1. (5 points). The table at right represents a forwarding table for an IP router (for simplicity, we are using 8 bit addresses).

<table>
<thead>
<tr>
<th>prefix</th>
<th>next hop output</th>
<th>address</th>
</tr>
</thead>
<tbody>
<tr>
<td>101*</td>
<td>2</td>
<td>1010 1111</td>
</tr>
<tr>
<td>0100*</td>
<td>4</td>
<td>0100 0110</td>
</tr>
<tr>
<td>0010 0*</td>
<td>6</td>
<td>-</td>
</tr>
<tr>
<td>1010 1*</td>
<td>7</td>
<td>-</td>
</tr>
<tr>
<td>0101 0*</td>
<td>5</td>
<td>0101 0011</td>
</tr>
<tr>
<td>1011 00*</td>
<td>3</td>
<td>1011 0000</td>
</tr>
<tr>
<td>0101 11*</td>
<td>1</td>
<td>0101 1100</td>
</tr>
<tr>
<td>0010 01*</td>
<td>9</td>
<td>-</td>
</tr>
</tbody>
</table>

If a packet arrives with destination address 0101 0011, what output is it sent to, and what is the IP address of the next network-level component to receive the packet?

5, 0101 0011

If a packet arrives with destination address 1010 1110, what output is it sent to, and what is the IP address of the next network-level component to receive the packet?

7, 1010 1110

Does the address 1011 0000 belong to a host or a router? How do you know?

*It belongs to a router. Only router addresses appear explicitly in the next-hop-address field.*
2. (5 points). Suppose a server with IP address 1.2.3.4 starts executing the following lines of java.

```java
ServerSocket sock = new ServerSocket();
sock.bind(InetSocketAddress("1.2.3.4",14357));
Socket connsock1 = sock.accept();
Socket connsock2 = sock.accept();
InetAddress x = connsock1.getInetAddress();
InetAddress y = connsock2.getLocalAddress();
```

Now, suppose a host with IP address 2.3.4.5 executes the following lines.

```java
Socket sockA = new Socket();
sockA.bind(InetSocketAddress("2.3.4.5",23456));
sockA.connect(InetSocketAddress("1.2.3.4",14357));
```

At this point, how many sockets are there at the server?

2

A short while later, another host with IP address 3.4.5.6 executes the following lines.

```java
Socket sockB = new Socket();
sockB.bind(InetSocketAddress("3.4.5.6", 54321))
sockB.connect(InetSocketAddress("1.2.3.4",14357))
```

At this point, how many sockets are there at the server?

3

How many port numbers are being used at the server?

1

What are the values of the variables $x$ and $y$ at the server?

$x=2.3.4.5$  $y=1.2.3.4$