

Mybatis

1. Mybatis 介绍



MyBatis

MyBatis 是支持 **普通 SQL 查询**，**存储过程**和**高级映射**的优秀**持久层框架**。MyBatis 消除了几乎所有的 JDBC 代码和参数的手工设置以及对结果集的检索封装。MyBatis 可以使用简单的 **XML 或注解**用于配置和原始映射，将接口和 Java 的 POJO（Plain Old Java Objects，普通的 Java 对象）映射成数据库中的记录。

JDBC-→dbutils-→MyBatis-→Hibernate

2. mybatis 快速入门

编写第一个基于 **mybaits** 的测试例子:

2.1. 添加 jar 包

【mybatis】

mybatis-3.1.1.jar

【MYSQL 驱动包】

mysql-connector-java-5.1.7-bin.jar

2.2. 建库+表

```
create database mybatis;
use mybatis;
CREATE TABLE users(id INT PRIMARY KEY AUTO_INCREMENT, NAME VARCHAR(20), age INT);
INSERT INTO users(NAME, age) VALUES('Tom', 12);
INSERT INTO users(NAME, age) VALUES('Jack', 11);
```

2.3. 添加 Mybatis 的配置文件 conf.xml

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE configuration PUBLIC "-//mybatis.org//DTD Config 3.0//EN"
"http://mybatis.org/dtd/mybatis-3-config.dtd">
<configuration>
    <environments default="development">
        <environment id="development">
            <transactionManager type="JDBC" />
            <dataSource type="POOLED">
                <property name="driver" value="com.mysql.jdbc.Driver" />
                <property name="url" value="jdbc:mysql://localhost:3306/mybatis" />
                <property name="username" value="root" />
                <property name="password" value="root" />
            </dataSource>
        </environment>
    </environments>
</configuration>
```

2.4. 定义表所对应的实体类

```
public class User {
    private int id;
    private String name;
    private int age;
    //get,set 方法
```

```
}
```

2.5. 定义操作 users 表的 sql 映射文件 userMapper.xml

```
<?xml version="1.0" encoding="UTF-8" ?>
<!DOCTYPE mapper PUBLIC "-//mybatis.org//DTD Mapper 3.0//EN"
"http://mybatis.org/dtd/mybatis-3-mapper.dtd">
<mapper namespace="com.atguigu.mybatis_test.test1.userMapper">
    <select id="getUser" parameterType="int"
        resultType="com.atguigu.mybatis_test.test1.User">
        select * from users where id=#{id}
    </select>
</mapper>
```

2.6. 在 conf.xml 文件中注册 userMapper.xml 文件

```
<mappers>
    <mapper resource="com/atguigu/mybatis_test/test1/userMapper.xml"/>
</mappers>
```

2.7. 编写测试代码：执行定义的 select 语句

```
public class Test {
    public static void main(String[] args) throws IOException {
        String resource = "conf.xml";
        //加载 mybatis 的配置文件（它也加载关联的映射文件）
        Reader reader = Resources.getResourceAsReader(resource);
        //构建 sqlSession 的工厂
        SqlSessionFactory sessionFactory = new SqlSessionFactoryBuilder().build(reader);
        //创建能执行映射文件中 sql 的 sqlSession
        SqlSession session = sessionFactory.openSession();
        //映射 sql 的标识字符串
        String statement = "com.atguigu.mybatis.bean.userMapper"+"selectUser";
        //执行查询返回一个唯一 user 对象的 sql
        User user = session.selectOne(statement, 1);
        System.out.println(user);
    }
}
```

```
}
```

3. 操作 users 表的 CRUD

3.1. XML 的实现

1). 定义 sql 映射 xml 文件:

```
<insert id="insertUser" parameterType="com.atguigu.ibatis.bean.User">
    insert into users(name, age) values("#{name}, #{age});
</insert>

<delete id="deleteUser" parameterType="int">
    delete from users where id=#{id}
</delete>

<update id="updateUser" parameterType="com.atguigu.ibatis.bean.User">
    update users set name=#{name},age=#{age} where id=#{id}
</update>

