Sprawozdanie z przedmiotu

Języki skryptowe w aplikacjach internetowych

Laboratorium № 1

MongoDB

Khoruzhyi Oleksii

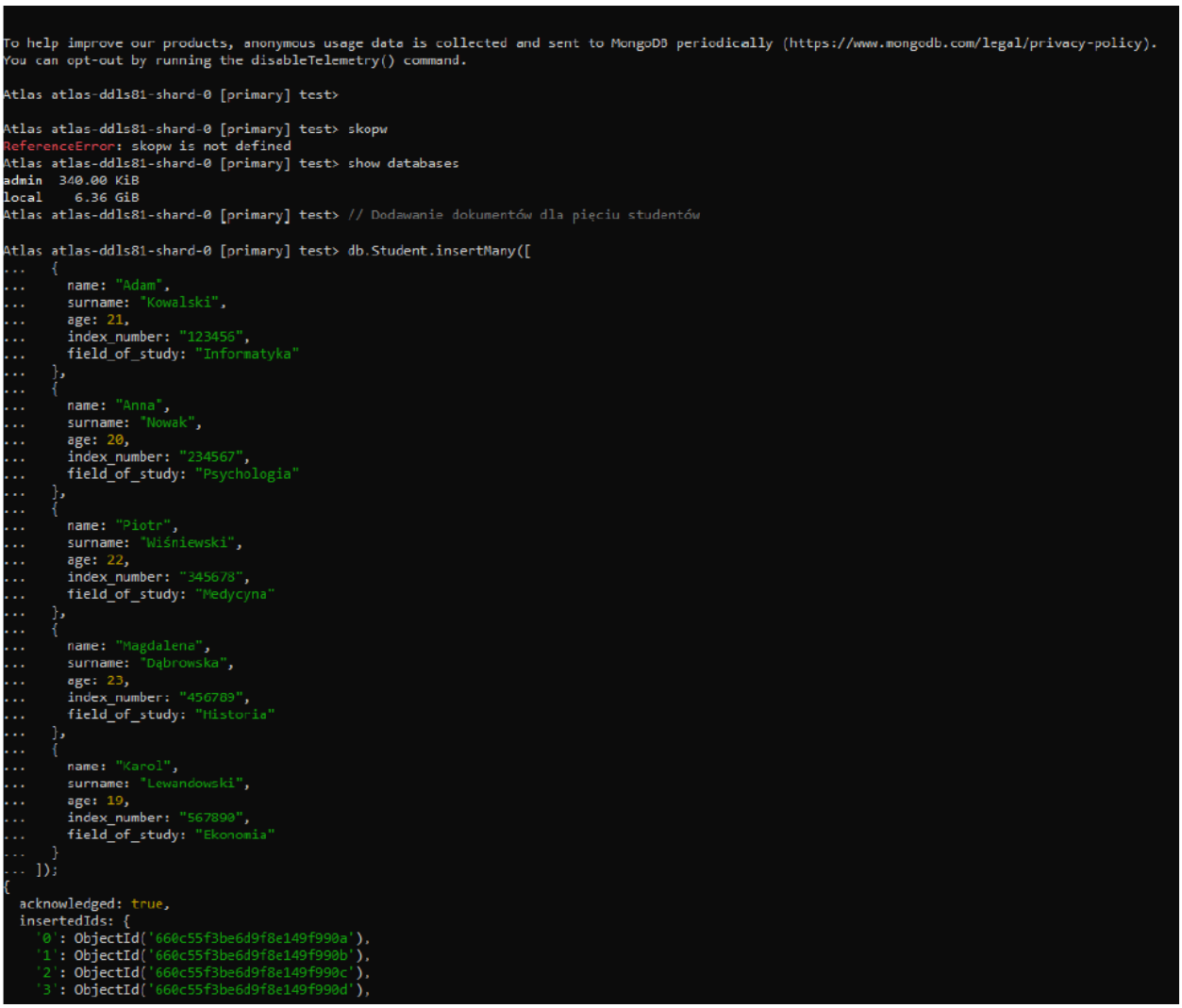
grupa nr.1

PAI WIMiI

Częstochowa 2024

1. Adding new data

- Create a new database.
- Create a collection named "Student" in the database.
- Add documents to the collection describing five students, please include information about name, surname, age, index number and field of study.



