Given $ax+by = \gcd(a,b) = 1 \Rightarrow (a < b) \wedge (b \text{ is a prime})$

Claim. $r_0 \cdot s_0 + r_1 \cdot s_1 = size \cdot k \quad , \quad k \in \mathbb{Z}$

choose s_0 in range $[33, 126]$

solve s_1 and k, in this case we only consider s_1

Proof. $r_0 \cdot s_0 + r_1 \cdot s_1 = size \cdot k$

$\Rightarrow r_1 \cdot s_1 - size \cdot k = -r_0 \cdot s_0$

To make it solvable,

$r_1 \cdot s_1 + size(-k) = 1 = \gcd(r_1, size)$

Than use extended euclid algorithm to solve s_1 and $-k$

and let x_0 be one solution to s_1 and y_0 be one solution to $-k$

$r_1(x_0) + size(y_0) = 1$

$\Rightarrow r_1(-r_0 \cdot s_0 \cdot x_0) + size(-r_0 \cdot s_0 \cdot x_0) = -r_0 s_0$

$\Rightarrow r_1(r_0 s_0 x_0) + size(r_0 s_0 x_0) = r_0 s_0$

By definition of linear diophantine equation, the general solution is

$s_1 = r_0 s_0 x_0 + size \cdot c \quad , \quad -k = r_0 s_0 x_0 - r_1 \cdot c \quad , \quad c \in \mathbb{Z}$

No need to solve $-k$ in this case, then x_0 must be positive (take absolute)

Since the character s_1 should be a printable character, then

$$33 \leq s_1 \leq 126$$

$$\Rightarrow \quad 33 \leq r_0 s_0 x_0 + size \cdot c \leq 126$$

$$\Rightarrow \quad 33 - r_0 s_0 x_0 \leq size \cdot c \leq 126 - r_0 s_0 x_0$$

Consider $r_0 s_0 x_0 - p = s_1$, need to find the greatest value p within the bound,

In case of negative bound,

$$\Rightarrow \min\{|33 - r_0 s_0 x_0|, |126 - r_0 s_0 x_0|\} \leq size \cdot c \leq \max\{|33 - r_0 s_0 x_0|, |126 - r_0 s_0 x_0|\}$$

Find p, $\exists i \in \mathbb{Z}^+$, $p = \max\{|33 - r_0 s_0 x_0|, |126 - r_0 s_0 x_0|\} - i$

s.t. $p \bmod size = 0$

Once we found p, calculate $s_1' = r_0 s_0 x_0 - p$ is one solution for s_1, $\wedge$, then $\exists j \in \mathbb{Z}^+$

$s_1 = s_1' + j$ s.t. $33 \leq s_1 \leq 126$

Hence, combined all, thus to obtain the formula

$\exists i, j \in \mathbb{Z}^+ \quad s_1 = [r_0 s_0 x_0 - (\max\{|33 - r_0 s_0 x_0|, |126 - r_0 s_0 x_0|\} - i)] + j$

s.t. $(\max\{|33 - r_0 s_0 x_0|, |126 - r_0 s_0 x_0|\} - i) \bmod size = 0 \wedge 33 \leq s_1 \leq 126$.