<select id="selectUser" parameterType="int" resultType="com.atguigu.ibatis.bean.User">
    select * from users where id=#{id}
</select>

<select id="selectAllUsers" resultType="com.atguigu.ibatis.bean.User">
    select * from users
</select>
```

2). 在 config.xml 中注册这个映射文件

```
<mapper resource="net/lamp/java/ibatis/bean/userMapper.xml"/>
```

3). 在 dao 中调用:

```
public User getUserById(int id) {  
    SqlSession session = sessionFactory.openSession();  
    User user = session.selectOne("URI+".selectUser", id);  
    return user;  
}
```

3.2. 注解的实现

1). 定义 sql 映射的接口

```
public interface UserMapper {  
    @Insert("insert into users(name, age) values(#{name}, #{age})")  
    public int insertUser(User user);  
  
    @Delete("delete from users where id=#{id}")  
    public int deleteUserById(int id);  
  
    @Update("update users set name=#{name},age=#{age} where id=#{id}")  
    public int updateUser(User user);  
  
    @Select("select * from users where id=#{id}")  
    public User getUserById(int id);  
  
    @Select("select * from users")  
    public List<User> getAllUser();  
}
```

2). 在 config 中注册这个映射接口

```
<mapper class="com.atguigu.ibatis.crud.ano.UserMapper"/>
```

3). 在 `dao` 类中调用

```
public User getUserById(int id) {  
    SqlSession session = sessionFactory.openSession();  
    UserMapper mapper = session.getMapper(UserMapper.class);  
    User user = mapper.getUserById(id);  
    return user;  
}
```

4. 几个可以优化的地方

4.1. 连接数据库的配置单独放在一个 `properties` 文件中

```
## db.properties  
  
<properties resource="db.properties"/>  
  
<property name="driver" value="${driver}" />  
<property name="url" value="${url}" />  
<property name="username" value="${username}" />  
<property name="password" value="${password}" />
```

4.2. 为实体类定义别名,简化 `sql` 映射 `xml` 文件中的引用

```
<typeAliases>  
    <typeAlias type="com.atguigu.ibatis.bean.User" alias="_User"/>  
</typeAliases>
```

4.3. 可以在 `src` 下加入 `log4j` 的配置文件,打印日志信息

1. 添加 jar:

log4j-1.2.16.jar

2.1. `log4j.properties`(方式一)

```
log4j.properties,  
log4j.rootLogger=DEBUG, Console  
#Console  
log4j.appender.Console=org.apache.log4j.ConsoleAppender  
log4j.appender.Console.layout=org.apache.log4j.PatternLayout  
log4j.appender.Console.layout.ConversionPattern=%d [%t] %-5p [%c] - %m%n  
log4j.logger.java.sql.ResultSet=INFO  
log4j.logger.org.apache=INFO  
log4j.logger.java.sql.Connection=DEBUG  
log4j.logger.java.sql.Statement=DEBUG  
log4j.logger.java.sql.PreparedStatement=DEBUG
```

2.2. log4j.xml(方式二)

```
<?xml version="1.0" encoding="UTF-8" ?>  
<!DOCTYPE log4j:configuration SYSTEM "log4j.dtd">  
<log4j:configuration xmlns:log4j="http://jakarta.apache.org/log4j/">  
  <appender name="STDOUT" class="org.apache.log4j.ConsoleAppender">  
    <layout class="org.apache.log4j.PatternLayout">  
      <param name="ConversionPattern"  
        value="%-5p %d{MM-dd HH:mm:ss,SSS} %m (%F:%L) \n" />  
    </layout>  
  </appender>  
  <logger name="java.sql">  
    <level value="debug" />  
  </logger>  
  <logger name="org.apache.ibatis">  
    <level value="debug" />  
  </logger>  
  <root>  
    <level value="debug" />  
    <appender-ref ref="STDOUT" />  
  </root>  
</log4j:configuration>
```

5. 解决字段名与实体类属性名不相同的冲突

5.1. 准备表和数据:

