LECTURE 10

SOFTWARE LICENSES

Closed-source software

Most end-user software is closed-source (proprietary).

- The executable is distributed to customers.
- The source code is either
  - never revealed (most commonly), or
  - only made available to select customers (rarely).

Example of closed-source software

- Operating systems: Microsoft Windows; Android, iOS, MacOS (except kernel)
- Office suites: Microsoft 365, iWork
- Creative software: Adobe suite, Autodesk suite, Final Cut Pro, Pro Tools, Logic Pro
- Development software: Visual Studio, XCode (except compiler)
- Collaboration software: Zoom, Teams, Skype, Slack, Discord
- Server-side and enterprise software: Microsoft IIS, SAP, OpenAI GPT-4
- Almost all videogames
- Almost all mobile apps

Free software

- “free” as in freedom (not “free lunch”)
- defined by the Free Software Foundation (FSF, est. 1985)
- software attached with a license (uses copyright law)
- gives freedoms (rights) to the user, to:
  - run the software as they wish
  - study and modify the software as they wish
  - redistribute (original and modified versions)
- based on the philosophy that all software should be free to protect users
- the “GNU” project is FSF’s software collection

Open-source software

- defined by the Open Source Initiative (OSI, est. 1998)
- software attached with a license (uses copyright law)
- specifies how software can be distributed:
  - no restrictions on redistribution
    - no discrimination against specific users, fields, products, other software, other technologies
  - source code must be available
  - derived works must be allowed
  - but modifications can be required to be clearly delineated

FSF vs. OSI

- FSF: for the user's sake, all software should be free on ethical grounds – free software licenses are a means to that end

- OSI: help businesses and developers publish and disseminate their open-source software – pragmatically, we do not want to add hurdles if they impair practical use

In practice?

The FSF and OSI each maintain a list of “approved” license.

Most FSF-approved free software licenses are also OSI-approved open-source licenses. And vice-versa.

The difference lies in the licenses each organization **promotes**

The “baseline” FSF license

The GNU General Public License (**GPL**):

- any user who receives the executable must be provided the source code as well upon request
- any derivative work is automatically covered by the GPL (the GPL is “viral”)
- dynamic linking with GPL software counts as derivative work

Amended FSF licenses

- The “more permissive” GNU Lesser General Public License (**LGPL**):
  - adds exception to allow dynamic linking with non-GPL software

- The “more restrictive” GNU Affero General Public License (**AGPL**)
  - definition of “user” includes over-the-network interactions

Typical open-source licenses

- Most popular: Apache License, BSD License, MIT License
- “permissive licenses”: fewer constraints on derivative work
  - unmodified parts still covered by the original license
  - but modified parts are not, can even be closed source
- some require acknowledgement of the original work (authors and/or project)
- differences among permissive licenses are minor (but important to lawyers)

Example projects

- “free software” (GPL-type licenses)
  - Linux kernel, **GPL**
  - GNU project, **GPL**
  - gcc, **GPL**
  - glibc (gcc’s standard C library), **LGPL**
  - git, **GPL**
  - gmp, **LGPL**
- “open source” (permissive licenses)
  - Apache web server, **Apache**
  - NGINX web server, **BSD**
  - LLVM, **Apache**
  - Chrome (more precisely: chromium), **BSD**
  - Node.js, Angular, React, **MIT**

End-user cost

Whether or not customers pay for software is **orthogonal** to source availability.

cost	closed-source	free / open-source
0	TikTok, Whatsapp, Discord	Chrome, Gimp, VLC, Blender
> 0	Photoshop, Maya, Ableton	Red Hat Enterprise Linux

Commercial, non-commercial

Whether or not developers are commercial entities is **orthogonal** to source availability.

developers	**closed-source**	**free** / **open-source**
non-commercial	(most amateur code until 2010s, some government software, legacy scientific software)	GNU system (Free software foundation), Blender, Krita, LibreOffice
commercial	Microsoft Windows, Microsoft 365, iWork, Adobe suite, Autodesk, …	Chrome, Ubuntu, Red Hat, NGINX, Docker, GitLab, Redis, LLVM

*the distinction between commercial and non-commercial is often blurry

How can commercial software be free / open-source?

