西安电子科技大学

研究生课程考试试题

（答案必须写在答题纸上或在答题卡上填涂）

考试科目：_____ 课程编号：_____

考试日期：2016 年 1 月 22 日 考试时间：120 分

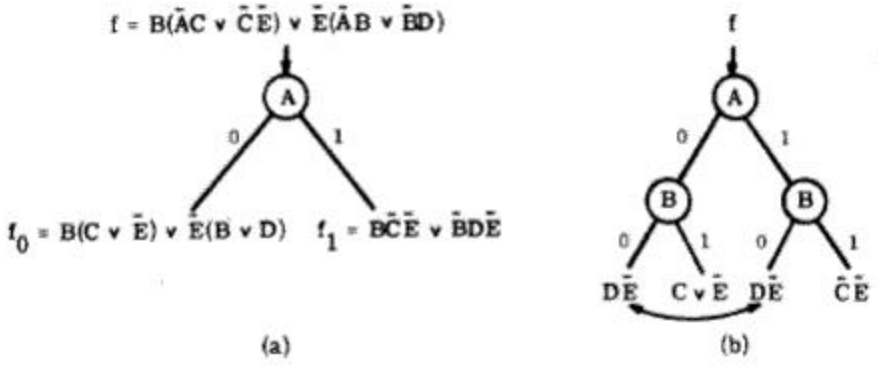
考试方式：（闭卷）任课教师：_____ 班号_____

学生姓名：_____ 学　　号：_____

1. (20 分) Give the diagram deriving from the Shannon expansion formula of function f (using Binary Decision Diagrams).

$$f = B(\bar{A}C \vee \bar{C}\bar{E}) \vee \bar{E}(\bar{A}B \vee \bar{B}D)$$

AKERS: BINARY DECISION DIAGRAMS



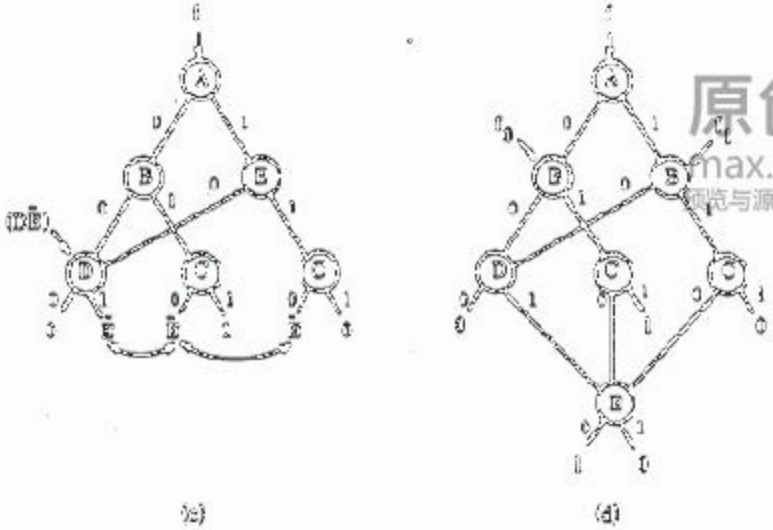
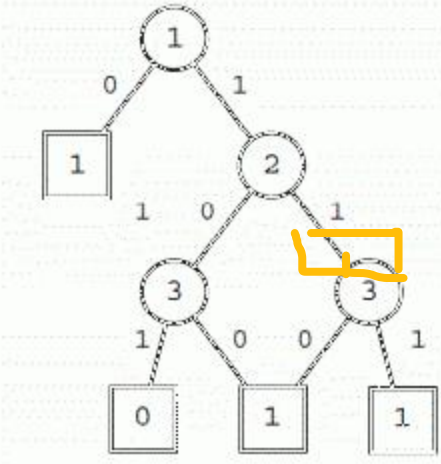
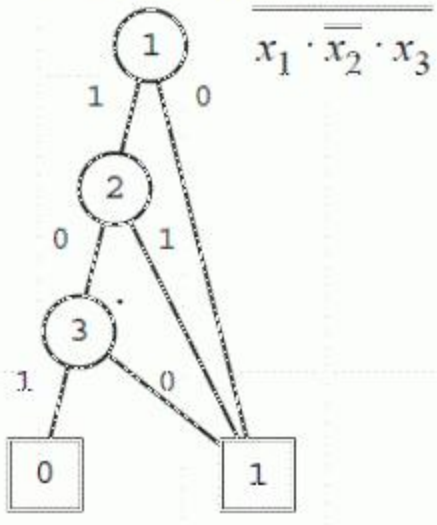


Fig. 5. Deriving a diagram by expansion.

