

Министерство образования Республики Беларусь

Учреждение образования
БЕЛОРУССКИЙ ГОСУДАРСТВЕННЫЙ УНИВЕРСИТЕТ
ИНФОРМАТИКИ И РАДИОЭЛЕКТРОНИКИ

Инженерно-экономический факультет
Кафедра экономической информатики

Отчёт
по дисциплине
«Системы и технологии интеллектуальной обработки данных»
Лабораторная работа №8
NOSQL БАЗЫ ДАННЫХ

Выполнила:

студентка гр.772302
Ковальчук О. Ю.

Проверил:

Кунцевич А. А.

Минск 2020

Исполняемый файл сервера баз данных:

```
~ — mongod • sudo                                     ~ — mongo                                     ~ — -zsh +
2020-05-17T00:24:57.496+0300 I STORAGE [initandlisten] WiredTiger message [1589664297:496541][10014:0x1164f5d40], txn-recover: Recovering log 2 through 3
2020-05-17T00:24:57.601+0300 I STORAGE [initandlisten] WiredTiger message [1589664297:601610][10014:0x1164f5d40], txn-recover: Recovering log 3 through 3
2020-05-17T00:24:57.678+0300 I STORAGE [initandlisten] WiredTiger message [1589664297:678348][10014:0x1164f5d40], txn-recover: Set global recovery timestamp: (0,0)
2020-05-17T00:24:57.823+0300 I RECOVERY [initandlisten] WiredTiger recoveryTimestamp. Ts: Timestamp(0, 0)
2020-05-17T00:24:57.834+0300 I STORAGE [initandlisten] Timestamp monitor starting
2020-05-17T00:24:57.837+0300 I CONTROL [initandlisten] 
2020-05-17T00:24:57.838+0300 I CONTROL [initandlisten] ** WARNING: Access control is not enabled for the database.
2020-05-17T00:24:57.838+0300 I CONTROL [initandlisten] **      Read and write access to data and configuration is unrestricted.
2020-05-17T00:24:57.838+0300 I CONTROL [initandlisten] ** WARNING: You are running this process as the root user, which is not recommended.
2020-05-17T00:24:57.838+0300 I CONTROL [initandlisten] 
2020-05-17T00:24:57.838+0300 I CONTROL [initandlisten] ** WARNING: This server is bound to localhost.
2020-05-17T00:24:57.838+0300 I CONTROL [initandlisten] **      Remote systems will be unable to connect to this server.
2020-05-17T00:24:57.838+0300 I CONTROL [initandlisten] **      Start the server with --bind_ip <address> to specify which IP
2020-05-17T00:24:57.838+0300 I CONTROL [initandlisten] **      addresses it should serve responses from, or with --bind_ip_all to
2020-05-17T00:24:57.838+0300 I CONTROL [initandlisten] **      bind to all interfaces. If this behavior is desired, start the
2020-05-17T00:24:57.838+0300 I CONTROL [initandlisten] **      server with --bind_ip 127.0.0.1 to disable this warning.
2020-05-17T00:24:57.838+0300 I CONTROL [initandlisten] 
2020-05-17T00:24:57.838+0300 I CONTROL [initandlisten] 
2020-05-17T00:24:57.838+0300 I CONTROL [initandlisten] ** WARNING: soft rlimits too low. Number of files is 256, should be at least 1000
2020-05-17T00:24:57.842+0300 I SHARDING [initandlisten] Marking collection local.system.replset as collection version: <unsharded>
2020-05-17T00:24:57.853+0300 I STORAGE [initandlisten] Flow Control is enabled on this deployment.
2020-05-17T00:24:57.853+0300 I SHARDING [initandlisten] Marking collection admin.system.roles as collection version: <unsharded>
2020-05-17T00:24:57.853+0300 I SHARDING [initandlisten] Marking collection admin.system.version as collection version: <unsharded>
2020-05-17T00:24:57.856+0300 I SHARDING [initandlisten] Marking collection local.startup_log as collection version: <unsharded>
2020-05-17T00:24:57.856+0300 I FTDC [initandlisten] Initializing full-time diagnostic data capture with directory '/System/Volumes/Data/data/db/diagnostic.data'
2020-05-17T00:24:57.860+0300 I SHARDING [LogicalSessionCacheRefresh] Marking collection config.system.sessions as collection version: <unsharded>
2020-05-17T00:24:57.860+0300 I NETWORK [initandlisten] Listening on /tmp/mongodb-27017.sock
2020-05-17T00:24:57.860+0300 I NETWORK [initandlisten] Listening on 127.0.0.1
2020-05-17T00:24:57.860+0300 I NETWORK [initandlisten] waiting for connections on port 27017
2020-05-17T00:24:57.860+0300 I SHARDING [LogicalSessionCacheReap] Marking collection config.transactions as collection version: <unsharded>
2020-05-17T00:24:57.880+0300 I NETWORK [listener] connection accepted from 127.0.0.1:57929 #1 (1 connection now open)
2020-05-17T00:24:57.887+0300 I NETWORK [conn1] received client metadata from 127.0.0.1:57929 conn1: { driver: { name: "nodejs", version: "3.5.6" }, os: { type: "Darwin", name: "darwin", architecture: "x64", version: "19.0.0" }, platform: "Node.js v12.4.0, LE (unified)", application: { name: "MongoDB Compass" } }
2020-05-17T00:24:58.007+0300 I SHARDING [ftdc] Marking collection local.oplog.rs as collection version: <unsharded>
```

