- Homework is due at the beginning of class

- Start early and get help if you need it

- Show all work neatly and clearly; redraw and/or rewrite problem if needed as work turned in should stand alone

- Identify your answers (with units) using a box or circle

- Staple multiple pages together

1. Find the simplified SOP expressions for outputs Y_a, Y_b that result from the two Karnaugh maps given below.

CD \ AB	00	01	11	10	Y_b
00	1	0	1	1	
01	0	0	1	1	
11	0	1	0	0	
10	0	0	0	1	

C \ AB	00	01	11	10	Y_a
0	1	0	1	0	
1	1	0	0	1	

2. Use Karnaugh maps to find the simplified SOP form of the following two Boolean expressions.

   (a) $Y = A\bar{B} + AB$ with two inputs A, B

   (b) $Y = \bar{A}BC + A\bar{B}C + AB\bar{C} + ABC$ with three inputs A, B, C

3. A rocket ship is preparing to launch. The system which enables the launch has three status levels: Red, Yellow and Green. The system has four inputs

   A: Mission control ready switch (1=ready, 0=not ready);
   B: Pilot indicator (1=pilot OK, 0=pilot not OK);
   C: Launch pad motion detector (1=motion detected, 0=no motion detected); and
   D: Engine ignition detector (1=engines ignited, 0=engines dead).

   The ship is clear for takeoff if all of the following conditions are met: Mission control is ready, the pilot is OK, there is no motion on the launch pad, engines are ignited. Launch status should be red if two or less of the above conditions are met. Status is yellow if exactly three of the conditions are met. Green status comes only when the rocket is clear for take off.

   Represent each status level with a reduced logical expression. Hint: You can think of this as three separate problems - one for each status level. For each level, create a truth table, reduce with a K-map and derive the reduced SOP expression from the K-map. You should end up with three logical expressions, one for each level (output) such as Y_{red}, Y_{yellow} and Y_{green}.