```
CREATE TABLE orders(  
    order_id INT PRIMARY KEY AUTO_INCREMENT,  
    order_no VARCHAR(20),  
    order_price FLOAT  
);  
INSERT INTO orders(order_no, order_price) VALUES('aaaa', 23);  
INSERT INTO orders(order_no, order_price) VALUES('bbbb', 33);  
INSERT INTO orders(order_no, order_price) VALUES('cccc', 22);
```

5.2. 定义实体类:

```
public class Order {  
    private int id;  
    private String orderNo;  
    private float price;  
}
```

5.3. 实现 `getOrderById(id)` 的查询:

方式一: 通过在 **sql** 语句中定义别名

```
<select id="selectOrder" parameterType="int" resultType="_Order">  
    select order_id id, order_no orderNo, order_price price from orders where order_id=#{id}  
</select>
```

方式二: 通过 **<resultMap>**

```
<select id="selectOrderResultMap" parameterType="int" resultMap="orderResultMap">  
    select * from orders where order_id=#{id}  
</select>
```

```
<resultMap type="_Order" id="orderResultMap">  
    <id property="id" column="order_id"/>  
    <result property="orderNo" column="order_no"/>  
    <result property="price" column="order_price"/>
```


</resultMap>

6. 实现关联表查询

6.1. 一对一关联

1). 提出需求

根据班级 id 查询班级信息(带老师的信息)

2). 创建表和数据

```
CREATE TABLE teacher(  
    t_id INT PRIMARY KEY AUTO_INCREMENT,  
    t_name VARCHAR(20)  
);  
CREATE TABLE class(  
    c_id INT PRIMARY KEY AUTO_INCREMENT,  
    c_name VARCHAR(20),  
    teacher_id INT  
);  
ALTER TABLE class ADD CONSTRAINT fk_teacher_id FOREIGN KEY (teacher_id) REFERENCES  
teacher(t_id);  
  
INSERT INTO teacher(t_name) VALUES('LS1');  
INSERT INTO teacher(t_name) VALUES('LS2');  
  
INSERT INTO class(c_name, teacher_id) VALUES('bj_a', 1);  
INSERT INTO class(c_name, teacher_id) VALUES('bj_b', 2);
```

3). 定义实体类:

```
public class Teacher {  
    private int id;  
    private String name;  
}
```

```
public class Classes {  
    private int id;  
    private String name;  
    private Teacher teacher;  
}
```

4). 定义 sql 映射文件 ClassMapper.xml

```
<!--  
    方式一：嵌套结果：使用嵌套结果映射来处理重复的联合结果的子集  
    封装联表查询的数据(去除重复的数据)  
    select * from class c, teacher t where c.teacher_id=t.t_id and c.c_id=1  
-->  
<select id="getClass" parameterType="int" resultMap="ClassResultMap">  
    select * from class c, teacher t where c.teacher_id=t.t_id and c.c_id=#{id}  
</select>  
<resultMap type="_Classes" id="ClassResultMap">  
    <id property="id" column="c_id"/>  
    <result property="name" column="c_name"/>  
    <association property="teacher" column="teacher_id" javaType="_Teacher">  
        <id property="id" column="t_id"/>  
        <result property="name" column="t_name"/>  
    </association>  
</resultMap>  
  
<!--  
    方式二：嵌套查询：通过执行另外一个 SQL 映射语句来返回预期的复杂类型  
    SELECT * FROM class WHERE c_id=1;  
    SELECT * FROM teacher WHERE t_id=1 //1 是上一个查询得到的 teacher_id 的值  
-->  
  
<select id="getClass2" parameterType="int" resultMap="ClassResultMap2">  
    select * from class where c_id=#{id}  
</select>  
<resultMap type="_Classes" id="ClassResultMap2">  
    <id property="id" column="c_id"/>  
    <result property="name" column="c_name"/>  
    <association property="teacher" column="teacher_id" javaType="_Teacher"  
select="getTeacher">  
    </association>
```

```
</resultMap>

<select id="getTeacher" parameterType="int" resultType="_Teacher">
    SELECT t_id id, t_name name FROM teacher WHERE t_id=#{id}
</select>
```

5). 测试