Результат выполнения запросов:

```
~ — mongod • sudo                                     ~ — mongo                                     ~ — -zsh +
=====
1.1) Уникальный и упорядоченный список URL.
[
  "https://www.facebook.com",
  "https://www.google.com",
  "https://www.my_site.com",
  "https://www.vk.com",
  "https://www.youtube.com"
]
=====
1.2) Упорядоченный список IP-адресов пользователей, посетивших ресурс с заданным URL (https://www.youtube.com).
[ "172.217.21.233" ]
=====
1.3) Упорядоченный список URL ресурсов, посещенных в заданный временной период [2020-05-16T19:23:27.317Z - 2020-05-16T20:23:27.317Z].
[
  "https://www.youtube.com",
  "https://www.vk.com",
  "https://www.google.com"
]
=====
1.4) Упорядоченный список URL ресурсов, посещенных пользователем с заданным IP-адресом (172.217.21.233).
[
  "https://www.youtube.com",
  "https://www.vk.com",
  "https://www.google.com"
]
=====
2.1) Список URL ресурсов с указанием суммарной длительности посещения каждого ресурса, упорядоченный по убыванию.
{ "_id" : "https://www.facebook.com", "value" : 82 }
{ "_id" : "https://www.my_site.com", "value" : 19 }
{ "_id" : "https://www.vk.com", "value" : 10 }
{ "_id" : "https://www.google.com", "value" : 8 }
{ "_id" : "https://www.youtube.com", "value" : 4 }
=====
2.2) Список URL ресурсов с указанием суммарного количества посещений каждого ресурса, упорядоченный по убыванию.
{ "_id" : "https://www.facebook.com", "value" : 3 }
{ "_id" : "https://www.google.com", "value" : 1 }
{ "_id" : "https://www.my_site.com", "value" : 1 }
{ "_id" : "https://www.vk.com", "value" : 1 }
{ "_id" : "https://www.youtube.com", "value" : 1 }
=====
2.3) Список URL ресурсов с указанием количества посещений каждого ресурса в день за заданный период, упорядоченный URL ресурса и убыванию количества посещений.
{ "_id" : "https://www.facebook.com", "value" : 3 }
{ "_id" : "https://www.my_site.com", "value" : 1 }
{ "_id" : "https://www.vk.com", "value" : 1 }
=====
```

```

=====
2.3) Список URL ресурсов с указанием количества посещений каждого ресурса в день за заданный период, упорядоченный URL ресурса и убыванию количества посещений.
{ "_id" : "https://www.facebook.com", "value" : 3 }
{ "_id" : "https://www.my_site.com", "value" : 1 }
{ "_id" : "https://www.vk.com", "value" : 1 }
=====

2.4) Список IP-адресов с указанием суммарного количества и суммарной длительности посещений ресурсов, упорядоченный по адресу, убыванию количества и убыванию длительности.
{
  "_id" : "https://www.facebook.com",
  "value" : {
    "connections" : 3,
    "time" : 82
  }
}
{
  "_id" : "https://www.my_site.com",
  "value" : {
    "connections" : 1,
    "timeSpent" : 13
  }
}
{
  "_id" : "https://www.vk.com",
  "value" : {
    "connections" : 1,
    "timeSpent" : 10
  }
}
{
  "_id" : "https://www.google.com",
  "value" : {
    "connections" : 1,
    "timeSpent" : 8
  }
}
{
  "_id" : "https://www.youtube.com",
  "value" : {
    "connections" : 1,
    "timeSpent" : 4
  }
}
}
true
>

```

Командой: `(db.logs.insertOne({URL:"https://https://www.my_site.com", IP:"172.217.21.234", timeStamp: new Date(),timeSpent:13}))` добавляются новые данные. Необходимо менять только URL и IP.

