Assignment 4: The Relational Algebra

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The requested queries

1. $\sigma_{\text{startdate} < \text{enddate}}(\text{event})$

2. $\pi_{\text{U.uid,E.eid}}(\rho_{\text{U}}(\text{user}) \bowtie_{\text{U.postcode = E.postcode}} \rho_{\text{E}}(\text{event}))$

3. $X := \rho_{\text{E}}(\text{event}) \bowtie_{\text{E.eid = EnoRv.eid}} \rho_{\text{EnoRv}}(\pi_{\text{eid}}(\text{event}) \setminus \pi_{\text{event}}(\text{review}))$
   $\pi_{\text{E.eid,E.title,E.description,E.startdate,E.enddate,E.organizer,E.postcode}}(X)$

4. Select events with at least 3 keywords:
   $X := \rho_{\text{K}_1}(\text{keyword}) \times \rho_{\text{K}_2}(\text{keyword}) \times \rho_{\text{K}_3}(\text{keyword})$
   $Y := \sigma_{K_1.\text{word} \neq K_2.\text{ word} \wedge K_1.\text{word} \neq K_3.\text{ word} \wedge K_2.\text{word} \neq K_3.\text{ word}}(X)$
   $Z := \sigma_{K_1.\text{event} = K_2.\text{event} \wedge K_1.\text{event} = K_3.\text{event}}(Y)$

   Select events with at least 2 keywords:
   $A := \rho_{\text{K}_4}(\text{keyword}) \times \rho_{\text{K}_4}(\text{keyword})$
   $B := \sigma_{K_4.\text{word} \neq K_5.\text{word}}(A)$
   $C := \sigma_{K_4.\text{event} = K_5.\text{event}}(B)$

   Select events with exactly 3 keywords:
   $\pi_{K_4.event}(C) \setminus \pi_{K_1.event}(Z)$

5. (a) $X := \rho_{R_1}(\text{review}) \times \rho_{R_2}(\text{review})$

   Keep reviews from R_1 that are not from latest date:
   $Y := \sigma_{R_1.\text{reviewdate} < R_2.\text{reviewdate} \wedge R_1.\text{user} = R_2.\text{user}}(X)$

   Select user id and event id for which the user wrote a review most recently:
   $Z := \pi_{\text{user,event}}(\text{review}) \setminus \pi_{R_1.\text{user},R_1.\text{event}}(Y)$

(b) $A := \rho_{R_1}(\text{review}) \times \rho_{R_2}(\text{review}) \times \rho_{E_1}(\text{event}) \times \rho_{E_2}(\text{event})$
$B := \sigma_{R_1.\text{user} = R_2.\text{user} \wedge R_1.\text{event} = E_1.\text{eid} \wedge R_2.\text{event} = E_2.\text{eid}}(A)$

Select reviews whose E_1.enddate are not from the latest:
$C := \sigma_{E_1.\text{enddate} < E_2.\text{enddate}(B)}$

Select user id and event id of the most-recent event (according to enddate) for which the user wrote a review:
$D := \pi_{R_1.\text{user}, E_1.\text{eid}}(B \setminus C)$

(c) $\pi_{\text{LR.user,LR.lreview,LE.levent}}(\rho_{\text{LR(user,lreview)}}(Z) \bowtie_{\text{LR.user} = \text{LE.user}} \rho_{\text{LE(user,levent)}}(D))$

Effiency of queries