## CS 240 Spring 2017

## Assignment 1 Entrance Gates (40 points)

Name:

1. (2 points)
2. (2 points)
3. (6 points)
F2 =

F1 =

A B C|F2 F1
-------------------000

001

010
011
100

101
110

111 |
4. (6 points)

4a. [2/6 points]

4b. [2/6 points]

4c. [2/6 points]
5. (2 points)

6. (5 points)
7. (8 points)

There are many ways to arrive at the final answers. It is clearest to take one reduction step at a time, using one law per step.

7a. [1/8 points]
expression

## law used for reduction

$(A+B)\left(A+B^{\prime}\right)$

7b. [3/8 points]
expression
$\mathrm{ABC}+\mathrm{A}^{\prime} \mathrm{B}+\mathrm{ABC}^{\prime}$

7c. [3/8 points]
expression
$\mathrm{A}^{\prime} \mathrm{B}^{\prime}+\mathrm{A}^{\prime} \mathrm{BC}{ }^{\prime}+\left(\mathrm{A}+\mathrm{C}^{\prime}\right)^{\prime}$
law used for reduction
law used for reduction

7d. [1/8 points]
expression law used for reduction
$\mathrm{A}^{\prime} \mathrm{B}^{\prime} \mathrm{C}^{\prime} \mathrm{D}^{\prime}+\mathrm{AB}^{\prime} \mathrm{C}^{\prime}+\mathrm{AB}^{\prime} \mathrm{CD}^{\prime}+\mathrm{ABD}+\mathrm{A}^{\prime} \mathrm{B}^{\prime} \mathrm{CD}^{\prime}+\mathrm{BC} \mathrm{C}^{\prime} \mathrm{D}+\mathrm{A}^{\prime}$
8. (3 points)

8a. [.5/3]

8b. [.5/3]

8c. $[1 / 3]$

8d. [1/3]
9. (6 points)