```
@Test
public void testOO() {
    SqlSession sqlSession = factory.openSession();
    Classes c = sqlSession.selectOne("com.atguigu.day03_mybatis.test5.OOMapper.getClass", 1);
    System.out.println(c);
}

@Test
public void testOO2() {
    SqlSession sqlSession = factory.openSession();
    Classes c = sqlSession.selectOne("com.atguigu.day03_mybatis.test5.OOMapper.getClass2", 1);
    System.out.println(c);
}
```

```
<!--
    association 用于一对一的关联查询的
    property   : 对象属性的名称
    javaType   : 对象属性的类型
    column     : 所对应的外键字段名称
    select     : 使用另一个查询封装的结果
-->
```

6.2. 一对多关联

1). 提出需求

根据 classId 查询对应的班级信息,包括学生,老师

2). 创建表和数据:

```
CREATE TABLE student(  
    s_id INT PRIMARY KEY AUTO_INCREMENT,  
    s_name VARCHAR(20),  
    class_id INT  
);  
INSERT INTO student(s_name, class_id) VALUES('xs_A', 1);  
INSERT INTO student(s_name, class_id) VALUES('xs_B', 1);  
INSERT INTO student(s_name, class_id) VALUES('xs_C', 1);  
INSERT INTO student(s_name, class_id) VALUES('xs_D', 2);  
INSERT INTO student(s_name, class_id) VALUES('xs_E', 2);  
INSERT INTO student(s_name, class_id) VALUES('xs_F', 2);
```

3). 定义实体类:

```
public class Student {  
    private int id;  
    private String name;  
}  
  
public class Classes {  
    private int id;  
    private String name;  
    private Teacher teacher;  
    private List<Student> students;  
}
```

4). 定义 sql 映射文件 ClassMapper.xml

```
<!--  
方式一: 嵌套结果: 使用嵌套结果映射来处理重复的联合结果的子集  
SELECT * FROM class c, teacher t, student s WHERE c.teacher_id=t.t_id AND c.C_id=s.class_id AND c.c_id=1  
-->  
<select id="getClass3" parameterType="int" resultMap="ClassResultMap3">  
    select * from class c, teacher t, student s where c.teacher_id=t.t_id and c.C_id=s.class_id and  
    c.c_id=#{id}  
</select>
```

```
<resultMap type="_Classes" id="ClassResultMap3">
  <id property="id" column="c_id"/>
  <result property="name" column="c_name"/>
  <association property="teacher" column="teacher_id" javaType="_Teacher">
    <id property="id" column="t_id"/>
    <result property="name" column="t_name"/>
  </association>
  <!-- ofType 指定 students 集合中的对象类型 -->
  <collection property="students" ofType="_Student">
    <id property="id" column="s_id"/>
    <result property="name" column="s_name"/>
  </collection>
</resultMap>

<!--
方式二：嵌套查询：通过执行另外一个 SQL 映射语句来返回预期的复杂类型
SELECT * FROM class WHERE c_id=1;
SELECT * FROM teacher WHERE t_id=1 //1 是上一个查询得到的 teacher_id 的值
SELECT * FROM student WHERE class_id=1 //1 是第一个查询得到的 c_id 字段的值
-->
<select id="getClass4" parameterType="int" resultMap="ClassResultMap4">
  select * from class where c_id=#{id}
</select>
<resultMap type="_Classes" id="ClassResultMap4">
  <id property="id" column="c_id"/>
  <result property="name" column="c_name"/>
  <association          property="teacher"          column="teacher_id"          javaType="_Teacher"
select="getTeacher2"></association>
  <collection property="students" ofType="_Student" column="c_id" select="getStudent"></collection>
</resultMap>

<select id="getTeacher2" parameterType="int" resultType="_Teacher">
  SELECT t_id id, t_name name FROM teacher WHERE t_id=#{id}
</select>

<select id="getStudent" parameterType="int" resultType="_Student">
  SELECT s_id id, s_name name FROM student WHERE class_id=#{id}
</select>
```

5). 测试:

