

[← Collections Policy Statement Index](#)

Computer Science, Telecommunication, and Artificial Intelligence (Classes QA75-76.9, TK5101-TK6720, TK7800-TK7895, and Q334-Q390)

Contents

- I. Scope
- II. Research strengths
 - A. General
 - B. Areas of Distinction
 - C. Weaknesses/Exclusions
- III. Collecting Policy
- IV. Collecting Levels

I. Scope

This Collections Policy Statement covers a major subset of the subclass QA - QA75-QA76.9, which deals with the general theory and application of computers as well as data processing and computer systems. Other works relating to computer technology are classified in TK5101-TK6720, which encompass telecommunication technologies (including telegraph, telephone, radio, radar, television and cable networks), TK7885-TK7895, which includes works on the design of computer hardware and circuitry as well as hardware and electronics, and Q334-Q390, which includes works on artificial intelligence and information theory. The advanced and interdisciplinary nature of the research connects computer science to such diverse subjects as analysis of algorithms, artificial intelligence, combinatorial optimization, computational biology, computational complexity, computational geometry, computer graphics, computer vision, computer-aided verification, concurrent data structures and architectures, constraint programming, database systems, agents and E-commerce, graph drawing, neural networks, software engineering, and static analysis, nanotechnology, scientific visualization and scientific computing, security and cryptography, theory of computation, theory of networking, internet computing, mobile and ubiquitous computing, randomized algorithms and probabilistic analysis, robotics, user interfaces and virtual reality. Works on applications of computers and artificial intelligence can also be found under their representative subjects (e.g. medicine, chemistry, military sciences).

By recent count (OPAC record analysis done June 2008) there were over 93,000 serial and monographic works falling within these major subsets (QA75.5-QA76.9 +55,000; TK5101-TK6720 +29,500; TK7880-TK7895 +6400; Q334-Q390 +2100).

The core group of archival collections in the history of computer science/data processing (along with the Library of Congress) include the Charles Babbage Institute, the Computer Museum, the Hagley Museum and Library, the National Archives and Records Administration, the Smithsonian Institution, and the Stanford University Libraries. IBM, AT&T, Texas Instruments, etc., have corporate archives. James W. Cortada's *Archives of Data-Processing History: a Guide to Major U.S. collections* (New York, Greenwood Press, 1990) provides additional collections.

II. Research Strengths

A. General

The major strength of the Library's computer sciences and telecommunications collections lies in its breadth and depth in both foreign and English language materials, and in its current collecting intensity, primarily at the research level.

The Library has roughly ninety percent of the publications of the major professional associations in the field of computer science and artificial intelligence: the Association for Computing Machinery (ACM) which has a mathematical or theoretical orientation, the Society for Industrial and Applied Mechanics (SIAM) which has a engineering or applications orientation, the Institute for Electrical and Electronics Engineers (IEEE), and the American Association for Artificial Intelligence (AAAI).

The Library's Reading Rooms, in an effort to improve on currency and access provides access not only to abstracting and indexing services in electronic format but also to full text databases. Databases of interest to the computer science researcher include:

- Inspec, for computing and information technology, provides coverage from over 3,500 journals, 1,500 conference proceedings as well as numerous books, dissertations and reports.
- ACM Guide to Computing Literature.
- CSA Technology Research Database, provides coverage from over 4,000 periodicals, conference proceedings, technical reports, trade journal/newsletter items, patents, books, and press releases.

Other electronic resources that provide support the interdisciplinary areas of computer science include EI Compendex, IEEE Conference Search, NTIS, Applied Science and Technology, and Digital Dissertations.

B. Areas of Distinction

Even though the history of computers, data processing and technology is still fairly brief, the Library has a significant collection of materials in its Manuscript Collections including the papers of Herman Hollerith (inventor of punch card system for mechanical tabulation), John von Neumann (pioneer in game theory), Vannevar Bush (analog computing), Claude Elwood Shannon ("father" of information theory) and John W. Backus (FORTRAN). These collections are complemented by several seminal papers in the field of information theory that were first published in technical report form and are therefore part of the Library's collections. The growth of the telecommunication industry and its history can be documented through the papers of Samuel F. B. Morse, the Bell Family papers, Lee De Forest papers (radio/sound recording), and Harold Sunde (engineer, RCA). The Library's American Memory site also provides special collections through the Samuel F. B. Morse Papers at the Library of Congress and the Bell Family Papers at the Library of Congress.

C. Weaknesses/Exclusions

One of the most important deficits is the Library's inability to capture conferences, preprints, and papers being published in electronic format only. Technical reports from large and small university departments and from industrial research and development laboratories such as IBM and AT&T are of extreme importance in the area of computer science, often more so than traditional published literature (which is frequently out-of-date by the time it reaches print). Unless it is received through the National Technical Information Service, the Library does not collect domestic technical reports in the computer sciences. (See *Collections Policy Statement for Technical Reports, Working Papers and Preprints*). Computer science researchers are primarily interested in recent reports, although older ones, particularly those with an emphasis on theory, are sometimes requested.

