

# CSCI235 – Database Systems

---

## MongoDB Data Manipulations

Sionggo Japit

[sjapit@uow.edu.au](mailto:sjapit@uow.edu.au)

3 October 2021

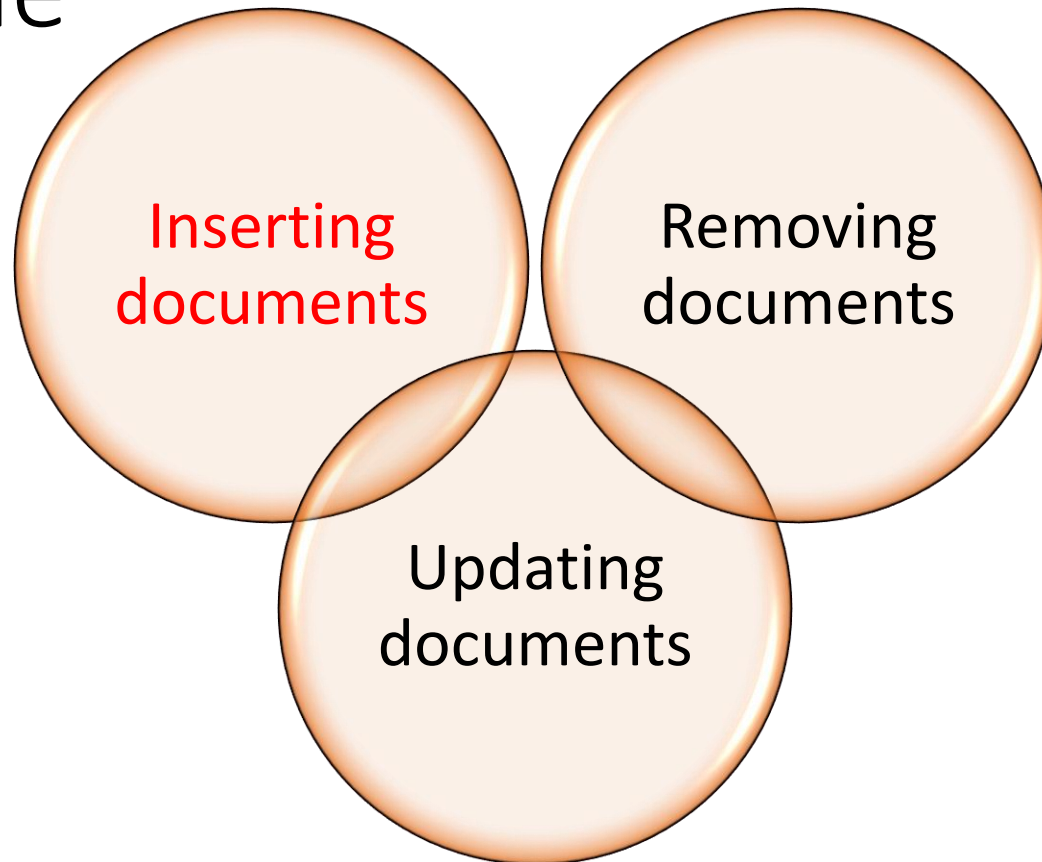
# Acknowledgements

The following presentation were adapted from the lecture slides of:

CSCI235 – Database Systems,  
18MongoDBDataManipulation

By Dr Janusz R. Getta,  
School of Computing and Information Technology  
University of Wollongong, Australia

# Outline



# Inserting documents

- A method insert() can be used to insert a single document into a collection

```
db.department.insert(  
  { "name": "School of Computing and Information Technology",  
    "code": "SCIT",  
    "total_staff_number": 30,  
    "budget": 1000000,  
    "address": { "street": "Nortfields Ave",  
                  "bldg": 3,  
                  "city": "Wollongong",  
                  "country": "Australia" }} )
```