- software has zero price, sell support and services (Ubuntu, Red Hat, NGINX)
- software costs money, convince customers not to redistribute it (Red Hat)
- open-core: basic functionality is open-source, sell advanced features (NGINX)
- open-sourced software accesses proprietary services (Chrome)
- open-sourced software is not core business (LLVM)

Use cases

- Closed-source:
  - source code is your “secret sauce”
  - customers willing to pay
- Open-source permissive licenses:
  - encourage wider adoption
  - encourage commercial entities to participate
- Free software GPL-type licenses:
  - protect users (ethical grounds)
  - force downstream developers to reciprocate
- Share source code, but do not give any right to modify (limited usefulness)

Patents

In most countries:

- Contrary to copyright law (protects creative processes) patents are not a fundamental right
- Patents are a pragmatic compromise for promoting innovation.

  The bargain is:

  - Share your innovation with the patent office (as opposed to keeping it secret)
  - Get N-year exclusivity on commercialization

Patents and software innovation

- Software innovation is quicker: N years is like centuries
- Ideas are cheap, execution is everything
- Software is close to mathematics (discovered, not invented)
- Patent disclosures do not include code! They don't actually help anyone.

Stuff that has been patented

- Buy with a single click (Amazon)
- Automatically make email addresses clickable (Apple)
- Fourier (1768–1830) series for compression (Fraunhofer Institute)

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United States Patent [19]

Hartman et al.

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[45] **Date of Patent: Sep. 28, 1999**

[54] **METHOD AND SYSTEM FOR PLACING A PURCHASE ORDER VIA A COMMUNICATIONS NETWORK**

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[57] **ABSTRACT**

A method and system for placing an order to purchase an item via the Internet. The order is placed by a purchaser at a client system and received by a server system. The server system receives purchaser information including identification of the purchaser, payment information, and shipment information from the client system. The server system then assigns a client identifier to the client system and associates the assigned client identifier with the received purchaser information. The server system sends to the client system the assigned client identifier and an HTML document identifying the item and including an order button. The client system receives and stores the assigned client identifier and receives and displays the HTML document. In response to the selection of the order button, the client system sends to the server system a request to purchase the identified item. The server system receives the request and combines the purchaser information associated with the client identifier of the client system to generate an order to purchase the item in accordance with the billing and shipment information whereby the purchaser effects the ordering of the product by selection of the order button.

26 Claims, 11 Drawing Sheets

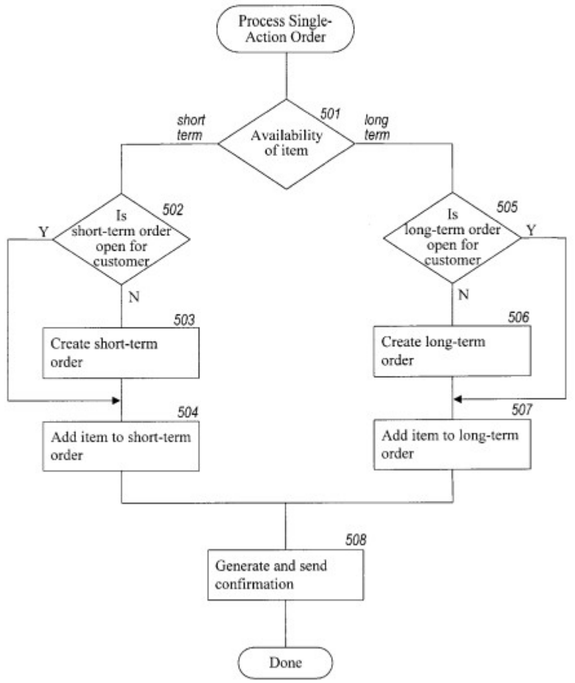

Fig. 5

METHOD AND SYSTEM FOR PLACING A PURCHASE ORDER VIA A COMMUNICATIONS NETWORK

TECHNICAL FIELD

The present invention relates to a computer method and system for placing an order and, more particularly, to a method and system for ordering items over the Internet.

BACKGROUND OF THE INVENTION

The Internet comprises a vast number of computers and computer networks that are interconnected through communication links. The interconnected computers exchange information using various services, such as electronic mail, Gopher, and the World Wide Web ("WWW"). The WWW service allows a server computer system (i.e., Web server or Web site) to send graphical Web pages of information to a remote client computer system. The remote client computer system can then display the Web pages. Each resource (e.g., computer or Web page) of the WWW is uniquely identifiable by a Uniform Resource Locator ("URL"). To view a specific Web page, a client computer system specifies the URL for that Web page in a request (e.g., a HyperText Transfer Protocol ("HTTP") request). The request is forwarded to the Web server that supports that Web page. When that Web server receives the request, it sends that Web page to the client computer system. When the client computer system receives that Web page, it typically displays the Web page using a browser. A browser is a special-purpose application program that effects the requesting of Web pages and the displaying of Web pages.

