

# CS 131 Discussion 8

Winter 2015

# Announcements

- **Project**
  - Thursday, March 05, 23:55

# Midterm

- Please see CCLE announcement for details
- I graded: questions 1, 3, 4
- Prof. Eggert graded: questions 2, 5

# Python



# Variables & Printing

Variables do not have to be declared before assignment, and can be rebound

```
>>> x = 1 + 2
>>> x
3
>>> x = "foo"
>>> x
'foo'
```

Strings can be enclosed in single, double, or triple (""") quotes (which can span across multiple lines)

```
>>> print "Mary's car"
Mary's car
```

```
>>> print("""Mary's "beautiful" car
was worth %s dollars""" % (x))
Mary's "beautiful" car
was worth 3 dollars
```

# Dictionaries, List, Tuple

Dictionary elements can be added easily

```
>>> w = {"Mary" : 1, "George" : 2,  
"Martin" : 3}
```

```
>>> w  
{'Martin': 3, 'Mary': 1, 'George': 2}
```

```
>>> w.get("Martin")  
3
```

```
>>> w["Betty"] = 4  
>>> w.get("Betty")  
4
```

You can use anything as key/value, as long as the key is hashable (eg. a list is not)

```
>>> y = {x : 1, "bar" : [1, 2, "baz"], 42 : (1,1)}  
>>> y  
{42: (1, 1), 3: 1, 'bar': [1, 2, 'baz']}
```

```
>>> z = y.get(42)  
>>> z.count(1)  
2
```

Both list and tuple can have any elements inside

```
>>> y.get("bar")[1:3]  
[2, 'baz']
```

```
>>> y.get("bar")[2]  
'baz'
```

# Control Flow Statements

Empty lists & tuples, or null objects are false

```
>>> if ([] or () or None):  
    print "() or [] or None is true"  
else:  
    print "() and [] and None are false"
```

() and [] and None are false

```
>>> if 3 != 4:  
    x = "foo"  
else:  
    x = "bar"
```

```
>>> x  
'foo'
```

```
>>> z = [1,2,3]  
>>> for i in z:  
    print i
```

```
1  
2  
3  
>>> i  
3
```

```
>>> for j in y.iteritems():  
    print j
```

```
(42, (1, 1))  
( 'foo', 1)  
( 'bar', [1, 2, 'baz'])
```

Note: Indenting is crucial! **All** statements in the same level **must** have the same indentation

# Functions

You can return different values, or no value

```
>>> def inverse(x):  
    if x == 0:  
        print "Oops!"  
        return  
    if x == 1:  
        return "It's the same!"  
    print "the answer is:"  
    return 1./x
```

```
>>> inverse(0)  
Oops!  
>>> inverse(1)  
"It's the same!"  
>>> inverse(2)  
the answer is:  
0.5
```

Nameless functions are also possible, if the function body is to return a single expression

```
>>> (lambda x:x*x)(3)  
9
```

```
>>> def applyTwice(f, x):  
    return f(f(x))
```

```
>>> applyTwice((lambda x: x*x), 2)  
16
```

```
>>> f = lambda x:x*x
```

```
>>> applyTwice(f, 2)  
16
```



# Classes

```
>>> class BaseClass(object):  
    def __init__(self, argx):  
        self.x = argx
```

```
>>> foo = BaseClass(3)  
>>> foo.x  
3
```

Class members are always accessible

```
>>> foo.x = 5
```

You can also add members to an instance

```
>>> foo.y = 6  
>>> bar = BaseClass(8)  
>>> bar.y #This results in a error!
```

