Logic System Assignment 1

A simple CAD tool based on K -map

Due date: 2021/04/16 11:59:59 pm

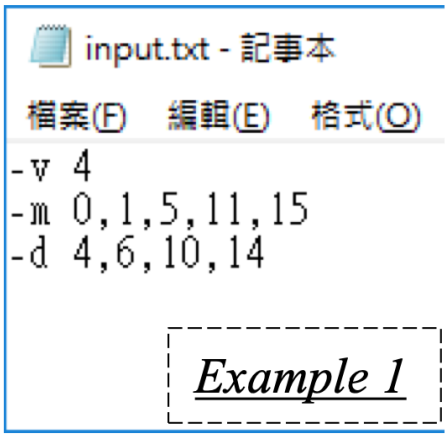
1. Description

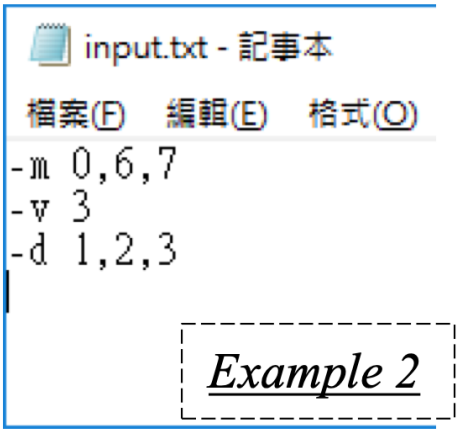
- Write a program to implement a (2~4 Variable) K-Map simplification process.
- The prime implicants and the essential prime implicants of the K-map should be indicated.
- Show the Minimum SOP (Sum of Product).

2. Requirement

- **Read the input file (Don't change the format)**
  Your program will read the input file for the ***minterm*** information and ***don't care term*** information:
  - ***Eg. F(A, B, C, D) = Σm(0,1,5,11,15) + Σ d(4,6,10,14)***

Input format:

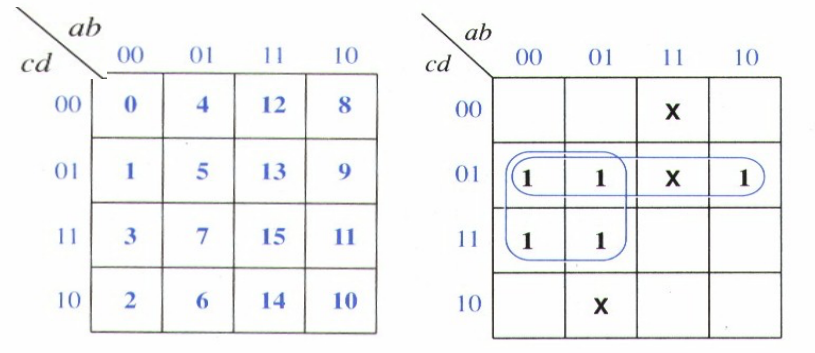




-v [Variable number]: Variable number, range(2~4)
-m [index, index …]: Minterm value index, range(0~2^v-1)
-d [index, index …]: Don't care index, range(0~2^v-1)

- **Initialize the terms in the K-map**

  You can create one two-dimensional arrays to allocate all the 1, 0, and X (don't care) terms of K-map.



cd \ ab	00	01	11	10
00	0	4	12	8
01	1	5	13	9
11	3	7	15	11
10	2	6	14	10

cd \ ab	00	01	11	10
00			X	
01	1	1	X	1
11	1	1		
10		X		

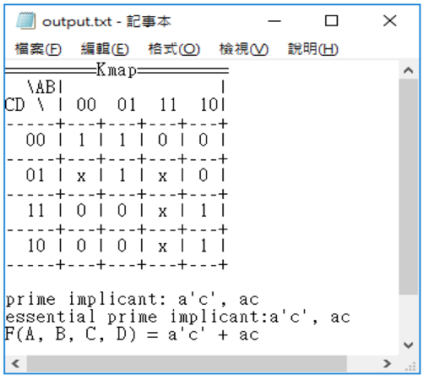
- **Write the output file (Don't change the format)**

  What you need to print in the output file:

  1. Kmap
  2. Prime implicant
  3. Essential prime implicant
  4. Minimum SOP

4-variable

Output format:



