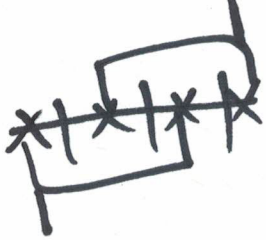
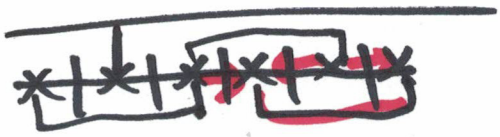




ENGR338 Quiz 3

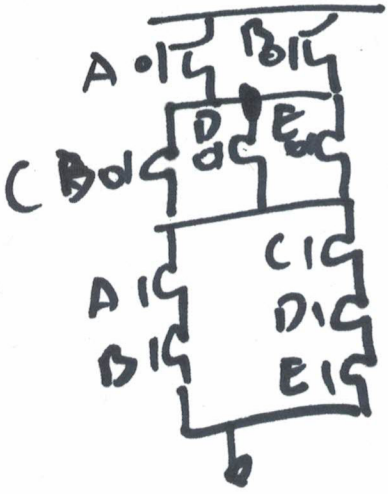
1. Draw the complex CMOS schematics and the stick diagrams of the following logic expressions. (50 points for each)

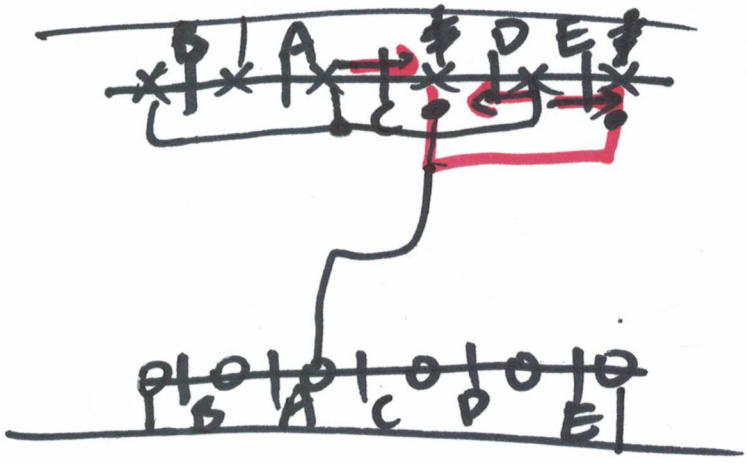
a. $\overline{(AB + CD)E + AB}$

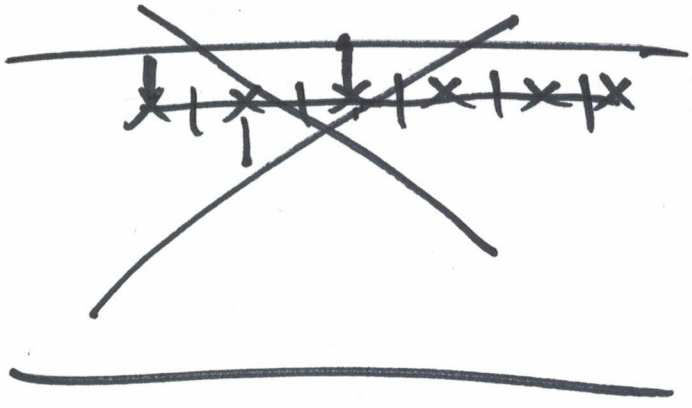
b. $\overline{AB + CDE + BC}$

$= \overline{ABE + CDE + AB} = \overline{AB \cdot (1+E) + CDE}$

$= \overline{AB + CDE}$