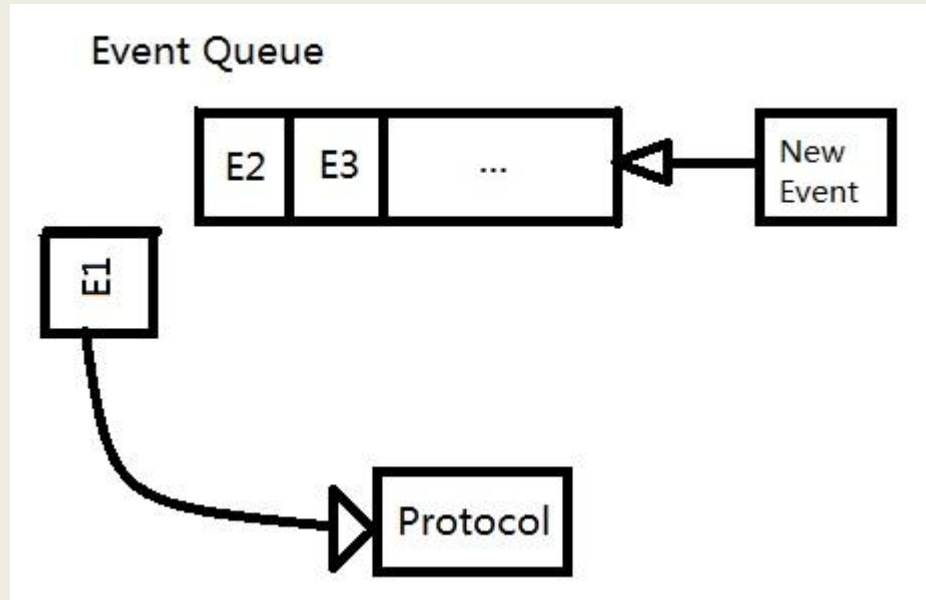
```
>>> class ChildClass(BaseClass):  
    def __init__(self, argx, argy):  
        super(ChildClass,self).__init__(argx)  
        self.y = argy  
    def getX(self):  
        return self.x  
    def getY(self):  
        return self.y
```

```
>>> baz = ChildClass(1,2)  
>>> baz.__dict__  
{'y': 2, 'x': 1}  
>>> baz.getX()  
1
```

# Twisted



# Event-Driven Architecture



- Events can enter the event queue
- The event in the front of the queue is pass to a protocol, which processes the event

# Reactor, Protocol, Factory, Transport

## Reactor event loop

- Waits on and dispatches events to event handlers

## Protocol

- Must handle these events:  
makeConnection, connectionMade, dataReceived, connectionLost

## Protocol Factory

- Builds new instances of protocols (for each new connection)
- Saves persistent information

## Transport

- Represents the connection between two endpoints
- Has following methods, which can be called by a protocol:  
write, writeSequence, loseConnection, getPeer, getHost

# Example: chatserver.py

```
from twisted.internet.protocol import Factory
from twisted.protocols.basic import LineReceiver
from twisted.internet import reactor

class ChatProtocol(LineReceiver):
    def __init__(self, factory):
        self.factory = factory
        self.name = None
        self.state = "REGISTER"

    def connectionMade(self):
        self.sendLine("What's your name?")

    def connectionLost(self, reason):
        if self.name in self.factory.users:
            del self.factory.users[self.name]
            self.broadcastMessage("%s has left the channel." % (self.name,))

    def lineReceived(self, line):
        if self.state == "REGISTER":
            self.handle_REGISTER(line)
        else:
            self.handle_CHAT(line)

    def handle_REGISTER(self, name):
        if name in self.factory.users:
            self.sendLine("Name taken, please choose another.")
            return
        self.sendLine("Welcome, %s!" % (name,))
        self.broadcastMessage("%s has joined the channel." % (name,))
        self.name = name
        self.factory.users[name] = self
        self.state = "CHAT"
```

```
    def handle_CHAT(self, message):
        message = "<%s> %s" % (self.name, message)
        self.broadcastMessage(message)

    def broadcastMessage(self, message):
        for name, protocol in self.factory.users.iteritems():
            if protocol != self:
                protocol.sendLine(message)

class ChatFactory(Factory):
    def __init__(self):
        self.users = {}

    def buildProtocol(self, addr):
        return ChatProtocol(self)

reactor.listenTCP(8000, ChatFactory())
reactor.run()
```

