Design and implementation of HTTP Proxy Server

Course Title: *Internet Application*

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1. Overview

1.1 Target

a) Forward HTTP data from browser to web server.
b) Record and display related information.
c) Forbid the access to sites in black list.

1.2 Target

a) Understand basic principles and operational mechanism of HTTP.
b) Be familiar with socket and web programming.
c) Using wireshark software to analyze network packets.

2. Requirements Analysis

2.1 Development Environment

a) Server Operation System: Red Flag Linux 5.0
Ubuntu 9.10
b) Client Operation System: Red Flag Linux 5.0
Ubuntu 9.10
Windows XP
Windows Vista
c) Client web browser: Windows Internet Explorer 8.0
Firefox 3.0 (Mozilla 5.0) for Windows
Firefox 3.0 (Mozilla 5.0) for Linux
d) Programming language: C language

2.2 Functional requirements in details

The functions of the HTTP proxy server are separated into several parts:
a) It can support multiple browsers concurrently
b) URL can contain domain name and port number. If the user does not insert a port number, it will automatically be set to 8080.
c) If browsers access sites in your “black list” proxy server will redirect them to a page written in HTML with cautions and also with audios and pictures.
d) Display HTTP version, browser type, client OS, language, site name, web server name and web server OS as the output of proxy server:
e) Proxy server can authenticate user by name and password.

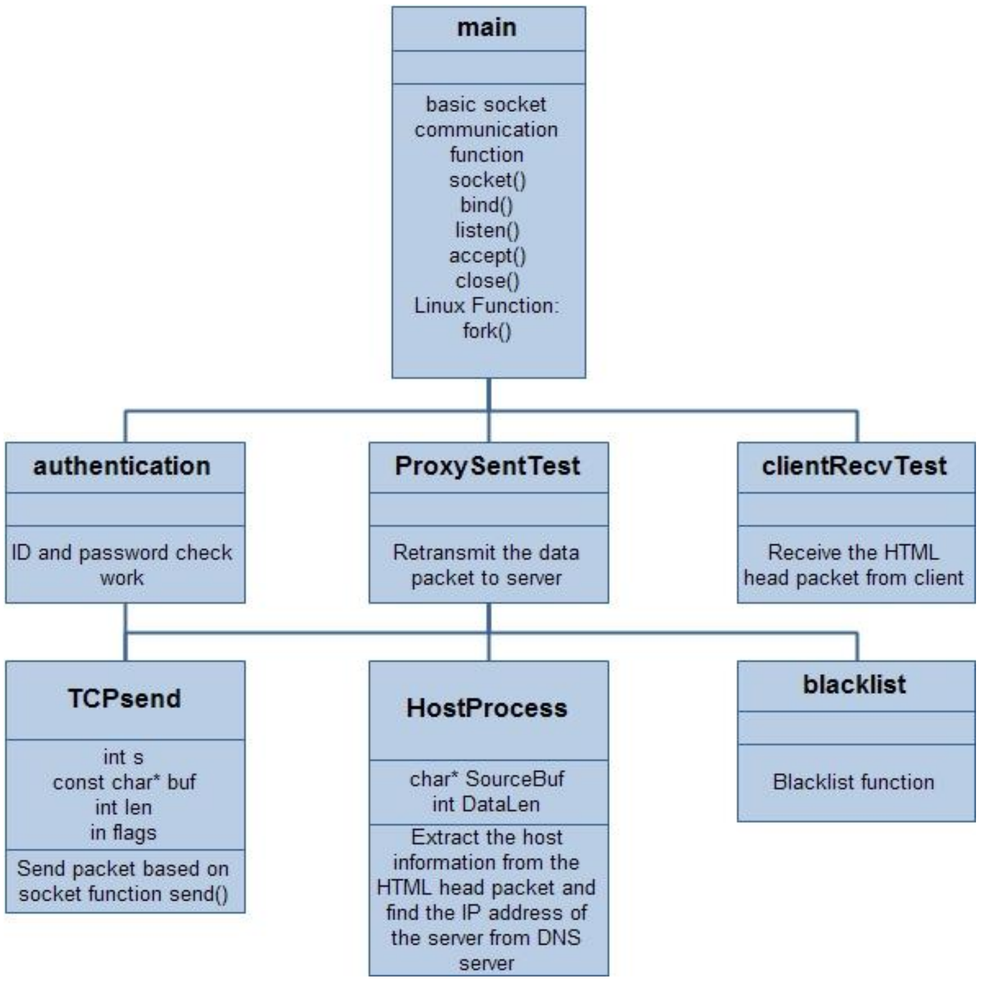
3. Preliminary Design

3.1 Decomposition of functional modules

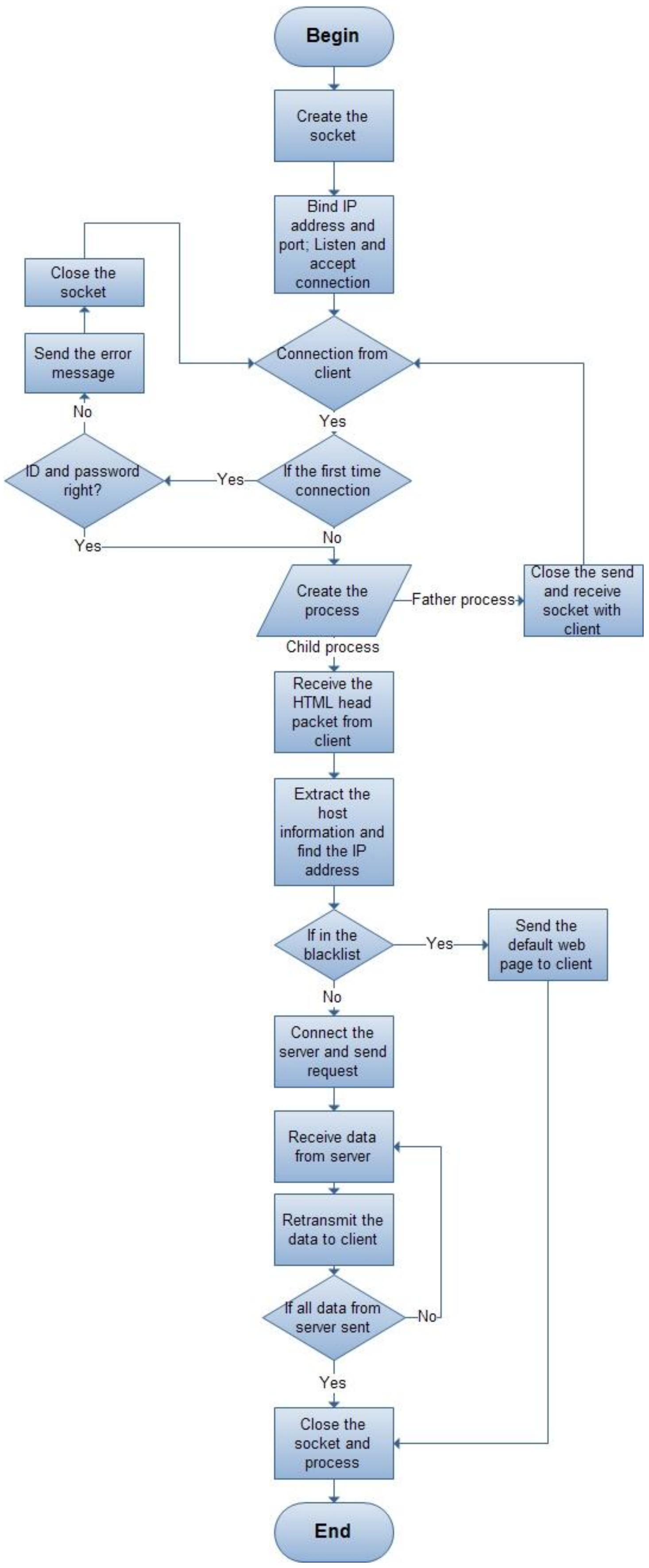
a) Main function: Achieve the basic function of socket communication. Including socket creating process, port and address binding process, listen and accept process, process creating process, socket close process.
b) Authentication function: To do the user ID authentication work when user first open the proxy and visit the website. If user does not insert the correct ID and password, the function will stop user from using the proxy.
c) User packet head receive function: This function is simple. It just receives the head of the HTML packet from client.
d) User packet head process function: The function is to extract the host name and port number of user's forwarding website from HTML packet head. The proxy will use these data to find the host of the website and make the connection.
e) Blacklist function: This function is to check the website which the user wants to visit. If the website is in the preset blacklist, the connection will be forbidden, and a caution page will be sent to client.
f) Data send function: This function is based on the socket function send(). However, it adds the send guaranty mechanism. If some packets are not successfully sent by the TCP/IP protocol, it will automatically resent the fail sending part.

3.2 Relationship and interface between the modules

The relationship and interface between different modules is shown below:


main
basic socket communication function
socket()
bind()
listen()
accept()
close()
Linux Function:
fork()
authentication
ID and password check work
ProxySentTest
Retransmit the data packet to server
clientRecvTest
Receive the HTML head packet from client
TCPsend
int s
const char* buf
int len
in flags
Send packet based on socket function send()
HostProcess
char* SourceBuf
int DataLen
Extract the host information from the HTML head packet and find the IP address of the server from DNS server
blacklist
Blacklist function

3.3 Overall flow chart

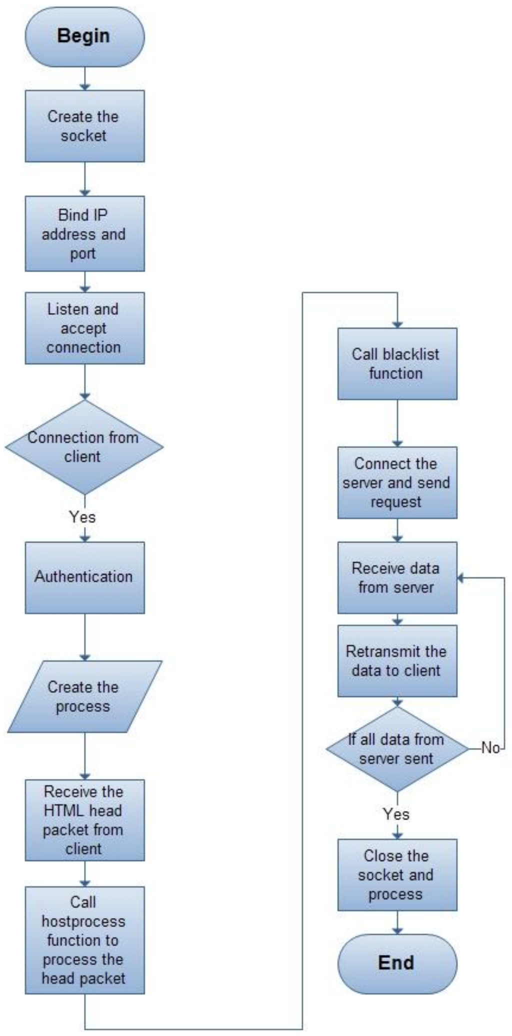

Begin
Create the socket
Bind IP address and port; Listen and accept connection
Close the socket
Send the error message
Connection from client
No
Yes
ID and password right?
Yes
If the first time connection
Yes
No
Create the process
Father process
Close the send and receive socket with client
Child process
Receive the HTML head packet from client
Extract the host information and find the IP address
If in the blacklist
Yes
Send the default web page to client
No
Connect the server and send request
Receive data from server
Retransmit the data to client
If all data from server sent
No
Yes
Close the socket and send process
End