Preprints, which are excluded from the Library of Congress permanent collections, have long been a primary information dissemination method in computer science. For working researchers, particularly in theoretical computer science, practically all the information dissemination takes place through early preprint exchanges and interactions at conferences. The growth of preprint archive resources on the web are a sign of their significance. Preprint resources include arXiv.org, cogprints.org, CORR (Computing Research Repository), and NCSTRL (Networked Computer Science Technical Reference Library).

With the advent of the Internet, many conferences and papers are being published in electronic format only. There is currently no means available to monitor and/or capture all of this information, and much of it is being lost to posterity. Materials that do come into the collection in electronic format (such as CD-ROM or DVD) or with mixed print/electronic material are in the custody of the Machine Readable Collections (MRC). Due to physical constraints these materials are primarily served in print format only. (See *Collections Policy Statement on Electronic Resources*.) Some preprint and conference resources, especially those from foreign universities and research institutions may also be held retained as "current issue only" in the vast, but largely uncataloged, collection held by the Technical Reports and Standards Section. (See *Collections Policy Statement on Technical Reports, Working Papers and Preprints*.)

III. Collecting Policy

The Library acquires materials in the fields of computer science in all formats and languages, e.g., print materials, microforms, and electronic, and from a variety of sources, including Copyright deposits, Cataloging in Publication (CIP), the overseas offices, purchase, and gift and exchange. Materials from all countries and in all languages are significant, and we collect broadly to ensure full representation of the literature.

Conference proceedings are currently collected comprehensively, however significant portions of computer science proceedings are migrating to electronic only (CD-ROM, or participant only access). Some e-journal and born digital materials are collected at a lower level than their print counterparts because the current Copyright law does not address the deposit of these materials. Also, some of the mechanics associated with the Library's acquisition of, storage and display of digital materials have not yet been resolved. As electronic materials in the fields of computer science, telecommunication and artificial intelligence proliferate, it is imperative that these materials are added, through web capture or other means, to Library of Congress collections.

A significant number of requests come into the Library of Congress for older versions of computer software and their accompanying manuals. However current Library of Congress practice is to not select software that is designed exclusively for servers or mainframes, software that is designed for onetime use (demo discs), software packages that are not "stand alones," or software that is not compatible with IBM type PC's. Significantly, even more so than print versions, it is difficult to track the many versions and releases of software that may be published. When usage of software depends on the availability of an earlier version (updates to a system), a fee, or a restriction imposed by registration, then the software title is generally not selected.

Materials in the fields of computer science, telecommunication and artificial intelligence are collected primarily at research and comprehensive levels. The Library holds a comprehensive collection of dissertations issued by Proquest (formerly UMI) and strives to permanently acquire all doctoral dissertations accepted by universities in the United States; foreign dissertations are acquired selectively. Related Library policies include "Best Edition" of Published Copyright Works for the Collections of the Library of Congress, LC Policy on Acquiring, Retaining and Cataloguing of Publications of 50 Pages or Less; Selection Guidelines for Electronic Resources, Collections Policy Statement on Bibliography and Library Science, Collections Policy Statement on Dissertations and Theses, Collections Policy Statement on Societies and Associations, Collections Policy and Technical Reports, Working Papers and Preprints, and Collections Policy Statement on Web Capture and Archiving.

IV. Collecting Levels

Computer Science; Telecommunication; and Artificial Intelligence			
Class	Subject	Level	Comments
QA75-QA76	Computer science	4	
QA76.38	Hybrid computers	4	
QA76.4	Analog computers	4	
QA76.5	Digital computers	4	Includes microcomputers, minicomputers, personal computers
QA76.6	Programming	4	
QA76.7	Programming languages	4	
QA76.75	Software	3	
QA76.76	Operating systems	4	
QA76.8	Computer systems	4	Includes: fault-tolerant computing, interactive systems, virtual computer systems, distributed processing

Computer Science; Telecommunication; and Artificial Intelligence			
Class	Subject	Level	Comments
QA76.9	Other topics A-Z: algorithms, computers and civilization, computers and family	4	Includes: Database management; computer architecture; computer arithmetic; computers and civilization; economic and psychological aspects; computer literacy
QA76.9	Computers and children	4	LC has primary RLG collecting responsibility
QA76.9	Computer simulation	4	
QA76.9	Computer standards, codes, specifications	5	
The following description of appropriate subclasses of Q is also in Science, General and is repeated here for convenience in identifying collection levels for Computer Science.			
Q334-342	Artificial intelligence	5	
Q350-390	Information theory	5	
Telecommunication; Electronics--Applications of electronics			
Class	Subject	Level	Comments
TK5101-TK6720	Telecommunication (telegraph, telephone, radio, radar, television)	4	
TK7880-TK7895	Electronics--applications of electronics	4	

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