port #

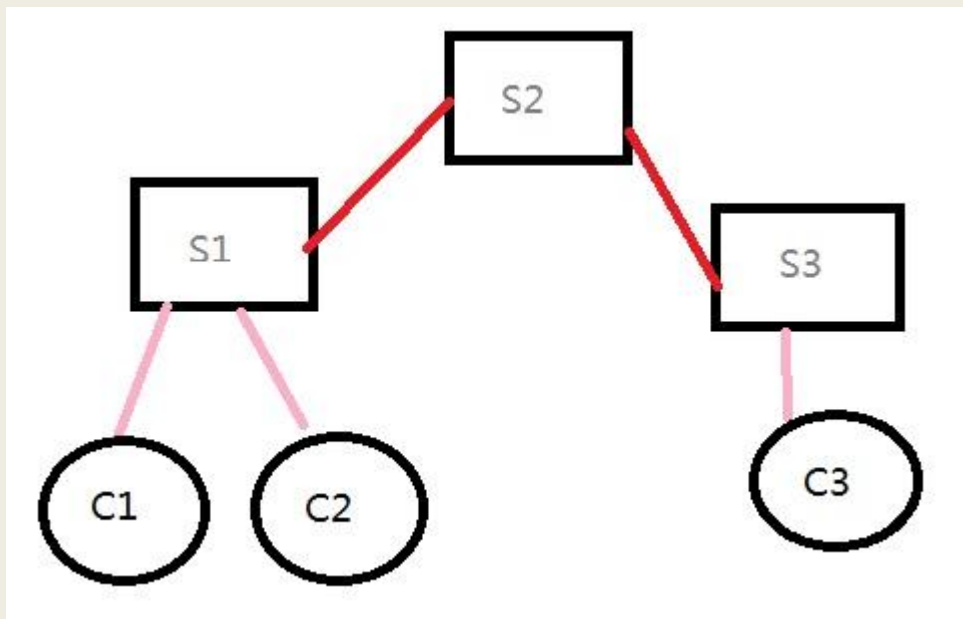
# Project

# Your task

- Investigate Twisted
- Build prototype of an event-driven application with an “application server herd” architecture. Five servers and non-predetermined number of clients
- Make comment on Twisted’s usefulness and compare to Node.js (Javascript, also event-driven)

# Application Server Herd

Example with 3 servers and 3 clients:





# Your Prototype

- 5 servers: 'Alford', 'Bolden', 'Hamilton', 'Parker', 'Powell'
  - Alford talks with Parker and Powell
  - Bolden talks with Parker and Powell
  - Hamilton talks with Parker
- Each server should accept TCP connections from clients (eg. via telnet)

# Client

- A client can send its location to the server:

```
IAMAT kiwi.cs.ucla.edu +34.068930-118.445127 1400794645.392014450
```

- Or it can query for places near a client's location:

```
WHATSAT kiwi.cs.ucla.edu 10 5
```

# Server

- Upon receiving an IAMAT from client C, the server sends C, and the server's neighbours:

AT Alford +0.563873386 kiwi.cs.ucla.edu +34.068930-118.445127 1400794699.108893381

- Upon receiving an WHATSAT from client C, the server queries Google Places and returns the location of the queried client (via AT), followed by the JSON returned by Google Places
- Upon receiving an AT from another server S, this server must check the timestamp of the AT, before storing the new location information and relaying the message to its neighbours



# Painfully-Detailed Step by Step Tutorial to Run the Example in the Spec

\* User processes older than 36 hours will  
\* You can run graphical applications from here  
!! Please see <http://www.seasnet.ucla.edu>

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\* Priority is given both on the servers and  
\* students doing coursework. Computing support is given  
\* each department.

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\* For assistance please contact [help@seas.ucla.edu](mailto:help@seas.ucla.edu)

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[yunl@lnxsrv02 ~]\$ **bash**

bash: /u/cs/class/cs111/cbin/share/shellsetup: Permission denied

bash-4.1\$ export PATH=/usr/local/cs/bin:\$PATH

bash-4.1\$ sed 's/1025/12000/' /u/cs/fac/egge

rt/src/Twisted-14.0.0/doc/\_downloads/chatserver.py

>chatserver.py

bash-4.1\$ vi chatserver.py

bash-4.1\$ ~

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unl@lnxsrv04 ~\$

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nl@lnxsrv01 ~\$

```
*****
* For assistance please contact help@seas.uc
*****
[yunl@lnxsrv02 ~]$ bash
bash: /u/cs/class/cs111/cbin/share/shellsetu
p: Permission denied
bash-4.1$ export PATH=/usr/local/cs/bin:$PAT
H
bash-4.1$ sed 's/1025/12000/' /u/cs/fac/egge
rt/src/Twisted-14.0.0/doc/_downloads/chatser
ver.py >chatserver.py
bash-4.1$ vi chatserver.py
bash-4.1$ vi chatserver.py
bash-4.1$ twistd -n -y chatserver.py
2015-02-25 00:27:46-0800 [-] Log opened.
2015-02-25 00:27:48-0800 [-] twistd 14.0.0 (/
usr/local/cs/Python-2.7.6/bin/python 2.7.6) s
tarting up.
2015-02-25 00:27:48-0800 [-] reactor class: t
wisted.internet.epollreactor.EPollReactor.
2015-02-25 00:27:48-0800 [-] ServerFactory st
arting on 12000
2015-02-25 00:27:48-0800 [-] Starting factory
<twisted.internet.protocol.ServerFactory ins
tance at 0x1133128>
```

