

## 华东师范大学数据科学与工程学院实验报告

课程名称：计算机网络与编程

年级：2021

上机实践成绩：

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上机实践名称：基于 UDP 的 Socket 编程

上机实践日期：2022.05.06

上机实践编号：11

组号：001-432

上机实践时间：13: 00

### 一、实验目的

学习使用 Datagram Socket 实现 UDP 通信

### 二、实验任务

使用 Datagram Socket 和 Datagram Packet 编写代码

### 三、使用环境

IntelliJ IDEA 2020.3.2

JDK 11.0.6

### 四、实验过程

Task1. 分别运行完善后的 UDP Provider 和 UDP Searcher，将运行结果附在实验报告中。

结果：

发送端：

```
"C:\jdk-18_windows-x64_bin (1)\jdk-18.0.1.1\bin\java.exe" "-javaagent:C:\Program Files (x86)\Windows Mail\IntelliJ IDEA 2022.1\lib\idea_rt.jar=63224:C:\Program Files (x86)\Windows Mail\IntelliJ IDEA 2022.1\bin" -Dfile.encoding=UTF-8 -classpath C:\Users\HUAWEI\IdeaProjects\untitled2\out\production\untitled2 WEIZHI.UDPSearcher
End of sending...
I'm sender.192.168.0.106:9091says: Welcome!
```

Process finished with exit code 0

接收端：

```
"C:\jdk-18_windows-x64_bin (1)\jdk-18.0.1.1\bin\java.exe" "-javaagent:C:\Program Files (x86)\Windows Mail\IntelliJ IDEA 2022.1\lib\idea_rt.jar=63219:C:\Program Files (x86)\Windows Mail\IntelliJ IDEA 2022.1\bin" -Dfile.encoding=UTF-8 -classpath C:\Users\HUAWEI\IdeaProjects\untitled2\out\production\untitled2 WEIZHI.weilegezhi
Blocked and wait for the searcher...
I'm receiver.192.168.0.106:9092's sender says:User:admin;Code:123
```

Process finished with exit code 0

Task2. 改写 UDP Provider 和 UDP Searcher 代码完成指定功能，并将实验结果附在实验报告中。

代码：

UDP Provider:

```
package WEIZHI;
import java.io.IOException;
import java.net.DatagramPacket;
import java.net.DatagramSocket;
```

```

import java.nio.charset.StandardCharsets;
import java.util.UUID;
public class weilegezhi {
    public static void main(String[] args) throws IOException {
        MessageUtil m2 = new MessageUtil();
        DatagramSocket datagramSocket = new DatagramSocket(9091);
        byte[] buf = new byte[1024];
        DatagramPacket receivePacket = new DatagramPacket(buf, 0, buf.length);
        System.out.println("Blocked and wait for the searcher...");
        datagramSocket.receive(receivePacket);
        String ip = receivePacket.getAddress().getHostAddress();
        int port = receivePacket.getPort();
        int len = receivePacket.getLength();
        String data = new String(receivePacket.getData(), 0, len);
        int a = m2.parsePort(data);
        System.out.println("I'm receiver." + ip + ":" + port + "'s sender says:" +
data);
        String tag = UUID.randomUUID().toString();
        String responseData = m2.buildWithTag(tag);
        byte[] responseDataBytes = responseData.getBytes(StandardCharsets.UTF_8);
        DatagramPacket responsePack = new DatagramPacket(responseDataBytes,
responseDataBytes.length, receivePacket.getAddress(), a);
        datagramSocket.send(responsePack);
        datagramSocket.close();
    }
}

```

#### UDP Searcher:

```

package WEIZHI;
import java.io.IOException;
import java.net.DatagramPacket;
import java.net.DatagramSocket;
import java.nio.charset.StandardCharsets;
import java.net.InetAddress;
public class UDPSearcher {
    public static void main(String[] args) throws IOException {
        MessageUtil m1 = new MessageUtil();
        String sendBytes = m1.buildWithPort(m1.port);
        DatagramSocket datagramSocket = new DatagramSocket(30000);
        DatagramPacket sendPacket = new DatagramPacket(sendBytes.getBytes(), 0,
sendBytes.getBytes().length, InetAddress.getByAddress("255.255.255.255"), 9091);
        datagramSocket.send(sendPacket);
        System.out.println("End of sending...");
        byte[] buf = new byte[1024];
        DatagramPacket receivePacket = new DatagramPacket(buf, buf.length);
        datagramSocket.receive(receivePacket);
        String ip = receivePacket.getAddress().getHostAddress();
        int port = receivePacket.getPort();
        int len = receivePacket.getLength();
        String data = new String(receivePacket.getData(), 0, len);
        String bb = m1.parseTag(data);
        System.out.println(bb);
        datagramSocket.close();
    }
}
class MessageUtil {
    private static final String TAG_HEADER = "special tag:";
    private static final String PORT_HEADER = "special port:";

    public int port = 30000;

    public String buildWithPort(int port) {

```

```
        return PORT_HEADER + port;
    }

    public int parsePort(String data) {
        if (data.startsWith(PORT_HEADER)) {
            return Integer.parseInt(data.substring(PORT_HEADER.length()));
        }
        return -1;
    }

    public String buildWithTag(String tag) {
        return TAG_HEADER + tag;
    }

    public String parseTag(String data) {
        if (data.startsWith(TAG_HEADER)) {
            return data.substring(TAG_HEADER.length());
        }
        return null;
    }
}
```

结果:

UDP Provider:

"C:\jdk-18\_windows-x64\_bin (1)\jdk-18.0.1.1\bin\java.exe" "-javaagent:C:\Program Files (x86)\Windows Mail\IntelliJ IDEA 2022.1\lib\idea\_rt.jar=65311:C:\Program Files (x86)\Windows Mail\IntelliJ IDEA 2022.1\bin" -Dfile.encoding=UTF-8 -classpath

C:\Users\HUAWEI\IdeaProjects\untitled2\out\production\untitled2 WEIZHI.weilegezhi

Blocked and wait for the searcher...

I'm receiver.192.168.0.106:30000's sender says:special port:30000

Process finished with exit code 0

UDP Searcher:

"C:\jdk-18\_windows-x64\_bin (1)\jdk-18.0.1.1\bin\java.exe" "-javaagent:C:\Program Files (x86)\Windows Mail\IntelliJ IDEA 2022.1\lib\idea\_rt.jar=65316:C:\Program Files (x86)\Windows Mail\IntelliJ IDEA 2022.1\bin" -Dfile.encoding=UTF-8 -classpath

C:\Users\HUAWEI\IdeaProjects\untitled2\out\production\untitled2 WEIZHI.UDPSearcher

End of sending...

f0d7c867-beb2-41c8-92bb-1499462f06d7

Process finished with exit code 0

## 五、总结

在本周的实验中，我们学习了如何使用 Datagram Socket 实现 UDP 通信，为以后的理论学习和实验项目打下了基础。