**FlexPref: A Framework for Extensible Preference Evaluation in Database Systems**

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**Need for Preference Functionality Inside the DBMS**

```
SELECT * FROM Restaurants R
WHERE R.AllowsGroups = True;
```

```
SELECT * FROM Restaurants R
WHERE R.AllowsGroups = True
PREFERRING MIN R.Price,
MAX R.Rating,
MIN R.WaitTime,
MIN TravelTime(User.Location, R.Location)
```

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**Implementing Preference Functions in a DBMS: Existing Approaches**

**The Layered (On-Top) Approach**

- **Simplicity**: easy to implement
- **Limited Efficiency**: cannot interact with DBMS internals, thus no query optimization

DBMS is a “black box” to the preference method. DBMS knows nothing about semantics of preference method. Almost all proposed algorithms take this approach. Severe performance limitations: 1. Evaluate SQL query 2. Evaluate preference function

Efficiency of the built-in approach: easy to implement

```
DBMS
```

The Built-In Approach

- **Efficient**: methods tightly coupled with DBMS
- **Infeasible**: cannot provide custom implementation for every preference method

Each preference method hand-coded inside query processor. This can get ugly! Must figure out how to couple preference evaluation with join, selection, etc. Not easy!

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**Many Multi-Objective Preference Evaluation Methods**

Quick Exercise

1. Go to Google Scholar
2. Search for papers on preference evaluation methods
3. How many results do you get back?

```
The list goes on and on and on...
```

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**The FlexPref Approach**

**Preference Implementation**

1. Define two macros and three functions in separate “MyPref.c” file outside DBMS/FlexPref

- PreferenceCompare(Object P, Object Q)

  - Macro
  - Two objects P and Q

  - Action: Update the score of P

  - Action: If P can never be a preferred object A function

- PreferenceAddToObject(Object P, Preferred Object S)

  - Macro
  - A data object P and a set of preferred objects S

  - Action: True if P is a preferred object and can be added to S

- PreferenceAddToSet(Object P, Preferred Object S)

  - Input: A data object P and a set of preferred objects S

  - Action: Add P to S and remove or rearrange objects from S

**Writing Queries**

```
SELECT * FROM Restaurants R
WHERE [Where_clause] 
PREFERRING [Objectives] [Preference Objectives]
```

**Experimental Analysis**

Preference evaluation with binary join
FlexPref Join vs. Built-In Selection v. Built-In Join

```
(a) Skyline  
(b) K-Dominance
```

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