Database Systems I

Database Applications (2)

Instructor: Ouldooz Baghban Karimi

CMPT 354 - Summer 2019
Connections

• Create a connection
  • Allocate resources for the connection
  • Relatively expensive to set up, libraries often cache connections for future use

  \[\text{connection} = \text{connect}(\text{bank.db})\]

• Should close connections when done
• Otherwise might cause resource leak
Query Execution

record = connection.execute("select * from account")

- Type Mismatch?
- What is the return type of execute()?
- How to pass data between DBMS and host language?

- SQL standard defines mappings between SQL and several languages

<table>
<thead>
<tr>
<th>SQL types</th>
<th>C types</th>
<th>Python types</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHAR(20)</td>
<td>char[20]</td>
<td>str</td>
</tr>
<tr>
<td>INTEGER</td>
<td>int</td>
<td>int</td>
</tr>
<tr>
<td>SMALLINT</td>
<td>short</td>
<td>int</td>
</tr>
<tr>
<td>REAL</td>
<td>float</td>
<td>float</td>
</tr>
</tbody>
</table>
Cursor

• SQL relations and results are sets of records

• What is the type of foo?
  
  \[ \text{record} = \text{connection.execute(“select * from account”)} \]

• Cursor over the Result Set
  • Similar to an iterator interface

• Relations are unordered
  • Cursors have no ordering guarantees
  • Use ORDER BY to ensure an ordering
Cursor

• Cursor similar to an iterator
  • `cursor = connection.execute("SELECT * FROM account")`

• Cursor methods
  • `fetchone()`
  • `fetchall()`
Acknowledgements

I have used materials from the following resources in preparation of this course:

• Database Systems: The Complete Book
• Database Systems (Kifer, Bernstein, Lewis)
• Database System Concepts: https://www.db-book.com
• Course offerings
  • W 4111 (Eugene Wu - Columbia): https://w4111.github.io/
  • CS 245 (Matei Zaharia - Stanford): http://web.stanford.edu/class/cs245/
  • CS 186 (Joe Hellerstein - Berkeley): https://sites.google.com/site/cs186fall17/