Kmap form fewest, largest groupings to cover all 1's

Finish up 3-var

F: Groups can be different size

G: Groups can overlap

H: Groups $2^i \times 2^j \times 2^k \times \cdots$

I: Don't need to make all groups

J: Groups can go over edge +torus

K: Can have multiple optimal solutions

L: Side must be 2^i, 3 is not a power of 2

M: 0 is a possible solution

Given $H(A, B, C) = B + A B' C + B' C'$

$H = 1$ when $B = 1$ or   or

         $ABC = 101$ or

         $BC = 00$

$H(A, B, C) = A + B + C'$

Let's use Kmaps to minimize $\overset{SOP}{\vee}$ expressions.

$F(A,B,C) = B + A'C + AB'C'$

First, put it into a kmap (3 var)

Consider each product term and ask where is it 1 ?

- $B = 1$ when $B = 1$
- $AB'C' = 1$ when $A = 1$ $B = 0$ & $C = 0$
- $A'C = 1$ when $A = 0$ & $C = 1$

Now minimize

$F(A,B,C) = B + A'C + AC'$

4-var Kmap = 3 var Kmap + 3 var kmap

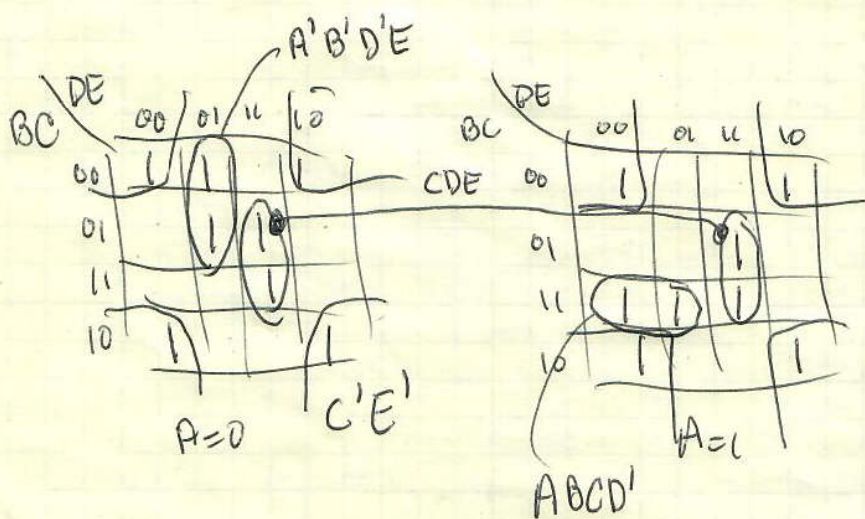| AB\CD	00	01	11	10
00	0	1	3	2
01	4	5	7	6
11	12	13	15	14
10	8	9	11	10

F: Grouping can go over edge - torus

G: Size of grouping determines # of vars

H: The hyperdonut

I: Tricky

5-var Kmap = 4 var + 4var

$$F(A,B,C,D,E) = \sum m(0,1,2,5,7,8,10,15,16,18,23,24,26,28,29,31)$$

A'B'D'E

BC\DE | 00 | 01 | 11 | 10

CDE

C'E'

A=0

BC\DE | 00 | 01 | 11 | 10

A=1

ABCD'

Minimize Determine the SOP$_{min}$ for the following functions.

F(A,B,C)=A'BC' + A'BC + AB'C' + AB'C
G(A,B,C)=A'B' + AB'C' + AC
H(A,B,C)=B+AB'C + B'C'
I(A,B,C)=A(B+C')+A'B'C'

A \ BC	00	01	11	10
0				
1				

F

A \ BC	00	01	11	10
0				
1				

G

A \ BC	00	01	11	10
0				
1				

H

A \ BC	00	01	11	10
0				
1				

I

Minimize Determine the SOP$_{min}$ realization

$F(A, B, C, D) = \sum m(0, 1, 4, 5, 8, 9)$
$G(A, B, C, D) = \sum m(0, 5, 7, 10, 11, 14, 15)$
$H(A, B, C, D) = \sum m(0, 2, 3, 5, 6, 7, 8, 10, 11, 14, 15)$
$I(A, B, C, D) = \sum m(1, 4, 6, 9, 11, 12, 14, 15)$

AB\CD	00	01	11	10
00				
01				
11				
10				

F

AB\CD	00	01	11	10
00				
01				
11				
10				

G

AB\CD	00	01	11	10
00				
01				
11				
10				

H

AB\CD	00	01	11	10
00				
01				
11				
10				

I

Minimize Determine the SOP$_{min}$ for the following functions.

$$F(A, B, C, D, E) = \sum m(0, 1, 2, 5, 7, 8, 10, 15, 16, 18, 23, 24, 26, 28, 29, 31)$$

$$G(A, B, C, D, E) = \sum m(0, 2, 4, 6, 7, 8, 9, 15, 16, 18, 20, 21, 22, 24, 25, 29)$$

BC\DE	00	01	11	10
00				
01				
11				
10				

A=0

BC\DE	00	01	11	10
00				
01				
11				
10				

A=1

F(A,B,C,D,E)=

BC\DE	00	01	11	10
00				
01				
11				
10				

A=0

BC\DE	00	01	11	10
00				
01				
11				
10				

A=1

G(A,B,C,D,E)=

Minmize Determine the SOP$_{min}$ reaization of the following functions.

$$F(A, B, C, D) = \sum m(0, 1, 5, 14, 15) + \sum d(4, 13)$$
$$G(A, B, C, D) = \sum m(0, 6, 7, 9, 10, 12) + \sum d(2, 4, 8, 13)$$

AB\CD	00	01	11	10
00				
01				
11				
10				

F

AB\CD	00	01	11	10
00				
01				
11				
10				

G