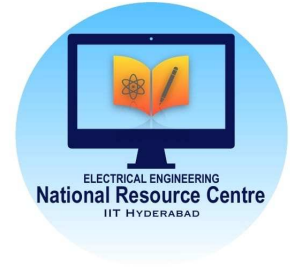




Karnaugh Map with Dont Care Conditions



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CONTENTS

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Abstract—This manual explains Karnaugh maps (K-map) using don't care conditions.

1 DON'T CARE CONDITIONS

1. Don't Care Conditions: 4 binary digits are used in the incrementing decoder [1]. However, only the numbers from 0-9 are used as input/output in the decoder and we *don't care* about the numbers from 10-15. This phenomenon can be addressed by revising the truth table in [1] to obtain Table 1.

2. The revised K-map for A is available in Fig. 2. Show that

$$A = W' \quad (1.1)$$

3. The revised K-map for B is available in Fig. 3. Show that

$$B = WX'Z' + W'X \quad (1.2)$$

4. The revised K-map for C is available in Fig. 4. Show that

$$C = X'Y + W'Y + WXY' \quad (1.3)$$

5. The revised K-map for D is available in Fig. 5. Show that

$$D = W'Z + WXY \quad (1.4)$$

Z	Y	X	W	D	C	B	A
0	0	0	0	0	0	0	1
0	0	0	1	0	0	1	0
0	0	1	0	0	0	1	1
0	0	1	1	0	1	0	0
0	1	0	0	0	1	0	1
0	1	0	1	0	1	1	0
0	1	1	0	0	1	1	1
0	1	1	1	1	0	0	0
1	0	0	0	1	0	0	1
1	0	0	1	0	0	0	0
1	0	1	0	-	-	-	-
1	0	1	1	-	-	-	-
1	1	0	0	-	-	-	-
1	1	0	1	-	-	-	-
1	1	1	0	-	-	-	-
1	1	1	1	-	-	-	-

TABLE 1

6. Verify the incrementing decoder with don't care conditions using the arduino.

7. Display Decoder: Use K-maps to obtain the minimized expressions for a, b, c, d, e, f, g in terms of A, B, C, D with don't care conditions.

8. Verify the display decoder with don't care conditions using arduino.

REFERENCES

- [1] G. V. V. Sharma. Karnaugh Map. [Online]. Available: https://github.com/gadepall/arduino/raw/master/ide/kmap/gvv_kmap.pdf

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ZY \ XW				
	00	01	11	10
00		0	0	
01		0	0	
11	-	-	-	-
10		0	-	-

Fig. 2: K-map for A with don't cares.

ZY \ XW				
	00	01	11	10
00	0	0		0
01			0	
11	-	-	-	-
10	0	0	-	-

Fig. 4: K-map for C with don't cares.

ZY \ XW				
	00	01	11	10
00	0		0	
01	0		0	
11	-	-	-	-
10	0	0	-	-

Fig. 3: K-map for B with don't cares.

ZY \ XW				
	00	01	11	10
00	0	0	0	0
01	0	0		0
11	-	-	-	-
10		0	-	-

Fig. 5: K-map for D with don't cares.