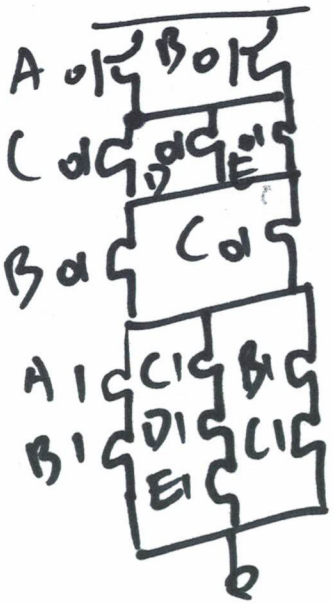


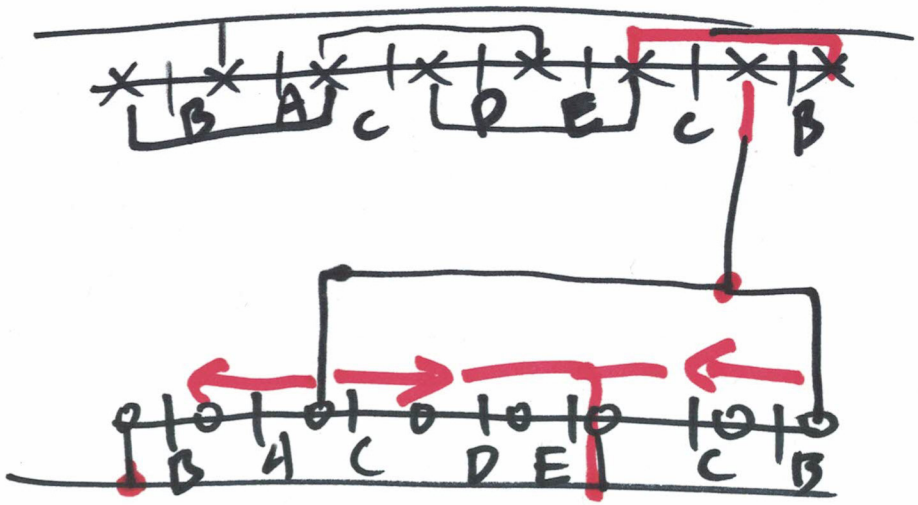




Quiz3

1. b. $AB + cDE + BC$





Static Logics Gates, AOIs, and Stick Diagrams

1. Convert the following logic expressions to CMOS AOI circuits and hand-draw the stick diagrams of the layouts. (100 points)

(a) G = $\bar{A}$

(b) G = $\overline{(A \cdot B)}$

(c) G = $\overline{(A + B)}$

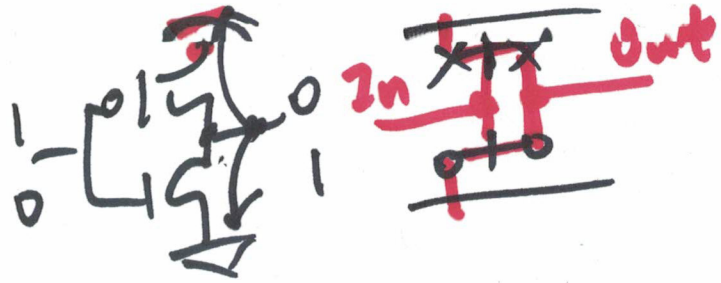
(d) G = $A \cdot B$

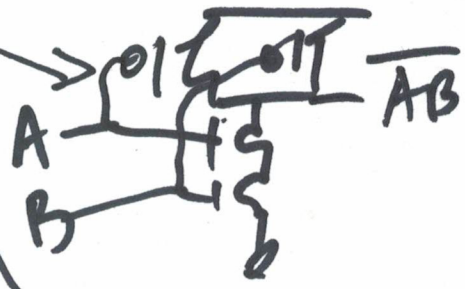
(e) G = $\overline{(A + B) \cdot (C + D) \cdot E}$