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* User processes older than 36 hours
* You can run graphical applications
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nl@lnxsrv01 ~]$
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* each department.
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* For assistance please contact help@seas.ucla.edu
*****
[yunl@lnxsr02 ~]$ bash
bash: /u/cs/class/cs111/cbin/share/shellsetups: Permission denied
bash-4.1$ export PATH=/usr/local/cs/bin:$PATH
H
bash-4.1$ sed 's/1025/12000/' /u/cs/fac/egge
rt/src/Twisted-14.0.0/doc/_downloads/chatserver.py >chatserver.py
bash-4.1$ vi chatserver.py
bash-4.1$ vi chatserver.py
bash-4.1$ twisted -n -y chatserver.py
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2015-02-25 00:27:48-0800 [-] Starting factory <twisted.internet.protocol.ServerFactory instance at 0x1133128>
2015-02-25 00:29:49-0800 [twisted.internet.protocol.ServerFactory] Got new client!
```

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*****
lnxsr04.seas.ucla.edu R
*****
* Please use "lnxsr.seas.ucla.edu" to
* User processes older than 36 hours
* You can run graphical applications
!! Please see http://www.seasnet.ucla.edu
*****
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* each department.
*****
* For assistance please contact help@seas.ucla.edu
*****
[yunl@lnxsr04 ~]$ bash
bash: /u/cs/class/cs111/cbin/share/shellsetups: Permission denied
bash-4.1$ telnet lnxsr.seas.ucla.edu 12000
Trying 164.67.100.234...
telnet: connect to address 164.67.100.234: Connection refused
Trying 164.67.100.231...
telnet: connect to address 164.67.100.231: Connection refused
Trying 164.67.100.232...
Connected to lnxsr.seas.ucla.edu.
Escape character is '^['.
```

```
l@lnxsr.seas.ucla.edu's password:
t login: Wed Feb 25 00:14:09 2015 from
*****
lnxsr01.seas.ucla.edu R
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* Please use "lnxsr.seas.ucla.edu" to
* User processes older than 36 hours
* You can run graphical applications
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or assistance please contact help@seas.ucla.edu
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nl@lnxsr01 ~]$
```

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For assistance please contact help@seas.ucla.edu  
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yunl@lnxsrv02 ~]\$ bash

bash: /u/cs/class/cs111/cbin/share/shellset: Permission denied

bash-4.1\$ export PATH=/usr/local/cs/bin:\$PATH

bash-4.1\$ sed 's/1025/12000/' /u/cs/fac/eggett/src/Twisted-14.0.0/doc/\_downloads/chatserver.py >chatserver.py

bash-4.1\$ vi chatserver.py

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bash-4.1\$ twistd -n -y chatserver.py

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2015-02-25 00:27:48-0800 [-] ServerFactory starting on 12000

2015-02-25 00:27:48-0800 [-] Starting factory <twisted.internet.protocol.ServerFactory instance at 0x1133128>

2015-02-25 00:29:49-0800 [twisted.internet.protocol.ServerFactory] Got new client!

2015-02-25 00:30:30-0800 [MyChat,0,164.67.100.234] received 'Hello World!'

\* Please use "lnxsrv.seas.ucla.edu" to login  
\* User processes older than 36 hours will be killed  
\* You can run graphical applications if you wish  
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\* For assistance please contact help@seas.ucla.edu  
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[yunl@lnxsrv04 ~]\$ bash

bash: /u/cs/class/cs111/cbin/share/shellset: Permission denied

bash-4.1\$ telnet lnxsrv.seas.ucla.edu 12000  
Trying 164.67.100.234...

telnet: connect to address 164.67.100.234: Connection refused

Trying 164.67.100.231...

telnet: connect to address 164.67.100.231: Connection refused

Trying 164.67.100.232...

Connected to lnxsrv.seas.ucla.edu.