4. Detailed Design

a) main function (main and ProxySentTest)

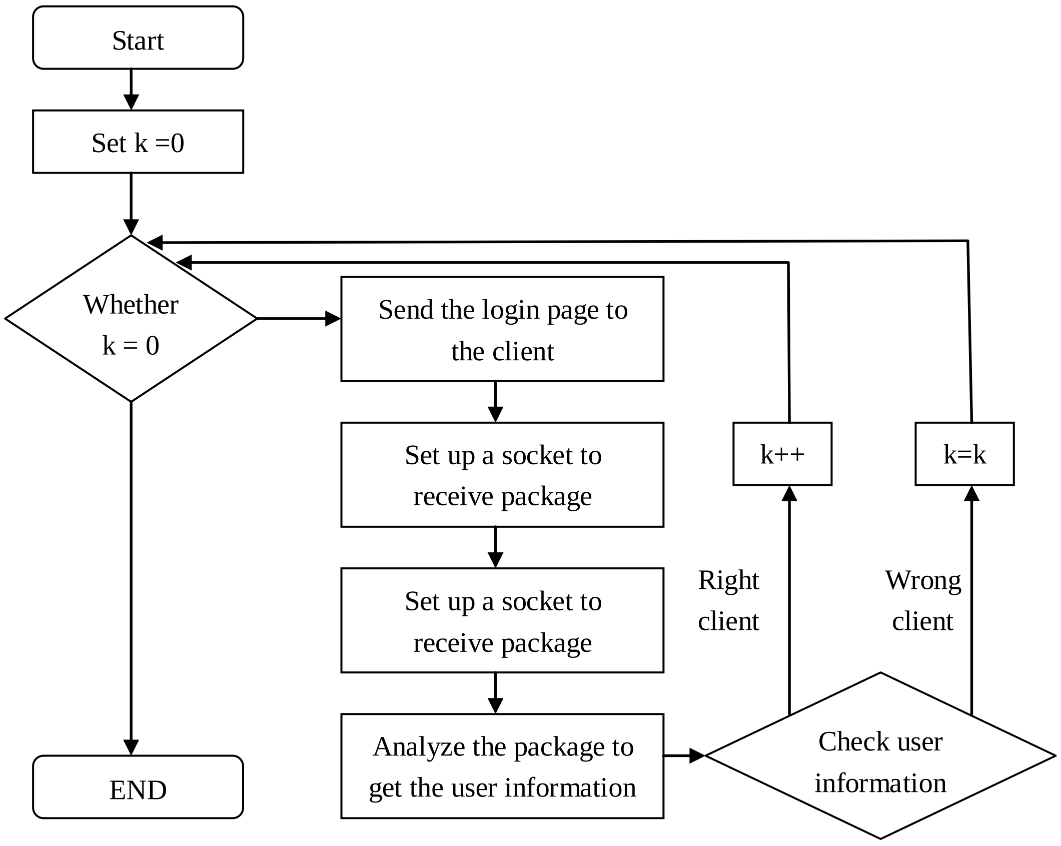
The main function is the main part of the program. It first creates the socket and binds it with the specific IP address and port. The default configuration of IP address is the address of the host who is running the proxy program and the default port number is 8080. It then starts to listen to this IP address and port number and does the authentication work. If the user successfully passes the identification authentication, it will create the process and receive the HTML head packet from client. It then calls the hostprocess function to process the head packet and connects the server. When the connection is successfully created, the main function will receive data from server and retransmit it to the client. After all data are sent, the main function will close the socket and finish the whole flow.

Flow chart:


Begin
Create the socket
Bind IP address and port
Listen and accept connection
Connection from client
Yes
Authentication
Create the process
Receive the HTML head packet from client
Call hostprocess function to process the head packet
Call blacklist function
Connect the server and send request
Receive data from server
Retransmit the data to client
If all data from server sent
No
Yes
Close the socket and process
End

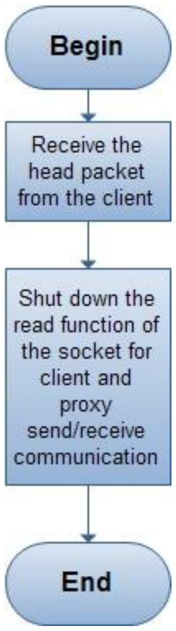
b) Authentication:

This part was built in the main function before we start the fork(). After we set up the connection with the client, we will send a buffer with the html code which can generate a webpage with the two labels let the client to type in ID and password. After the client click the button "login" on the page, we will receive a package with the ID and the password. From the result of the wieshark we san see the format of the package ---"IDXXX&PASSWORDXXX&LOGINLOGIN&". Then by using strtok() and strstr() we can get the ID and the password. Then we compare the ID and password with what we defined. If both of them are the same we will leave this process and go into the main function. Then a notice message will tell the client the success of the login. If any of them not correct we will stop the socket and go back to the start of the authentication.


Start
Set k =0
Whether k = 0
Send the login page to the client
Set up a socket to receive package
Set up a socket to receive package
Analyze the package to get the user information
Check user information
Right client
Wrong client
k++
k=k
END

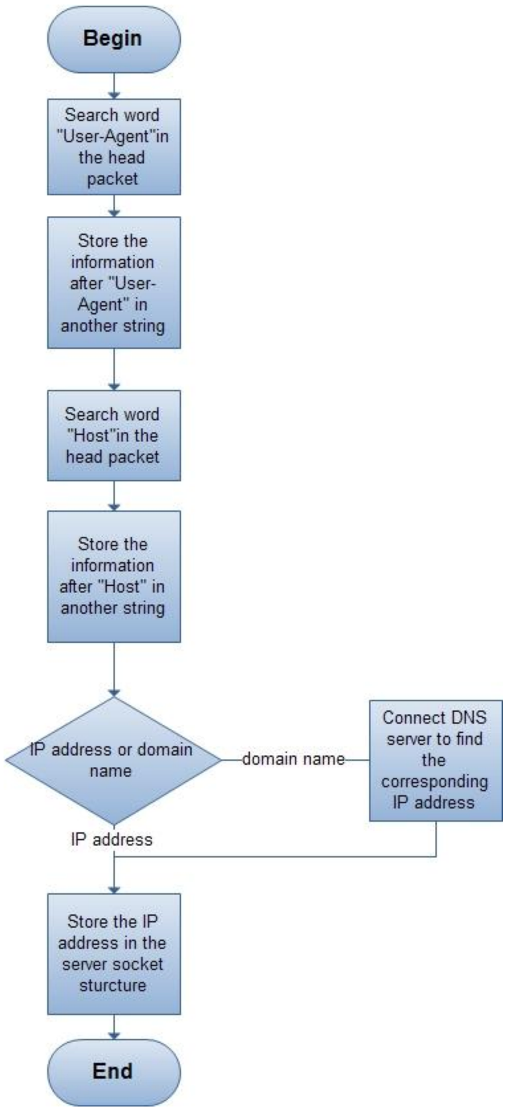
c) <u>User packet head receive function (clientRecvTest):</u> This function is simple. It just receives the head of the HTML packet from client.

Flow chart:


Begin
Receive the head packet from the client
Shut down the read function of the socket for client and proxy send/receive communication
End

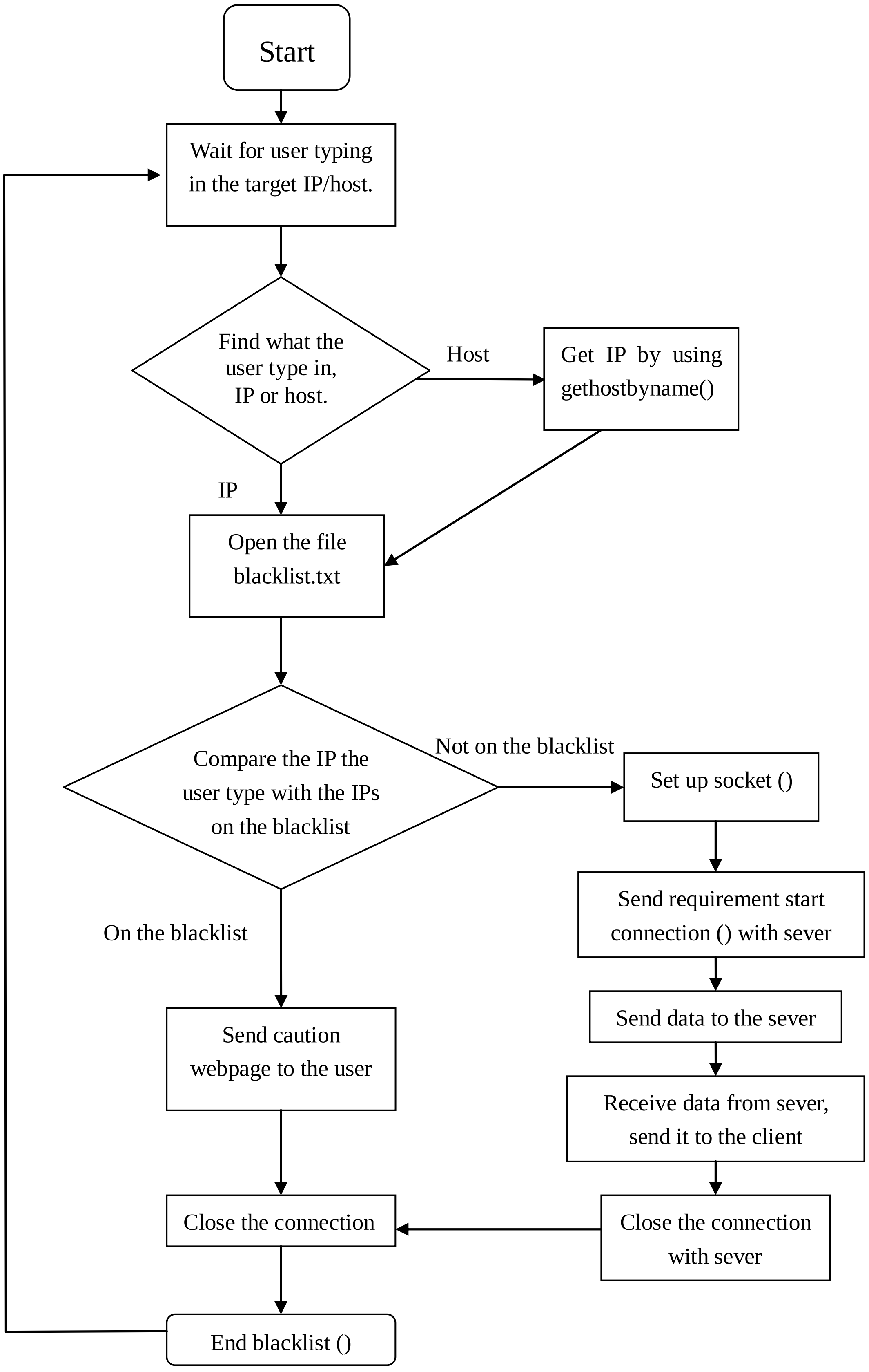
<u>d) User packet head process function (HostProcess):</u> The function first receives the HTML packet from the main function, which is stored in a string. The function then searches the string to find the “Host” word. When found, it will cut the “Host” and store the IP address or domain name after it in another string. Then the function finds the “User-Agent” in the same way. The function then to make sure host name which user types in is an IP address or domain name. If it is a domain name, the function will connect the DNS server and obtain the corresponding IP address. At last it saves the IP address into the server socket structure.

