R=4 Rt=1 Rp=3 Rc=1 Final=3 Bound=0

# IRRED Time was 0.00 sec, cost is c=3(3) in=7 out=3 tot=10

# READ 1 call(s) for 0.00 sec ( 0.0%)

# COMPL 1 call(s) for 0.00 sec ( 0.0%)

# IRRED 1 call(s) for 0.00 sec ( 0.0%)

# irred Time was 0.00 sec, cost is c=3(3) in=7 out=3 tot=10

.i 4

.o 1

.ilb a b c d

.p 3

0--1 1

-0-0 1

111- 1

.e

# WRITE Time was 0.00 sec, cost is c=3(3) in=7 out=3 tot=10