# horizontal lineDatabase R&D Exercise

Assignment 1

I confirm that this is my own work and that use of material from other sources, including the Internet, has been properly and fully acknowledged and referenced.

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| Name: | Pang, Jinhao |
| Date: | 2022.09.12 |
| NYU ID: | N19475049 |
| Course Section Number: | csci-ga.2433-001 |



**Total in points** (100 points total): \_\_\_\_\_

**Professor’s Comments:**

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## 1. Database R&D Exercise (Report)

**—**

### Select a product from the following types of DBMS or data service (at least two): XML, ODB, NoSQL, Cloud, etc.

ObjectDB (ODBMS, NoSQL)

### Write a short report to explain your choice and the capabilities and inner-workings.

ObjectDB is a pure Java Object-Oriented Database Management System (ODBMS)[1] and also a unique NoSQL database[2]. Compared to the other NoSQL technology, ObjectDB has the capabilities of ACID, i.e., atomicity, consistency, isolation, and durability. With managed only by built-in Java APIs (JPA 2 and JDO 2), ObjectDB could have the nearly equivalent power of SQL databases but is easy to use in Java[2]. Two benefits can be brought by the ObjectDB[3]:

* Time cost. The learning curve is suitable for programmers to implement and develop, which leads to less time and cost for the market.
* Performance Improvement. ObjectDB can efficiently store and manage graphs by storing collection and map fields while relational databases require more effort to join the tables for multiple records. Furthermore, it reduces the intermediate ORM layer for better performance.

As limited information is released, only features are exposed without specific architecture. Eight database tools and utilities are mentioned on the public website: Database Explorer, Database Doctor, Replication, Online Backup, Class Enhancer, Transaction Replayer, and BIRT Reports Driver [4], responsible for GUI, server, performance-boosting, cluster, recovery, debug, operation replay and reports, respectively.

### Demonstrate the use of the database systems of your choice on small example(s) of your choice.

Say there is a problem with finding the shortest path passing through all points. The number of points is large, and the data need to be storage properly for easy access. In this case, according to the instruction from the official website[5], it can be stored by the following class:

A picture containing text

Description automatically generated

Figure Demo class

If considering the example in the homework, the .csv data can be easily stored in the Java structure, like String, Date. As for .jpg/jjif files, an array of bytes (byte[]) can be used to store encoded images. Hence, all of the column mentioned can be stored in one class.

Text

Description automatically generated

Figure Persistent Fields in Class

### Reference:

[1] “ObjectDB Overview.” https://www.objectdb.com/database/overview (accessed Sep. 11, 2022).

[2] “Is ObjectDB a NoSQL Database?” https://www.objectdb.com/database/faq/object/db/nosql (accessed Sep. 11, 2022).

[3] “What are the main benefits of using ObjectDB?” https://www.objectdb.com/database/faq/simple/fast/database (accessed Sep. 11, 2022).

[4] “ObjectDB Object Database Features.” https://www.objectdb.com/database/features (accessed Sep. 11, 2022).

[5] “Defining a JPA Entity Class.” https://www.objectdb.com/java/jpa/start/entity (accessed Sep. 11, 2022).