Flow chart:


Begin
Search word "User-Agent"in the head packet
Store the information after "User-Agent" in another string
Search word "Host"in the head packet
Store the information after "Host" in another string
IP address or domain name
domain name
Connect DNS server to find the corresponding IP address
IP address
Store the IP address in the server socket sturcture
End

e) Blacklist:

Function: Void blacklist ()

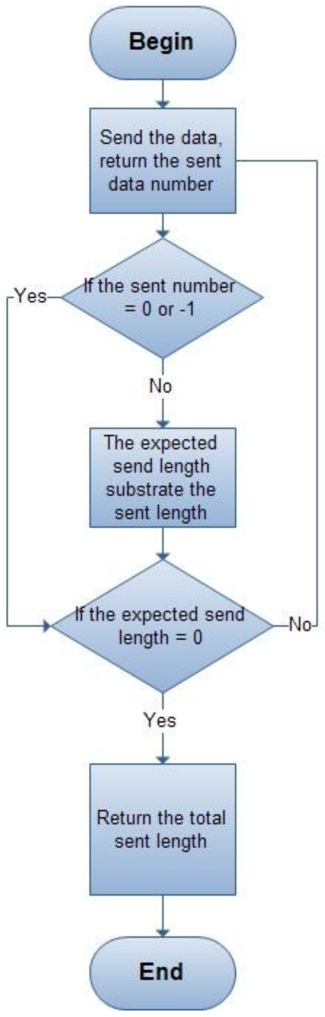


Start
Wait for user typing in the target IP/host.
Find what the user type in, IP or host.
Host
Get IP by using gethostbyname()
IP
Open the file blacklist.txt
Compare the IP the user type with the IPs on the blacklist
Not on the blacklist
Set up socket ()
Send requirement start connection () with sever
Send data to the sever
Receive data from sever, send it to the client
On the blacklist
Send caution webpage to the user
Close the connection
Close the connection with sever
End blacklist ()

In this module we use a .txt file to store the blacklist and limit user to access the website with the

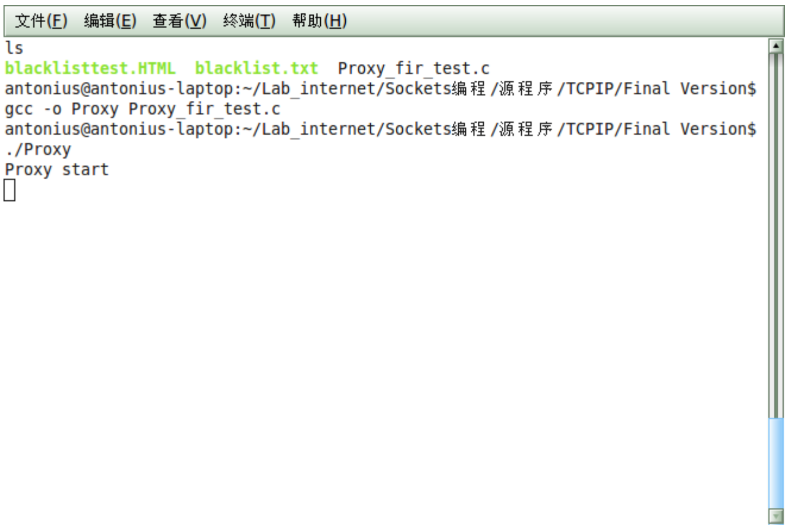
same IP on the blacklist. Here we read the file by using “fgets”. The data will be read maximum 20 bits per line then store the data in the buffer. The buffer has a max-length of 20 bits for the IP will not be longer than 20 bits. And this also makes the blacklist a fixed form that each line of the file has only one “black IP”.
This function will be used every time user wants to visit a website. When the user type in the IP or host name, we will store it in the buffer. As we have analysis the package before. We will get the target IP by gethostbyname() or directly from what the user typed in. Then we will compare the IP with the blacklist. If it on the blacklist, we will send a caution webpage by reading an .html file and close the connection. If the IP not on the blacklist we will set up the connection with the sever and start to send and receive data.

f) Data send function (TCPsend): The function is based on the socket function send(). However, when we use the send() function, one problem will occur, that send() cannot guarantee that all data will be successfully sent to the destination. So we rewrite the function. In this function, we first use the send() function to send the data. The send() function will return a value of the actual send byte number. The function will compare the return value with the expected value for sending. If they are not the same, the function will store the difference between them and send the last data depending on this difference. Only when all data are sent does the function exits.
Flow chart:

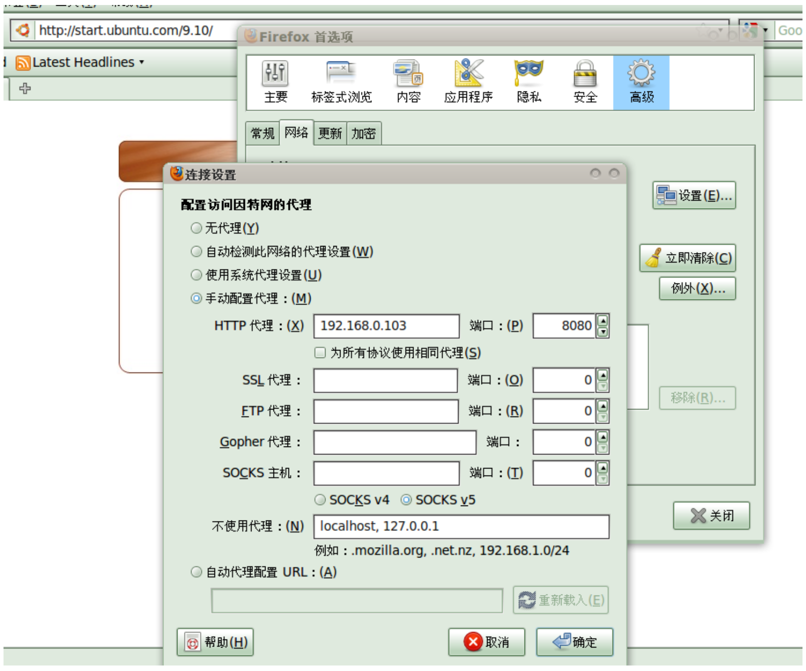

Begin
Send the data, return the sent data number
If the sent number = 0 or -1
Yes
No
The expected send length substrate the sent length
If the expected send length = 0
No
Yes
Return the total sent length
End

5. Results

a) Proxy start and the user should configure the browser



```
ls
blacklisttest.HTML  blacklist.txt  Proxy_fir_test.c
antonius@antonius-laptop:~/Lab_internet/Sockets编程/源程序/TCPIP/Final Version$
gcc -o Proxy Proxy_fir_test.c
antonius@antonius-laptop:~/Lab_internet/Sockets编程/源程序/TCPIP/Final Version$
./Proxy
Proxy start
```



配置访问因特网的代理

- 无代理(Y)
- 自动检测此网络的代理设置(W)
- 使用系统代理设置(U)
- [✓ 手动配置代理：(M)]

HTTP 代理：(X) 192.168.0.103　端口：(P) 8080

☐ 为所有协议使用相同代理(S)

