PROBLEMS

1. Many business computers have three distinct and worldwide unique identifiers. What are they?

DNS名称、IP地址和以太网地址。

1. In Fig. 7-4, there is no period after laserjet. Why not?

laseriet后面应该跟上.cs.vu.nl，因为图7-4表示的是针对cs.vn.nl域名的DNS数据库。

1. Consider a situation in which a cyberterrorist makes all the DNS servers in the world crash simultaneously. How does this change one’s ability to use the Internet?

DNS服务被攻击后，域名和IP就联系不上了。所以利用域名访问网页的做法就不行了，因为找不到域名对应的IP地址，从而不能访问到想要的网页的服务器了。使用IP地址访问网页还是可以，但是IP对于大多数人来说太陌生了，不如网址来的习惯。

1. DNS uses UDP instead of TCP. If a DNS packet is lost, there is no automatic recovery. Does this cause a problem, and if so, how is it solved?

P480 DNS使用UDP数据包发送，只有查询和响应。如果在很短的时间内没有响应返回，DNS客户端必须重复查询请求。这样能应对服务器关闭、查询和响应包丢失的情况。所以用UDP不会引发问题（它在服务端相当于有个重复发送的判断和成功与否的判断）。

1. John wants to have an original domain name and uses a randomized program to generate a secondary domain name for him. He wants to register this domain name in the com generic domain. The domain name that was generated is 253 characters long. Will the com registrar allow this domain name to be registered?

因为域名需要加上.com4个字符，就会形成总长度为257bytes的域名，而DNS域名长度必须小于等于256bytes。

1. Can a machine with a single DNS name have multiple IP addresses? How could this occur?

P489可以，DNS命名机制遵循的是以组织为边界，而不是以物理网络为边界。即使计算机科学系分散在Babbage Hall和Turing Hall两栋楼中，但这两栋楼里的主机通常属于同一个域。

1. The number of companies with a Web site has grown explosively in recent years. As a result, thousands of companies are registered in the com domain, causing a heavy load on the top-level server for this domain. Suggest a way to alleviate this problem without changing the naming scheme (i.e., without introducing new top-level domain names). It is permitted that your solution requires changes to the client code.

可以将顶级服务器多弄几台分服务器以扩大服务最大负载量。

1. Some email systems support a Content Return: header field. It specifies whether the body of a message is to be returned in the event of nondelivery. Does this field belong to the envelope or to the header?

信封，信封的内容能被邮件传输代理查看。如果属于了邮件头，那么传输代理就不知道Content Return的内容，于是就不知道在nondelivery的时候是否返回邮件了，那就完成不了该文件头的功能了。

1. Electronic mail systems need directories so people’s email addresses can be looked up. To build such directories, names should be broken up into standard components (e.g., first name, last name) to make searching possible. Discuss some problems that must be solved for a worldwide standard to be acceptable.

各个国家的名字的姓和名的顺序不一样，而且每个国家使用的文字不一样，每个国家的姓名长度也不一样。

1. A large law firm, which has many employees, provides a single email address for each employee. Each employee’s email address is <login>@lawfirm.com. However, the firm did not explicitly define the format of the login. Thus, some employees use their first names as their login names, some use their last names, some use their initials, etc. The firm now wishes to make a fixed format, for example: firstname.lastname@lawfirm.com, that can be used for the email addresses of all its employees. How can this be done without rocking the boat too much?

可以作用于全体员工的电子邮件地址，只需要让每个员工把自己原来的login邮箱和新建的firstname.lastname邮箱关联起来。

1. A binary file is 4560 bytes long. How long will it be if encoded using base64 encoding, with a CR+LF pair inserted after every 110 bytes sent and at the end?

