2.(a). $A \ll B =$

	00	01	11	10
0	1	0		
1	1	1		

$\bar{A} \cap B =$

	00	01	11	10
0	0	1		
1	0	0		

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

	00	01	11	10
0	1	0		
1	1	1		

Thus, $A \ll B = \overline{\bar{A} \cap B}$

(b). $A \ll (B \cap C) = A \cup \overline{B \cap C}$

$B \cap C =$

	00	01	11	10
0	0	0	0	1
1	0	0	0	1

$\overline{B \cap C} =$

	00	01	11	10
0	1	1	1	0
1	1	1	1	0

$A =$

	00	01	11	10
0	0	0	0	0
1	1	1	1	1

$A \cup \overline{B \cap C} =$

	00	01	11	10
0	1	1	0	1
1	1	1	1	1

$(A \ll B) \ll C$:

$A \ll B =$

	00	01	11	10
0	1	1	0	0
1	1	1	1	1

$\overline{C} =$

	00	01	11	10
0	1	0	1	0
1	1	0	1	0

$(A \ll B) \ll C = (A \ll B) \cup \overline{C}$

$=$

	00	01	11	10
0	1	1	0	1
1	1	1	1	1

Thus, $A \ll (B \cap C) = (A \ll B) \ll C$

(c). $B \cup C =$

	00	01	11	10
0	0	1	1	1
1	0	1	1	1

$\overline{B \cup C} =$

	00	01	11	10
0	1	0	0	0
1	1	0	0	0

$A \ll (B \cup C) = A \cup \overline{B \cup C} =$

	00	01	11	10
0	1	0	0	0
1	1	1	1	1

$A \ll B =$

	00	01	11	10
0	1	1	0	0
1	1	1	1	1

$A \ll C =$

	00	01	11	10
0	1	0	0	1
1	1	1	1	1

$(A \ll B) \cap (A \ll C) =$

	00	01	11	10
0	1	0	0	0
1	1	1	1	1

Thus, $A \ll (B \cup C) = (A \ll B) \cap (A \ll C)$

3.

Programming	Logic	Math	Entry
0	0	0	$18-2-4-3-1-3-1-2=2$
0	0	1	$10-4-3-1=2$
0	1	1	$5-1=4$
0	1	0	$10-4-1-2=3$
1	0	0	$7-3-1-2=1$
1	0	1	$4-1=3$
1	1	1	1
1	1	0	$3-1=2$

P \ L	00	01	11	10
0	2	2	4	3
1	1	3	1	2

M

(a). 2 students study none of the three subjects

(b). 3 students study just logic.