

Subject: Lecture on Operating System Lecture Exercise 7.3

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問題7.3

server.pl を使って、簡単なアクセスカウンター(何回アクセスしたかを数える)を作ってみよ。他のマシン上、他のユーザのserverにリクエストを送ってどのように実行されるかを調べよ。

このserver.pl/client.pl を改良して Instant Messenger Program を作れ。real-time application を作ってみよう。

「キーボードの入力を時間を含めて忠実に再現する プログラムを作れ」

(1)アクセスカウンター

- ・ソースの抜粋

ソースの場所 : /home/y05/j05002/OS-Lecture7/mondai7-3/server2.pl
/home/y05/j05002/OS-Lecture7/mondai7-3/client2.pl

- server2.pl

省略

```
my $paddr;  
my $counter = 0;  
  
# $SIG{CHLD} = %&REAPER;  
  
for ( ; $paddr = accept(Client,Server); close Client) {  
my($port,$iaddr) = sockaddr_in($paddr);  
my $name = gethostbyaddr($iaddr,AF_INET);
```

省略

```
$counter++;  
print "%t counter : $counter%n";  
}
```

- client2.pl

```
#!/usr/bin/perl -w  
require 5.002;  
use strict;  
use Socket;  
my ($remote,$port, $iaddr, $paddr, $proto, $line);
```

```
$remote = shift || 'pw002.st.ie.u-ryukyu.ac.jp';
```

省略

- ・実行結果(server)

```
[j05002@pw002 mondai7-3]% perl server2.pl  
server2.pl 29247: server started on port 2345 at Tue Jan 16 15:38:08 2007  
server2.pl 29247: connection from pw002.st.ie.u-ryukyu.ac.jp [ 133.13.52.2 ]  
at port 33738 at Tue Jan 16 15:38:13 2007
```

```

counter : 1
server2.pl 29247: connection from pw002.st.ie.u-ryukyu.ac.jp [ 133.13.52.2 ]
at port 33742 at Tue Jan 16 15:38:17 2007
counter : 2
server2.pl 29247: connection from pw002.st.ie.u-ryukyu.ac.jp [ 133.13.52.2 ]
at port 33743 at Tue Jan 16 15:38:18 2007
counter : 3
server2.pl 29247: connection from pw002.st.ie.u-ryukyu.ac.jp [ 133.13.52.2 ]
at port 33744 at Tue Jan 16 15:38:19 2007
counter : 4

```

- ・ 実行結果(client)

```

[j05002@pw002 mondai7-3]% perl client2.pl
Hello there, pw002.st.ie.u-ryukyu.ac.jp, it's now Tue Jan 16 15:38:13 2007
[j05002@pw002 mondai7-3]% perl client2.pl
Hello there, pw002.st.ie.u-ryukyu.ac.jp, it's now Tue Jan 16 15:38:17 2007
[j05002@pw002 mondai7-3]% perl client2.pl
Hello there, pw002.st.ie.u-ryukyu.ac.jp, it's now Tue Jan 16 15:38:18 2007
[j05002@pw002 mondai7-3]% perl client2.pl
Hello there, pw002.st.ie.u-ryukyu.ac.jp, it's now Tue Jan 16 15:38:19 2007

```

(2)Instant Messenger Program

- ・ ソースの抜粋

ソースの場所 : /home/y05/j05002/OS-Lecture7/mondai7-3/server-mes.pl
/home/y05/j05002/OS-Lecture7/mondai7-3/client-mes.pl

- server-mes.pl

省略

```

my $pid;

# $SIG{CHLD} = ¥&REAPER;

while(1) {
    $paddr = accept(Client,Server);
    my($port,$iaddr) = sockaddr_in($paddr);
    my $name = gethostbyaddr($iaddr,AF_INET);
    my $flag = 0;

    select(Client); $|=1;
    select(STDOUT); $|=1;

    print "login <$name [",inet_ntoa($iaddr),"]>¥n";

    unless(defined ($pid = fork())) {
        die "cannot fork: $!";
    } elsif($pid == 0) {
        while(1) {
            print "> ";
            my $line = <>;
            print Client $line;
        }
        exit;
    } else {
        while(<Client>) {
            chomp($_);
            if("" eq $_) {}
            else {
                print "¥n$name: $_¥n ¥n> ";
            }
        }
    }
}

```

```

}
waitpid($pid,0);
}
print "logout <$name [",inet_ntoa($iaddr),"]>¥n";
}
close Client;
exit;

```

- client.pl

省略

```

my $pid;

socket(SOCK, PF_INET, SOCK_STREAM, $proto) || die "socket: $!";
connect(SOCK, $paddr) || die "connect: $!";

($port,$iaddr) = sockaddr_in($paddr);
my $name = gethostbyaddr($iaddr,AF_INET);

select(SOCK); $|=1;
select(STDOUT); $|=1;

print "login <$name [",inet_ntoa($iaddr),"]>¥n";

unless(defined ($pid = fork())) {
die "cannot fork: $!";
} elsif($pid == 0) {
while(1) {
print "> ";
$line = <>;
print SOCK "$line";
}
} else {
while(<SOCK>) {
chomp($_);
if(" " eq $_) {}
else {
print "¥n$name: $_¥n ¥n> ";
}
}
}
waitpid($pid,0);
}
close (SOCK) || die "close: $!";
exit;

```

・実行結果(server)

```

[j05002@pw002 mondai7-3]% perl server-mes.pl
server-mes.pl 29467: server started on port 2345 at Tue Jan 16 16:02:02 2007
login <pw002.st.ie.u-ryukyu.ac.jp [133.13.52.2]>
HELLO!
pw002.st.ie.u-ryukyu.ac.jp: HELLO!

```

こちらはserver側です

```

pw002.st.ie.u-ryukyu.ac.jp: こちらはclient側です

```

・実行結果(client)

```
[j05002@pw002 mondai7-3]% perl client-mes.pl  
login <pw002.st.ie.u-ryukyu.ac.jp [133.13.52.2]>  
pw002.st.ie.u-ryukyu.ac.jp: HELLO!
```

```
HELLO!
```

```
pw002.st.ie.u-ryukyu.ac.jp: こちらはserver側です
```

```
こちらはclient側です
```

(3) real-time application

・ソースの場所

```
/home/y05/j05002/OS-Lecture7/key/keyrecord2.c  
/home/y05/j05002/OS-Lecture7/key/keyplay.c
```

・実行結果

```
[j05002@pw002 key]% ./keyrecord2 > messages  
this is a test.
```

```
time: 5.742607  
real time
```

```
time: 13.180090  
[j05002@pw002 key]% ./keyplay < messages  
this is a test.  
real time  
[j05002@pw002 key]% less messages  
"messages" may be a binary file. See it anyway?
```

messagesには、文字情報だけでなく入力時間も含まれているのでバイナリファイルとなっている。