Solutions to Mid-Term Exam

Question 1

```
/*
 q1.c
 EECE 485 Mid-Term Exam Solutions
 Question 1
 Ed Casas, October 23 2000
*/

#define STATUS  0x300
#define CONTROL 0x301
#define MASK    0x8F
#define ON      0x01
#define OFF     0x00

/* Check the status port and turn motor off if
   any of the sensor or panic button bis are on.
*/

void check(void)
{
        if ( speek(STATUS) & MASK ) {
                spoke(CONTROL,ON) ;
        } else {
                spoke(CONTROL,OFF) ;
        }
}

/* Continuously check the sensors and set the motor
   accordingly. */

main()
{
        while(1) {
                check() ;
        }
}
```

Question 2

(a) As stated in the question the inputs are `full` and `bottle` and the outputs are `move` and `open`. As stated in the question we can perform the operations in 3 steps (states): `setup`, `fill` and `clear` with the following outputs:

state	move	open
setup	1	0
fill	0	1
clear	1	0

Each state sequences to the next whenever the condition stated in the question are met:

state	full	bottle	next state
setup	X	0	setup
setup	X	1	fill
fill	0	X	fill
fill	1	X	clear
clear	X	1	clear
clear	X	0	setup

(b) By inspection, the sum of products equations are:

$x = \overline{A}\,\overline{B} + A\,\overline{B}$

$y = \overline{A}\,B + A\,\overline{B}$

and the corresponding schematic is: