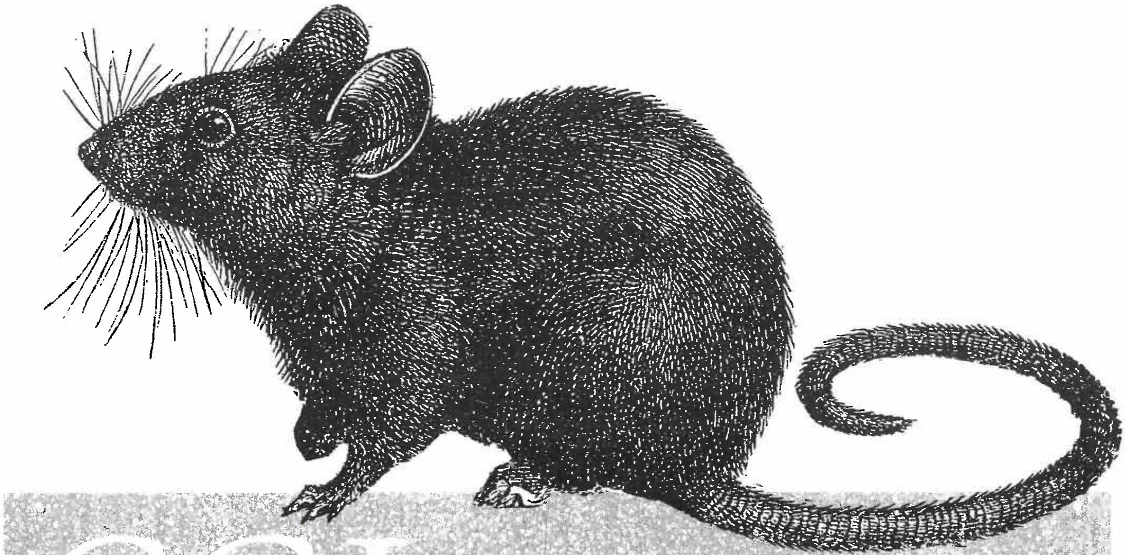
On-the-Spot Information

Examples in Perl



CGI Programming

on the World Wide Web

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- ArchiePlex Gateway

  A gateway to the Archie search server. Allows the user to search for a specific string and returns a virtual hypertext document. This useful gateway is located at *http://pubweb.nexor.co.uk/public/archie/archieplex/archieplex.html.* A simple Archie gateway is presented in Chapter 10.

- Guestbook with World Map

  A guestbook is a forms-based application that allows users to leave messages for everyone to see. Though there are numerous guestbooks on the Web, this is one of the best. You can access it at *http://www.cosy.sbg.ac.at/rec/guestbook.*

- Japanese <-> English Dictionary

  A sophisticated CGI program that queries the user for an English word, and returns a virtual document with graphic images of an equivalent Japanese word, or vice versa. It can be accessed at *http://www.wg.omron.co.jp/cgi-bin/j-e?SASE=jfiedl.html* or at *http://enterprise.ic.gc.ca/cgi-bin/j-e.*

Although most of these documents are curiosities, they illustrate the powerful aspects of CGI. The interface allows for the creation of highly effective virtual documents using forms and gateways.

Internal Workings of CGI

So how does the whole interface work? Most servers expect CGI programs and scripts to reside in a special directory, usually called *cgi-bin*, and/or to have a certain file extension. (These configuration parameters are discussed in the "Configuring the Server" section in this chapter.) When a user opens a URL associated with a CGI program, the client sends a request to the server asking for the file.

For the most part, the request for a CGI program looks the same as it does for all Web documents. The difference is that when a server recognizes that the address being requested is a CGI program, the server does not return the file contents verbatim. Instead, the server tries to execute the program. Here is what a sample client request might look like:

```
GET /cgi-bin/welcome.pl HTTP/1.0
Accept: www/source
Accept: text/html
Accept: image/gif
User-Agent: Lynx/2.4 libwww/2.14
From: shishir@bu.edu
```

This GET request identifies the file to retrieve as */cgi-bin/welcome.pl*. Since the server is configured to recognize all files in the *cgi-bin* directory tree as CGI programs, it understands that it should execute the program instead of relaying it directly to the browser. The string HTTP/1.0 identifies the communication protocol to use.

The client request also passes the data formats it can accept (www/source, text/html, and image/gif), identifies itself as a Lynx client, and sends user information. All this information is made available to the CGI program, along with additional information from the server.

The way that CGI programs get their input depends on the server and on the native operating system. On a UNIX system, CGI programs get their input from standard input (STDIN) and from UNIX environment variables. These variables store such information as the input search string (in the case of a form), the format of the input, the length of the input (in bytes), the remote host and user passing the input, and other client information. They also store the server name, the communication protocol, and the name of the software running the server.

Once the CGI program starts running, it can either create and output a new document, or provide the URL to an existing one. On UNIX, programs send their output to standard output (STDOUT) as a data stream. The data stream consists of two parts. The first part is either a full or partial HTTP header that (at minimum) describes what format the returned data is in (e.g., HTML, plain text, GIF, etc.). A blank line signifies the end of the header section. The second part is the body, which contains the data conforming to the format type reflected in the header. The body is not modified or interpreted by the server in any way.

A CGI program can choose to send the newly created data directly to the client or to send it indirectly through the server. If the output consists of a complete HTTP header, the data is sent directly to the client without server modification. (It's actually a little more complicated than this, as we will discuss in Chapter 3, *Output from the Common Gateway Interface.*) Or, as is usually the case, the output is sent to the server as a data stream. The server is then responsible for adding the complete header information and using the HTTP protocol to transfer the data to the client.

Here is the sample output of a program generating an HTML virtual document, with the complete HTTP header:

```
HTTP/1.0 200 OK
Date: Thursday, 22-February-96 08:28:00 GMT
Server: NCSA/1.4.2
MIME-version: 1.0
Content-type: text/html
Content-length: 2000

<HTML>
<HEAD><TITLE>Welcome to Shishir's WWW Server!</TITLE></HEAD>
```

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