P504 基64编码，每3字节一组，共4560/3=1520组，每组中有4个6位的单元，共1520\*4=6080个单元，然后把每个单元都变成对应的char编码，相当于每个单元变成了8位，所以现在共6080字节。如果每110字节就加回车换行对的话，那么需要6080/110=56 (向上取整，最后一行也加上)，加入56\*2=112个新字符，所以最后共6192字节。

1. Name five MIME types not listed in this book. You can check your browser or the Internet for information.

MIME：多用途Internet邮件拓展。

超文本标记语言文本 .html text/html

xml文档 .xml text/xml

XHTML文档 .xhtml application/xhtml+xml

普通文本 .txt text/plain

RTF文本 .rtf application/rtf

PDF文档 .pdf application/pdf

Microsoft Word文件 .word application/msword

PNG图像 .png image/png

GIF图形 .gif image/gif

JPEG图形 .jpeg,.jpg image/jpeg

au声音文件 .au audio/basic

1. Suppose that you want to send an MP3 file to a friend, but your friend’s ISP limits the size of each incoming message to 1 MB and the MP3 file is 4 MB. Is there a way to handle this situation by using RFC 5322 and MIME?

P506 message/external-body 可以让邮件附上MP3的网址，从而携带上MP3的信息，而不真正传输它。接收者可以通过网址下载MP3。

1. Suppose that John just set up an auto-forwarding mechanism on his work email address, which receives all of his business-related emails, to forward them to his personal email address, which he shares with his wife. John’s wife was unaware of this, and activated a vacation agent on their personal account. Because John forwarded his email, he did not set up a vacation daemon on his work machine. What happens when an email is received at John’s work email address?

P500

因为个人邮箱使用度假代理的原因，所以个人邮箱每来一封信，度假代理就会原路返回一封回信。同时，因为工作邮箱使用自动转发的机制，所以当工作邮箱任意收到一封来信时，他会转发给个人邮箱。此时，如果工作邮箱收到任意一封来信，它就会转发给个人邮箱，而个人邮箱又会返回工作邮箱信件，从而让工作邮箱又收到一封信，工作邮箱又转发到个人邮箱，形成了循环。但是如果度假代理能跟踪它们已经给哪些用户发过这种回复的话，那能够避免重复发送相同的回复。

1. In any standard, such as RFC 5322, a precise grammar of what is allowed is needed so that different implementations can interwork. Even simple items have to be defined carefully. The SMTP headers allow white space between the tokens. Give two plausible alternative definitions of white space between tokens.
2. Is the vacation agent part of the user agent or the message transfer agent? Of course, it is set up using the user agent, but does the user agent actually send the replies? Explain your answer.

度假代理是一个程序，会检查每一个接受消息，然后回复一个答复。度假代理当然不能被当作是用户代理的一部分，因为邮件传输代理才是自动回复消息的处理者。

1. In a simple version of the Chord algorithm for peer-to-peer lookup, searches do not use the finger table. Instead, they are linear around the circle, in either direction. Can a node accurately predict which direction it should search in? Discuss your answer.

如果不用指取表，而是线性查找（一个接一个），那么顺逆时针都差不多，分不出好与坏，最多就按照顺逆时针节点序号差小的选择，但也不能保证实际访问节点就小。

1. IMAP allows users to fetch and download email from a remote mailbox. Does this mean that the internal format of mailboxes has to be standardized so any IMAP program on the client side can read the mailbox on any mail server? Discuss your answer.

不需要，IMAP程序要做好与在邮件服务端的IMAP后台程序之间的通信就可以了，不需要知道mainbox的结构。

1. Consider the Chord circle of Fig. 7-71. Suppose that node 18 suddenly goes online. Which of the finger tables shown in the figure are affected? how?

节点1的指取表的17项的ip变为18，节点4的指取表不变，节点12的指取表的16项的后继节点ip变为18.

1. Does Webmail use POP3, IMAP, or neither? If one of these, why was that one chosen? If neither, which one is it closer to in spirit?

P514

webmail既不是POP3也不是IMAP，IMAP更像Webmail，因为它能为用户提供邮件服务，能运行邮件服务器。

1. When Web pages are sent out, they are prefixed by MIME headers. Why?

P519

因为浏览器能从MIME头中知道当前网页的类型。从而可以区别对待不同类型的网页，例如：html/text类型的网页直接显示，内置类型的网页也能直接显示，而MIME类型不是一个内置的类型，那么浏览器查阅其MIME类型表，以便确定如何显示该页面。

1. Is it possible that when a user clicks on a link with Firefox, a particular helper is started, but clicking on the same link in Internet Explorer causes a completely different helper to be started, even though the MIME type returned in both cases is identical? Explain your answer.

