American National Standard

Adopted for Use by the Federal Government

FIPS 24

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flowchart symbols and their usage in information processing

american national standards institute, inc.
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ANSI X3.5-1970

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Revision of
USA Standard
X3.5-1968

American National Standard Flowchart Symbols and Their Usage in Information Processing

Sponsor
Business Equipment Manufacturers Association

Approved September 1, 1970
American National Standards Institute, Inc

American National Standard

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Foreword

(This Foreword is not a part of American National Standard Flowchart Symbols and Their Usage in Information Processing, X3.5-1970.)

The purpose of a flowchart is to improve man-to-man communication relative to the description and analysis of an information processing problem. Flowcharting is a technique in which symbols represent both the sequence of operations and the flow of data and paperwork.

The use of flowcharts became widespread in the field of information processing concurrent with the application of electronic computers to problems of business and industry. Occasionally, however, the interpretation of a flowchart resulted in misunderstanding. One source of misunderstanding stemmed from a lack of uniformity of meaning for specific symbols in the flowcharts.

The historical development of flowchart symbols has many facets. Initially, groups of individuals in a company coordinated their work on flowcharting. Later, this same need for a uniform set of symbols became apparent to larger groups of persons who exchanged flowcharts, for example, government, commercial and industrial user groups, equipment manufacturers, form suppliers, professional societies, and consultants. Eventually, as each group attempted to establish a uniform set of symbols for its own members, the need for an American National Standard for flowchart symbols was recognized.

The American National Standards Committee on Computers and Information Processing, X3, delegated to the Subcommittee on Problem Definition and Analysis, X3-6, the responsibility for preparing a standard for flowchart symbols and their usage. In meeting this obligation, the X3-6 Subcommittee:

(1) Identified and analyzed the information processing functions to be flowcharted.

(2) Obtained and studied sets of symbols from organizations.

(3) Performed a statistical study on the definitions and the symbols representing those functions.

(4) Obtained copies of flowcharting conventions from contributing organizations.

(5) Analyzed the material received to determine the types of conventions used and the extent to which these conventions find common application.

(6) Circulated the results to a representative audience for comment.

(7) Developed and recommended a standard for flowchart symbols and their usage for information processing problem definition.

American National Standard X3.5-1970 is an expansion of X3.5-1968, which was itself a revision of a 1966 standard on the subject. The symbol shapes contained in X3.5-1968 are unchanged; however, several definitions and names have been modified slightly so that they conform exactly to *Flowchart Symbols for Information Processing,* ISO Recommendation R 1028-1969 (Geneva: International Organization for Standardization, March 1969, 1st edition). In addition to several clarifying remarks that have been added, this standard contains thirteen additional symbols and their definitions.

Suggestions for improvement gained in the use of this standard will be welcome. They should be sent to the American National Standards Institute, 1430 Broadway, New York, N.Y. 10018.

At the time it approved this standard, the X3 Committee had the following members:

Charles A. Phillips, *Chairman* Alexander C. Grove, *Secretary*†

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American National Standard Flowchart Symbols and Their Usage in Information Processing

1. Purpose and Scope

1.1 Purpose. The purpose of this standard is to establish flowchart symbols and their usage in the preparation of flowcharts for information processing systems, including automatic data processing systems.

1.2 Scope. This standard prescribes and defines flowchart symbols to represent the sequence of operations, the flow of data, and the flow of paperwork on flowcharts for information processing; prescribes presentation techniques for flowchart symbols on flowcharts; and prescribes and defines the use of flowchart symbols for the following: flowchart text, symbol identification, symbol cross reference, connector referencing, symbol striping, multiple exits, branching table, and repetitive representation of the same media.

This standard does not cover pictorial-type flowcharts that utilize pictures or drawings to depict a system.

2. Definitions

analysis. The methodical investigation of a problem, and the separation of the problem into smaller related units for further detailed study.

annotation. An added descriptive comment or explanatory note.

auxiliary operation. An offline operation performed by equipment not under control of the central processing unit.

bidirectional flow. In flowcharting, flow that can be extended over the same flowline in either direction.

central processing unit. A unit of a computer that includes the circuits controlling the interpretation and execution of instructions.

communication link. The physical means of connecting one location to another for the purpose of transmitting and receiving information.

connector. A means of representing on a flowchart a break in a line of flow.

data. Any representations such as characters or analog quantities to which meaning is or might be assigned.

decision. A determination of a future action.

display. A visual presentation of data.

document. (1) A medium and the data recorded on it for human use, for example, a report sheet, a book. (2) By extension, any record that has permanence and that can be read by man or machine.

flowchart. A graphical representation of the definition, analysis, or solution of a problem in which symbols are used to represent operations, data, flow, equipment, and so forth.

flowchart text. The descriptive information that is associated with flowchart symbols.

flow direction function. The function of linking symbols. The indicating of the sequence of available information and executable operations.

flowline. On a flowchart, a line representing a connecting path between flowchart symbols; a line to indicate a transfer of data or control.

function. A specific purpose of an entity or its characteristic action.

inconnector. A connector that indicates a continuation of a broken flowline.

information. The meaning that a human assigns to data by means of the known conventions used in its representation.

information processing. The execution of a systematic sequence of operations performed upon data.

input/output function. The making available of information for processing (input) or the recording of the processed information (output).