```
@Test
public void testOM() {
    SqlSession sqlSession = factory.openSession();
    Classes c = sqlSession.selectOne("com.atguigu.day03_mybatis.test5.OMapper.getClass3", 1);
    System.out.println(c);
}

@Test
public void testOM2() {
    SqlSession sqlSession = factory.openSession();
    Classes c = sqlSession.selectOne("com.atguigu.day03_mybatis.test5.OMapper.getClass4", 1);
    System.out.println(c);
}
```

```
<!--
    collection : 做一对多关联查询的
    ofType : 指定集合中元素对象的类型
-->
```

7. 动态 SQL 与模糊查询

7.1. 提出需求:

实现多条件查询用户(姓名模糊匹配, 年龄在指定的最小值到最大值之间)

7.2. 准备数据表和数据:

```
create table d_user(
    id int primary key auto_increment,
    name varchar(10),
    age int(3)
);

insert into d_user(name,age) values('Tom',12);
insert into d_user(name,age) values('Bob',13);
```

```
insert into d_user(name,age) values('Jack',18);
```

7.3. ConditionUser(查询条件实体类)

```
private String name;  
private int minAge;  
private int maxAge;
```

7.4. User(表实体类)

```
private int id;  
private String name;  
private int age;
```

7.5. userMapper.xml(映射文件)

```
<?xml version="1.0" encoding="UTF-8" ?>  
<!DOCTYPE mapper PUBLIC "-//mybatis.org//DTD Mapper 3.0//EN"  
    "http://mybatis.org/dtd/mybatis-3-mapper.dtd">  
<mapper namespace="com.atguigu.day03_mybatis.test6.userMapper">  
    <select id="getUser" parameterType="com.atguigu.day03_mybatis.test6.ConditionUser"  
        resultType="com.atguigu.day03_mybatis.test6.User">  
        select * from d_user where age>=#{minAge} and age<=#{maxAge}  
        <if test='name!="%null%"'>and name like #{name}</if>  
    </select>  
</mapper>
```

7.6. UserTest(测试)

```
public class UserTest {  
  
    public static void main(String[] args) throws IOException {  
  
        Reader reader = Resources.getResourceAsReader("conf.xml");  
  
        SqlSessionFactory sessionFactory = new SqlSessionFactoryBuilder().build(reader);
```

```
SqlSession sqlSession = sessionFactory.openSession();

String statement = "com.atguigu.day03_mybatis.test6.userMapper.getUser";

List<User> list = sqlSession.selectList(statement, new ConditionUser("%a%", 1, 12));

System.out.println(list);
}
}
```

MyBatis 中可用的动态 SQL 标签

- if
- choose(when,otherwise)
- trim(where,set)
- foreach

8.调用存储过程

8.1. 提出需求:

查询得到男性或女性的数量, 如果传入的是 0 就女性否则是男性

8.2. 准备数据库表和存储过程:

```
create table p_user(
    id int primary key auto_increment,
    name varchar(10),
    sex char(2)
);

insert into p_user(name,sex) values('A',"男");
insert into p_user(name,sex) values('B',"女");
insert into p_user(name,sex) values('C',"男");
```



```
#创建存储过程(查询得到男性或女性的数量, 如果传入的是 0 就女性否则是男性)
DELIMITER $
CREATE PROCEDURE mybatis.ges_user_count(IN sex_id INT, OUT user_count INT)
BEGIN
    IF sex_id=0 THEN
        SELECT COUNT(*) FROM mybatis.p_user WHERE p_user.sex='女' INTO user_count;
    ELSE
        SELECT COUNT(*) FROM mybatis.p_user WHERE p_user.sex='男' INTO user_count;
    END IF;
END
$

#调用存储过程
DELIMITER ;
SET @user_count = 0;
CALL mybatis.ges_user_count(1, @user_count);
SELECT @user_count;
```

8.3. 创建表的实体类

```
public class User {
    private String id;
    private String name;
    private String sex;
}
```

8.4. userMapper.xml