2. Inquiries

- Please display all students
- Find documents that meet certain criteria:
- age greater than 24 years,
- iname containing the letter "a",
- having a specific index number,
- all those who do not have the letter "b" in their surname

```
{
  _id: ObjectId('660c55f3be6d9f8e149f990a'),
  name: 'Adam',
  surname: 'Kowalski',
  age: 21,
  index_number: '123456',
  field_of_study: 'Informatyka'
},
{
  _id: ObjectId('660c55f3be6d9f8e149f990b'),
  name: 'Anna',
  surname: 'Nowak',
  age: 20,
  index_number: '234567',
  field_of_study: 'Psychologia'
},
{
  _id: ObjectId('660c55f3be6d9f8e149f990c'),
  name: 'Piotr',
  surname: 'Wiśniewski',
  age: 22,
  index_number: '345678',
  field_of_study: 'Medycyna'
},
{
  _id: ObjectId('660c55f3be6d9f8e149f990d'),
  name: 'Magdalena',
  surname: 'Dąbrowska',
  age: 23,
  index_number: '456789',
  field_of_study: 'Historia'
},
{
  _id: ObjectId('660c55f3be6d9f8e149f990e'),
  name: 'Karol',
  surname: 'Lewandowski',
  age: 19,
  index_number: '567890',
  field_of_study: 'Ekonomia'
}
```

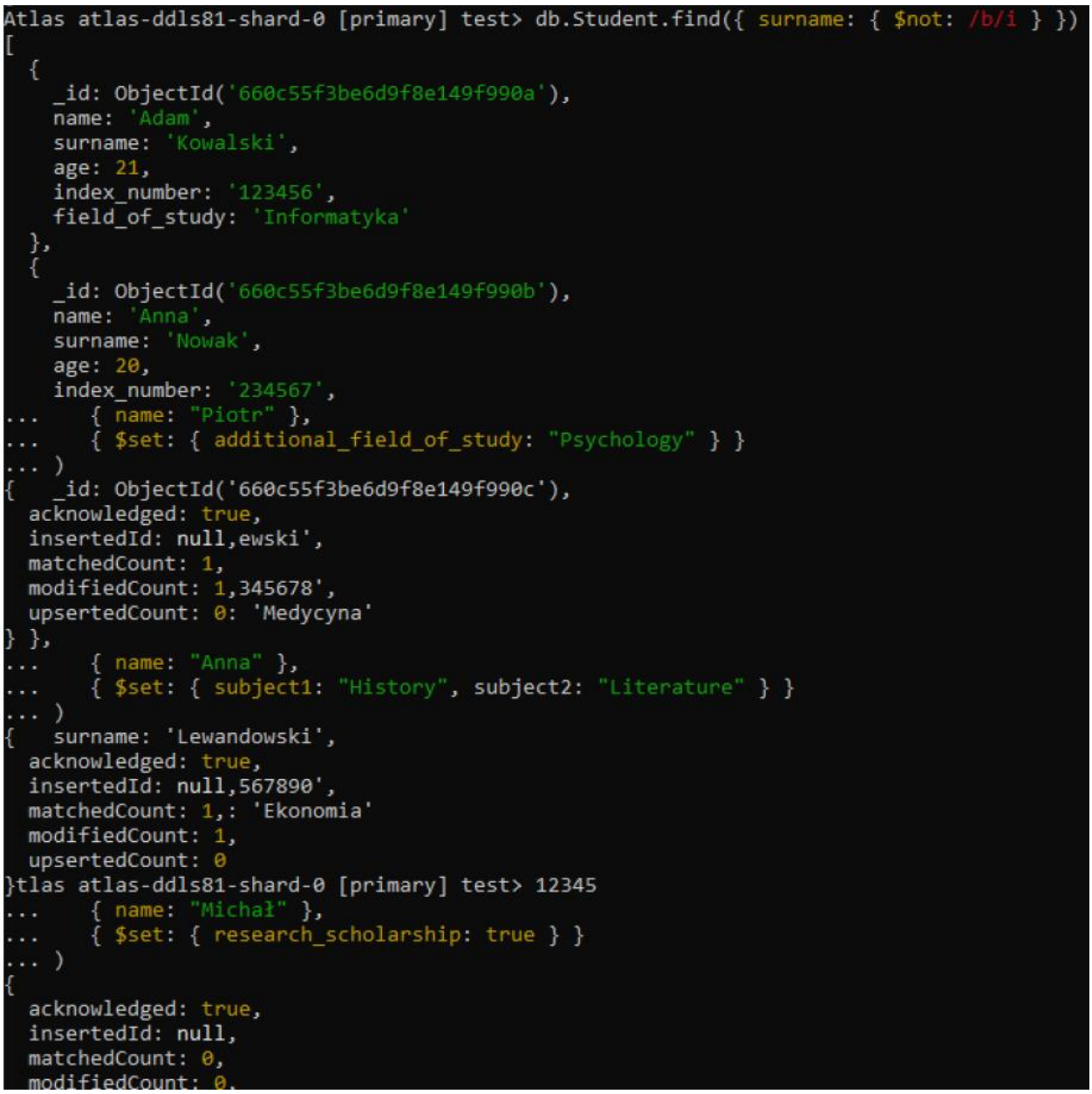
```
]
Atlas atlas-ddls81-shard-0 [primary] test> db.Student.find({ age: { $gt: 24 } })

Atlas atlas-ddls81-shard-0 [primary] test> db.Student.find({ name: { $regex: /a/i } })
[
  {
    _id: ObjectId('660c55f3be6d9f8e149f990a'),
    name: 'Adam',
    surname: 'Kowalski',
    age: 21,
    index_number: '123456',
    field_of_study: 'Informatyka'
  },
  {
    _id: ObjectId('660c55f3be6d9f8e149f990b'),
    name: 'Anna',
    surname: 'Nowak',
    age: 20,
    index_number: '234567',
    field_of_study: 'Psychologia'
  },
  {
    _id: ObjectId('660c55f3be6d9f8e149f990d'),
    name: 'Magdalena',
    surname: 'Dąbrowska',
    age: 23,
    index_number: '456789',
    field_of_study: 'Historia'
  },
  {
    _id: ObjectId('660c55f3be6d9f8e149f990e'),
    name: 'Karol',
    surname: 'Lewandowski',
    age: 19,
    index_number: '567890',
    field_of_study: 'Ekonomia'
  }
```

```
Atlas atlas-ddls81-shard-0 [primary] test> db.Student.find({ surname: { $not: /b/i } })
[
  {
    _id: ObjectId('660c55f3be6d9f8e149f990a'),
    name: 'Adam',
    surname: 'Kowalski',
    age: 21,
    index_number: '123456',
    field_of_study: 'Informatyka'
  },
  {
    _id: ObjectId('660c55f3be6d9f8e149f990b'),
    name: 'Anna',
    surname: 'Nowak',
    age: 20,
    index_number: '234567',
    field_of_study: 'Psychologia'
  },
  {
    _id: ObjectId('660c55f3be6d9f8e149f990c'),
    name: 'Piotr',
    surname: 'Wiśniewski',
    age: 22,
    index_number: '345678',
    field_of_study: 'Medycyna'
  },
  {
    _id: ObjectId('660c55f3be6d9f8e149f990e'),
    name: 'Karol',
    surname: 'Lewandowski',
    age: 19,
    index_number: '567890',
    field_of_study: 'Ekonomia'
  }
]
```