(f) G = $\overline{(A \cdot B) + (C \cdot D)}$

(g) G = $\overline{(A \cdot B + C)} \cdot \bar{D}$

(h) G = $\overline{(A \cdot B)} + A \cdot B$





NOR

$AB = \overline{\overline{AB}}$

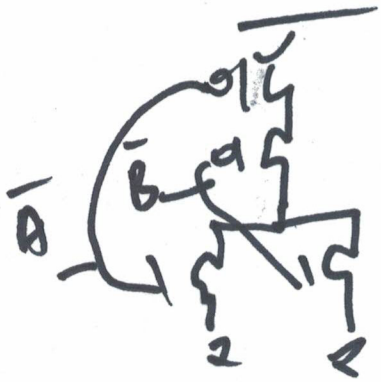
$= \overline{\bar{A} + \bar{B}}$

$AB \neq \overline{A+B}$

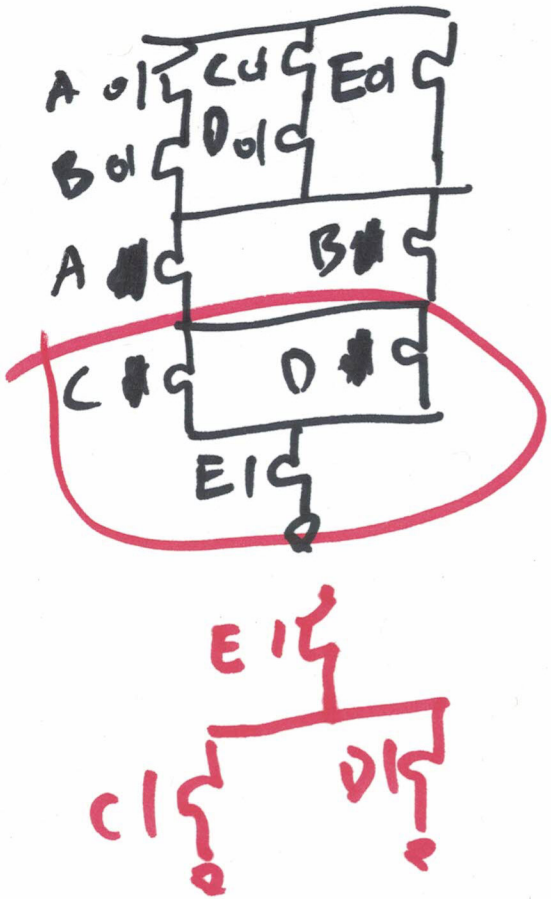
demorgan's law

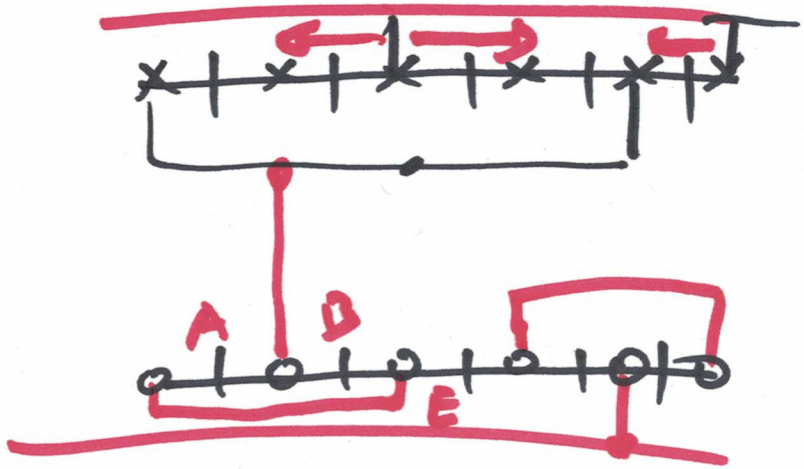
$\overline{AB} = \bar{A} + \bar{B}$

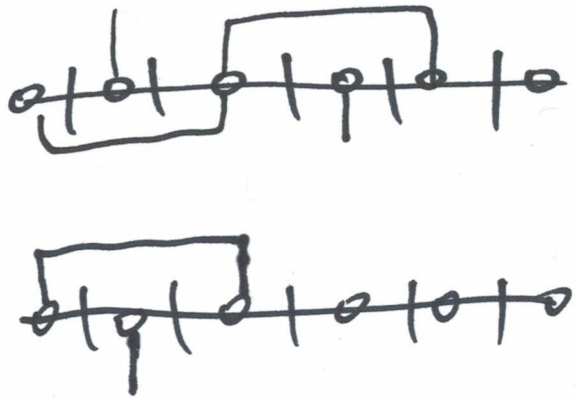
$\overline{A+B} = \bar{A} \cdot \bar{B}$



(e) $\overline{(A+B)\cdot(C+D)\cdot E}$



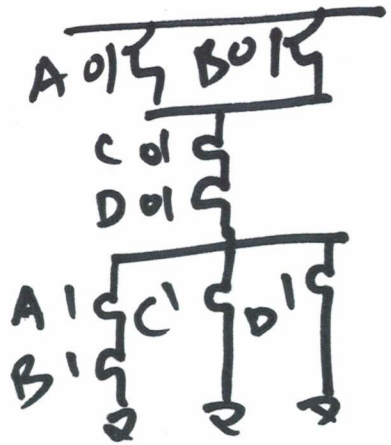


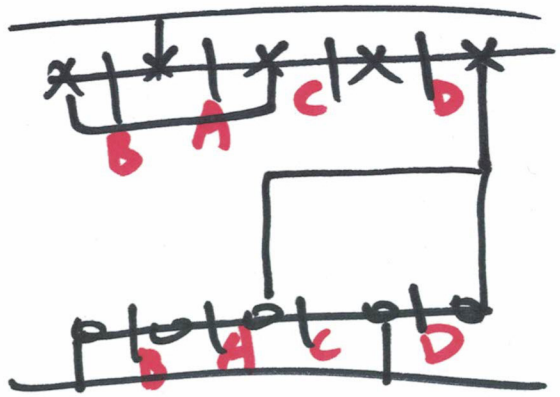


(f) $G = \overline{AB+CD}$

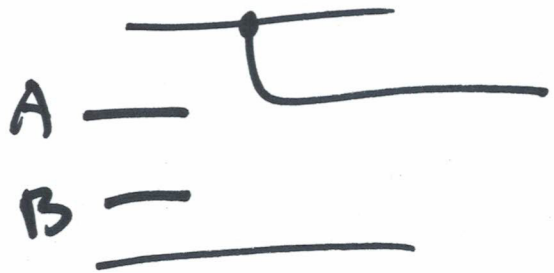
(g) $G = \overline{AB+C} \cdot \overline{D}$

