Section 1: UDP, TCP, and addresses
Addressing

• Project 0 requires sending your own IP address to another client
• Problem: getting own IP address can be hard
• How can we do it?
Getting own IP address: hostname method

Steps

• Get the computer’s host name
• Resolve it into an IP address

Python example

```python
import socket
name = socket.gethostname()
ip = socket.gethostbyname(name)
```

• Sometimes doesn’t work depending on hostname configuration and/or will just return local host (127.0.0.1)
Getting own IP address: connect to server method

<table>
<thead>
<tr>
<th>Steps</th>
<th>Python example</th>
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</thead>
<tbody>
<tr>
<td>• Create a socket</td>
<td>import socket</td>
</tr>
<tr>
<td>• Connect to known server</td>
<td>s = socket.socket(socket.AF_INET,</td>
</tr>
<tr>
<td>on internet</td>
<td>socket.SOCK_DGRAM)</td>
</tr>
<tr>
<td>• Get socket address</td>
<td>s.connect(('gmail.com',80))</td>
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<tr>
<td>• Useful when previous</td>
<td>ip = s.getsockname()</td>
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<tr>
<td>method doesn’t work</td>
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<tr>
<td>• Similar methods exist</td>
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<tr>
<td>for other languages as</td>
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<td>well</td>
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Other Methods

- getaddrinfo()
  - E.g., socket.getaddrinfo(name, o)
  - Can return other network interfaces that you don’t want (e.g., IPv6)

- Querying outside URL
  - E.g., urllib2.urlopen('http://abstract.cs.washington.edu/~zahorjan/ip.cgi').read()
  - Best method (if you have a dedicated server to tell you your IP)
Ports

- Addresses specific to applications/services on a system
- 16-bit numbers (from 0 to 165535)
Well-Known Ports

- Many applications/services have designated ports
- Examples:
  - ftp: 21
  - ssh: 22
  - telnet: 23
  - http: 80
- Ports from 0 to 1023 are “well-known ports” (don’t use them for protocols you make up!)
- Can see a list of your system’s well known ports in /etc/services (Linux/Unix)
Hostnames map to IP addresses

- Hosts contact DNS (Domain Name System) servers to get IP address of a given name
- E.g., ‘www.gmail.com’ maps to 173.194.33.118
- nslookup demo