3. Data update:

- Add new fields to existing documents. For the first one, please add a field describing an additional field of study, for the second one, two individual subjects. For the third one, information about a research scholarship.
- Change the name of the first student and the surname of the second.
- Delete any 3 fields from existing documents.



```
Atlas atlas-ddls81-shard-0 [primary] test> db.Student.find({ surname: { $not: /b/i } })
[
  {
    _id: ObjectId('660c55f3be6d9f8e149f990a'),
    name: 'Adam',
    surname: 'Kowalski',
    age: 21,
    index_number: '123456',
    field_of_study: 'Informatyka'
  },
  {
    _id: ObjectId('660c55f3be6d9f8e149f990b'),
    name: 'Anna',
    surname: 'Nowak',
    age: 20,
    index_number: '234567',
...     { name: "Piotr" },
...     { $set: { additional_field_of_study: "Psychology" } }
... )
{   _id: ObjectId('660c55f3be6d9f8e149f990c'),
  acknowledged: true,
  insertedId: null,ewski',
  matchedCount: 1,
  modifiedCount: 1,345678',
  upsertedCount: 0: 'Medycyna'
} },
...     { name: "Anna" },
...     { $set: { subject1: "History", subject2: "Literature" } }
... )
{   surname: 'Lewandowski',
  acknowledged: true,
  insertedId: null,567890',
  matchedCount: 1,: 'Ekonomia'
  modifiedCount: 1,
  upsertedCount: 0
}tlas atlas-ddls81-shard-0 [primary] test> 12345
...     { name: "Michał" },
...     { $set: { research_scholarship: true } }
... )
{
  acknowledged: true,
  insertedId: null,
  matchedCount: 0,
  modifiedCount: 0,
```

```
}
...     { name: "Piotr" },
...     { $set: { name: "Marek" } }
... )
{
  acknowledged: true,
  insertedId: null,
  matchedCount: 1,
  modifiedCount: 1,
  upsertedCount: 0
}
Atlas atlas-ddls81-shard-0 [primary] test> db.Student.updateOne(
...     { name: "Piotr" },
...     { $set: { name: "Marek" } }
... )
{
  acknowledged: true,
  insertedId: null,
  matchedCount: 0,
  modifiedCount: 0,
  upsertedCount: 0
}
Atlas atlas-ddls81-shard-0 [primary] test> db.Student.updateOne(
...     { name: "Anna" },
...     { $set: { surname: "Nowakowska" } }
... )
{
  acknowledged: true,
  insertedId: null,
  matchedCount: 1,
  modifiedCount: 1,
  upsertedCount: 0
}
Atlas atlas-ddls81-shard-0 [primary] test>
```

