```
→ data_ibr ./undo_001 undo 269 272
UndoRecord {
    addr: 0x0110@(272),
    undo_rec_hdr: UndoRecordHeader {
        addr: 0x0110@(272),
        prev_rec_offset: 0,
        next_rec_offset: 285,
        type_info: INSERT_REC
        cmpl_info: [],
        extra_flags: [],
    },
    undo_rec_data: Insert(
        UndoRecForInsert {
            addr: 0x0113@(275),
            undo_no: 0,
            table_id: 1065,
            key_fields: [
                UndoRecKeyField {
                    addr: 0x0116@(278),
                    sequence: 0,
                    key_len: 4,
                    key_data: b"\x80\0\0\x01",
                },
            ],
        },
    ),
}
→ data
```
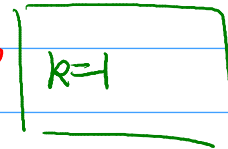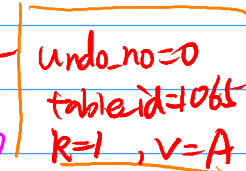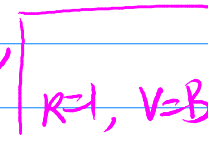
0x80000001 ⟹ 1

```
→ data ibr ./rtc/t.ibd dump 4
*********************************** Row 1 ***********************************
        k => I32(1)
   DB_TRX_ID => TrxId(0x000000000d20)
 DB_ROLL_PTR => RbPtr(RollPtr { value: 0x020000011c0151, insert: F  rseg_id: UndoSpace(2), page_no: 284, boffset
        v => Str("B")
```

Insert   U(1), P(269), B(272)

roll_ptr

k=1

update   U(2), P(284), B(337)

undo_no=0
table_id=1065
k=1, v=A

update,   U(1), P(287), B(337)

roll_ptr

k=1, v=B

Rec.

k=1, v=C
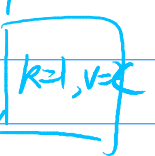
roll_ptr

337

```
→   data ibr undo_002 undo 284 337          →   data ibr undo_001 undo 287 337
UndoRecord {                                UndoRecord {
    addr: 0x0151@(337),                         addr: 0x0151@(337),
    undo_rec_hdr: UndoRecordHeader {            undo_rec_hdr: UndoRecordHeader {
        addr: 0x0151@(337),                         addr: 0x0151@(337),
        prev_rec_offset: 0,                         prev_rec_offset: 0,
        next_rec_offset: 369,                       next_rec_offset: 368,
        type_info: UPD_EXIST_REC,                   type_info: UPD_EXIST_REC,
        cmpl_info: [NO_ORD_CHANGE],                 cmpl_info: [NO_ORD_CHANGE],
        extra_flags: [CMPL_INFO_MULT, MODIFY_BLOB], extra_flags: [CMPL_INFO_MULT, MODIFY_B
    },                                          },
    undo_rec_data: Update(                      undo_rec_data: Update(
        UndoRecForUpdate {                          UndoRecForUpdate {
            addr: 0x0154@(340),                         addr: 0x0154@(340),
            new1byte: 0,                                new1byte: 0,
            undo_no: 0,                                 undo_no: 0,
            table_id: 1065,                             table_id: 1065,
            info_bits: 0,                               info_bits: 0,
            trx_id: 3359,                               trx_id: 3360,
            roll_ptr: RollPtr {                         roll_ptr: RollPtr {
                value: 0x810000010d0110,                    value: 0x020000011c0151,
                insert: T,                                  insert: F,
                rseg_id: UndoSpace(1),                      rseg_id: UndoSpace(2),
                page_no: 269,                               page_no: 284,
                boffset: 272,                               boffset: 337,
            },                                          },
            key_fields: [                               key_fields: [
                UndoRecKeyField {                           UndoRecKeyField {
                    addr: 0x0166@(358),                         addr: 0x0165@(357),
                    sequence: 0,                                sequence: 0,
                    key_len: 4,                                 key_len: 4,
                    key_data: b"\x80\0\0\x01",                  key_data: b"\x80\0\0\x01",
                },                                          },
            ],                                          ],
            n_fields: 1,                                n_fields: 1,
            upd_fields: [                               upd_fields: [
                UndoRecUpdatedField {                       UndoRecUpdatedField {
                    addr: 0x016c@(364),                         addr: 0x016b@(363),
                    sequence: 0,                                sequence: 0,
                    field_no: 3,                                field_no: 3,
                    field_len: 1,                               field_len: 1,
                    field_data: b"A",                           field_data: b"B",
                },                                          },
            ],                                          ],
        },                                          },
    ),                                          ),
}                                           }
→   data
```

(handwritten annotations: "K=1", "V=A")

ReadView

creator_trx_id=2

Insert
0

↑ rt

trx=1 1

→

trx=2 2

creator_trx_id=2

高 →
低1 →

活跃 ds[3]

记录 REC3tr