Escape character is '^['.

Hello World!

Hello World!

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t login: Wed Feb 25 00:14:09 2015 from s

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lnxsrv01.seas.ucla.edu RHE

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For assistance please contact help@seas.ucla.edu  
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yunl@lnxsrv01 ~]\$



```
* each department.
*****
* For assistance please contact help@seas.uc
*****
[yunl@lnxsr02 ~]$ bash
bash: /u/cs/class/cs111/cbin/share/shellsetu
p: Permission denied
bash-4.1$ export PATH=/usr/local/cs/bin:$PAT
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bash-4.1$ sed 's/1025/12000/' /u/cs/fac/egge
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.234] received 'Hello World!'
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* students doing coursework. Computing su
* each department.
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* For assistance please contact help@seas
*****
[yunl@lnxsr04 ~]$ bash
bash: /u/cs/class/cs111/cbin/share/shellse
up: Permission denied
bash-4.1$ telnet lnxsr01.seas.ucla.edu 1200
Trying 164.67.100.234...
telnet: connect to address 164.67.100.234:
Connection refused
Trying 164.67.100.231...
telnet: connect to address 164.67.100.231:
Connection refused
Trying 164.67.100.232...
Connected to lnxsr01.seas.ucla.edu.
Escape character is '^]'.
Hello World!
Hello World!
```

```
yunl@lnxsr01.seas.ucla.edu's password:
Last login: Wed Feb 25 00:14:09 2015 from
*****
lnxsr01.seas.ucla.edu
*****
* Please use "lnxsr01.seas.ucla.edu"
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* students doing coursework. Computing s
* each department.
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* For assistance please contact help@sea
*****
[yunl@lnxsr01 ~]$ bash
bash: /u/cs/class/cs111/cbin/share/shell
Permission denied
bash-4.1$ telnet lnxsr01.seas.ucla.edu 12
Trying 164.67.100.231...
telnet: connect to address 164.67.100.23
Connection refused
Trying 164.67.100.232...
Connected to lnxsr01.seas.ucla.edu.
Escape character is '^]'.

```

```
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* For assistance please contact help@seas.uc
*****
[yunl@lnxsr02 ~]$ bash
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* Please use "lnxsr01.seas.ucla.edu" t
* User processes older than 36 hours
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* students doing coursework. Computing su
* each department.
*****
* For assistance please contact help@seas
*****
[yunl@lnxsr04 ~]$ bash
bash: /u/cs/class/cs111/cbin/share/shellse
up: Permission denied
bash-4.1$ telnet lnxsr01.seas.ucla.edu 1200
Trying 164.67.100.234...
telnet: connect to address 164.67.100.234:
Connection refused
Trying 164.67.100.231...
telnet: connect to address 164.67.100.231:
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```

```
Last login: wed Feb 25 00:14:09 2015 from
*****
lnxsr01.seas.ucla.edu R
*****

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[yunl@lnxsr01 ~]$ bash
bash: /u/cs/class/cs111/cbin/share/shells
Permission denied
bash-4.1$ telnet lnxsr01.seas.ucla.edu 120
Trying 164.67.100.231...
telnet: connect to address 164.67.100.231
nection refused
Trying 164.67.100.232...
Connected to lnxsr01.seas.ucla.edu.
Escape character is '^]'.
Hello Ever
```

```

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bash: /u/cs/class/cs111/cbin/share/shellsetu
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bash-4.1$ export PATH=/usr/local/cs/bin:$PAT
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bash-4.1$ sed 's/1025/12000/' /u/cs/fac/egge
rt/src/Twisted-14.0.0/doc/_downloads/chatser
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2015-02-25 00:27:48-0800 [-] ServerFactory st
arting on 12000
2015-02-25 00:27:48-0800 [-] Starting factory
<twisted.internet.protocol.ServerFactory ins
tance at 0x1133128>
2015-02-25 00:29:49-0800 [twisted.internet.pr
otocol.ServerFactory] Got new client!
2015-02-25 00:30:30-0800 [MyChat,0,164.67.100
.234] received 'Hello World!'
2015-02-25 00:31:37-0800 [twisted.internet.pr
otocol.ServerFactory] Got new client!
2015-02-25 00:32:31-0800 [MyChat,1,164.67.100
.231] received 'Hello Everyone!'

```

