Given,

a1 ---- a2, a3, a4, a5, a6, a7, a8, a9, a10, b1

b1 → b2, c1

c1 ---- c2, d1, l1

d1 → d2, l1

e1 ---- e2, e3, c1

a1, e1 **→** f1

g1 → g2, b1

h1 → h2, h3, h4, h5, g1, e1

i1 → i2, i3, i4

j1 **→** j2, j3

k1 — **k**2, k3

| 11 → | 12, | 13, | 14, | 15, | 16, | 17, | 18, | 19, | 110, | 111, | 112, | 113, | 114

q1, e1, l1 — q2, q3, q4

q1, e1, l1, r1 ---- r2, r3, r4, r5, r6, r7

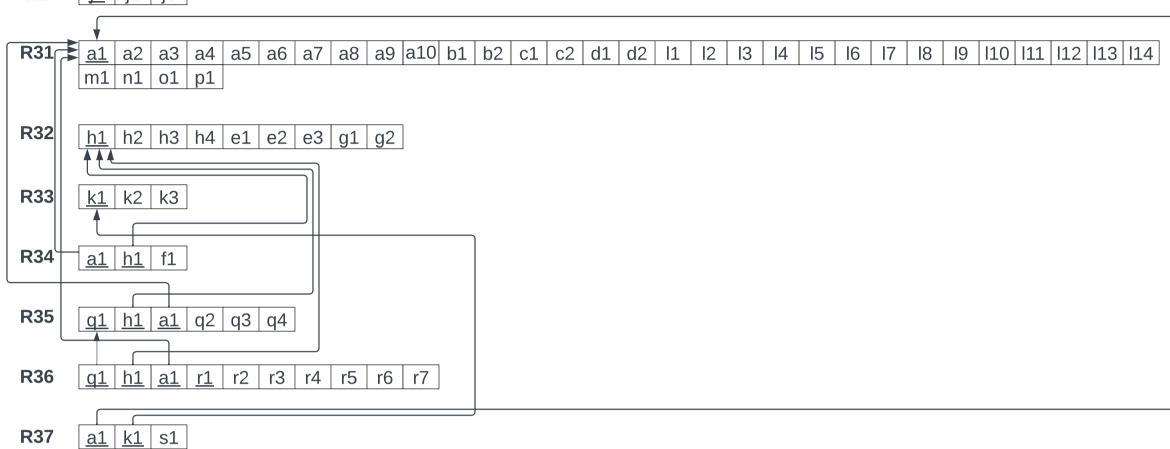
a1, k1 --- s1

<u>1NF</u>

- **R1** <u>i1</u> i2 i3 i4
- **R2** <u>j1</u> j2 j3

<u> 2NF</u>

- **R1** <u>i1</u> i2 i3 i4
- **R2** <u>j1</u> j2 j3



<u>3NF</u>

R1 <u>i1</u> i2 i3 i4

R2 j1 j2 j3

R311 a1 a2 a3 a4 a5 a6 a7 a8 a9 a10 b1

R312 b1 b2 c1

R313 c1 c2 d1 l1

R314 d1 d2

R315 l1 l2 l3 l4 l5 l6 l7 l8 l9 l10 l11 l12 l13 l14 m1 n1 o1 p1

R321 h1 h2 h3 h4 e1 g1

R322 e1 e2 e3

R33 k1 k2 k3

R34 a1 h1 f1

BCNF

R37 <u>a1</u> <u>k1</u> s1

<u>q1 h1 a1</u> q2 q3 q4

<u>q1 h1 a1 r1 r2 r3 r4 r5 r6 r7</u>

There are no relations where a non-key identifies a primary key or part of primary key. Thus all relations are in BCNF.