

TABLE I: Symbol notations

| Symbol | Description |
|----------------------|---|
| T | A table instance |
| α | A data record in a table |
| $\hat{\alpha}$ | Bags of data records |
| β | An attribute in a table |
| $\hat{\beta}$ | Bags of attributes |
| Θ | An expression |
| $T.\beta_i$ | The i_{th} attribute in T |
| $T.\bar{\beta}$ | All attributes in T |
| $\pi_{\beta}(T)$ | Data projection on attribute β |
| $\sigma_{\Theta}(T)$ | Data selection on expression Θ |
| $\xi_{\alpha}(T)$ | The multiplicity of data record α in table T |
| $\xi_{\beta}(T)$ | The multiplicity of attribute β in table T |
| $[a, \dots, a]_n$ | A list of element a with length n |
| \bowtie | Data join operation |
| \times | Cartesian product operation |
| $max(a_1, a_2)$ | The maximum value in a_1 and a_2 |
| $min(a_1, a_2)$ | The minimum value in a_1 and a_2 |
| $num2str(n)$ | Converting the numeric type n to a string |
| $str2num(s)$ | Converting the string type s to a number |
| $type(a)$ | The data type of a |
| $[a, \dots, a]_n$ | A data list of a of length n |