Challenger

Randomly choose $\{u_1, u_2, ..., u_v\}$, $\{r_1, r_2, ..., r_c\}$, $\{t_{1,1}, t_{1,2}, ..., t_{v,c}\}$ in $[1, n)$, assign $L_{i,j} = ([r_j]G, t_{i,j}, [u_i r_j]G)$ for $1 \leq i \leq v$ and $1 \leq j \leq c$

Randomly choose j' in $[1, c]$, t' in $[1, n)$, assign $L' = ([r_{j'}]G, t', [r_{j'}]Q_1)$

Randomly choose j'' in $[1, c]$, replace $L_{i,j''}$ with $(Q_2, t_{i,j''}, [u_i]Q_2)$ for $1 \leq i \leq v$
Randomly choose $\{u_1'', u_2'', ..., u_w''\}$, $\{t_1'', t_2'', ..., t_w''\}$ in $[1, n)$, assign $L_k'' = (Q_2, t_k'', [u_k'']Q_2)$, for $1 \leq i \leq w$
randomly choose d in $[1, w]$, replace L_d'' with (Q_2, t_d'', Q_3)

RP-based Linkage **Adversary**

$L_{i,j}; 1 \leq i \leq v, 1 \leq i \leq v$
$L' = ([r_{j'}]G, t', [r_{j'}]Q_1)$
$L_{k}''; 1 \leq k \leq w = (Q_2, t_k'', [u_k'']Q_2)$

$ID_{U'}$ in $\{u_1, u_2, ..., u_w\}$ or not

Input: G, Q_1, Q_2, Q_3

Output: s, s