

$G = \{x^i | 0 \leq i \leq 342, x^{342} = 1\}$   
 $\gcd(11, 343) = 1, x^{11}$  generates the Group.

$p := 7; e := 3; g := x^{11}; h := x^{41};$

$$\begin{aligned} p &:= 7 \\ e &:= 3 \\ g &:= x^{11} \\ h &:= x^{41} \end{aligned} \tag{1}$$

Step1:

$x0 := 0;$

$$x0 := 0 \tag{2}$$

$s := x^{11 \cdot 49 \mod 343}, h0 := x^{41 \cdot 49 \mod 343},$

$$\begin{aligned} s &:= x^{196} \\ h0 &:= x^{294} \end{aligned} \tag{3}$$

Searching **for**  $d0$ ;  $d0 = 5$  satisfies  $s^{d0} = h0$

$d0 := 5;$

$$d0 := 5 \tag{4}$$

$x^{196 \cdot 5 \mod 343},$

$$x^{294} \tag{5}$$

$x1 := x0 + p^0 \cdot d0;$

$$x1 := 5 \tag{6}$$

Step 2:

$h1 := x^{(-55+41) \cdot 7 \mod 343},$

$$h1 := x^{245} \tag{7}$$

Searching **for**  $d1$ ;  $d1 = 3$  satisfies  $s^{d1} = h1$

$d1 := 3;$

$$d1 := 3 \tag{8}$$

$$x^{196 \cdot 3 \bmod 343},$$

$$x^{245} \tag{9}$$

$$x2 := x1 + p^1 \cdot d1;$$

$$x2 := 26 \tag{10}$$

Step 3:

$$h2 := x^{-286+41 \bmod 343},$$

$$h2 := x^{98} \tag{11}$$

*Searching **for**  $d2$ ;  $d2 = 4$  satisfies  $d2 = h2$*

$$d2 := 4;$$

$$d2 := 4 \tag{12}$$

$$x^{196 \cdot 4 \bmod 343},$$

$$x^{98} \tag{13}$$

$$x3 := x2 + p^2 \cdot d2;$$

$$x3 := 222 \tag{14}$$

*$x3$  is our logarithm*