Homework 29
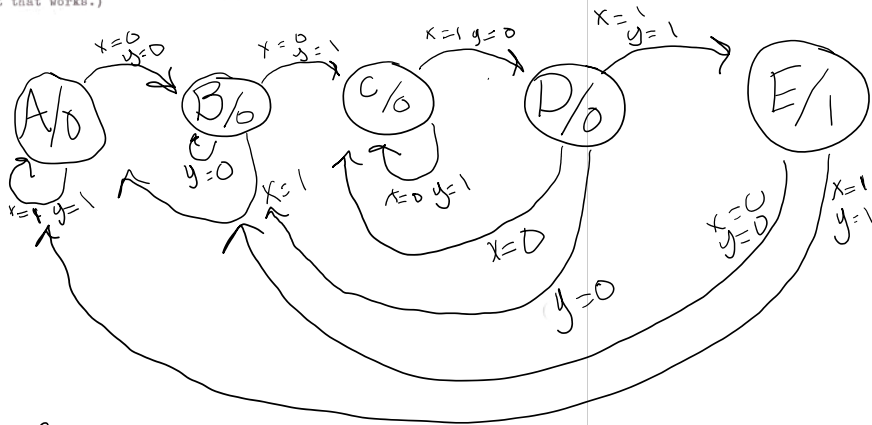
Homework 29 - ELEC 2200 - Fall 2021

Make a one-hot finite state machine using falling edge DFFs (.5 points) to output a 1 only after receiving the sequence 00, 01, 10, 11 on inputs named x and y, respectively. Use only NOR gates.(1 point for gates, 1 point for correct equations for sequence detection/states, 2.5 points for completed circuit that works.)

$D_A = Q_A xy + Q_B x + Q_E x y$

$D_B = Q_A \overline{x}\,\overline{y} + Q_B \overline{y} + Q_D \overline{y} + Q_E \overline{x}\,\overline{y}$

$D_C = Q_B \overline{x} y + Q_C \overline{x} y + Q_D \overline{x}$

$D_D = Q_C x \overline{y}$
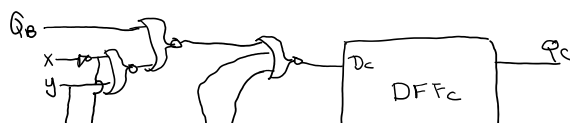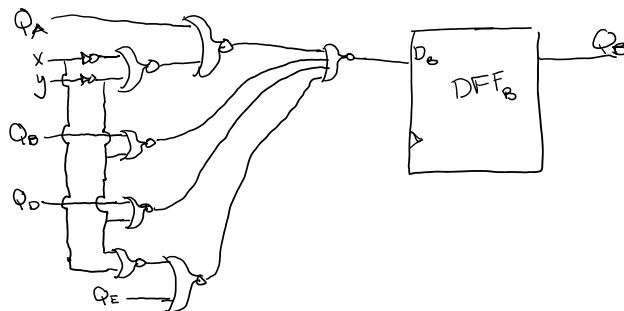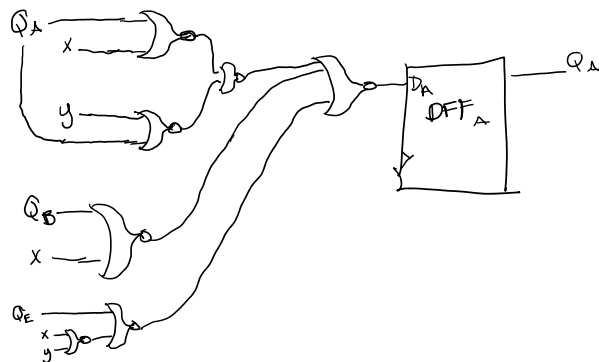
$D_E = Q_D xy$

$Z = Q_E$

To get to.

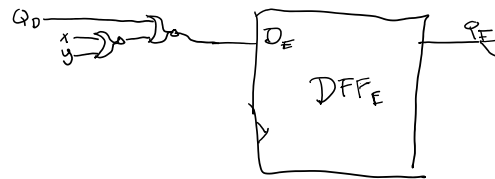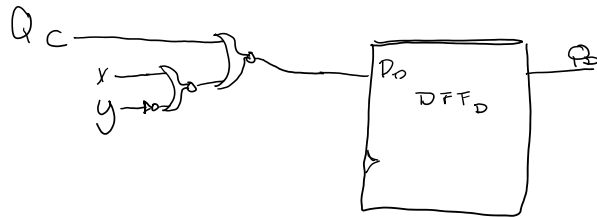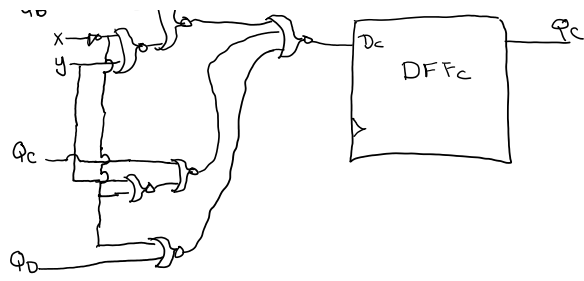A → A, input x=1 input y=1
B, input x=1
E, input x=1 input y=1

B → A, input x=0 input y=0
B, input y=0
D, input y=0
E, input x=0 input y=0

C → B, input x=0 input y=1
C, input x=0 input y=1
D, input x=0

D → C, input x=1 input y=0

E → D, x input =1 y input =1

D_C DFF$_C$ Q_C

x
y

Q_C

Q_D

Q C

x
y

D_D DFF$_D$ Q_D

Q_D

x
y

D_E DFF$_E$ Q_E

DFF$_E$

Z