有可能，因为两个浏览器安装的处理helper的插件不一样。

1. Although it was not mentioned in the text, an alternative form for a URL is to use the IP address instead of its DNS name. Use this information to explain why a DNS name cannot end with a digit.

因为IP地址用数字结尾，所以为了区分DNS和IP，规定了DNS不能以数字结尾。

1. Imagine that someone in the math department at Stanford has just written a new document including a proof that he wants to distribute by FTP for his colleagues to review. He puts the program in the FTP directory ftp/pub/forReview/newProof.pdf. What is the URL for this program likely to be?

ftp://math.stanford.edu/ftp/pub/forReview/newProof.pdf

1. In Fig. 7-22, www.aportal.com keeps track of user preferences in a cookie. A disadvantage of this scheme is that cookies are limited to 4 KB, so if the preferences are extensive, for example, many stocks, sports teams, types of news stories, weather for multiple cities, specials in numerous product categories, and more, the 4-KB limit may be reached. Design an alternative way to keep track of preferences that does not have this problem.

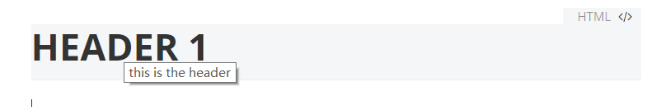
将要记录的用户信息放在服务器端，用ID索引，这样每次只需要用户传送带有新加的、新修改的用户信息的cookies就行了，同时用这些新信息去更新服务端的数据库。

1. Sloth Bank wants to make online banking easy for its lazy customers, so after a customer signs up and is authenticated by a password, the bank returns a cookie containing a customer ID number. In this way, the customer does not have to identify himself or type a password on future visits to the online bank. What do you think of this idea? Will it work? Is it a good idea?

我觉得不太安全，因为cookies时储存在磁盘中的，容易丢失，而且cookies在传输过程中是潜在传输的，大量且难以察觉，容易被截取。所以很容易获取cookies，而只需要cookies就能登陆的话，对于一个银行账户来说太不安全了。

1. (a) Consider the following HTML tag: <h1 title=‘‘this is the header’’> HEADER 1 </h1> Under what conditions does the browser use the TITLE attribute, and how? (b) How does the TITLE attribute differ from the ALT attribute?

展示如下效果：放在HEADER1上会显示value“this is the header”



ALT只能用于图像的缺省显示。而title参数基本可以用于所有html的标签，包括图像。

1. How do you make an image clickable in HTML? Give an example.

<a herf=”…”> <img src=” www.baidu.com/img/bd\_logo1.png”> </a>

1. Write an HTML page that includes a link to the email address username@DomainName.com. What happens when a user clicks this link?

<a href="mailto:325063151@qq.com"> [325063151@qq.com</a](mailto:325063151@qq.com%3c/a)>

点击会跳转到win10的邮箱。

<a href="325063151@qq.com"> [325063151@qq.com</a](mailto:325063151@qq.com%3c/a)>

点击后不能找到邮箱。

1. Write an XML page for a university registrar listing multiple students, each having a name, an address, and a GPA.

xml:P542:

<?xml version=”1.0” ?>

<student#list>

<student>

<name>Alice</name>

<address>Center street 87th</address>

<gpa>3.4</gpa>

</student>

<student>

<name>Bob</name>

<address>Center street 27th</address>

<gpa>3.8</gpa>

</student>

<student>

<name>Carey</name>

<address>Center street 76th</address>

<gpa>3.6</gpa>

</student>

</student#list>

1. For each of the following applications, tell whether it would be (1) possible and (2) better to use a PHP script or JavaScript, and why: (a) Displaying a calendar for any requested month since September 1752. (b) Displaying the schedule of flights from Amsterdam to New York. (c) Graphing a polynomial from user-supplied coefficients.
2. 查询需要的月份，javascript当然可以完成。再填写完表单后，php也能完成查询。javascript会比php更好，因为它可以本地就完成操作了（比如弄个计算月份长什么样的算法写入page中，然后本地运行这个算法），所以javascript更快，而且不用和浏览器交互。
3. 查询从城市到城市的航班信息，由于信息是动态的，所以和(a)不同，所以javascript是不能完成的，除非它能实现从服务器查询，单独的本地javascrpt是没办法完成的，php可以。
4. 画函数，应该都能完成，javascript应该更快。
5. Write a program in JavaScript that accepts an integer greater than 2 and tells whether it is a prime number. Note that JavaScript has if and while statements with the same syntax as C and Java. The modulo operator is %. If you need the square root of x, use Math.sqrt(x).

