Name: _____ Date: _____

Problem 1.

From the truth table below, write the Boolean expression for output Y as a sum of products (one product term for each row where $Y = 1$), then draw its logic-gate circuit.

A	B	Y
0	0	0
0	1	1
1	0	1
1	1	0

Problem 2.

From the truth table below, write the Boolean expression for output Y as a sum of products (one product term for each row where $Y = 1$), then draw its logic-gate circuit.

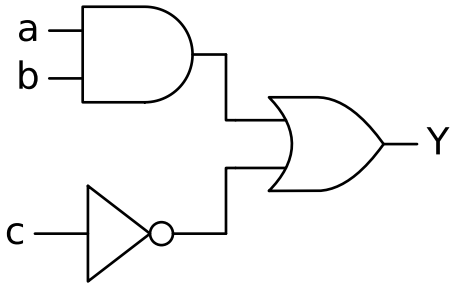
A	B	Y
0	0	1
0	1	0
1	0	0
1	1	1

Problem 3.

From the truth table below, write the Boolean expression for output Y as a sum of products (one product term for each row where $Y = 1$), then draw its logic-gate circuit.

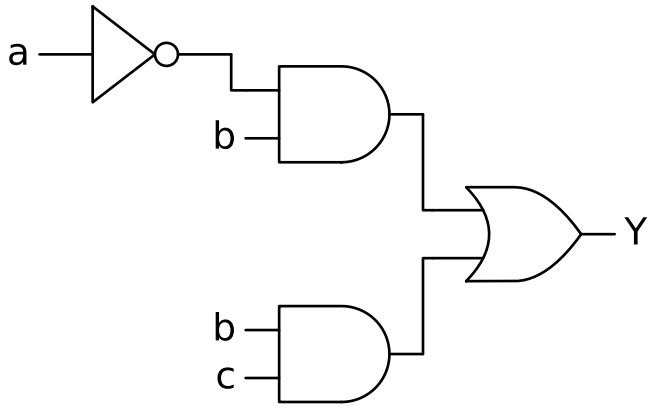
A	B	C	Y
0	0	0	0
0	0	1	0
0	1	0	0
0	1	1	1
1	0	0	0
1	0	1	1
1	1	0	1
1	1	1	1

Problem 4.



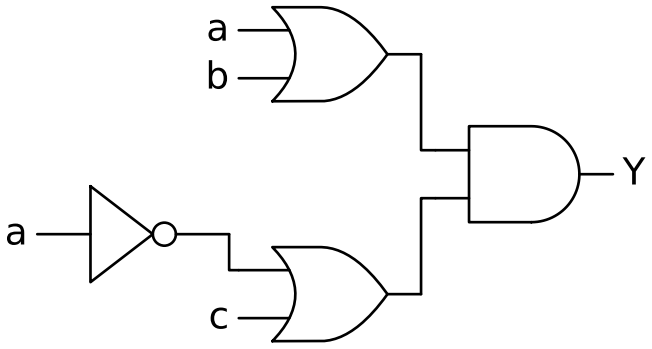
Write the Boolean expression for output Y, then draw its truth table.

Problem 5.



Write the Boolean expression for output Y, then draw its truth table.

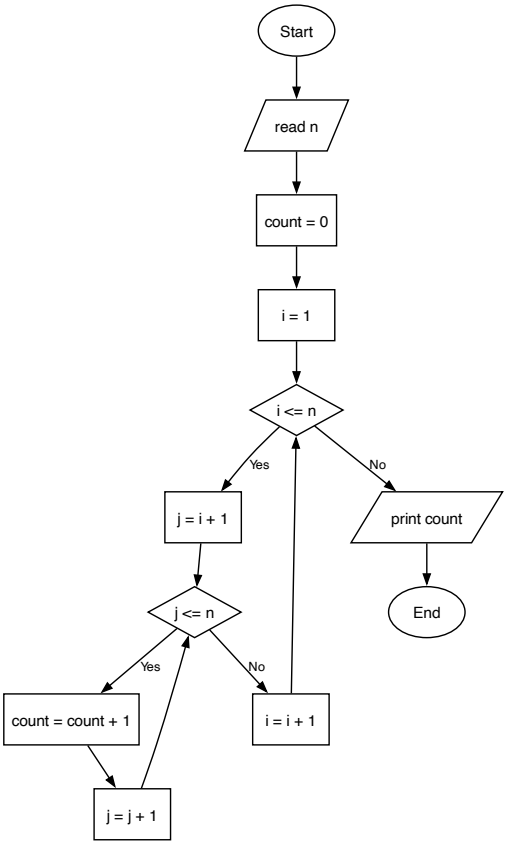
Problem 6.



Write the Boolean expression for output Y, then draw its truth table.

Problem 7.

Trace this algorithm for $n = 3$, and complete the trace table.



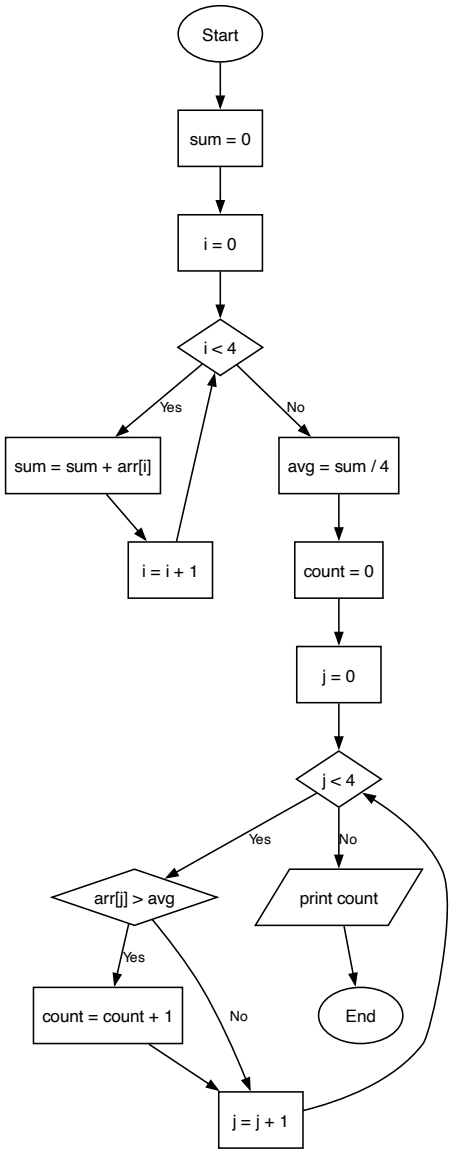
n	count	i	j	output

In the real world this is how you count the number of distinct pairs in a group of n things: the number of handshakes if n people all shake hands once, or the number of direct links in a network where every one of n computers connects to every other. It always works out to n × (n - 1) / 2.

Problem 8.

Trace this algorithm, taking the list *arr* to be [70, 90, 60, 80], and complete the trace table.

Reminder: the items of a list have positions counted from 0, so the list [60, 75, 50] has 3 items in positions 0, 1, 2 — arr[i] means the item at position i, so arr[0] is the first item.



sum	i	avg	count	j	output

This two-pass pattern — go through the data once to measure something overall, then go through it again to compare each item against that measure — is everywhere in data analysis: for example, finding how many students scored above the class average, or how many days this month were hotter than usual.