4. Data deletion:

- Remove individual documents from the collection.
- Delete multiple documents that meet the specified criteria.
- Delete the entire collection.

```
Atlas atlas-ddls81-shard-0 [primary] test> db.Student.updateOne(
...     { name: "Marek" },
...     { $unset: { additional_field_of_study: "", field_of_study: "", research_scholarship: "" } }
... )
{
  acknowledged: true,
  insertedId: null,
  matchedCount: 1,
  modifiedCount: 1,
  upsertedCount: 0
}
Atlas atlas-ddls81-shard-0 [primary] test>
```

```
Atlas atlas-ddls81-shard-0 [primary] test> db.Student.updateOne(
...     { name: "Anna" },
...     { $unset: { subject1: "", subject2: "", age: "" } }
... )
{
  acknowledged: true,
  insertedId: null,
  matchedCount: 1,
  modifiedCount: 1,
  upsertedCount: 0
}
Atlas atlas-ddls81-shard-0 [primary] test>
```

```
Atlas atlas-ddls81-shard-0 [primary] test> db.Student.updateOne(
...     { name: "Michał" },
...     { $unset: { index_number: "", surname: "", field_of_study: "" } }
... )
{
  acknowledged: true,
  insertedId: null,
  matchedCount: 0,
  modifiedCount: 0,
  upsertedCount: 0
}
Atlas atlas-ddls81-shard-0 [primary] test> db.Student.deleteMany({ age: 20 })
{ acknowledged: true, deletedCount: 0 }
Atlas atlas-ddls81-shard-0 [primary] test> db.Student.deleteMany({ age: { $gte: 22 } })
{ acknowledged: true, deletedCount: 2 }
Atlas atlas-ddls81-shard-0 [primary] test> db.Student.drop()
true
Atlas atlas-ddls81-shard-0 [primary] test>
```

General Summary

In this task, the following steps were undertaken to manage the "Students" collection:

1. **Creation of the Collection:**

   A new collection named "Students" was created in the database to store detailed student information, such as first name, last name, class number, year of study, etc.

2. **Adding Documents:**

   Several documents representing different students were added to the "Students" collection. Each document included comprehensive data about the students, such as first name, last name, age, field of study, etc.

3. **Updating Documents:**

   Existing student documents were updated by adding a new field, "grades," to store individual student grades.

4. **Deleting Documents:**

   Data for a specific student was removed from the collection based on their index

number or another unique identifier, ensuring the data remains current and organized.

5. **Indexing Fields:**
   The "index_number" field in the "Students" collection was indexed to significantly speed up the process of searching for students by their index number.
6. **Adding Nested Documents:**
   A "courses" field was added to the student documents, storing a list of courses along with grades and comments. This made the student data more detailed and organized.
7. **Data Aggregation:**
   Aggregation operations were performed to obtain the average grades of all students and other statistics about their academic performance.
8. **Switching to Another Database:**
   A new database called "university" was created, and the "Students" collection was moved to this new database for better data organization within the university context.
9. **Creating Backups:**
   A backup of the "Students" collection was made and saved in BSON or JSON format to protect the data from loss.

These actions enabled effective management of student data, improved search speed, and ensured data security and integrity through regular backups.