# Inserting documents

- It is possible to insert many documents in one call

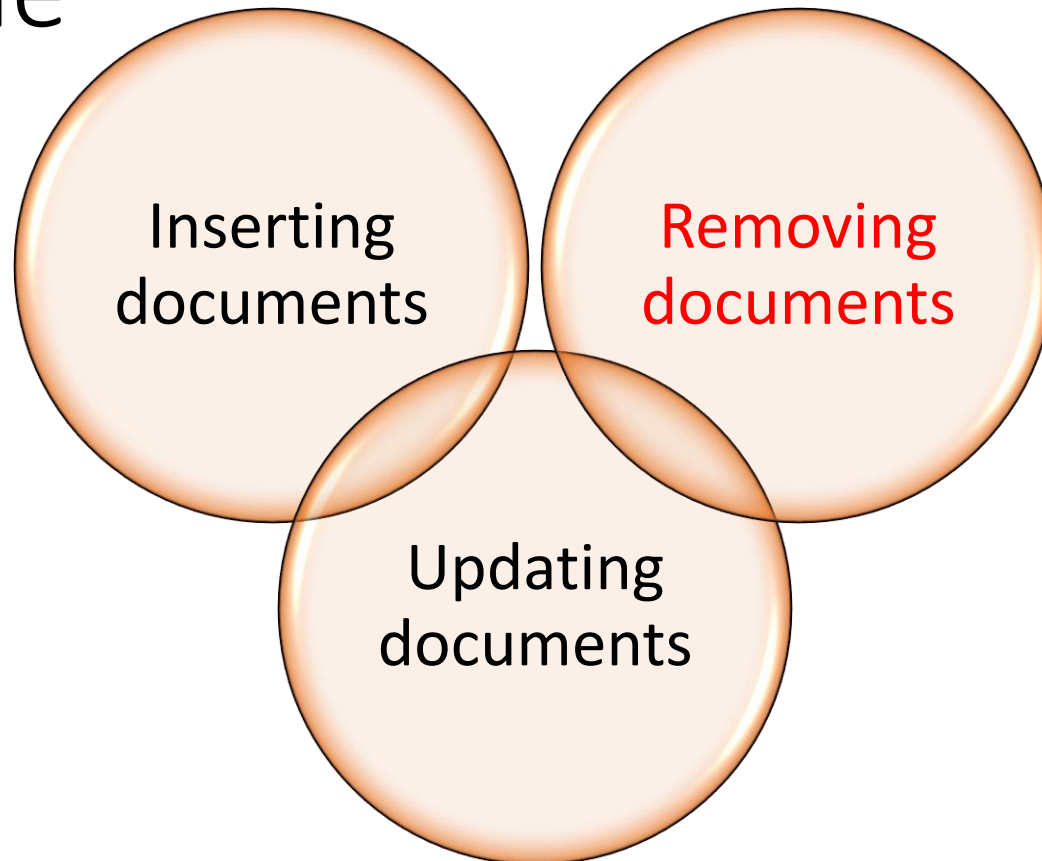
```
db.department.insert(  
  [ { "_id " :1,  
      "name":"School of Computing and Information Technology",  
      "code":"SCIT",  
      "total_staff_number":30,  
      "budget":1000000 },  
    { "_id " :2,  
      "name": "School of Electrical Engineering",  
      "code":"SENG",  
      "total_staff_number":20,  
      "budget":100000 } ]  
)
```

# Inserting documents

## Restrictions on insertions:

- It is impossible to insert two documents with the same “\_id” into the same collection.
- Insertion of many documents with one call can be done only on one collection.
- “There is a limit on much data can be inserted in one inserts(48Mb).
- If insertion of many documents with on call fails then entire operation is not rolled back (partial insertion).
- A document must be smaller than 16 Mb.

# Outline



```
db.department.insert(  
  { "name":"School of Computing and Information Technology",  
    "code":"SCIT",  
    "total_staff_number":30,  
    "budget":1000000,  
    "address": { "street": "Nortfields Ave",  
                  "bldg":3,  
                  "city":"Wollongong",  
                  "country":"Australia" },  
    "courses":[ { "code":"CSCI235",  
                   "title":"Database Systems",  
                   "credits":6 },  
                  { "code":"CSIT115",  
                    "title":"Data Management and Security",  
                    "credits":6 },  
                  { "code":"CSCI317",  
                    "title":"Database Performance Tuning",  
                    "credits",6 },  
                  { "code":"CSIT321",  
                    "title":"Software Project",  
                    "credits":12 } ]  
  }  
)
```

A sample document used in  
the following examples.



# Removing documents

- A method `remove()` can be used to remove the documents from a collection.

Remove all documents from a collection:

```
db.department.remove({})
```

- Remove all departments whose code is `SCIT`

```
db.department.remove({"code":"SCIT"})
```

- Remove all departments whose name is `School of Physics` and whose code is `SOPH`