SSL 代理：　端口：(O) 0

FTP 代理：　端口：(R) 0

Gopher 代理：　端口： 0

SOCKS 主机：　端口：(T) 0

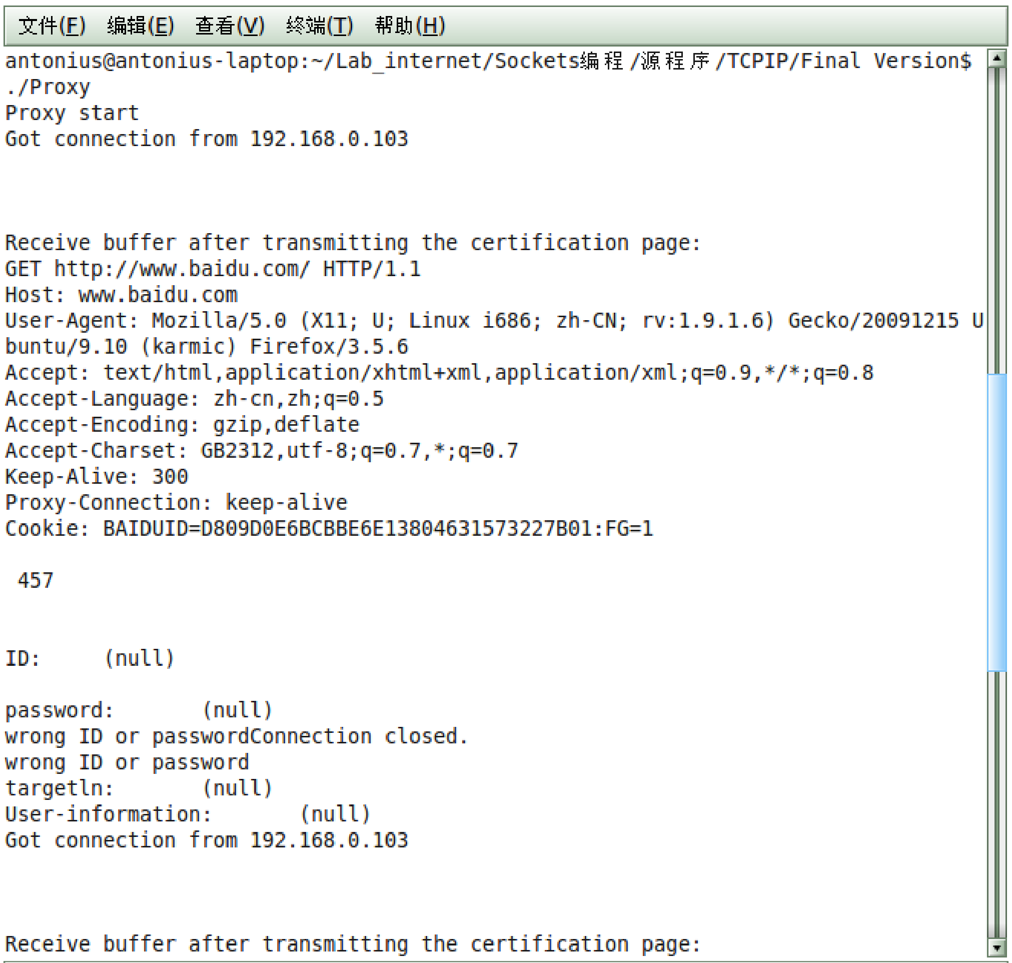
SOCKS v4 [✓ SOCKS v5]

不使用代理：(N) localhost, 127.0.0.1

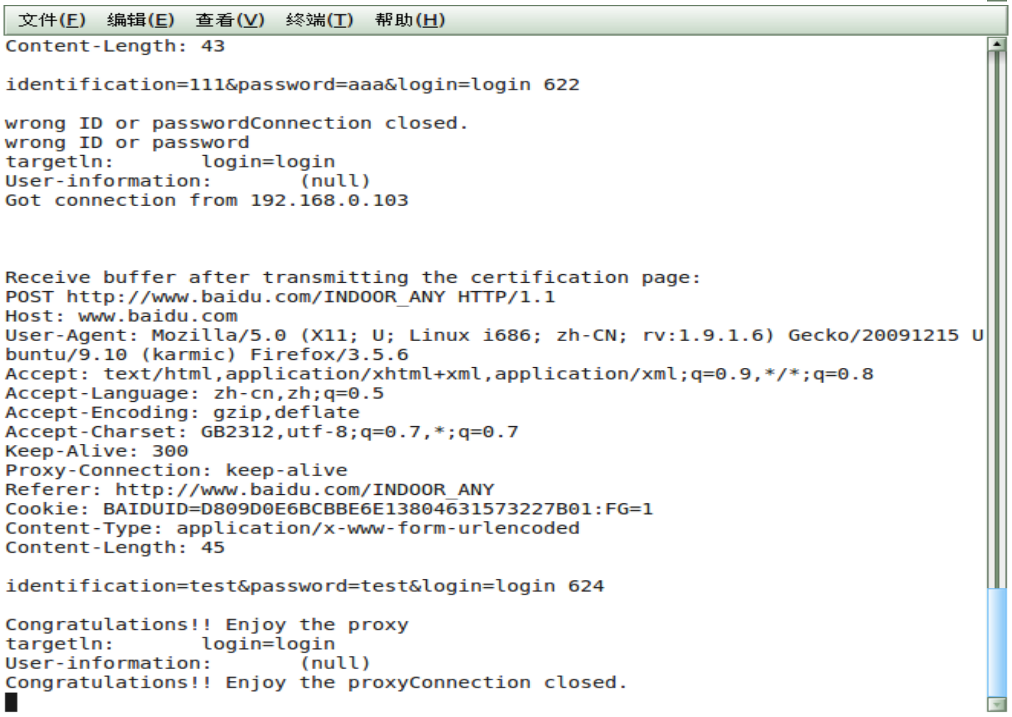
例如：.mozilla.org, .net.nz, 192.168.1.0/24

- 自动代理配置 URL：(A)

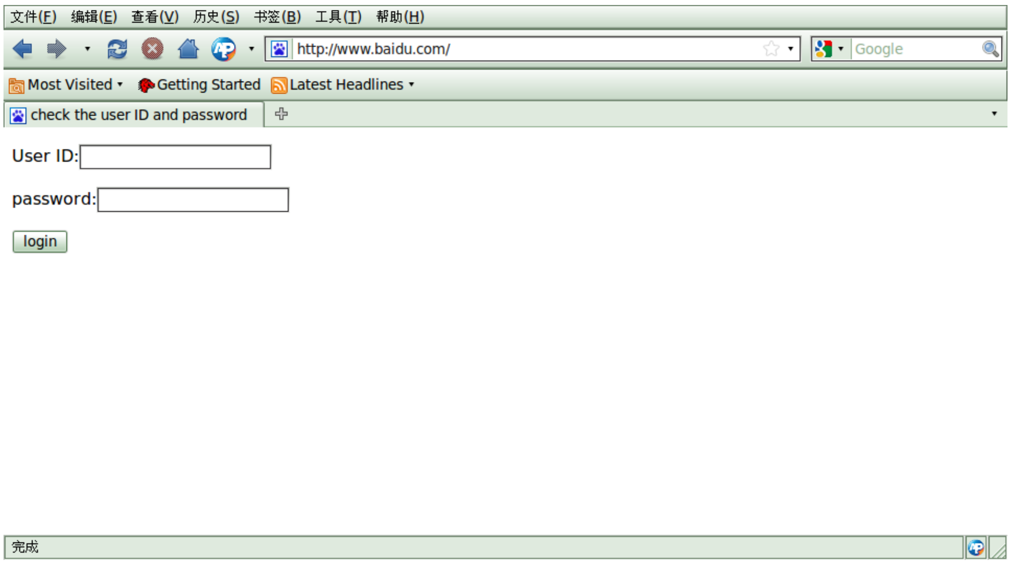
b) When user connects the proxy, proxy will receive the data packet and sends back an authentication page



```
antonius@antonius-laptop:~/Lab_internet/Sockets编程/源程序/TCPIP/Final Version$
./Proxy
Proxy start
Got connection from 192.168.0.103



Receive buffer after transmitting the certification page:
GET http://www.baidu.com/ HTTP/1.1
Host: www.baidu.com
User-Agent: Mozilla/5.0 (X11; U; Linux i686; zh-CN; rv:1.9.1.6) Gecko/20091215 U
buntu/9.10 (karmic) Firefox/3.5.6
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8
Accept-Language: zh-cn,zh;q=0.5
Accept-Encoding: gzip,deflate
Accept-Charset: GB2312,utf-8;q=0.7,*;q=0.7
Keep-Alive: 300
Proxy-Connection: keep-alive
Cookie: BAIDUID=D809D0E6BCBBE6E13804631573227B01:FG=1

 457


ID:     (null)

password:       (null)
wrong ID or passwordConnection closed.
wrong ID or password
targetln:       (null)
User-information:       (null)
Got connection from 192.168.0.103



Receive buffer after transmitting the certification page:
```



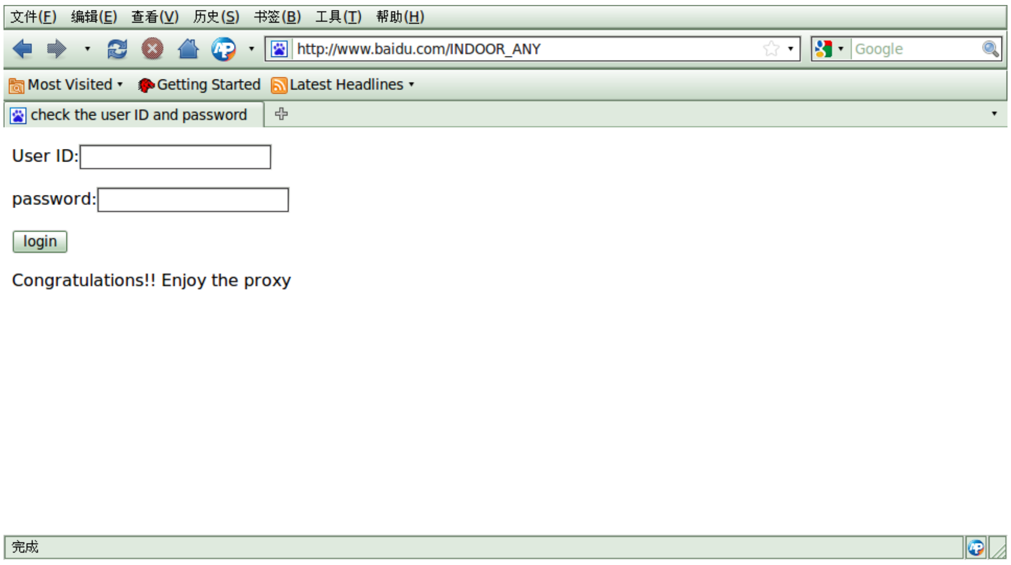
```
Content-Length: 43

identification=111&password=aaa&login=login 622

wrong ID or passwordConnection closed.
wrong ID or password
targetln:       login=login
User-information:       (null)
Got connection from 192.168.0.103



Receive buffer after transmitting the certification page:
POST http://www.baidu.com/INDOOR_ANY HTTP/1.1
Host: www.baidu.com
User-Agent: Mozilla/5.0 (X11; U; Linux i686; zh-CN; rv:1.9.1.6) Gecko/20091215 U
buntu/9.10 (karmic) Firefox/3.5.6
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8
Accept-Language: zh-cn,zh;q=0.5
Accept-Encoding: gzip,deflate
Accept-Charset: GB2312,utf-8;q=0.7,*;q=0.7
Keep-Alive: 300
Proxy-Connection: keep-alive
Referer: http://www.baidu.com/INDOOR_ANY
Cookie: BAIDUID=D809D0E6BCBBE6E13804631573227B01:FG=1
Content-Type: application/x-www-form-urlencoded
Content-Length: 45

identification=test&password=test&login=login 624

Congratulations!! Enjoy the proxy
targetln:       login=login
User-information:       (null)
Congratulations!! Enjoy the proxyConnection closed.
```


