

作业 3

- 1、切换到 studentdb 数据库；
- 2、创建 students 集合和 courses 集合，集合前要加前缀，格式为姓名的第一个字母，如本人张元鸣，则所创建的集合为：zym_students, zym_courses。

```
> use studentdb
switched to db studentdb
> db
studentdb
> db.createCollection("zkx_students")
{ "ok" : 1 }
> db.createCollection("zkx_courses")
{ "ok" : 1 }
```

- 3、在 2 个集合中分别插入文档（按照基本表中给出的数据）。

插入 zkx_students:

```
> db.zkx_students.insert( {Sname:"王建平", Ssex:"男", Sage:21, Dname:"自动化", Courses:[ {Cno:"C01", Grade:92}, {Cno:"C03",Grade:84}]} )
WriteResult({ "nInserted" : 1 })
> db.zkx_students.insert( {Sname:"刘华", Ssex:"女", Sage:19, Dname:"自动化", Courses:[ {Cno:"C01", Grade:90}, {Cno:"C02",Grade:94}, {Cno:"C03",Grade:82}]} )
WriteResult({ "nInserted" : 1 })
> db.zkx_students.insert( {Sname:"范林军", Ssex:"女", Sage:18, Dname:"计算机", Courses:[ {Cno:"C01", Grade:72}, {Cno:"C02",Grade:90}]} )
WriteResult({ "nInserted" : 1 })
> db.zkx_students.insert( {Sname:"李伟", Ssex:"男", Sage:19, Dname:"数学", Courses:[ {Cno:"C03", Grade:75}]} )
WriteResult({ "nInserted" : 1 })
> db.zkx_students.insert( {Sname:"黄河", Ssex:"男", Sage:18, Dname:"数学"} )
WriteResult({ "nInserted" : 1 })
> db.zkx_students.insert( {Sname:"长江", Ssex:"男", Sage:20, Dname:"数学"} )
WriteResult({ "nInserted" : 1 })
```

```
选择mongo.exe
> db.zkx_students.find().pretty()
{
  "_id" : ObjectId("5fafcbfb2a07ad2b6b577823"),
  "Sname" : "王建平",
  "Ssex" : "男",
  "Sage" : 21,
  "Dname" : "自动化",
  "Courses" : [
    {
      "Cno" : "C01",
      "Grade" : 92
    },
    {
      "Cno" : "C03",
      "Grade" : 84
    }
  ]
}
{
  "_id" : ObjectId("5fafcc712a07ad2b6b577824"),
  "Sname" : "刘华",
  "Ssex" : "女",
  "Sage" : 19,
  "Dname" : "自动化",
  "Courses" : [
    {
      "Cno" : "C01",
      "Grade" : 90
    },
    {
      "Cno" : "C02",
      "Grade" : 94
    },
    {
      "Cno" : "C03",
      "Grade" : 82
    }
  ]
}
```

```
{
  "id" : ObjectId("5fafcd512a07ad2b6b577825"),
  "Sname" : "范林军",
  "Ssex" : "女",
  "Sage" : 18,
  "Dname" : "计算机",
  "Courses" : [
    {
      "Cno" : "C01",
      "Grade" : 72
    },
    {
      "Cno" : "C02",
      "Grade" : 90
    }
  ]
},
{
  "id" : ObjectId("5fafcda52a07ad2b6b577826"),
  "Sname" : "李伟",
  "Ssex" : "男",
  "Sage" : 19,
  "Dname" : "数学",
  "Courses" : [
    {
      "Cno" : "C03",
      "Grade" : 75
    }
  ]
},
{
  "id" : ObjectId("5fafcde52a07ad2b6b577827"),
  "Sname" : "黄河",
  "Ssex" : "男",
  "Sage" : 18,
  "Dname" : "数学"
},
{
  "id" : ObjectId("5fafce022a07ad2b6b577828"),
  "Sname" : "长江",
  "Ssex" : "男",
  "Sage" : 20,
  "Dname" : "数学"
}
```