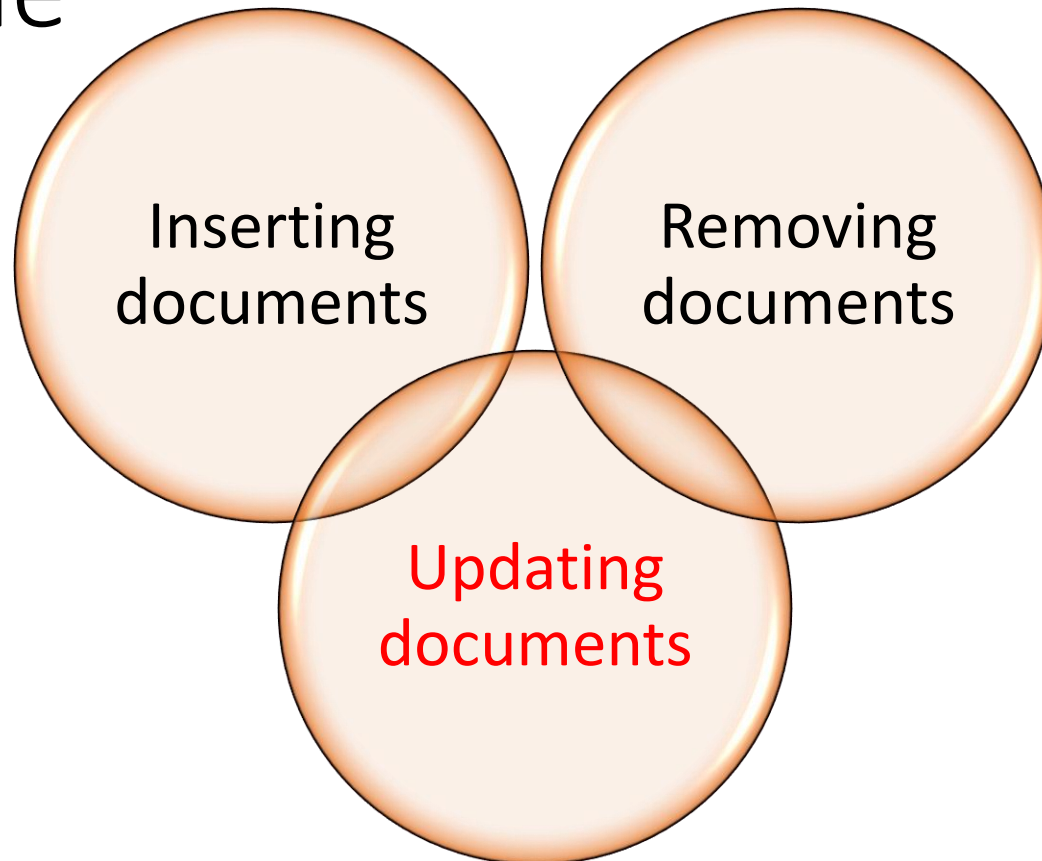
```
db.department.remove({"name":"School of Physics","code":"SOPH"})
```

# Removing documents

- Drop a collection

```
db.department.drop({})
```

# Outline



# Updating documents

- Replace SCIT department with a new document

```
db.department.update(  
    {"code":"SCIT"},  
    {"code":"SCSE",  
     "budget":10000 } )
```

- Increment budget of SCIT department by 100000

```
db.department.update(  
    {"code":"SCIT"},  
    {"$inc": {"budget":100000}})
```

# Updating documents

- Change a budget of SCIT department to 5000000

```
db.department.update(  
    {"code":"SCIT"},  
    {"$set":{"budget":5000000}}  
)
```

- Multiply budget of SCIT department by 2

```
db.department.update(  
    {"code":"SCIT"},  
    {"$mul":{"budget":2}}  
)
```

# Updating documents

- Rename a key `budget` into `large budget`

```
db.department.update(  
    { "code": "SCIT" },  
    { "$rename":  
      { "budget": "large budget" } }  
)
```

- Remove a `large budget` pair

```
db.department.update(  
    { "code": "SCIT" },  
    { "$unset": { "large  
budget": null } } )
```

# Updating documents

- Remove a **large budget** pair

```
db.department.update(  
    { "code": "SCIT",  
      { "$rename":  
        { "budget": "large budget" } }  
    )
```

- Add a **medium budget** pair

```
db.department.update(  
    { "code": "SCIT",  
      { "$set": { "medium  
budget": 1000000 } } } )
```

# Updating documents

- Create a **last update** pair with the current date

```
db.department.update(  
    {"code":"SCIT"},  
    {"$set":{"last update":null}}  
)  
  
db.department.update(  
    {"code":"SCIT"},  
    {"$currentDate":{"last  
update":true}} )
```



# Updating documents

- Change credits of a course with a code **CSCI835** to **12**

```
db.department.update(  
    {"courses.code":"CSCI835"},  
    {"$set":  
    {"course.0.credits":12}} )
```

- Delete a course with a code **SOPH101**

```
db.department.update(  
    {"courses.code":"SOPH101"},  
    ,  
    {"$pull":{"courses":{"code":"  
SOPH101"}}}} )
```

# Updating documents

- Insert a new course into an array courses

```
db.department.update(  
    {  
        "code": "SOPH",  
        "$push": {  
            "courses": {  
                "code": "SOPH101",  
                "title": "Magnetism",  
                "credits": 6  
            }  
        }  
    }  
)
```

- Update the first selected elements in an array courses

```
db.department.update(  
    {  
        "courses.code": "SOPH101",  
        "$set": {  
            "courses.$.code": "SOPH103"  
        }  
    }  
)
```

# References

- MongoDB Reference, Database Commands, Query and Write Operation Commands,  
<https://docs.mongodb.com/manual/reference/method/db.collection.update/>
- MongoDB Reference, Operators, Update Operators,  
<https://docs.mongodb.com/manual/reference/operator/update/>
- Chodorow K. MongoDB The Definitive Guide, O'Reilly, 2013, chapter 2.