文件(F) 编辑(E) 查看(V) 历史(S) 书签(B) 工具(T) 帮助(H)
http://www.baidu.com/
Google
Most Visited
Getting Started
Latest Headlines
check the user ID and password

User ID:

password:

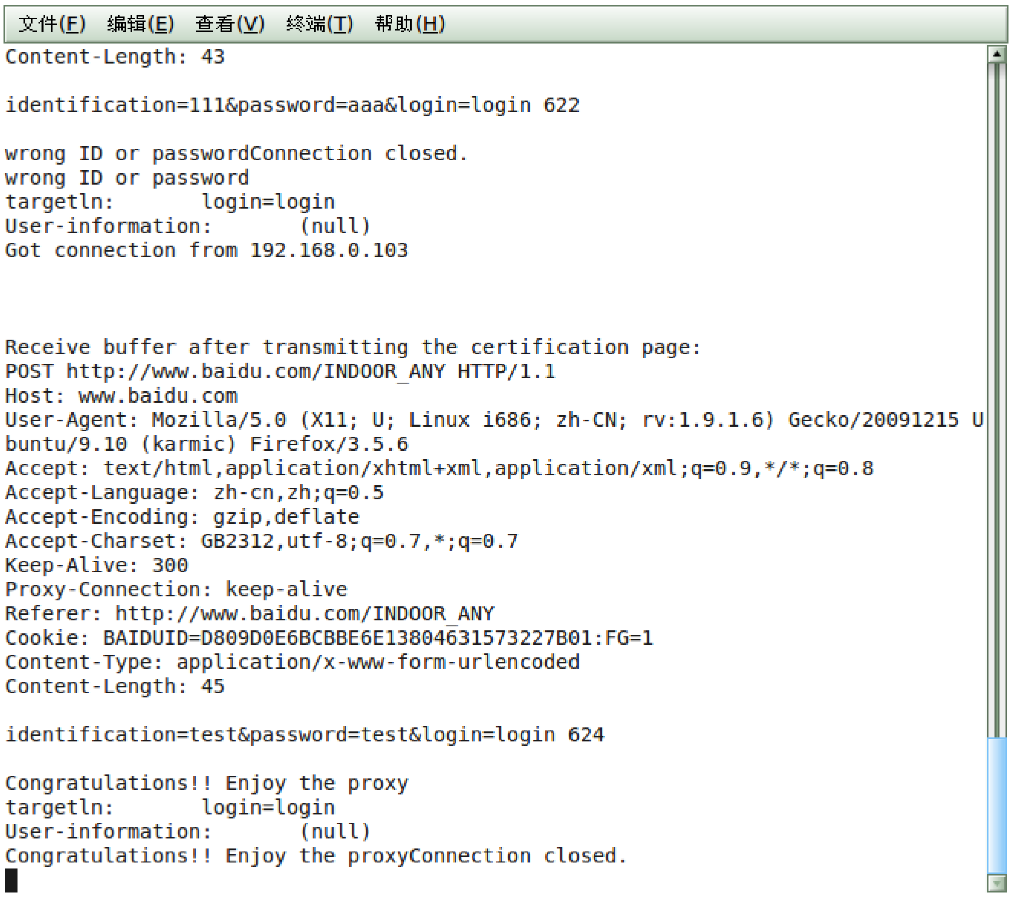
c) If the user inserts the right ID and password, the web page will show the corresponding words


文件(F) 编辑(E) 查看(V) 历史(S) 书签(B) 工具(T) 帮助(H)
http://www.baidu.com/INDOOR_ANY
Google
Most Visited
Getting Started
Latest Headlines
check the user ID and password

User ID:

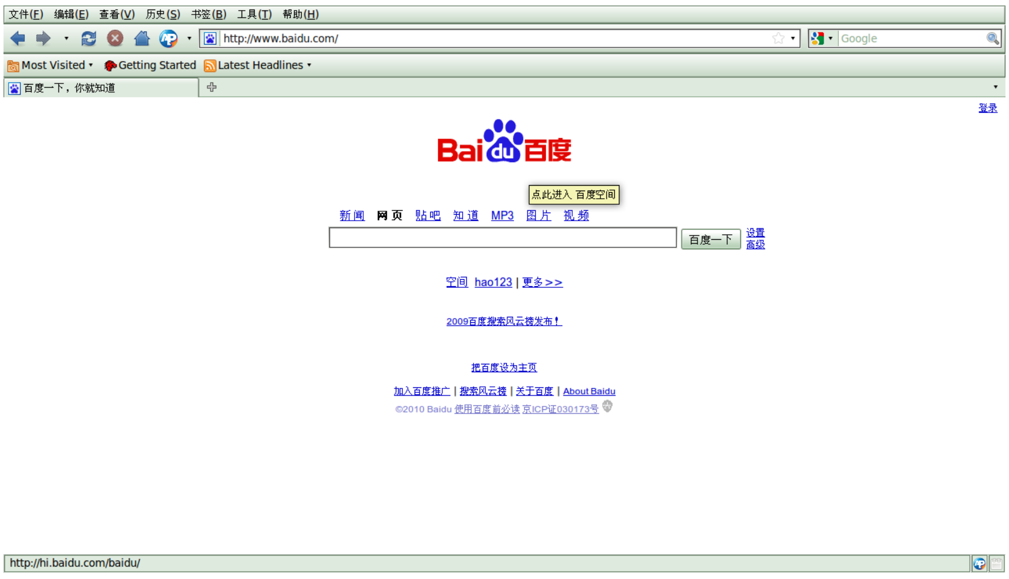
password:

Congratulations!! Enjoy the proxy



```
Content-Length: 43

identification=111&password=aaa&login=login 622

wrong ID or passwordConnection closed.
wrong ID or password
targetln:       login=login
User-information:       (null)
Got connection from 192.168.0.103



Receive buffer after transmitting the certification page:
POST http://www.baidu.com/INDOOR_ANY HTTP/1.1
Host: www.baidu.com
User-Agent: Mozilla/5.0 (X11; U; Linux i686; zh-CN; rv:1.9.1.6) Gecko/20091215 U
buntu/9.10 (karmic) Firefox/3.5.6
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8
Accept-Language: zh-cn,zh;q=0.5
Accept-Encoding: gzip,deflate
Accept-Charset: GB2312,utf-8;q=0.7,*;q=0.7
Keep-Alive: 300
Proxy-Connection: keep-alive
Referer: http://www.baidu.com/INDOOR_ANY
Cookie: BAIDUID=D809D0E6BCBBE6E13804631573227B01:FG=1
Content-Type: application/x-www-form-urlencoded
Content-Length: 45

identification=test&password=test&login=login 624

Congratulations!! Enjoy the proxy
targetln:       login=login
User-information:       (null)
Congratulations!! Enjoy the proxyConnection closed.
```

d) Then the user can insert the web site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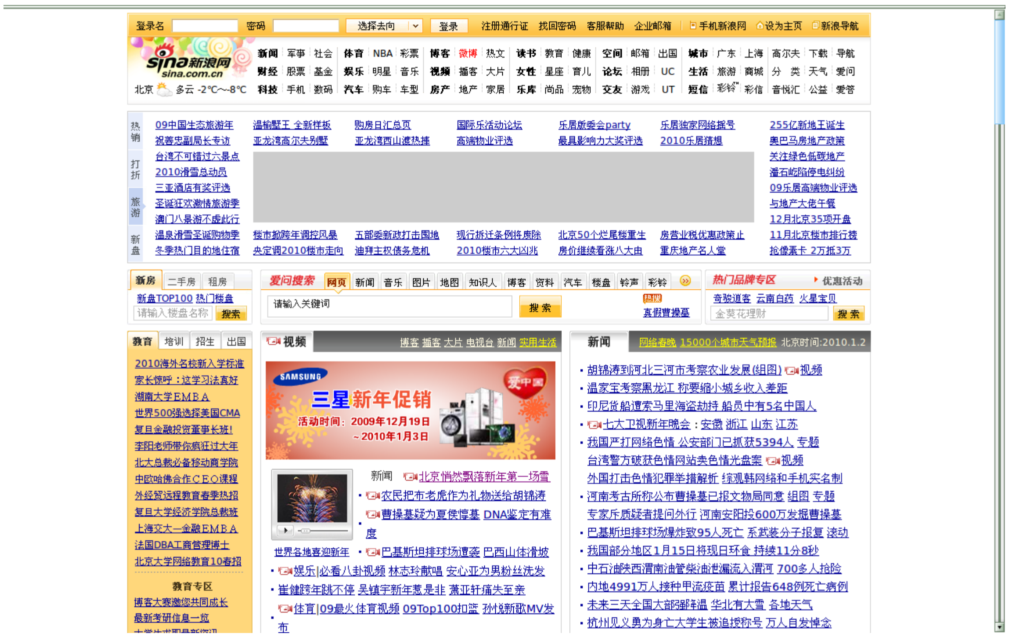
登录名 密码 选择去向 登录 注册通行证 找回密码 客服帮助 企业邮箱 手机新浪网 设为主页 新浪导航

