Test 2 last ques

Tuesday, 19 December 2023 3:23 PM

SECR1013 DIGITAL LOGIC TEST 2 (PART B) 2020/2021-1

QUESTION 4 (18 MARKS)

The 2020 Movement Control Order (MCO) is a preventive measure by the federal government of Malaysia in response to the COVID-19 pandemic in the country on 18 March 2020. During MCO, essentially the country is in lockdown. Further down the road, during Recovery Movement Control Order (RMCO), several restrictions like travel are allowed for certain countries.

The following are rules to determine who is allowed to enter Malaysia (output) for citizens from two countries, New Zealand and Singapore.

(1) You are essential worker from New Zealand. AB = 11

(2) You are non-essential worker from New Zealand going to green zone with zero COVID-19 cases. ABCD = 1011

(3) You are essential worker from Singapore going to green zone in Malaysia ABC = 011

Hints & Notes:

(1) There are 4 input variables.

(2) Red zone districts with zero COVID-19 cases does not exist. C=0 D=1 X

(3) Red zone: dangerous districts with 40 or more cases of COVID-19. ≥ 40 = red

(4) Green zone: district with less than 40 cases of COVID-19. < 40 = green

Design a combinational logic circuit with the least number of gates that will produce the desired output. All steps must be shown clearly. Please make sure all variables are defined, labelled and explained. If there is a need, you may state your (logical) assumption.

output – Malaysia

input

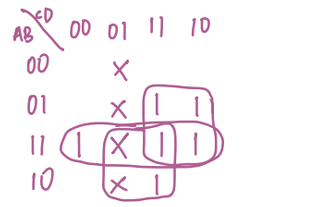
A – 1 New Zealand
0 Singapore

B – 1 essential
0 non-essential

C – 1 green zone
0 red zone

D – 1 zero covid-19 case
0 have covid-19 case

	A	B	C	D	(1)	(2)	(3)
	0	0	0	0			
X	0	0	0	1			
	0	0	1	0			
	0	0	1	1			
	0	1	0	0			
X	0	1	0	1			
	0	1	1	0			1
	0	1	1	1			1
	1	0	0	0			
X	1	0	0	1			
	1	0	1	0			
	1	0	1	1		1	
	1	1	0	0	1		
X	1	1	0	1	X		
	1	1	1	0	1		
	1	1	1	1	1		



output = AB + AD + BC