2. (20 分) Transform the following arbitrary function graph into a reduced graph denoting the same function.



After Reduction



3. (15 分) Judge if there are conflicting clauses in the following CNFs. If not, write all feasible assignments.

不行就画个真值表。。

(1) $(x \vee y \vee z)(x \vee \bar{y})(y \vee \bar{z})(z \vee \bar{x})(\bar{x} \vee \bar{y} \vee \bar{z})$

假设 x=0, $(x \vee \bar{y})$=>y=0+$(y \vee \bar{z})$=>z=0

x=0, y=0, z=0=>$(x \vee y \vee z)$=0

假设 x=1, $(z \vee \bar{x})$=>z=1+$(y \vee \bar{z})$=>y=1

x=1, y=1, z=1, $(\bar{x} \vee \bar{y} \vee \bar{z})$=>0

所以说，所有的值都使得这个语句结果为 0，根据定义，是冲突语句

(2) $(\bar{x} \vee y \vee \bar{z})(x \vee \bar{y} \vee z)(x \vee y \vee z)(\bar{x} \vee \bar{y})$

$(x \vee \bar{y} \vee z)(x \vee y \vee z)$=> $x \vee z$

$(\bar{x} \vee \bar{y})$ $(\bar{x} \vee y \vee \bar{z})$=> $(\bar{x} \vee \bar{z})$

所以，x、z 一个为 1

a. x=1, z=0, $\bar{x} \vee \bar{y}$=>y=0

b. x=0, z=1, y随便

存在 x、y、z 的值，使得这个语句结果不为 0，所以不是冲突语句。

(3) $(\bar{x} \vee y \vee z)(\bar{y} \vee z)(x \vee y)(y \vee z)(\bar{x} \vee y \vee \bar{z})$

$(y \vee z)$ $(\bar{x} \vee y \vee z)$=> $y \vee z$

$\overline{(x} \vee y \vee \bar{z})(\bar{x} \vee y \vee z)$=> $\bar{x} \vee y$

$(\bar{y} \vee z)(x \vee y)$=> $x \vee z$

x=0, $x \vee z$,$x \vee y$=>z=1, y=1

x=1, $\bar{x} \vee y$=>y=1, $\bar{y} \vee z$=>z=1

存在 x、y、z 的值，使得这个语句结果不为 0，所以不是冲突语句。

4. (10 分) Prove the following equation.

$$(x+y)(y'+z) \equiv (x+y)(y'+z)(x+z)$$

画个真值表

x	y	z	x+y	y’ +z	左	x+z	右
0	0	0	0	1	0	0	0
0	0	1	0	1	0	1	0
0	1	0	1	0	0	0	0
0	1	1	1	1	1	1	1
1	0	0	1	1	1	1	1
1	0	1	1	1	1	1	1
1	1	0	1	0	0	1	0
1	1	1	1	1	1	1	1

由真值表可知， $(x+y)(y'+z) \equiv (x+y)(y'+z)(x+z)$

5. (15 分) Translate the following program into logical formula.

Program:

$$x, y: \textit{natural initially } x = y = 0$$

$$\begin{bmatrix} l_0: \ \textit{if } x = 0 \ \textit{do} \\ [l_1: y := y + 2] \\ l_2: \ \textit{while } x = 1 \ \textit{do} \\ [l_3:] \end{bmatrix} \quad || \quad \begin{bmatrix} m_0: \ x := 1 \\ m_1: \end{bmatrix}$$

– P_1 –　　– P_2 –