Question 1  Power Consumption

Suppose an iPhone’s leakage current is 3mA, and supply voltage is 1.5V. When playing Angry Birds, the clock frequency is 800MHz and net capacitance is 200pF (pico Farads). (a) What is the value of the static power consumption?  (b) What is the dynamic power consumption (ignoring crowbar current)?  (c) What is the total power consumption?

Question 2  Truth tables

Consider the following Boolean expressions. For each expression write out the corresponding truth table.

(a) \( \overline{A + B} \)

(b) \( (AB + \overline{AB})C \)
Question 3  Boolean Algebra

Ben Bitdiddle and Alyssa P. Hacker are having an argument over the equivalence of two Boolean expression (they have nothing better to do). Alyssa P. Hacker claims that the following two expressions are equivalent:

\[ \overline{A}B + BC \overset{?}{=} (\overline{A(B + C)})B \]

Ben Bitdiddle on the other hand disagrees and claims that they are not. Who is right? If they are equivalent, prove it using Boolean algebra. If they are not, evaluate the truth table to show that they are not equivalent.

Question 4  CMOS Circuits

For the following Boolean expressions draw the equivalent CMOS gate implementation. Clearly mark the input and output signals and do not assume you have the complements of any signals. Minimize the number of CMOS transistors used in your implementation.

(a) \( A + B + C \)

(b) \( \overline{ABC} \)

(c) \( (\overline{A} + B)\overline{C} \)