

EECS 151 HW 02

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1 Moment of Truth Table

1.a

| <i>A</i> | <i>B</i> | <i>C</i> | <i>Y</i> |
|----------|----------|----------|----------|
| 0 | 0 | 0 | 1 |
| 0 | 0 | 1 | 0 |
| 0 | 1 | 0 | 1 |
| 0 | 1 | 1 | 1 |
| 1 | 0 | 0 | 1 |
| 1 | 0 | 1 | 0 |
| 1 | 1 | 0 | 1 |
| 1 | 1 | 1 | 1 |

1.b

| <i>A</i> | <i>B</i> | <i>C</i> | <i>Y</i> |
|----------|----------|----------|----------|
| 0 | 0 | 0 | 1 |
| 0 | 0 | 1 | 1 |
| 0 | 1 | 0 | 0 |
| 0 | 1 | 1 | 0 |
| 1 | 0 | 0 | 1 |
| 1 | 0 | 1 | 0 |
| 1 | 1 | 0 | 0 |
| 1 | 1 | 1 | 1 |

1.c

| <i>A</i> | <i>B</i> | <i>C</i> | <i>Y</i> |
|----------|----------|----------|----------|
| 0 | 0 | 0 | 1 |
| 0 | 0 | 1 | 1 |
| 0 | 1 | 0 | 1 |
| 0 | 1 | 1 | 0 |
| 1 | 0 | 0 | 1 |
| 1 | 0 | 1 | 1 |
| 1 | 1 | 0 | 1 |
| 1 | 1 | 1 | 1 |

2 Boo...lean

$$Y = \overline{DC + (\overline{DC + BA})D + B(A + \overline{C})} \quad (1)$$

$$= (\overline{D + \overline{C}}) \cdot \overline{(\overline{DC + BA})D} + B(\overline{A} \cdot \overline{\overline{C}}) \quad (2)$$

$$= (\overline{D + \overline{C}}) \cdot (\overline{DC + BA})D + B\overline{A}C \quad (3)$$

$$= (\overline{D + \overline{C}}) \cdot (\overline{D + \overline{C}} + B\overline{A})D + B\overline{A}C \quad (4)$$

$$= (\overline{D + \overline{C}} + B\overline{A})D\overline{D} + (\overline{D + \overline{C}} + B\overline{A})D\overline{C} + B\overline{A} \cdot C \quad (5)$$

$$= (\overline{D + \overline{C}} + B\overline{A})D\overline{C} + B\overline{A}C \quad (6)$$

$$= \overline{D}D\overline{C} + \overline{C}D\overline{C} + B\overline{A}D\overline{C} + B\overline{A}C \quad (7)$$

$$= D\overline{C} + B\overline{A}D\overline{C} + B\overline{A}C \quad (8)$$

$$= D\overline{C} + B\overline{A}(D\overline{C} + C) \quad (9)$$

$$= D\overline{C} + B\overline{A}C \quad (10)$$

3 K for Karnaugh Map

3.a

$$\begin{pmatrix} 0 & 0 & 0 & 0 \\ 1 & 0 & 0 & 0 \\ 1 & 1 & 0 & 0 \\ 0 & 0 & 0 & 0 \end{pmatrix} \Rightarrow F = BC'D' + ABC' \quad (11)$$

3.b

$$\begin{pmatrix} 1 & 1 & 1 & 1 \\ 1 & 1 & 1 & 1 \\ 1 & 1 & 0 & 1 \\ 1 & 1 & 0 & 1 \end{pmatrix} \Rightarrow F = A' + C' + D' \quad (12)$$

3.c

$$\begin{pmatrix} 0 & 1 & 0 & 0 \\ 0 & 1 & 1 & 1 \\ 0 & 1 & 0 & 0 \\ 0 & 1 & 0 & 0 \end{pmatrix} \Rightarrow F = C'D + A'BD + A'BC \quad (13)$$

4 Mealy or Moore

This is a Mealy machine. Converting to a Moore machine,