```
<mapper namespace="com.atguigu.day03_mybatis.test7.userMapper">
    <select id="getCount" resultType="java.util.Map" statementType="CALLABLE">
        {call
ges_user_count(#{sex_id,mode=IN,jdbcType=INTEGER},#{result,mode=OUT,jdbcType=INTEGER})
        }
    </select>
</mapper>
```

8.5. 测试调用:

```
Map<String, Integer> paramMap = new HashMap<>();
paramMap.put("sex_id", 1);
Object returnValue = sqlSession.selectOne(statement, paramMap);
System.out.println("result="+paramMap.get("result"));
System.out.println("sex_id="+paramMap.get("sex_id"));
System.out.println("returnValue="+returnValue);
```

```
<!--
  <select>
    parameterMap : 引用<parameterMap>
    statementType : 指定Statement的真实类型: CALLABLE 执行调用存储过程的语句
  <parameterMap> : 定义多个参数的键值对
    type : 需要传递的参数的真实类型 java.util.Map
  <parameter> : 指定一个参数key-value
-->
```

9. Mybatis 缓存

9.1. 理解 MyBatis 缓存

正如大多数持久层框架一样，MyBatis 同样提供了一级缓存和二级缓存的支持

1. 一级缓存: 基于 PerpetualCache 的 HashMap 本地缓存，其存储作用域为 Session，当 Session flush 或 close 之后，该 Session 中的所有 Cache 就将清空。
2. 二级缓存与一级缓存其机制相同，默认也是采用 PerpetualCache，HashMap 存储，不同在于其存储作用域为 Mapper(Namespace)，并且可自定义存储源，如 Ehcache。
3. 对于缓存数据更新机制，当某一个作用域(一级缓存 Session/二级缓存 Namespaces)的进行了 C/U/D 操作后，默认该作用域下所有 select 中的缓存将被 clear。

9.2. Mybatis 一级缓存

1) 提出需求:

根据 id 查询对应的用户记录对象

2). 准备数据库表和数据

```
CREATE TABLE c_user(  
    id INT PRIMARY KEY AUTO_INCREMENT,  
    NAME VARCHAR(20),  
    age INT  
);  
INSERT INTO c_user(NAME, age) VALUES('Tom', 12);  
INSERT INTO c_user(NAME, age) VALUES('Jack', 11);
```

3). 创建表的实体类

```
public class User implements Serializable{  
  
    private int id;  
    private String name;  
    private int age;  
}
```

4). userMapper.xml

```
<?xml version="1.0" encoding="UTF-8" ?>  
<!DOCTYPE mapper PUBLIC "-//mybatis.org/DTD Mapper 3.0//EN"  
    "http://mybatis.org/dtd/mybatis-3-mapper.dtd">  
<mapper namespace="com.atguigu.mybatis.test8.userMapper">  
  
    <select id="getUser" parameterType="int" resultType="_CUser">  
        select * from c_user where id=#{id}  
    </select>  
  
    <update id="updateUser" parameterType="_CUser">  
        update c_user set  
            name=#{name}, age=#{age} where id=#{id}  
    </update>  
</mapper>
```

5). 测试:

```
/*
```

```
* 一级缓存: 也就 Session 级的缓存(默认开启)
*/
@Test
public void testCache1() {
    SqlSession session = MybatisUtils.getSession();
    String statement = "com.atguigu.mybatis.test8.userMapper.getUser";
    User user = session.selectOne(statement, 1);
    System.out.println(user);

    /*
     * 一级缓存默认就会被使用
     */
    /*
    user = session.selectOne(statement, 1);
    System.out.println(user);
    */

    /*
    1. 必须是同一个 Session,如果 session 对象已经 close()过了就不可能用了
    */
    /*
    session = MybatisUtils.getSession();
    user = session.selectOne(statement, 1);
    System.out.println(user);
    */

    /*
    2. 查询条件是一样的
    */
    /*
    user = session.selectOne(statement, 2);
    System.out.println(user);
    */

    /*
    3. 没有执行过 session.clearCache()清理缓存
    */
    /*
    session.clearCache();
    user = session.selectOne(statement, 2);
    System.out.println(user);
    */
}
```

