A Visual Learning Tool for Database Operation

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The main goal is to understand the fundamental mechanism of database systems
- getting professional skill, such as developing database systems, is not the main goal
- Need to practice manipulation of Relational Database
- Normalization, relational operations such as Projection/Selection/Join
- Need to learn how to retrieve the intended data from database by making proper queries
- prior to master the syntax of the specific query language like SQL
- Assigned time for database class is limited
  - e.g. Only 1-2 hours can be used for database practices

"sAccess" – A web-based online tool for database learning

- Designed for database learning activity, especially for practices of Relational Database operations
- Simple command set: easy to operate databases
- Preset datasets are offered; your original data can be used too
- Web application: no need to install extra softwares or plugins

sAccess official website: http://sAccess.eplang.jp/
- You can try sAccess here anytime
- English version is now available!
Contact: saccess@klab.eplang.jp

Targeted learning activity

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**Characteristics**

**Database operations by simple commands**
- Complex operation can be done by combining multiple commands

![Table Sales]

```
select wday Sun
```

```
select gender male
```

```
projection hour, age
```

(equivalent SQL: 
`select hour, age from Sales where wday = "Sun" and gender = "male"`)

**Description of the operation results with the transition of tables**
- Enable to observe what change has occurred by each operation
- Add, modify, delete or change the order of commands and it will soon affect the transition of tables simultaneously
- **Easy to try-and-error operations for database practices**

**Internal design**

**Developed as an web application**
- Apache + PHP5 + SQLite3 (bundled with PHP5)
- Any major web browsers supporting JavaScript can use sAccess

**Virtually independent database environment**
- Temporary DB is given to each user
  - delete it when the user closes the web browser
- Each DB is independent from others
  - one user’s operations never affect other’s DB

<table>
<thead>
<tr>
<th>Command List</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Selection</strong></td>
</tr>
<tr>
<td>SELECT</td>
</tr>
<tr>
<td>REMOVE</td>
</tr>
<tr>
<td>COMPARE</td>
</tr>
<tr>
<td>DISTINCT</td>
</tr>
<tr>
<td><strong>Projection</strong></td>
</tr>
<tr>
<td>PROJECTION</td>
</tr>
<tr>
<td>JOIN</td>
</tr>
<tr>
<td>ADD</td>
</tr>
<tr>
<td><strong>Statistics</strong></td>
</tr>
<tr>
<td>SORT</td>
</tr>
<tr>
<td>SUM</td>
</tr>
<tr>
<td>AVG</td>
</tr>
<tr>
<td>COUNT</td>
</tr>
</tbody>
</table>

**Current situations & future work**

- **Current situations**
  - Several high-schools and universities in Japan has used sAccess in real computer-science classes for non-professional students; in each cases teachers gave this system good evaluations
  - Some classes which used sAccess got better grades than those which used Microsoft Access

- **Future work**
  - Implementing learning support functions for schema design, including normalization
  - Class management mode: sharing single DB in a class to experience multiple database operations