Problem # 155

Find the integer n that is the smallest positive multiple of 15 and whose every digit is either 8 or 0.

Solution:

Answer: $\boxed{8880}$

Proof.

Since n is divisible by 5 its last digit must be either 0 or 5, but according to the given condition, it must be 0. Since it is also divisible by 3 and is positive, its sum of digits is also divisible by 3, so it has to have three 8's. Thus the smallest such integer is 8880.

□

Source: American Invitational Mathematics Examination (AIME) 1984.