插入 zkx_courses:

```
...
> db.zkx_courses.insert(
... {Cno:"C04",
... Cname:"DB 设计",
... Pre_Cno:"C03",
... Credits:3})
WriteResult({ "nInserted" : 1 })
> db.zkx_courses.insert( {Cno:"C05", Cname:"C++", Credits:3})
WriteResult({ "nInserted" : 1 })
> db.zkx_courses.insert( {Cno:"C06", Cname:"网络原理",Pre_Cno:"C07", Credits:3})
WriteResult({ "nInserted" : 1 })
> db.zkx_courses.insert( {Cno:"C07", Cname:"操作系统",Pre_Cno:"C05", Credits:3})
WriteResult({ "nInserted" : 1 })
```

```

mongo.exe
WriteResult({ "nInserted" : 1 })
> db.zkx_courses.find().pretty()
{
  "_id" : ObjectId("5fafd02d2a07ad2b6b577829"),
  "Cno" : "C01",
  "Cname" : "英语",
  "Credits" : 2,
  "Students" : [
    "s01",
    "s02",
    "s03"
  ]
}

{
  "_id" : ObjectId("5fafd0c82a07ad2b6b57782a"),
  "Cno" : "C02",
  "Cname" : "数据结构",
  "Pre_Cno" : "C05",
  "Credits" : 2,
  "Students" : [
    "s02",
    "s03"
  ]
}

{
  "_id" : ObjectId("5fafd1002a07ad2b6b57782b"),
  "Cno" : "C03",
  "Cname" : "数据库",
  "Pre_Cno" : "C02",
  "Credits" : 2,
  "Students" : [
    "s01",
    "s02",
    "s04"
  ]
}

{
  "_id" : ObjectId("5fafd255ac3a37529806dddd"),
  "Cno" : "C04",
  "Cname" : "DB_设计",
  "Pre_Cno" : "C03",
  "Credits" : 3
}

{
  "_id" : ObjectId("5fafd271ac3a37529806ddde"),
  "Cno" : "C05",
  "Cname" : "C++",
  "Credits" : 3
}

{
  "_id" : ObjectId("5fafd29bac3a37529806dddf"),
  "Cno" : "C06",
  "Cname" : "网络原理",
  "Pre_Cno" : "C07",
  "Credits" : 3
}

{
  "_id" : ObjectId("5fafd2b1ac3a37529806dde0"),
  "Cno" : "C07",
  "Cname" : "操作系统",
  "Pre_Cno" : "C05",
  "Credits" : 3
}

```

4、完成以下操作：

1) 查询姓名是王建平的文档。

```

db.zkx_students.find({Sname:"王建平"}, {_id:0}).pretty()
{
  "Sname" : "王建平",
  "Ssex" : "男",
  "Sage" : 21,
  "Dname" : "自动化",
  "Courses" : [
    {
      "Cno" : "C01",
      "Grade" : 92
    },
    {
      "Cno" : "C03",
      "Grade" : 84
    }
  ]
}

```

2) 查询年龄大于 20 岁的学生文档。

```

> db.zkx_students.find({Sage: {$gt:20}}, {_id:0}).pretty()
{
  "Sname" : "王建平",
  "Ssex" : "男",
  "Sage" : 21,
  "Dname" : "自动化",
  "Courses" : [
    {
      "Cno" : "C01",
      "Grade" : 92
    },
    {
      "Cno" : "C03",
      "Grade" : 84
    }
  ]
}

```

3) 查询选修了 C01 且及格的学生文档。

```
> db.zkx_students.find({"Courses.Cno":"C01","Courses.Grade":{"$gte:60}}).pretty()
{
  "_id" : ObjectId("5fafcbfb2a07ad2b6b577823"),
  "Sname" : "王建平",
  "Ssex" : "男",
  "Sage" : 21,
  "Dname" : "自动化",
  "Courses" : [
    {
      "Cno" : "C01",
      "Grade" : 92
    },
    {
      "Cno" : "C03",
      "Grade" : 84
    }
  ]
}

{
  "_id" : ObjectId("5fafcc712a07ad2b6b577824"),
  "Sname" : "刘华",
  "Ssex" : "女",
  "Sage" : 19,
  "Dname" : "自动化",
  "Courses" : [
    {
      "Cno" : "C01",
      "Grade" : 90
    },
    {
      "Cno" : "C02",
      "Grade" : 94
    },
    {
      "Cno" : "C03",
      "Grade" : 82
    }
  ]
}

{
  "_id" : ObjectId("5fafcd512a07ad2b6b577825"),
  "Sname" : "范林军",
  "Ssex" : "女",
  "Sage" : 18,
  "Dname" : "计算机",
  "Courses" : [
    {
      "Cno" : "C01",
      "Grade" : 72
    },
    {
      "Cno" : "C02",
      "Grade" : 90
    }
  ]
}
```

4) 在姓名上创建一个升序的唯一索引。

```
> db.zkx_students.createIndex({Sname:1}, {unique:true})
{
  "createdCollectionAutomatically" : false,
  "numIndexesBefore" : 1,
  "numIndexesAfter" : 2,
  "ok" : 1
}
```

5) 查询各门课程的平均分数。

```
> db.zkx_students.aggregate([{$unwind:"$Courses"}, {$group: {_id:"$Courses.Cno", avg:{$avg:"$Courses.Grade"}}}]).pretty()
{
  "_id" : "C02", "avg" : 92
}
{
  "_id" : "C03", "avg" : 80.33333333333333
}
{
  "_id" : "C01", "avg" : 84.66666666666667
}
```