

BEE 271 Spring 2017
Homework 1

Please answer the following questions.

1. Convert 709 base 10 to binary. Show your steps. What is the minimum number of bits needed to represent this number?
2. How are ones and zeros represented in digital systems?
3. One of the axioms of Boolean algebra is that $1 + 0 = 1$. Why is it called an axiom? What's the difference between that and a theorem?
4. What is the principle of duality?
5. What is DeMorgan's theorem? Use Venn diagrams to prove it.
6. DeMorgan's theorem allows us to do what with bubbles? Draw an example.

The remaining questions refer to the following truth table, where f is a combinatorial result of the inputs, A, B and C:

| A | B | C | f |
|---|---|---|---|
| 0 | 0 | 0 | 0 |
| 0 | 0 | 1 | 0 |
| 0 | 1 | 0 | 1 |
| 0 | 1 | 1 | 0 |
| 1 | 0 | 0 | 1 |
| 1 | 0 | 1 | 1 |
| 1 | 1 | 0 | 0 |
| 1 | 1 | 1 | 0 |

7. What are the minterms?
8. What are the maxterms?
9. Write a canonical POS solution.
10. Write a canonical SOP solution.