I. RELATIONAL ALGEBRA

(for theta join) model.p_id = inventory.p_id

① $\pi_{p\_id, quantity}(\sigma_{order.order\_id = 1 \wedge inventory.quantity = 0}(Orders \bowtie Model \bowtie Inventory))$

orders.model = Model = model (for theta join)

② $\pi_{p\_id, cost}(\sigma_{Model = 'SD70Ace'}(Part \bowtie_{part.p\_id = Model.p\_id} Model))$

③ $\pi_{Model.model}(\sigma_{current < 0.1 \cdot overall}(Model \bowtie Inventory))$

$overall \leftarrow {}_{model}\mathcal{G}_{count(p\_id)\ as\ overall}(Model)$

$current \leftarrow {}_{model}\mathcal{G}_{count(p\_id)\ as\ current\_amount}(\sigma_{quantity > 0}(Inventory \bowtie_{inventory.p\_id = model.p\_id} Model))$

III. NORMALIZATION

① → look for the attributes that cannot be determined because then they should be present in the candidate keys (TRIVIAL)

$A^+ = A$
$B^+ = A, B, C, F$ > candidate keys
$C^+ = C, D, B$
$F^+ = F, E$

→ see if other attributes are required to find the set of candidate keys
↳ find closure of BDE
↳ check attributes that can be determined from this set

$(AF)^+ = AEF$ - no help

BC

② $(AD)^+ = AD$

③ $(F)^+ = FE$

④ violation in BCNF: $F \rightarrow E$ is not trivial
$F \rightarrow E$ does not have superkey on LHS of functional dependency

NOT in BCNF

→ split R into R1=EF & R2=ABCDF

→ restrictions of R1 & R2 by F

F1: F→E
F2: B→C, C→ABDF

R1(E, F)

R2(ABCDF)