javascript:P538

<html>

<head>

<script language="javascript" type="text/javascript">

function response(test\_form){

var tmp=test\_form.number.value;

var i=2;

var issu=1;

document.open();

document.writeln("<html><body>");

while(i<=Math.sqrt(tmp)){

if( (tmp%i )==0){

document.writeln("has factor ", " : ",i,"<p>");

issu=0;

break;

}

i=i+1;

}

if(issu==1)

document.writeln("Yes, it is.");

else

document.writeln("No, it is not.");

document.writeln("</body></html>");

document.close();

}

</script>

</head>

<body>

<form>

Please enter number:<input type="text" name="number">

<input type="button" value="submit" onclick="response(this.form)">

</form>

</body>

</html>

不把script写好是不会出网页的。还有为什么chrome可以运行而ie不行。

1. An HTML page is as follows: <html> <body> <a href="www.info-source.com/welcome.html"> Click here for info </a> </body> </html> If the user clicks on the hyperlink, a TCP connection is opened and a series of lines is sent to the server. List all the lines sent.

P550

GET /welcome.html HTTP/1.1

HOST: [www.info-source.com](http://www.info-source.com)

最后一个头（HOST）后面必须跟一个空行以告诉服务器没有更多的请求头了。

1. The If-Modified-Since header can be used to check whether a cached page is still valid. Requests can be made for pages containing images, sound, video, and so on, as well as HTML. Do you think the effectiveness of this technique is better or worse for JPEG images as compared to HTML? Think carefully about what ‘‘effectiveness’’ means and explain your answer.

JPEG图片会更有效，因为一般图片更大，比一个HTML类更大，传输一次也延迟更久，所以如果能多次重复使用同一个JPEG，那么会更有效减少延迟。同时HTML类变化更快、更多，它的保存时间相对更少，而JPEG一般都能保持很长一段时间不变。

1. On the day of a major sporting event, such as the championship game in some popular sport, many people go to the official Web site. Is this a flash crowd in the same sense as the 2000 Florida presidential election? Why or why not?

查了一下2000年佛罗里达州大选发生的事情：本来已经宣布布什为新任总统，但是佛州由于点票出现了问题，后来才紧急叫停，重新计票。

计票出问题这个flash crowd是不可预知的，而观看球赛是可以预知的。所以不是同一种flash crowd。

1. Does it make sense for a single ISP to function as a CDN? If so, how would that work? If not, what is wrong with the idea?

P583:内容分发

可以，如果那个网络提供商能联系到所有内容提供商，并且取得合作，获得内容的话，那他就可以做CDN的功能了。只不过因为内容提供商很多，所以需要一个网络提供商很多联系才行。但是对于特定的内容来说，网络提供商拥有特点内容是可以增加自己的竞争力（收入的），比方说足球比赛的转播权。

1. Assume that compression is not used for audio CDs. How many MB of data must the compact disc contain in order to be able to play two hours of music?

P557 音频压缩

在每秒44100个采样并且每个样值为16位的情况下，立体声需要1.411Mbps的带宽，所以共2\*60\*60\*1.411Mb = 10080 Mb = 1260 MB

1. In Fig. 7-42(c), quantization noise occurs due to the use of 4-bit samples to represent nine signal values. The first sample, at 0, is exact, but the next few are not. What is the percent error for the samples at 1/32, 2/32, and 3/32 of the period?

真实值是sin(2\*PI\*i/32)，带入i=1,2,3分别得到0.195,0.383,0.556，而它们分边是0.25,0.5,0.5,所以误差分别为-0.055,-0.117,0.056,对应的百分比误差率是28.2%,30.5%,10.1%

1. Could a psychoacoustic model be used to reduce the bandwidth needed for Internet telephony? If so, what conditions, if any, would have to be met to make it work? If not, why not?