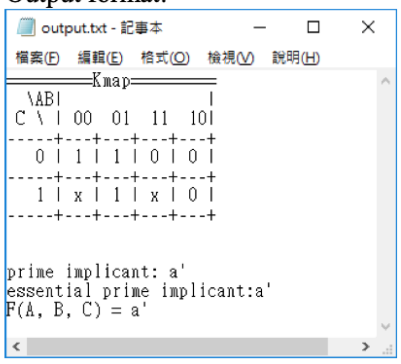
```
output.txt - 記事本
檔案(F) 編輯(E) 格式(O) 檢視(V) 說明(H)
═══════Kmap═══════
  \AB|              |
CD \ | 00  01  11  10|
-----+---+---+---+---+
  00 | 1 | 1 | 0 | 0 |
-----+---+---+---+---+
  01 | x | 1 | x | 0 |
-----+---+---+---+---+
  11 | 0 | 0 | x | 1 |
-----+---+---+---+---+
  10 | 0 | 0 | x | 1 |
-----+---+---+---+---+

prime implicant: a'c', ac
essential prime implicant:a'c', ac
F(A, B, C, D) = a'c' + ac
```

Index:

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

3-variable

Output format:



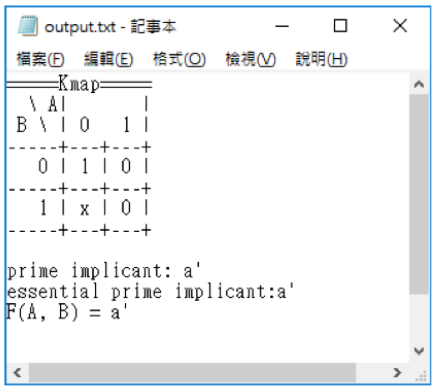
```
output.txt - 記事本
檔案(F) 編輯(E) 格式(O) 檢視(V) 說明(H)
═══════Kmap═══════
  \AB|              |
C \ | 00  01  11  10|
-----+---+---+---+---+
   0 | 1 | 1 | 0 | 0 |
-----+---+---+---+---+
   1 | x | 1 | x | 0 |
-----+---+---+---+---+


prime implicant: a'
essential prime implicant:a'
F(A, B, C) = a'
```

Index:

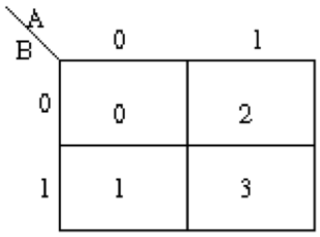
C \ AB	00	01	11	10
0	0	2	6	4
1	1	3	7	5

2-variable

Output format:



Index:



3. Hand in Specification

- You can finish your program in *C, C++, Java*.
- *Your program should:*
  - Read an input file (file name: "input.txt")
  - Write an output file (file name: "output.txt")
  - Both under the same directory of the program
- *What you need to upload:*
  1. A source code (file name: "simulator. ")
  2. A execution file (the file compiled from source code, file name: "simulator. ")
  3. A readme.txt (Tell TA what OS you use and the bonus)
  4. A document report with some explanations (code, experience…) (file name: "report.pdf")

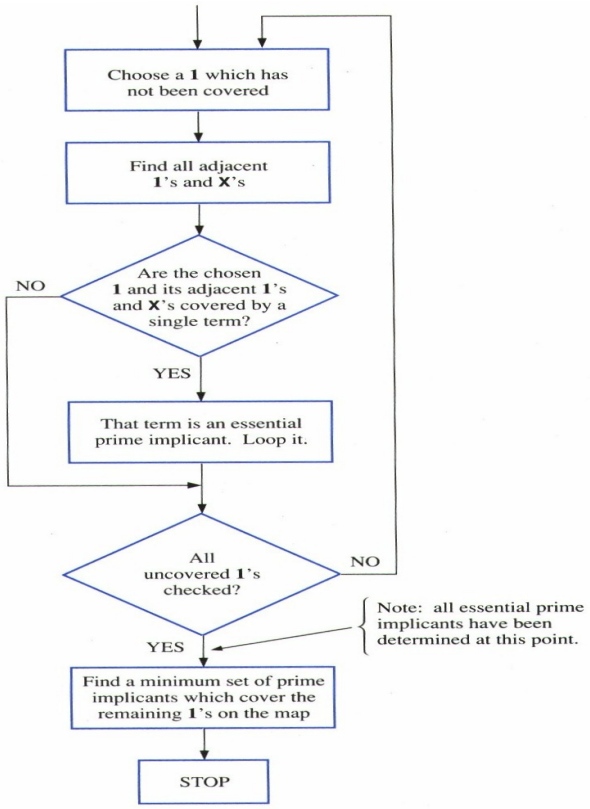
  All of the put in the directory name "StudentID_version" and compress into .tar or .zip (Example: "E24071234_1.zip")

- *Upload path (using FTP):*
  - Host: 140.116.164.225
  - User name: logic_lab
  - Password: logic2021
  - Path: Assignment1 - kmap/

4. Grading

- **Program (total 80%)**
  - Basic function (70%)
  - Comment (10%)
  - *Bonus (10%, eg. GUI, infinite variable….)*
- **Document Report (20%)**
  - Code explanation
  - Experience

5. Hint (lecture5 p.26)



6. Contact information: *ericwang0911@gmail.com*