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三星新年促销 活动时间：2009年12月19日～2010年1月3日
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· 崔健跨年跳不停 吴镇宇新年惹是非 萧亚轩痛失至亲
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· 河南考古所称公布曹操墓已报文物局同意 组图 专题
专家斥质疑者提问外行 河南安阳投600万发掘曹操墓
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· 未来三天全国大部降温 华北有大雪 各地天气
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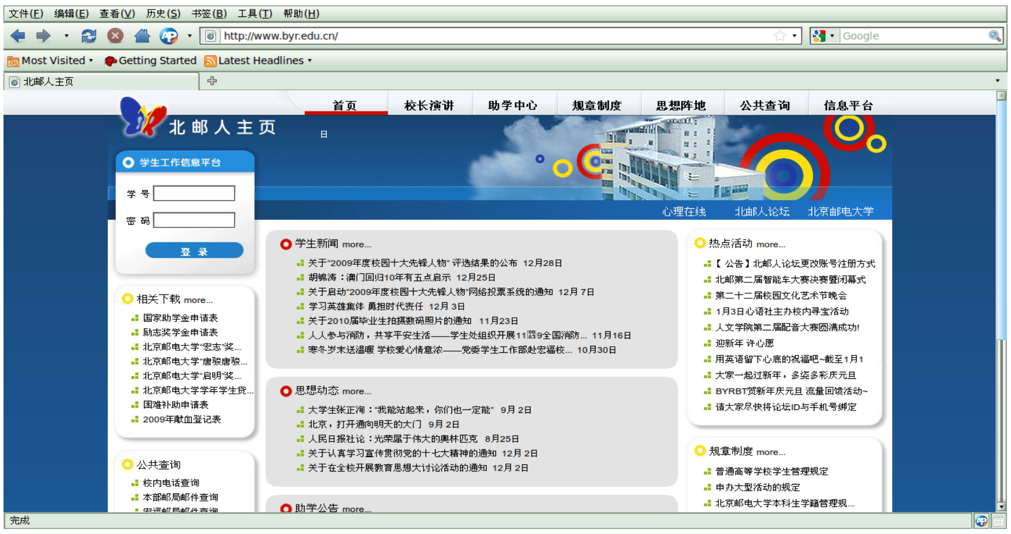
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CG
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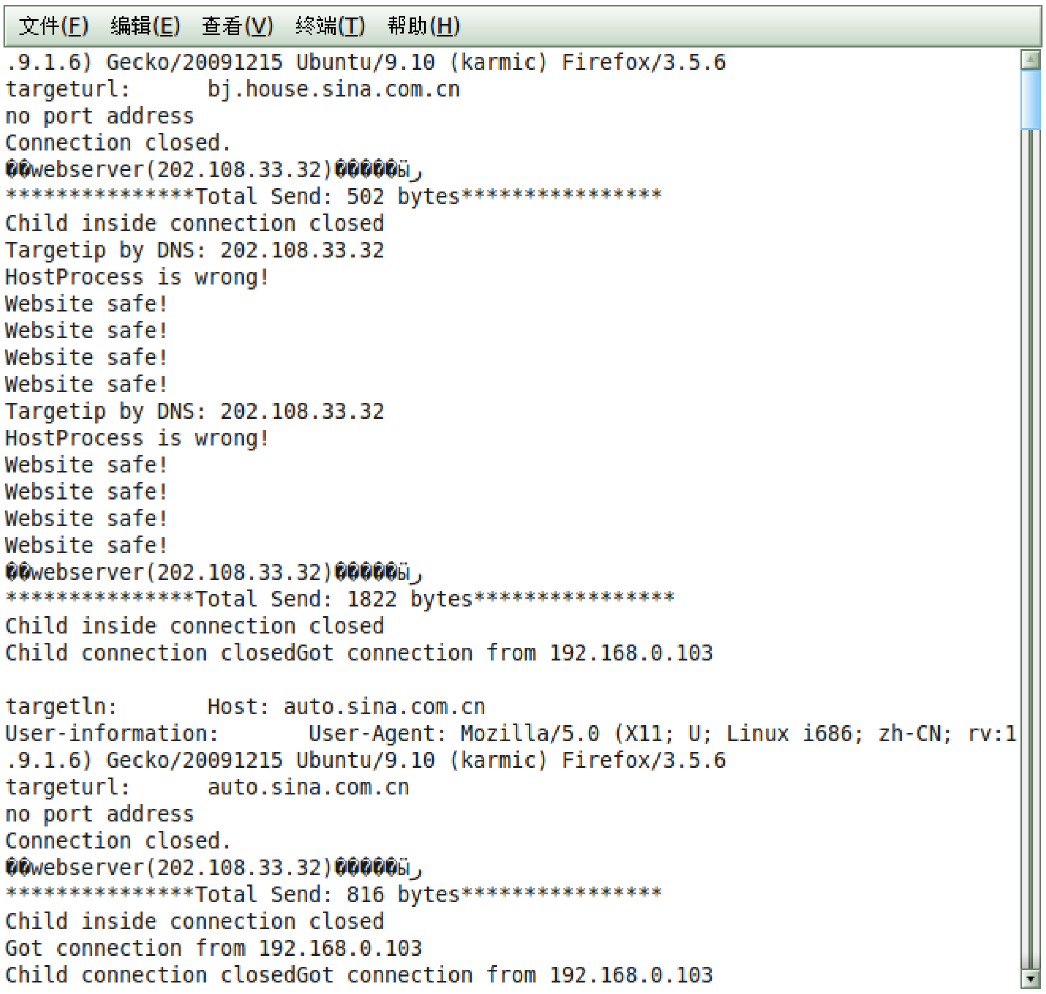
00:06
00:57
相关视频
不知道看什么？豆丸一下
正在从 218.60.33.14 传送数据...

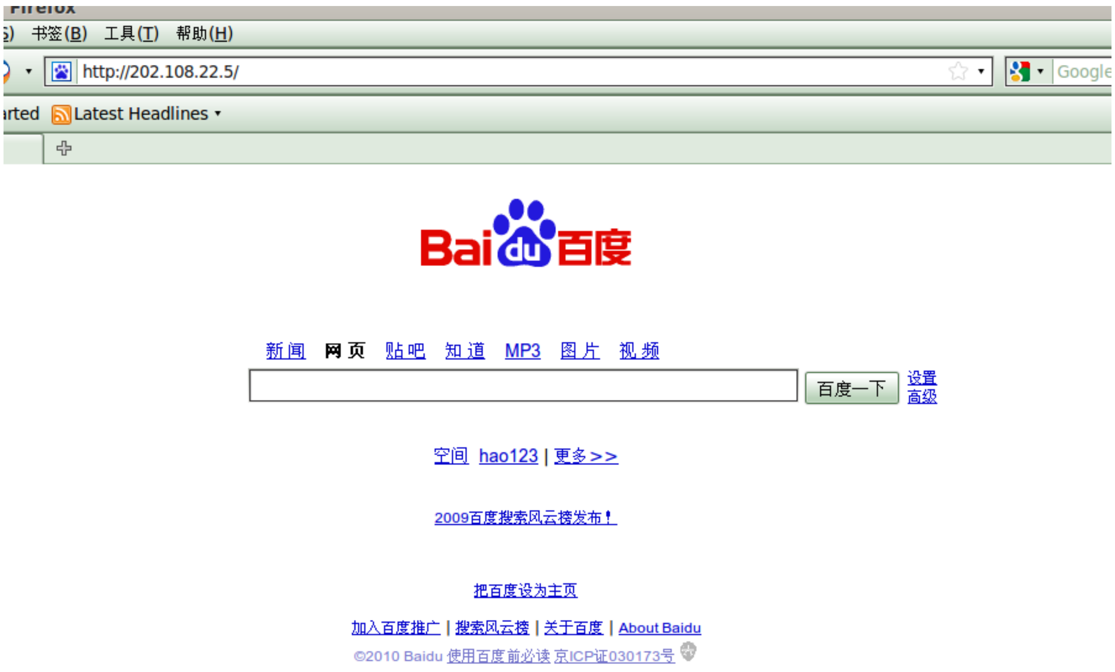
e) The corresponding terminal shot is shown below



```
.9.1.6) Gecko/20091215 Ubuntu/9.10 (karmic) Firefox/3.5.6
targeturl:      bj.house.sina.com.cn
no port address
Connection closed.
��webserver(202.108.33.32)������ʲ¸
***************Total Send: 502 bytes****************
Child inside connection closed
Targetip by DNS: 202.108.33.32
HostProcess is wrong!
Website safe!
Website safe!
Website safe!
Website safe!
Targetip by DNS: 202.108.33.32
HostProcess is wrong!
Website safe!
Website safe!
Website safe!
Website safe!
��webserver(202.108.33.32)������ʲ¸
***************Total Send: 1822 bytes****************
Child inside connection closed
Child connection closedGot connection from 192.168.0.103

targetln:       Host: auto.sina.com.cn
User-information:       User-Agent: Mozilla/5.0 (X11; U; Linux i686; zh-CN; rv:1
.9.1.6) Gecko/20091215 Ubuntu/9.10 (karmic) Firefox/3.5.6
targeturl:      auto.sina.com.cn
no port address
Connection closed.
��webserver(202.108.33.32)������ʲ¸
***************Total Send: 816 bytes****************
Child inside connection closed
Got connection from 192.168.0.103
Child connection closedGot connection from 192.168.0.103
```

f) The user can also visit the website with IP address


Firefox
) 书签(B) 工具(T) 帮助(H)
http://202.108.22.5/
Google
rted Latest Headlines
Bai du 百度
新闻 网页 贴吧 知道 MP3 图片 视频
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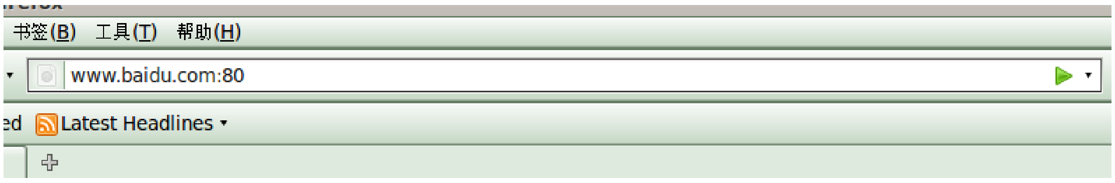
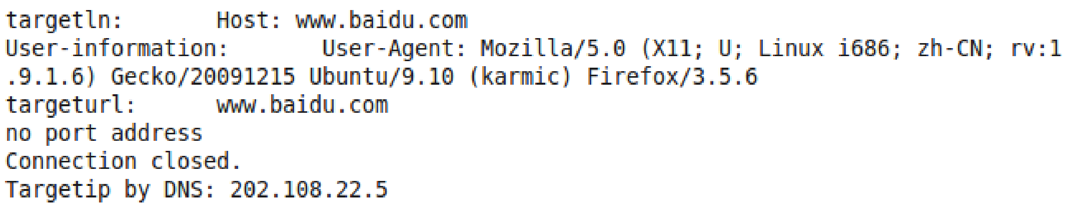
g) Website with port number is also allowed



```
www.baidu.com:80
```

