

homework 2

Simin Zhai

x	y	z	A	B	C
0	0	0	0	1	1
0	0	1	1	0	0
0	1	0	1	0	1
0	1	1	1	1	0
1	0	0	0	1	1
1	0	1	1	0	0
1	1	0	1	0	1
1	1	1	1	1	0

A

x \ yz	00	01	11	10
0		1	1	1
1		1	1	1

$$A = z + yz'$$

B

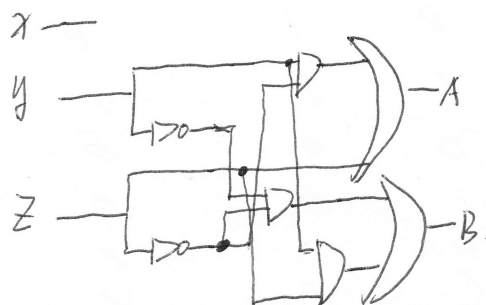
x \ yz	00	01	11	10
0		1		1
1		1		1

$$B = y'z' + yz$$

C

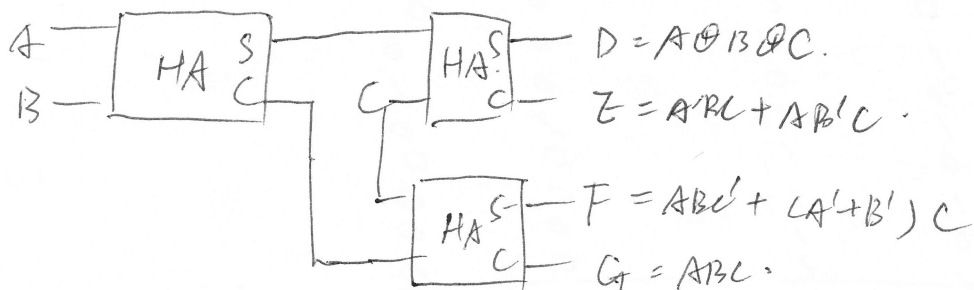
x \ yz	00	01	11	10
0		1		1
1		1		1

$$C = z'$$



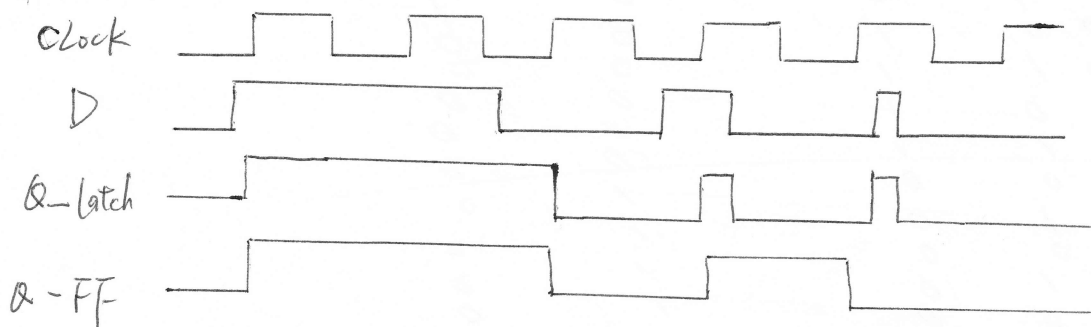
2. Half Adder: $S = A \oplus B$ $C = AB$.

① $D = A \oplus B \oplus C$ ② $Z = A'BC + AB'C$ ③ $F = ABC' + (A' + B')C$ ④ $G = ABC$



3. Is on the next page.

4.



[illegible]

x_2	x_1	x_0	y_2	y_1	y_0	unsigned $x < y$	signed $x < y$	$x = y$
/	/	0	0	0	0	0	/	0
/	/	0	0	0	/	0	/	0
/	/	0	0	/	0	0	/	0
/	/	0	0	/	/	0	/	0
/	/	0	/	0	0	0	/	0
/	/	0	/	0	/	0	/	0
/	/	0	/	/	0	0	0	1
/	/	0	/	/	/	0	0	/
<hr/>								
/	/	/	0	0	0	0	/	0
/	/	/	0	0	/	0	/	0
/	/	/	0	/	0	0	/	0
/	/	/	0	/	/	0	/	0
/	/	/	/	0	0	0	0	0
/	/	/	/	0	/	0	0	0
/	/	/	/	/	0	0	0	0
/	/	/	/	/	/	0	0	0

5.

State	Remainder	Answer
start	000000	000000
5	000000	000000.
4	000200	000000.
3	001000	001000.
2	001100.	001000.
1	000100	001010.
0	000000	001011.

The diagram is a hand-drawn state transition graph for a vending machine. The states are represented by circles and the transitions by arrows with labels. The states and their transitions are as follows:

- Reset**:
 - Self-loop: *Reset*
 - Transition to **25c vend**: *25c vend*
 - Transition to **Reset** (via **40c vend**): *out vend*
- 25c vend**:
 - Transition to **five**: *in dime*
- five**:
 - Self-loop: *five*
 - Transition to **ten**: *in dime*
- ten**:
 - Self-loop: *ten*
 - Transition to **fifteen**: *in dime*
- fifteen**:
 - Self-loop: *fifteen*
 - Transition to **twenty**: *in dime*
- twenty**:
 - Self-loop: *twenty*
 - Transition to **twenty five**: *in dime*
- twenty five**:
 - Self-loop: *twenty five*
 - Transition to **thirty**: *in dime*
- thirty**:
 - Self-loop: *thirty*
 - Transition to **thirty five**: *in dime*
- thirty five**:
 - Self-loop: *thirty five*
 - Transition to **forty**: *in dime*
- forty**:
 - Self-loop: *forty*
 - Transition to **Reset**: *out vend*

There are also some additional labels and arrows that are less clear, such as *out dime* and *in nickel*, which might represent different coin denominations or actions.