Данные в MongoDB Compass:

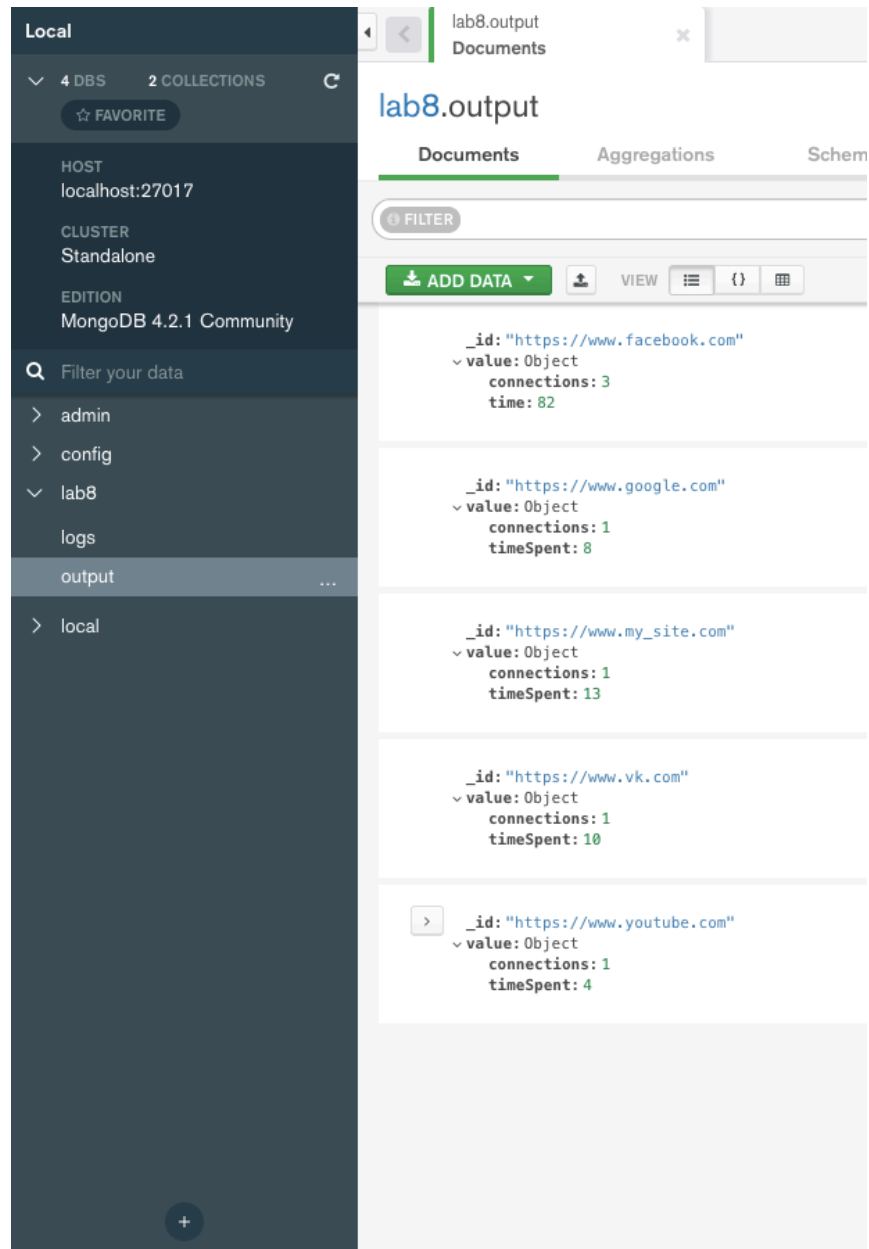
The screenshot shows the MongoDB Compass interface for the 'lab8.logs' collection. The left sidebar shows the database structure with 'lab8' selected. The main area displays 7 documents in a list view. Each document contains the following fields:

- `_id`: ObjectId (e.g., "5ec0573e52ae4116bbb1703e")
- `URL`: String (e.g., "https://www.youtube.com")
- `IP`: String (e.g., "172.217.21.233")
- `timeStamp`: ISODate (e.g., "2020-05-16T19:23:27.317+00:00")
- `timeSpent`: Integer (e.g., 4)

The interface also shows document statistics: 7 documents, 809B total size, 116B avg size, and 1 index.

Командой load («/System/Volumes/Data/data/db/run_queries.js») выполняем наши запросы из файла run_queries.js.

Итог суммарного количества и суммарной длительности посещений ресурсов в MongoDB Compass:



The screenshot shows the MongoDB Compass interface. On the left, the 'Local' sidebar displays the database structure: 4 DBS, 2 COLLECTIONS. The 'lab8' database is selected, and the 'output' collection is highlighted. The main panel shows the 'lab8.output' collection with 5 documents. Each document contains the following fields:

- `_id`: A URL string.
- `value`: An object containing `connections` and `timeSpent`.

Document	<code>_id</code>	<code>value.connections</code>	<code>value.timeSpent</code>
1	<code>"https://www.facebook.com"</code>	3	82
2	<code>"https://www.google.com"</code>	1	8
3	<code>"https://www.my_site.com"</code>	1	13
4	<code>"https://www.vk.com"</code>	1	10
5	<code>"https://www.youtube.com"</code>	1	4