

We can represent a pair of nonnegative integers,  $a$  and  $b$ , with the integer that is the product  $2^a 3^b$ . This is because we can always extract  $a$  or  $b$  by dividing by the base of the other exponent (so 3 if looking for  $a$  or 2 if looking for  $b$ ) until it is no longer possible (to get an integer, meaning the number modulo 3 is not 0), at which point  $2^a$  or  $3^b$  remains. From this point, take the logarithm<sup>1</sup> of the base (2 for  $a$  and 3 for  $b$ ) to recover  $a$  or  $b$ .

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<sup>1</sup>This can be done without a `log` primitive by multiplying the base over and over again until the integer is reached; the value is the number of multiplications performed.