Currently, Web pages are typically defined using HyperText Markup Language ("HTML"). HTML provides a standard set of tags that define how a Web page is to be displayed. When a user indicates to the browser to display a Web page, the browser sends a request to the server computer system to transfer to the client computer system an HTML document that defines the Web page. When the requested HTML document is received by the client computer system, the browser displays the Web page as defined by the HTML document. The HTML document contains various tags that control the displaying of text, graphics, controls, and other features. The HTML document may contain URLs of other Web pages available on that server computer system or other server computer systems.

The World Wide Web is especially conducive to conducting electronic commerce. Many Web servers have been developed through which vendors can advertise and sell product. The products can include items (e.g., music) that are delivered electronically to the purchaser over the Internet and items (e.g., books) that are delivered through conventional distribution channels (e.g., a common carrier). A server computer system may provide an electronic version of a catalog that lists the items that are available. A user, who is a potential purchaser, may browse through the catalog using a browser and select various items that are to be purchased. When the user has completed selecting the items to be purchased, the server computer system then prompts the user for information to complete the ordering of the items. This purchaser-specific order information may include the purchaser's name, the purchaser's credit card number, and a shipping address for the order. The server computer system then typically confirms the order by sending a confirming Web page to the client computer system and schedules shipment of the items.

Since the purchaser-specific order information contains sensitive information (e.g., a credit card number), both

vendors and purchasers want to ensure the security of such information. Security is a concern because information transmitted over the Internet may pass through various intermediate computer systems on its way to its final destination. The information could be intercepted by an unscrupulous person at an intermediate system. To help ensure the security of the sensitive information, various encryption techniques are used when transmitting such information between a client computer system and a server computer system. Even though such encrypted information can be intercepted, because the information is encrypted, it is generally useless to the interceptor. Nevertheless, there is always a possibility that such sensitive information may be successfully decrypted by the interceptor. Therefore, it would be desirable to minimize the sensitive information transmitted when placing an order.

The selection of the various items from the electronic catalogs is generally based on the "shopping cart" model. When the purchaser selects an item from the electronic catalog, the server computer system metaphorically adds that item to a shopping cart. When the purchaser is done selecting items, then all the items in the shopping cart are "checked out" (i.e., ordered) when the purchaser provides billing and shipment information. In some models, when a purchaser selects any one item, then that item is "checked out" by automatically prompting the user for the billing and shipment information. Although the shopping cart model is very flexible and intuitive, it has a downside in that it requires many interactions by the purchaser. For example, the purchaser selects the various items from the electronic catalog, and then indicates that the selection is complete. The purchaser is then presented with an order Web page that prompts the purchaser for the purchaser-specific order information to complete the order. That Web page may be prefilled with information that was provided by the purchaser when placing another order. The information is then validated by the server computer system, and the order is completed. Such an ordering model can be problematic for a couple of reasons. If a purchaser is ordering only one item, then the overhead of confirming the various steps of the ordering process and waiting for, viewing, and updating the purchaser-specific order information can be much more than the overhead of selecting the item itself. This overhead makes the purchase of a single item cumbersome. Also, with such an ordering model, each time an order is placed sensitive information is transmitted over the Internet. Each time the sensitive information is transmitted over the Internet, it is susceptible to being intercepted and decrypted.

SUMMARY OF THE INVENTION

An embodiment of the present invention provides a method and system for ordering an item from a client system. The client system is provided with an identifier that identifies a customer. The client system displays information that identifies the item and displays an indication of an action (e.g., a single action such as clicking a mouse button) that a purchaser is to perform to order the identified item. In response to the indicated action being performed, the client system sends to a server system the provided identifier and a request to order the identified item. The server system uses the identifier to identify additional information needed to generate an order for the item and then generates the order.

The server system receives and stores the additional information for customers using various computer systems so that the server system can generate such orders. The server system stores the received additional information in association with an identifier of the customer and provides

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