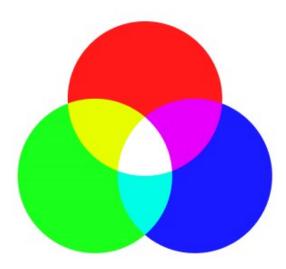
International Olympiad in Cryptography NSUCRYPTO'2020 First round October 18 Section A



Victor is studying the Moctod search server. Inside its software, he found two integer variables a and b that change their values when special search queries "RED", "GREEN" and "BLUE" are processed. More precisely, the pair (a, b) is changed to (a + 18b, 18a - b) when processing the query "RED", to (17a + 6b, -6a + 17b) when processing "GREEN", and to (-10a - 15b, 15a - 10b) when processing "BLUE". When any of a or b reaches a multiple of 324, it resets to 0. Whenever (a, b) = (0, 0), the server crashes.

On the server startup, the variables (a, b) are set to (20, 20). Prove that the server will never crash with these initial values, regardless of the search queries processed.





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