```

* User processes older than 36 hours
* You can run graphical applications
!! Please see http://www.seasnet.ucla

*****
*****
* SEASnet Computing Access
*
* Priority is given both on the servers a
* students doing coursework. Computing su
* each department.
*****
* For assistance please contact help@seas
*****
[yunl@lnxsrv04 ~]$ bash
bash: /u/cs/class/cs111/cbin/share/shellse
up: Permission denied
bash-4.1$ telnet lnxsrv.seas.ucla.edu 1200
Trying 164.67.100.234...
telnet: connect to address 164.67.100.234:
Connection refused
Trying 164.67.100.231...
telnet: connect to address 164.67.100.231:
Connection refused
Trying 164.67.100.232...
Connected to lnxsrv.seas.ucla.edu.
Escape character is '^]'.
Hello World!
Hello World!
Hello Everyone!

```

```

lnxsrv01.seas.ucla.edu R
*****
*****
* Please use "lnxsrv.seas.ucla.edu" to
* User processes older than 36 hours v
* You can run graphical applications
!! Please see http://www.seasnet.ucla

*****
*****
* SEASnet Computing Access
*
* Priority is given both on the servers a
* students doing coursework. Computing sup
* each department.
*****
* For assistance please contact help@seas
*****
[yunl@lnxsrv01 ~]$ bash
bash: /u/cs/class/cs111/cbin/share/shellse
Permission denied
bash-4.1$ telnet lnxsrv.seas.ucla.edu 1200
Trying 164.67.100.231...
telnet: connect to address 164.67.100.231:
Connection refused
Trying 164.67.100.232...
Connected to lnxsrv.seas.ucla.edu.
Escape character is '^]'.
Hello Everyone!
Hello Everyone!

```

```
bash-4.1$ export PATH=/usr/local/cs/bin:$PATH
bash-4.1$ sed 's/1025/12000/' /u/cs/fac/egge
rt/src/Twisted-14.0.0/doc/_downloads/chatser
ver.py >chatserver.py
bash-4.1$ vi chatserver.py
bash-4.1$ vi chatserver.py
bash-4.1$ twistd -n -y chatserver.py
2015-02-25 00:27:46-0800 [-] Log opened.
2015-02-25 00:27:48-0800 [-] twistd 14.0.0 (/
usr/local/cs/Python-2.7.6/bin/python 2.7.6) s
tarting up.
2015-02-25 00:27:48-0800 [-] reactor class: t
wisted.internet.epollreactor.EPollReactor.
2015-02-25 00:27:48-0800 [-] ServerFactory st
arting on 12000
2015-02-25 00:27:48-0800 [-] Starting factory
<twisted.internet.protocol.ServerFactory ins
tance at 0x1133128>
2015-02-25 00:29:49-0800 [twisted.internet.pr
otocol.ServerFactory] Got new client!
2015-02-25 00:30:30-0800 [MyChat,0,164.67.100
.234] received 'Hello World!'
2015-02-25 00:31:37-0800 [twisted.internet.pr
otocol.ServerFactory] Got new client!
2015-02-25 00:32:31-0800 [MyChat,1,164.67.100
.231] received 'Hello Everyone!'
2015-02-25 00:33:41-0800 [MyChat,1,164.67.100
.231] received 'Say goodbye by typing ctrl-]'
2015-02-25 00:34:03-0800 [MyChat,1,164.67.100
.231] Lost a client!
```

```
* User processes older than 36 hours
* You can run graphical applications
!! Please see http://www.seasnet.ucla.edu

*****
*****
* SEASnet Computing Access
*
* Priority is given both on the servers a
* students doing coursework. Computing su
* each department.
*****
* For assistance please contact help@seas
*****
[yunl@lnxsrv04 ~]$ bash
bash: /u/cs/class/cs111/cbin/share/shellse
up: Permission denied
bash-4.1$ telnet lnxsrv.seas.ucla.edu 1200
Trying 164.67.100.234...
telnet: connect to address 164.67.100.234:
Connection refused
Trying 164.67.100.231...
telnet: connect to address 164.67.100.231:
Connection refused
Trying 164.67.100.232...
Connected to lnxsrv.seas.ucla.edu.
Escape character is '^]'.
Hello World!
Hello World!
Hello Everyone!
Say goodbye by typing ctrl-]
```

```
* User processes older than 36 hours v
* You can run graphical applications f
!! Please see http://www.seasnet.ucla.edu

