



3.3.3 Karnaugh Maps

Computer Science (9608)

Oct/Nov 2015. P31/P32

5 (a) (i)

INPUT			OUTPUT
P	Q	R	Z
0	0	0	0
0	0	1	0
0	1	0	0
0	1	1	0
1	0	0	1
1	0	1	1
1	1	0	0
1	1	1	1

(ii) For the truth table above complete the Karnaugh Map (K-map).

		PQ			
		00	01	11	10
R	0				
	1				

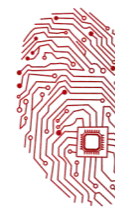
[1]

The K-map can be used to simplify the function in **part(a)(i)**.

(iii) Draw loop(s) around appropriate groups of 1's to produce an optimal sum-of-products. [2]

(iv) Using your answer to **part (a)(iii)**, write the simplified sum-of-products Boolean function. [1]



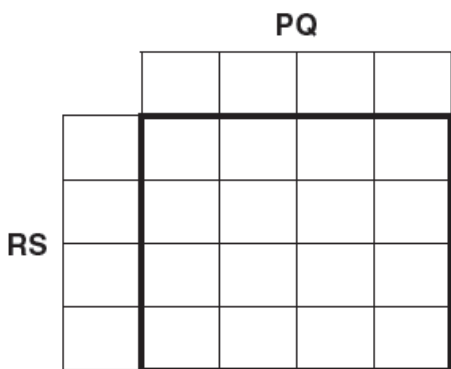


3.3.3 Karnaugh Maps

(b) The truth table for a logic circuit with four inputs is given below:

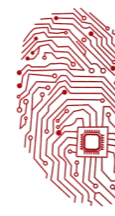
INPUT				OUTPUT
P	Q	R	S	Z
0	0	0	0	0
0	0	0	1	0
0	0	1	0	0
0	0	1	1	0
0	1	0	0	0
0	1	0	1	1
0	1	1	0	0
0	1	1	1	1
1	0	0	0	0
1	0	0	1	1
1	0	1	0	0
1	0	1	1	0
1	1	0	0	0
1	1	0	1	1
1	1	1	0	0
1	1	1	1	1

(i) Complete the K-map corresponding to the truth table above.



- (ii) Draw loop(s) around appropriate groups of 1's to produce an optimal sum-of-products. [2]
- (iii) Using your answer to **part (b)(ii)**, write the simplified sum-of-products Boolean function. [2]





3.3.3 Karnaugh Maps

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5 (a) (i)

INPUT			OUTPUT
A	B	C	X
0	0	0	0
0	0	1	0
0	1	0	0
0	1	1	1
1	0	0	0
1	0	1	0
1	1	0	1
1	1	1	1

(ii) For the truth table above complete the Karnaugh Map (K-map).

		AB			
		00	01	11	10
C	0				
	1				

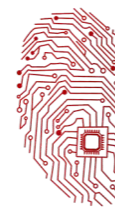
[1]

The K-map can be used to simplify the function in **part(a)(i)**.

(iii) Draw loop(s) around appropriate groups of 1's to produce an optimal sum-of-products. [2]

(iv) Using your answer to **part (a)(iii)**, write the simplified sum-of-products Boolean function. [2]



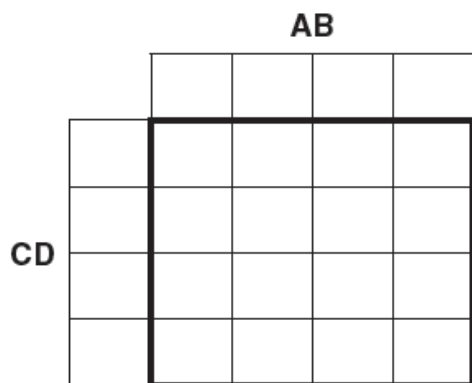


3.3.3 Karnaugh Maps

(b) The truth table for a logic circuit with four inputs is given below:

INPUT				OUTPUT
A	B	C	D	X
0	0	0	0	0
0	0	0	1	0
0	0	1	0	0
0	0	1	1	0
0	1	0	0	1
0	1	0	1	0
0	1	1	0	1
0	1	1	1	0
1	0	0	0	0
1	0	0	1	0
1	0	1	0	0
1	0	1	1	0
1	1	0	0	1
1	1	0	1	0
1	1	1	0	1
1	1	1	1	1

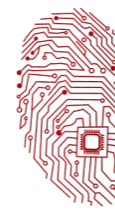
(i) Complete the K-map corresponding to the truth table above.



(ii) Draw loop(s) around appropriate groups of 1's to produce an optimal sum-of-products. [2]

(iii) Using your answer to part (b)(ii), write the simplified sum-of-products Boolean function. [2]





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May/June 2018.P31/P33

4 (a) A Boolean expression produces the following truth table.

INPUT			OUTPUT
A	B	C	X
0	0	0	0
0	0	1	0
0	1	0	1
0	1	1	1
1	0	0	1
1	0	1	1
1	1	0	0
1	1	1	0

(i) Write the Boolean expression for the truth table as a sum-of-products.

X =

[2]

(ii) Complete the Karnaugh Map (K-map) for the truth table in part (a)(i).

		AB			
		00	01	11	10
C	0				
	1				

[1]

The K-map can be used to simplify the function in part (a)(i).

(iii) Draw loop(s) around appropriate group(s) of 1s to produce an optimal sum-of-products for the table in part(a)(ii).

[2]

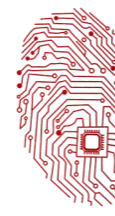
(iv) Write the simplified sum-of-products expression for your answer to part (a)(iii).

X =

[2]

(b) A logic circuit with four inputs produces the following truth table.





3.3.3 Karnaugh Maps

INPUT				OUTPUT
A	B	C	D	X
0	0	0	0	0
0	0	0	1	0
0	0	1	0	0
0	0	1	1	0
0	1	0	0	1
0	1	0	1	1
0	1	1	0	1
0	1	1	1	1
1	0	0	0	0
1	0	0	1	0
1	0	1	0	0
1	0	1	1	0
1	1	0	0	1
1	1	0	1	1
1	1	1	0	0
1	1	1	1	0

(i) Complete the K-map that corresponds to the truth table.

AB

CD				

(ii) Draw loop(s) around appropriate group(s) of 1s to produce an optimal sum-of-products for the table in part (b)(i). [4]
[2]

(iii) Write the simplified sum-of-products expression for your answer to part (b)(ii). [2]
 X =