```
/*
 4. 没有执行过增删改的操作(这些操作都会清理缓存)
 */
/*
 session.update("com.atguigu.mybatis.test8.userMapper.updateUser",
                new User(2, "user", 23));
 user = session.selectOne(statement, 2);
 System.out.println(user);
 */
}
```

9.3. Mybatis 二级缓存

1). 添加一个<cache>在 userMapper.xml 中

```
<mapper namespace="com.atguigu.mybatis.test8.userMapper">

  <cache/>

</mapper>
```

2). 测试

```
/*
 * 测试二级缓存
 */
@Test
public void testCache2() {
    String statement = "com.atguigu.mybatis.test8.userMapper.getUser";

    SqlSession session = MybatisUtils.getSession();
    User user = session.selectOne(statement, 1);
    session.commit();
    System.out.println("user="+user);

    SqlSession session2 = MybatisUtils.getSession();
    user = session2.selectOne(statement, 1);
    session2.commit();
    System.out.println("user2="+user);
}
```

3). 补充说明

1. 映射语句文件中的所有 select 语句将会被缓存。
2. 映射语句文件中的所有 insert, update 和 delete 语句会刷新缓存。
3. 缓存会使用 Least Recently Used (LRU, 最近最少使用的) 算法来收回。
4. 缓存会根据指定的时间间隔来刷新。
5. 缓存会存储 1024 个对象

```
<cache
  eviction="FIFO" //回收策略为先进先出
  flushInterval="60000" //自动刷新时间 60s
  size="512" //最多缓存 512 个引用对象
  readOnly="true"/> //只读
```

10. spring 集成 mybatis

10.1. 添加 Jar 包

【mybatis】

mybatis-3.2.0.jar
mybatis-spring-1.1.1.jar
log4j-1.2.17.jar

【spring】

spring-aop-3.2.0.RELEASE.jar
spring-beans-3.2.0.RELEASE.jar
spring-context-3.2.0.RELEASE.jar
spring-core-3.2.0.RELEASE.jar
spring-expression-3.2.0.RELEASE.jar
spring-jdbc-3.2.0.RELEASE.jar
spring-test-3.2.4.RELEASE.jar
spring-tx-3.2.0.RELEASE.jar

aopalliance-1.0.jar
cglib-nodep-2.2.3.jar
commons-logging-1.1.1.jar

【MYSQL 驱动包】

mysql-connector-java-5.0.4-bin.jar

10.2. 数据库表

```
CREATE TABLE s_user(  
    user_id INT AUTO_INCREMENT PRIMARY KEY,  
    user_name VARCHAR(30),  
    user_birthday DATE,  
    user_salary DOUBLE  
)
```

10.3. 实体类: User

```
public class User {  
  
    private int id;  
    private String name;  
    private Date birthday;  
    private double salary;  
  
    //set,get 方法  
}
```

10.4. DAO 接口: UserMapper (XXXMapper)

```
public interface UserMapper {  
  
    void save(User user);  
    void update(User user);  
    void delete(int id);  
    User findById(int id);  
    List<User> findAll();  
}
```

10.5. SQL 映射文件: userMapper.xml

```
<?xml version="1.0" encoding="UTF-8"?>  
<!DOCTYPE mapper PUBLIC "-//mybatis.org//DTD Mapper 3.0//EN"
```

```
"http://mybatis.org/dtd/mybatis-3-mapper.dtd">

<mapper namespace="com.atguigu.mybatis.test9.UserMapper">
    <resultMap type="User" id="userResult">
        <result column="user_id" property="id"/>
        <result column="user_name" property="name"/>
        <result column="user_birthday" property="birthday"/>
        <result column="user_salary" property="salary"/>
    </resultMap>

    <!-- 取得插入数据后的 id -->
    <insert id="save" keyColumn="user_id" keyProperty="id" useGeneratedKeys="true">
        insert into s_user(user_name,user_birthday,user_salary)
        values(#{name},#{birthday},#{salary})
    </insert>

    <update id="update">
        update s_user
        set user_name = #{name},
            user_birthday = #{birthday},
            user_salary = #{salary}
        where user_id = #{id}
    </update>

