



## Problem 7. «The machine DH-d»

Let  $G$  be a cyclic group of a large prime order  $q$  and  $g$  be a generator of  $G$ . Tom designed the machine DH-d that on input  $(g, g^x)$  outputs  $g^{x^d}$ . Here  $g^x$  is an arbitrary element of  $G$  and  $d$  is a small fixed positive integer.

Use the machine DH-d to solve the Diffie – Hellman problem, that is, find  $g^{xy}$  from  $(g, g^x, g^y)$ . Suggest a solution with the minimal requests to the machine.