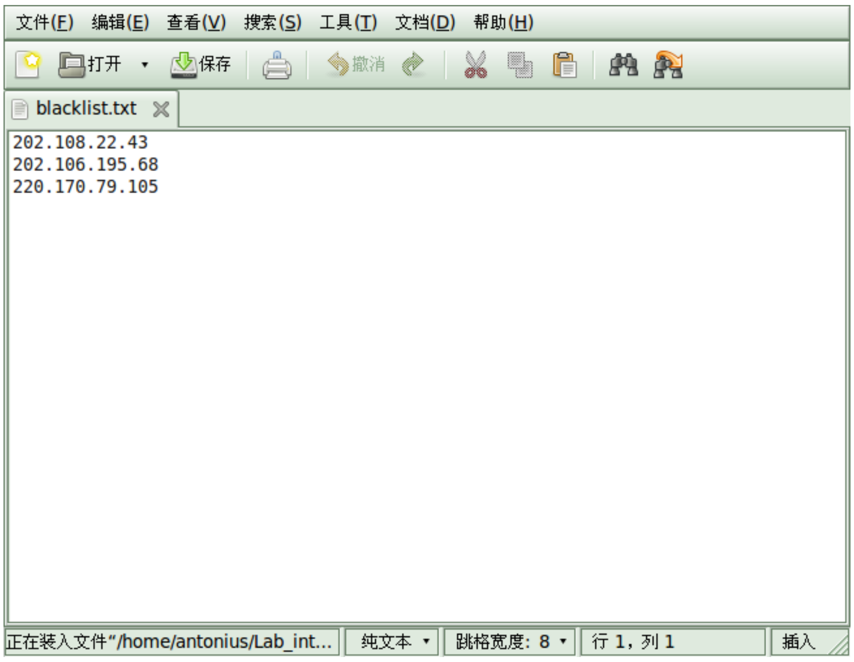
h) Host information can be viewed



```
targetln:       Host: www.baidu.com
User-information:       User-Agent: Mozilla/5.0 (X11; U; Linux i686; zh-CN; rv:1
.9.1.6) Gecko/20091215 Ubuntu/9.10 (karmic) Firefox/3.5.6
targeturl:      www.baidu.com
no port address
Connection closed.
Targetip by DNS: 202.108.22.5
```

i) Blacklist can be set; here we use www.byr.edu.cn (123.127.134.58)

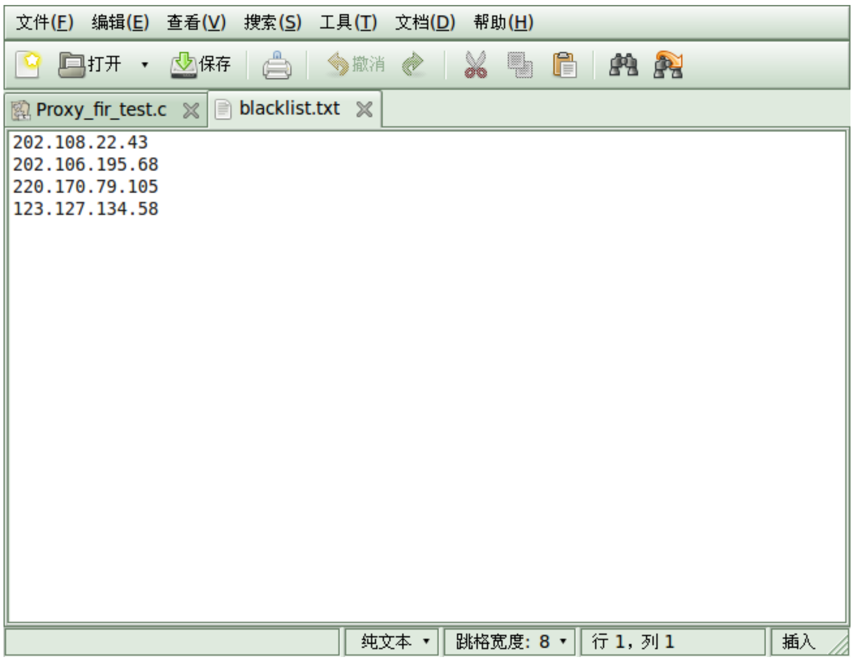
First the file does not contain the IP address of byr.edu.cn, and then it can be accessed.



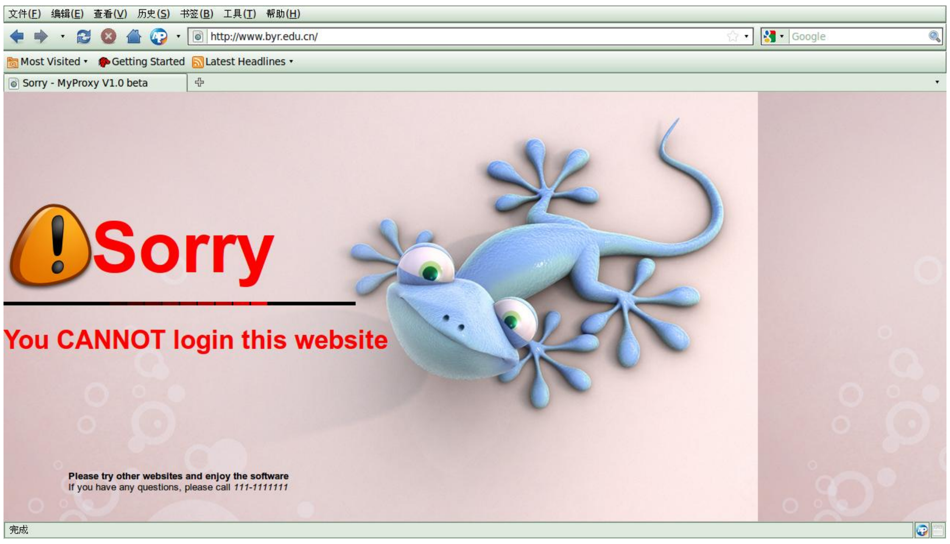
```
202.108.22.43
202.106.195.68
220.170.79.105
```

```
正在装入文件"/home/antonius/Lab_int...   纯文本   跳格宽度: 8   行 1, 列 1   插入
```

Then we add the IP address of byr.edu.cn to the blacklist. And the website will not be allowed to visit now.



```
202.108.22.43
202.106.195.68
220.170.79.105
123.127.134.58
```


文件(F) 编辑(E) 查看(V) 历史(S) 书签(B) 工具(T) 帮助(H)
http://www.byr.edu.cn/
Google
Most Visited
Getting Started
Latest Headlines
Sorry - MyProxy V1.0 beta
完成

Sorry

You CANNOT login this website

Please try other websites and enjoy the software
If you have any questions, please call 111-1111111

6. Summary and Conclusion

We divide the job into several parts as we mentioned in 3.1. The main body which can realize the proxy function include modules a), c), d), f) were finished by Liu Xiao. As the modules a), c), d), f) have a close relationship, we think these parts should be finished together. To finish these functions together will make it easy to run the function and check the error. The additional functions b), e) were written by Song Yutian. These two parts was finished separately. We add the additional function to the main body by using function or a while() loop which will not disrupt the main function’s performance. Because there have some values are used in different parts, we use overall values to make them available for different parts.

The basic function performs very well. We allow the client visit most website outside the blacklist with a high speed. Send data is written in a function TCPSEND. In this function, we use a while loop to keep sure the data will be the client completely. Because we don’t have any function to prevent spend a long time to receive a single package. If the client visits a busy website the webpage will take a very long time to display on the screen. So add a time control function will make the proxy process more fluent.

The additional parts can realize the requirement of the experiment. The blacklist and authentication performs well and robust. But there still have some problem like after the client login the webpage will not go to the target website automatically. This can be improved by set up a socket to realize the work. But as the time limit and afraid to make the hole program broke down I give up improving the code. Also a client register can make it better for multi-client work.

