CSE 461 24sp Section 1 – Socket API, Ping & Traceroute

First section? I think you mean first socket

Socket API

Berkeley sockets, also called BSD sockets, is an API that provides an abstraction on the application layer for network communication. A socket is represented as a file descriptor by the API under the POSIX standards (CSE333) to support a common interface for I/O.

Primitive	Description
SOCKET	Create a new communication endpoint
BIND	Associate a local address (port) with a socket
LISTEN	Announce willingness to accept connections; (give queue size)
ACCEPT	Passively establish an incoming connection
CONNECT	Actively attempt to establish a connection
SEND	Send some data over the connection
RECEIVE	Receive some data from the connection
CLOSE	Release the connection

Like all major languages, the *socket* module in Python provides access to the Socket API. For example, the function to create a socket that looks like this:

```
socket.socket(family=AF_INET, type=SOCK_STREAM, …)
```

- ➔ `family` is the address family. Common ones are listed below:
  - `socket.INET` – *Specifies an IPv4 address.*
  - `socket.INET6` – *Specifies an IPv6* address.
- ➔ `type` is the socket type. Only the two below are generally useful:
  - `socket.SOCK_STREAM` – *Creates a socket for TCP connection.*
  - `socket.DGRAM` – *Creates a socket for UDP connection.*

Exercise 1

Consider the sample server/client code below. Assume we are concerned with serving just a single client.

```
# Server

listener =
socket.socket(socket.AF_INET,
              socket.SOCK_STREAM)
listener.bind(server_address)

while True:
  connection, client_addr =
listener.accept()
  connection.recv(n_bytes)

listener.close()
```

```
# Client

socket =
socket.socket(socket.AF_INET,

socket.SOCK_STREAM)
socket.connect(server_address)
socket.sendto(message,
              server_address)
socket.close()
```

a) Circle the type of socket being set up

TCP / UDP

b) Briefly explain what this program does. Do you spot any errors?

c) What happens if no client talks to the server?

d) Suppose we launched a server from this code and have a single client sends some bytes to it. How many sockets will be created between the server and client?

e) Would this program work (well) in multi-client scenarios? In other words, if the server is waiting on data from client A, can it accept a connection request from client B?

Ping & Traceroute (HW1)

You can look up man page for a complete list of arguments.

```
ping [-t ttl] host
```

```
traceroute [-m max_ttl] [-q nqueries] host
```

- ➔ `max_ttl` – *Specifies the maximum number of hops (max time-to-live) traceroute will probe. Default is 30.*
- ➔ `nqueries` – *Sets the number of probe packets per hop. Default is 3.*