Subject 24.242. Logic II. Answers to the first sample homework.

1. Write down a bounded formula whose extension is the set of triples $\langle x,y,z\rangle$ such that $x,y,$ and z are positive integers and z is a common divisor of x and y.
$(((0 < x \wedge 0 < y) \wedge 0 < z) \wedge ((\exists u < sx)(u\,z) = x) \wedge (\exists v < sy)(v\,z) = y))$.

2. Define, for F, a finite set of natural numbers, Code(F) to be $\sum_{x \in F} 2Ex$, so that F is the set of places in the binary decimal expansion of Code(F) where 1s appear. Give the Arabic numeral for Code({2,4,6,8}).
Code({2,4,6,8}) = (2E2) + (2E4) + (2E6) + (2E8) = 4 + 16 + 64 + 256 = 340.