Appendix: Source Codes

```
#include <stdio.h>
#include <stdlib.h>
#include <unistd.h>
#include <errno.h>
#include <string.h>
#include <sys/types.h>
#include <netinet/in.h>
#include <sys/socket.h>
#include <sys/wait.h>
#include <arpa/inet.h>
#include <netdb.h>
#include<ctype.h>

#define IE_REQUEST_LEN 2048
#define MAX_CHARBUFF 20480
#define BACKLOG 10

int sock_client_found, sock_client_SR, sock_server_SR;        /* listen on sock_client_found,
send and receive on sock_client_SR */
struct sockaddr_in proxy_addr;
struct sockaddr_in clnt_addr;
struct sockaddr_in server_addr;
struct in_addr **addr_test;
pid_t pid;
int sin_size;
int k=1;
char recvbuffer[MAX_CHARBUFF];
char sendbuffer[MAX_CHARBUFF];
char checkbuffer[MAX_CHARBUFF];
char *targetip;
```

```
void clientRecvTest();
void ProxySentTest();
int HostProcess(char * SourceBuf,int DataLen);
int TCPsend(int s,const char *buf,int len,int flags);
int TCPrecv(int s,char *buf,int len,int flags);
void blacklist();
int n=1;
int tcpsendnum=0;


int main()
{

        int k=0;
        char *check="identification=";
        char *check1="password=";
        char *buffer,*buffer1;
        char *ID,*password;

        fputs("Proxy start\n",stdout);
    if((sock_client_found = socket(AF_INET, SOCK_STREAM, 0))==-1)
        {
            perror("Socket: ");
            exit(1);
      }
        memset(&proxy_addr,0,sizeof(proxy_addr));
    proxy_addr.sin_family = AF_INET;
    proxy_addr.sin_addr.s_addr = INADDR_ANY;
        proxy_addr.sin_port = htons(8080);
    if(bind(sock_client_found,(struct sockaddr*)&proxy_addr,sizeof(struct sockaddr)) == -1)
        {
            perror("Bind: ");
            exit(1);
        }
        if(listen(sock_client_found,BACKLOG)== -1)
        {
            perror("Listen: ");
            exit(1);
        }




    while(1)
        {
            setsockopt(sock_client_found,SOL_SOCKET,SO_REUSEADDR,&k,sizeof(int));
            sin_size = sizeof(struct sockaddr_in);

            if ((sock_client_SR = accept(sock_client_found, (struct sockaddr
*)&clnt_addr,&sin_size)) == -1)
                {
                    perror("Accept: ");
                    continue;
                }
            printf("Got connection from %s\n", inet_ntoa(clnt_addr.sin_addr));

            if(k==0)
            {
             memset(checkbuffer,0,MAX_CHARBUFF);
             char reply[]="<html><head><title>check the user ID and password</title><meta
http-equiv=Content-Type content=\"text/html;charset=gb2312\"></head><body><form id=
\"loginForm\"name=\"login\" action=\"INDOOR_ANY\"method=\"post\"><p><label>User
ID:<input type=\"text\"name=\"identification\"/></label></p><p><label>password:<input
type=\"password\"name=\"password\"/></label></p><input name= \"login\" type=\"submit\"
value=\"login\"class=\"submit\"></form></body></html>";
             tcpsendnum = TCPsend(sock_client_SR,reply,strlen(reply),0);
             int Checkrecv;
             Checkrecv= recv(sock_client_SR,checkbuffer,MAX_CHARBUFF,0);
               if(Checkrecv>0)
               {
                printf("\n\n\nReceive buffer after transmitting the certification page:
\n%s %d\n\n",checkbuffer,strlen(checkbuffer));
                //perror("recv");
               }

             buffer=(char*)malloc(sizeof(char)*(strlen(checkbuffer)+1));
             strcpy(buffer,checkbuffer);

             buffer1=(char*)malloc(sizeof(char)*(strlen(checkbuffer)+1));
             strcpy(buffer1,checkbuffer);

             ID=strtok(strstr(buffer,check),"&");
             password=strtok(strstr(buffer1,check1),"&");

             int isid = 1, ispassword= 1;


             if(ID!= NULL)
             {
```

```
        isid = strcmp("identification=test",ID);
      }
      else
      {
printf("\nID:\t%s\n",ID);
      }


      if(password!= NULL)
      {
        ispassword = strcmp("password=test",password);
      }
      else
      {
printf("\npassword:\t%s\n",password);
      }


      if(isid!=0 || ispassword !=0)
        {
          printf("wrong ID or password");
        }
      else
        {
          printf("Congratulations!! Enjoy the proxy");
          char* tempsend = "Congratulations!! Enjoy the proxy";
          tcpsendnum = TCPsend(sock_client_SR,tempsend, strlen(tempsend),0);
          k=k+1;
        }
      close(sock_client_SR);
      }


  pid = fork();
    if (pid == 0)
        {
                clientRecvTest();
                ProxySentTest();
                fputs("Child connection closed",stdout);
        }
    else if (pid <0)
          {
                printf("Fork error!\n");
                exit(-1);
```

```
                                }
                    else if (pid >0)
                            {
                                    close(sock_client_SR);
                                    printf("Connection closed.\n");
                            }
            }
      return 0;

}



void clientRecvTest()
{
    char clntName[INET_ADDRSTRLEN];
    inet_ntop(AF_INET,&clnt_addr.sin_addr.s_addr,clntName,sizeof(clntName));
    int numBytesRcvd;
    int numBytesSent;
    numBytesRcvd = recv(sock_client_SR,recvbuffer,MAX_CHARBUFF,0);

    shutdown(sock_client_SR,SHUT_RD);

    // fputs(recvbuffer,stdout);
}

void ProxySentTest()
{
      int flag=0;
      int numBytesRecvS;
      server_addr.sin_family = AF_INET;
      if((sock_server_SR = socket(AF_INET, SOCK_STREAM, 0))==-1)
              {
                      perror("Socket: ");
                      exit(1);
              }

          if(HostProcess(recvbuffer, strlen(recvbuffer))== 0);
        {
                  printf("HostProcess is wrong!\n");

        }
```

```
  blacklist();

if (connect(sock_server_SR, (struct sockaddr *)&server_addr, sizeof(server_addr))== -1)
      {
             perror("connect ");
             exit(1);
      }




numBytesRecvS = TCPsend(sock_server_SR,recvbuffer, strlen(recvbuffer),0);

char      dest[1000];
numBytesRecvS=1;
int senlen=0;
memset(dest,0,1000);
numBytesRecvS=recv(sock_server_SR,dest,sizeof(dest)-1,0);
if(numBytesRecvS==0)
{
      printf("connection with webserver(%s)close\n",inet_ntoa(clnt_addr.sin_addr));
      shutdown(sock_server_SR,SHUT_RD);
      return;
  }
  else if(numBytesRecvS==-1)
{
  shutdown(sock_server_SR,SHUT_RD);
  return;
}


char szRespondLine[1000]={0};
int count = 0;

char *pch;
char *pdest;
pdest = strchr(dest,'\n');    //'\n' first position
count = pdest - dest+1;
pdest++; // go over '\n'
pch = strchr(pdest,'\n');    // '\n' second position
count +=(pch -pdest+1);
strncpy(szRespondLine,dest,count);
szRespondLine[count]='\0';
```

```
    senlen = TCPsend(sock_client_SR,dest,numBytesRecvS,0);
    if(senlen==0)
    {
        printf("conection with (%s) close...\n",inet_ntoa(clnt_addr.sin_addr));
        return;
    }
      else if(senlen==-1)
    {
        return;
    }



    while(numBytesRecvS>0)
    {
          memset(dest,0,1000);
          numBytesRecvS=recv(sock_server_SR,dest,sizeof(dest),0);
          if(numBytesRecvS==0)
  {
    printf("connection with webserver(%s)close\n",inet_ntoa(server_addr.sin_addr));
    shutdown(sock_server_SR,SHUT_RD); //close receive
    break;
  }
          else if(numBytesRecvS==-1)
  {
        break;
  }

  senlen = TCPsend(sock_client_SR,dest,numBytesRecvS,0);    //send the data to the client
  if(senlen==0)
  {
          printf("connection with (%s) closed...\n",inet_ntoa(clnt_addr.sin_addr));
          break;
  }
  else if(senlen==-1)
  {
        break;
  }
}
tcpsendnum += senlen;

      close(sock_client_SR);
      close(sock_server_SR);
      printf("***************Total Send: %d bytes****************\n", tcpsendnum);
```

```
        fputs("Child inside connection closed\n",stdout);
}


int HostProcess(char * SourceBuf,int DataLen)
{


    char *search="Host";
    char *search1="User-Agent";

    char *targetln,*targetla,*targetan,*targetport,*targeturl;
    char *buffer,*buffer1;
    struct hostent *targetIpByDN;
    char * SourceBufe;

    SourceBufe = SourceBuf;

    server_addr.sin_family = AF_INET;

    buffer=(char*)malloc(sizeof(char)*(strlen(SourceBufe)+1));
    strcpy(buffer,SourceBufe);

    buffer1=(char*)malloc(sizeof(char)*(strlen(SourceBufe)+1));
    strcpy(buffer1,SourceBufe);

    targetln=strtok(strstr(buffer,search),"\r\n");
    printf("\ntargetln:\t%s\n",targetln);

    targetan=strtok(strstr(buffer1,search1),"\r\n");
    printf("User-information:\t%s\n",targetan);

    targeturl=strtok((char*)strcasestr(targetln,":")+2,"\r\n");
    targetip=(char*)malloc(sizeof(char)*(strlen(targeturl)+1));


    printf("targeturl:\t%s\n",targeturl);

    strcpy(targetip,targeturl);

    targetport=strstr(targeturl,":");

    if(targetport!= NULL)
    {
            targetport+=1;
            printf("targetport:\t%s\n",targetport);
            server_addr.sin_port = htons((u_short)atoi(targetport));
    }
    else
    {
            server_addr.sin_port = htons(80);
            printf("no port address\n");
    }

    targetip=strtok(targetip,":");
    if(*targetip >= '0' && *targetip <= '9')
    {
            printf("targetip:\t%s\n",targetip);
            server_addr.sin_addr.s_addr = inet_addr(targetip);
    }
    else
    {
                targetIpByDN =(struct hostent *)gethostbyname(targetip);
                if(!targetIpByDN)
                {
                        printf("get sever formation is wrong\n");
                        printf("%s\n",targetip);
                        return -1;
                }
            addr_test = ((struct in_addr **)targetIpByDN->h_addr_list);
            printf("Targetip by DNS: %s \n", inet_ntoa(*addr_test[0]));
            server_addr.sin_addr.s_addr = inet_addr(inet_ntoa(*addr_test[0]));
    }

    return 1;
}



int TCPrecv(int s,char *buf,int len,int flags)
{

  int nRev=0,recvCount=0;
  int length =len;

  if(buf==NULL)
    return 0;
    printf("\nbull error3\n");

  // receive data
  while(length>0)
  {
    nRev =recv(s,buf+recvCount,length,flags);

    printf("receive number: %d", nRev);

    if(nRev==0)
    {
      printf("\nerror for nRev = 0\n");
      break;
    }
    if(nRev==-1)//error
    {
      printf("\nNW error\n");
      break;
    }
    printf("\nNo error\n");
    length-=nRev;
    recvCount+=nRev;
    printf("\n %d %d\n",length,recvCount);
  }
  printf("\nNo error2\n");
  return recvCount; //return the number of data received
}


int TCPsend(int s,const char *buf,int len,int flags)
{
  int n=0,sendCount=0;
  int length =len;
  if(buf==NULL)
    return 0;
  while(length>0)
  {
    n=send(s,buf+sendCount,length,flags); //send data
    if(n==0)
    {
      break;
    }
    if(n==-1)//error
    {
      break;

    }
    length-=n;
    sendCount+=n;
  }

  return sendCount; // return the number send to the client
}

//blacklist
void blacklist()
{
    char blip[20];
    FILE *inFile;

    inFile = fopen("blacklist.txt","r");

    if(inFile == NULL)
    {
        printf("\n Failed to open blacklist.\n");
        exit(1);
    }
    while (fgets(blip,20,inFile)!=NULL)
    {
        strtok(blip,"\n");

        int isblack;

        if(*targetip >= '0' && *targetip <= '9')
        {
          isblack = strcmp(targetip,blip);
        }
        else
        {
          isblack = strcmp(inet_ntoa(*addr_test[0]),blip);//IP get by gethostbyname
        }

        if(isblack == 0)
        {
                char send[250];
                FILE *caution;
                caution = fopen("blacklisttest.HTML","r");
                char caubuff[20480];
                char picbuff[20480];

                if(caution == NULL)
                {
                    printf("\n Failed to open blacklist.\n");
                    exit(1);
                }

                while(fgets(send,250,caution)!=NULL)
                {
                  strcat(caubuff,send);
                }
                fclose(caution);



                //char reply[]="<html>You are logining a wesite on the blacklist</html>";
                int numBytesSent = TCPsend(sock_client_SR,caubuff,strlen(caubuff),0);
                int numBytesRecv=    recv(sock_client_SR,picbuff,MAX_CHARBUFF,0);
                printf("Website in BLACK LIST!\n");
                //printf("\n\n\nReceive buffer after black list: \n%s %d\n\n",picbuff,strlen(picbuff));


                close(sock_server_SR);
        }
        else
        {
                printf("Website safe!\n");//connection,resv,send
        }
      }
        fclose(inFile);
}
```