心里声学:P558

因为对话用的也是人类语言，所以可以用心理声学去编码压缩对话。但是因为对话需要实时性，所以并没有太多时间去编码，而且对话可能需要一定的完整性才能编码，而这又涉及到编码要求的速度。所以如果速度跟不上，还是不要编码为好。

1. An audio streaming server has a one-way ‘‘distance’’ of 100 msec to a media player. It outputs at 1 Mbps. If the media player has a 2-MB buffer, what can you say about the position of the low-water mark and the high-water mark?

P570

低水位标志：指缓冲区的视频存量如果少于这个标志就要去尽量填满，比方说网络中断了导致视频存量不断下降，此时越过低水位标志后客户端就会发送新的请求，比如重新连接、换一个节点什么的。所以要能够预留出时间来缓存，由于100ms的延迟，重新建立连接的话就是，来回就是200ms，所以预留200ms\*1Mbps=0.2Mb=0.025MB就差不多是低水位标志了。

高水位标志，相对的是为了防止超出缓存总量（2MB），当缓存量超过高水位标志，客户端就会发送暂停的信号给服务端，此时仍然保持接收。所以差不多要又100ms的延迟，所以高水位为2MB-100ms\*1Mbps=1.9875MB，可以适当再小一点，以免网络延迟造成100ms变多，变到1.975就可以了（与低水位相对）。

1. Does voice over IP have the same problems with firewalls that streaming audio does? Discuss your answer.

要看voice的传输方式会不会被防火墙拦截下来，如果UDP会被拦截，那么通过UDP传输的voice就会被拦截（如果企图出防火墙）。

1. What is the bit rate for transmitting uncompressed 1200 × 800 pixel color frames with 16 bits/pixel at 50 frames/sec?

一帧有1200\*800\*16bits，而50帧/s = 50\*1200\*800\*16 bits/s=768 000 000 bits/s = 768 Mbps

1. Can a 1-bit error in an MPEG frame affect more than the frame in which the error occurs? Explain your answer.

P570 MPEG丢包处理

如果出错的是I帧，那么会影响它接下来的P,B帧。而如果出错的是P,B帧，则不会影响其他的帧。

1. Consider a 50,000-customer video server, where each customer watches three movies per month. Two-thirds of the movies are served at 9 P.M. How many movies does the server have to transmit at once during this time period? If each movie requires 6 Mbps, how many OC-12 connections does the server need to the network?

P183 OC-12

每天的电影平均量：50000\*3/30=5000部，每天9点的电影平均量：5000\*2/3=3333部

每部需要6Mbps的带宽，则总带宽需要6\*3333=20000Mbps=20Gbps，使用OC-12的连接方式，每个OC-12连接提供594.432Mbos，所以需要20000/594.432=34个OC-12连接。

1. Suppose that Zipf’s law holds for accesses to a 10,000-movie video server. If the server holds the most popular 1000 movies in memory and the remaining 9000 on disk, give an expression for the fraction of all references that will be to memory. Write a little program to evaluate this expression numerically.

P585 齐普夫定律

第k个的比率是C/K,C=1/(1+1/2+1/3+…+1/N),在这里N=10000。所以前1000个的比率和是 (1+1/2+…+1/1000) / (1+1/2+1/3+…+1/10000)

编程计算如下：（python）

a=sum([1.0/i for i in range(1,1001)])

b=sum([1.0/i for i in range(1,10001)])

print(a/b)

算出来0.76479

1. Some cybersquatters have registered domain names that are misspellings of common corporate sites, for example, www.microsfot.com. Make a list of at least five such domains.

<http://www.1enovo.com>

<http://www.ilidilid.com/> 镜像b站

1. Numerous people have registered DNS names that consist of www.word.com, where word is a common word. For each of the following categories, list five such Web sites and briefly summarize what it is (e.g., www.stomach.com belongs to a gastroenterologist on Long Island). Here is the list of categories: animals, foods, household objects, and body parts. For the last category, please stick to body parts above the waist.

<https://eye.com/> 待售

<https://www.glasses.com/> 卖眼镜的

48. Rewrite the server of Fig. 6-6 as a true Web server using the GET command for HTTP 1.1. It should also accept the Host message. The server should maintain a cache of files recently fetched from the disk and serve requests from the cache when possible.