    <delete id="delete">
        delete from s_user
        where user_id = #{id}
    </delete>

    <select id="findById" resultMap="userResult">
        select *
        from s_user
        where user_id = #{id}
    </select>

    <select id="findAll" resultMap="userResult">
        select *
        from s_user
    </select>
</mapper>
```


10.6. spring 的配置文件: beans.xml

```
<?xml version="1.0" encoding="UTF-8"?>
<beans xmlns="http://www.springframework.org/schema/beans"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xmlns:p="http://www.springframework.org/schema/p"
  xmlns:context="http://www.springframework.org/schema/context"
  xmlns:tx="http://www.springframework.org/schema/tx"
  xsi:schemaLocation="
    http://www.springframework.org/schema/beans
    http://www.springframework.org/schema/beans/spring-beans-3.2.xsd
    http://www.springframework.org/schema/context
    http://www.springframework.org/schema/context/spring-context-3.2.xsd
    http://www.springframework.org/schema/tx
    http://www.springframework.org/schema/tx/spring-tx-3.2.xsd">

  <!-- 1. 数据源 : DriverManagerDataSource -->
  <bean id="dataSource"
    class="org.springframework.jdbc.datasource.DriverManagerDataSource">
    <property name="driverClassName" value="com.mysql.jdbc.Driver"/>
    <property name="url" value="jdbc:mysql://localhost:3306/mybatis"/>
    <property name="username" value="root"/>
    <property name="password" value="root"/>
  </bean>

  <!-- 2. mybatis 的 SqlSession 的工厂 : SqlSessionFactoryBean -->
  <bean id="sqlSessionFactory" class="org.mybatis.spring.SqlSessionFactoryBean">
    <property name="dataSource" ref="dataSource"/>
    <property name="typeAliasesPackage" value="com.atuigu.spring_mybatis2.domain"/>
  </bean>

  <!-- 3. mybatis 自动扫描加载 Sql 映射文件 : MapperScannerConfigurer -->
  <bean class="org.mybatis.spring.mapper.MapperScannerConfigurer">
    <property name="basePackage" value="com.atuigu.spring_mybatis2.mapper"/>
    <property name="sqlSessionFactory" ref="sqlSessionFactory"/>
  </bean>

  <!-- 4. 事务管理 : DataSourceTransactionManager -->
  <bean
    class="org.springframework.jdbc.datasource.DataSourceTransactionManager">
    <property name="dataSource" ref="dataSource"/>
    id="txManager"
```

```
</bean>

<!-- 5. 使用声明式事务 -->
<tx:annotation-driven transaction-manager="txManager" />

</beans>
```

10.7. mybatis 的配置文件: mybatis-config.xml

```
<?xml version="1.0" encoding="UTF-8" ?>
<!DOCTYPE configuration
  PUBLIC "-//mybatis.org//DTD Config 3.0//EN"
  "http://mybatis.org/dtd/mybatis-3-config.dtd">

<configuration>
  <!-- Spring 整合 myBatis 后，这个配置文件基本可以不要了-->
  <!-- 设置外部配置文件 -->
  <!-- 设置类别名 -->
  <!-- 设置数据库连接环境 -->
  <!-- 映射文件 -->
</configuration>
```

10.8. 测试

```
@RunWith(SpringJUnit4ClassRunner.class) //使用Springtest框架

@ContextConfiguration("/beans.xml") //加载配置

public class SMTest {

    @Autowired //注入
    private UserMapper userMapper;

    @Test
    public void save() {
        User user = new User();
        user.setBirthday(new Date());
        user.setName("marry");
    }
}
```

```
        user.setSalary(300);
        userMapper.save(user);
        System.out.println(user.getId());
    }

    @Test
    public void update() {
        User user = userMapper.findById(2);
        user.setSalary(2000);
        userMapper.update(user);
    }

    @Test
    public void delete() {
        userMapper.delete(3);
    }

    @Test
    public void findById() {
        User user = userMapper.findById(1);
        System.out.println(user);
    }

    @Test
    public void findAll() {
        List<User> users = userMapper.findAll();
        System.out.println(users);
    }
}
```