*****
*****
* SEASnet Computing Access
*
* Priority is given both on the servers ar
* students doing coursework. Computing sup
* each department.
*****
* For assistance please contact help@seas
*****
[yunl@lnxsrv01 ~]$ bash
bash: /u/cs/class/cs111/cbin/share/shellse
Permission denied
bash-4.1$ telnet lnxsrv.seas.ucla.edu 1200
Trying 164.67.100.231...
telnet: connect to address 164.67.100.231:
Connection refused
Trying 164.67.100.232...
Connected to lnxsrv.seas.ucla.edu.
Escape character is '^]'.
Hello Everyone!
Hello Everyone!
Say goodbye by typing ctrl-]
Say goodbye by typing ctrl-]
^]
telnet> quit
Connection closed.
bash-4.1$
```



```
twisted.internet.epollreactor.EPollReactor.
2015-02-25 00:27:48-0800 [-] ServerFactory starting on 12000
2015-02-25 00:27:48-0800 [-] Starting factory
<twisted.internet.protocol.ServerFactory instance at 0x1133128>
2015-02-25 00:29:49-0800 [twisted.internet.protocol.ServerFactory] Got new client!
2015-02-25 00:30:30-0800 [MyChat,0,164.67.100.234] received 'Hello World!'
2015-02-25 00:31:37-0800 [twisted.internet.protocol.ServerFactory] Got new client!
2015-02-25 00:32:31-0800 [MyChat,1,164.67.100.231] received 'Hello Everyone!'
2015-02-25 00:33:41-0800 [MyChat,1,164.67.100.231] received 'Say goodbye by typing ctrl-]'
2015-02-25 00:34:03-0800 [MyChat,1,164.67.100.231] Lost a client!
^C2015-02-25 00:34:36-0800 [-] Received SIGINT, shutting down.
2015-02-25 00:34:36-0800 [-] (TCP Port 12000 Closed)
2015-02-25 00:34:36-0800 [-] Stopping factory
<twisted.internet.protocol.ServerFactory instance at 0x1133128>
2015-02-25 00:34:36-0800 [MyChat,0,164.67.100.234] Lost a client!
2015-02-25 00:34:36-0800 [-] Main loop terminated.
2015-02-25 00:34:36-0800 [-] Server Shut Down
.
bash-4.1$ ...Type ctrl-C to terminate server
```

```
* User processes older than 36 hours
* You can run graphical applications
!! Please see http://www.seasnet.ucla.edu

*****
*****
SEASnet Computing Access

Priority is given both on the servers and students doing coursework. Computing support is provided by each department.
*****
For assistance please contact help@seasnet.ucla.edu
*****
unl@lnxsrvt04 ~]$ bash
sh: /u/cs/class/cs111/cbin/share/shellset: Permission denied
sh-4.1$ telnet lnxsrv.seasnet.ucla.edu 12000
ying 164.67.100.234...
lnet: connect to address 164.67.100.234: connection refused
ying 164.67.100.231...
lnet: connect to address 164.67.100.231: connection refused
ying 164.67.100.232...
Connected to lnxsrv.seasnet.ucla.edu.
Escape character is '^]'.
llo World!
llo World!
llo Everyone!
y goodbye by typing ctrl-]
Connection closed by foreign host.
sh-4.1$
```

```
* Please use "lnxsrv.seasnet.ucla.edu" to connect
* User processes older than 36 hours will be terminated
* You can run graphical applications from the servers
!! Please see http://www.seasnet.ucla.edu

*****
*****
SEASnet Computing Access
*
* Priority is given both on the servers and students doing coursework. Computing support is provided by each department.
*****
* For assistance please contact help@seasnet.ucla.edu
*****
[yunl@lnxsrvt01 ~]$ bash
bash: /u/cs/class/cs111/cbin/share/shellset: Permission denied
bash-4.1$ telnet lnxsrv.seasnet.ucla.edu 12000
Trying 164.67.100.231...
telnet: connect to address 164.67.100.231: connection refused
Trying 164.67.100.232...
Connected to lnxsrv.seasnet.ucla.edu.
Escape character is '^]'.
Hello Everyone!
Hello Everyone!
Say goodbye by typing ctrl-]
Say goodbye by typing ctrl-]
^]
telnet> quit
Connection closed.
bash-4.1$
```