$= \overline{AB+C+D}$





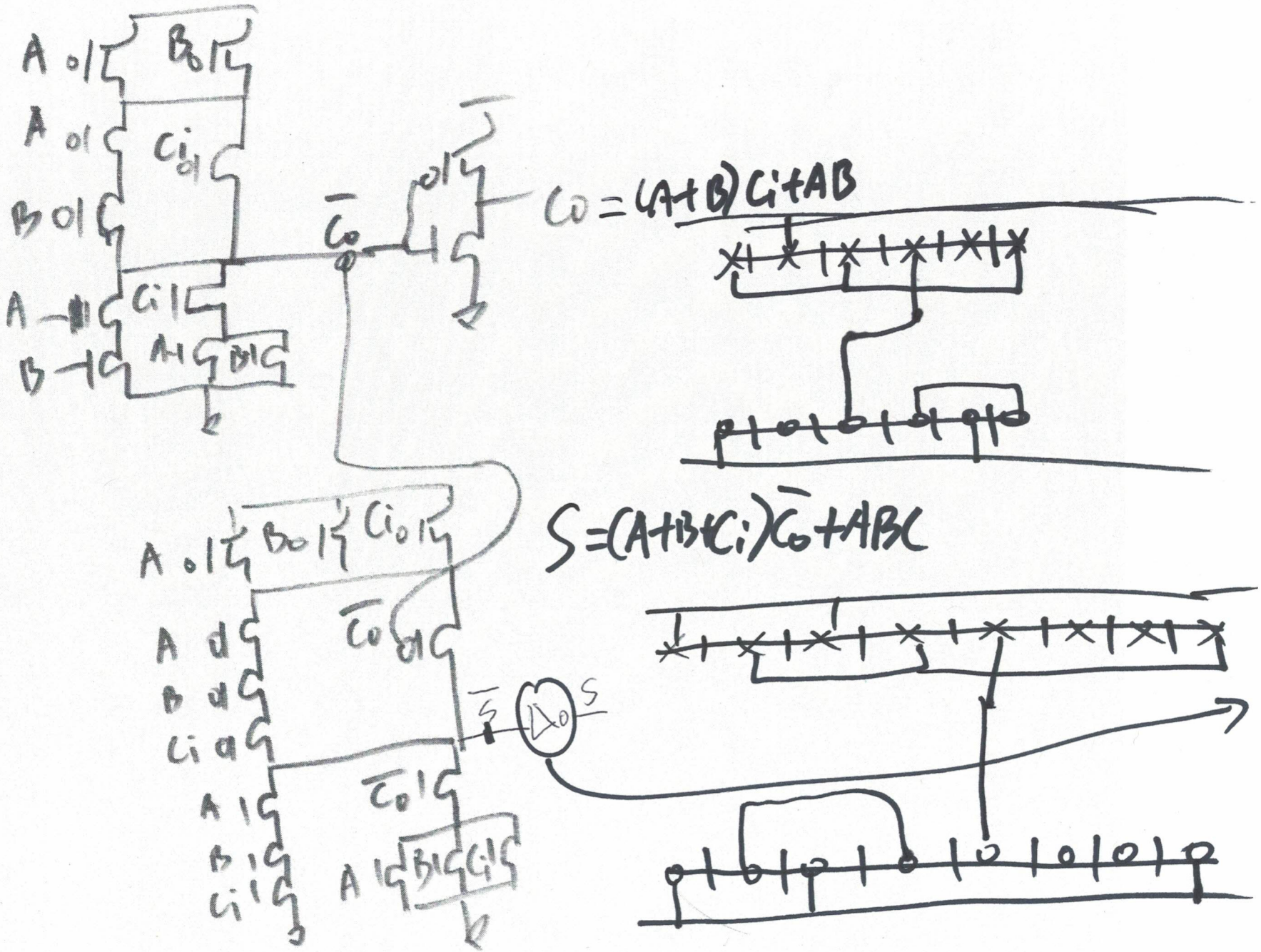
(h) $G = \overline{AB} + AB = 1$



③ ① FreeRTOS

② ② FPGAs (ASIC)

① ③ Algorithms — LeedCode


A
B
Ci
Co
Co = (A+B)Ci+AB
S=(A+B+Ci)Co+ABC
S