I/O. An abbreviation for input/output. (See input/output function.)

magnetic tape. (1) A tape with a magnetic surface on which data can be stored by selective

polarization of portions of the surface. (2) A tape of magnetic material used as the constituent in some forms of magnetic cores.

manual input. (1) The entry of data by hand into a device at the time of processing. (2) The data entered as in (1).

medium. The material or configuration thereof on which data is recorded; for example, paper tape, cards, magnetic tape.

normal direction flow. A flow in a direction from left to right or top to bottom on a flowchart.

offline storage. Storage not under control of the central processing unit.

online storage. Storage under control of the central processing unit.

operation. The event or specific action performed by a logic element.

outconnector. A connector that indicates a point at which a flowline is broken for a continuation at another point.

problem definition. A term associated with both the statement and solution phase of a problem and used to denote the transformations of data and the relationship of procedures, data, constraints, environments, and so forth.

process function. The process of executing a defined operation or group of operations.

processing. A term including any operation or combination of operations on data, where an operation is the execution of a defined action.

punched card. (1) A card punched with a pattern of holes to represent data. (2) A card as in (1) before being punched.

punched tape. A tape on which a pattern of holes or cuts is used to represent data.

represent. To use one or more characters or symbols to depict a well-defined concept.

reverse direction flow. In flowcharting, a flow in a direction other than left to right or top to bottom.

striping. The use of a line across the upper part of a flowchart symbol to signify that a detailed representation of a function is located elsewhere in the same set of flowcharts.

symbol. A representation of something by reason of relationship, association, or convention.

system. An organized collection of men, machines, and methods required to accomplish a specific objective.

terminal. A point in a system or communication network at which information can either enter or leave.

transmit. To send data from one location and to receive the data at another location.

3. Flowchart Symbols

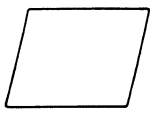
3.1 Symbols Represent Functions. Symbols are used on a flowchart to represent the functions of an information processing system. These functions are input/output, processing, flow direction, and annotation.

A basic symbol is established for each function and can always be used to represent that function. Specialized symbols are established which may be used in place of a basic symbol to give additional information.

The size of each symbol may vary but the dimensional ratio of each symbol shall be maintained.

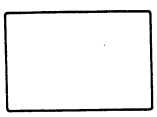
3.2 Basic Symbols

3.2.1 ***Input/Output Symbol.*** The symbol shown below represents an input/output function (I/O), that is, the making available of information for processing (input), or the recording of processed information (output).



Dimensional Ratio
Width:Height = 1:2/3

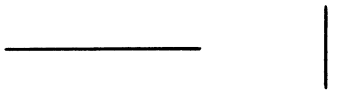
3.2.2 ***Process Symbol.*** The symbol shown below represents any kind of processing function; for example, the process of executing a defined operation or group of operations resulting in a change in value, form, or location of information, or in the determination of which of several flow directions are to be followed.



Dimensional Ratio
Width:Height = 1:2/3

3.2.3 ***Flowline Symbol.*** The symbol shown below represents the function of linking sym-

bols. It indicates the sequence of available information and executable operations.



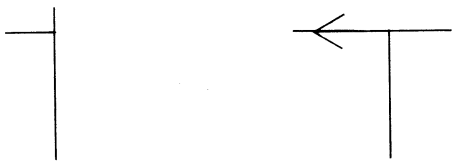
Flow direction is described in detail in 4.4.1.

3.2.3.1 *Crossing of Flowlines.* Flowlines may cross; this means they have no logical interrelation.

Example:

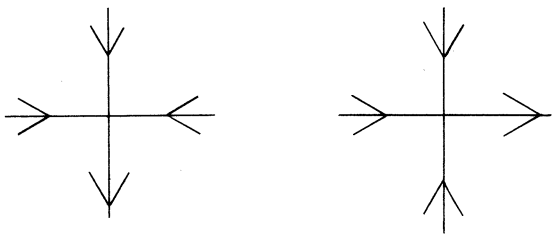
3.2.3.2 *Junction of Flowlines.* Two or more incoming flowlines may join with one outgoing flowline.

Example:

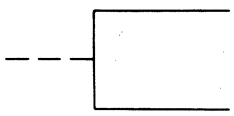


Every flowline entering and leaving a junction should have arrowheads near the junction point.

Example:



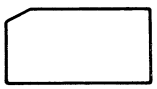
3.2.4 ***Comment, Annotation Symbol.*** The symbol shown below represents the annotation function, that is, the addition of descriptive comments or explanatory notes as clarification. The broken line is connected to any symbol at a point where the annotation is meaningful by extending the broken line in whatever fashion is appropriate.



3.3 Specialized Symbols

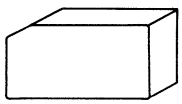
3.3.1 ***Input/Output Symbols.*** Specialized I/O Symbols may represent the I/O function and, in addition, denote the medium on which the information is recorded or the manner of handling the information or both. If no specialized symbol exists, the basic I/O symbol is used.

3.3.1.1 *Punched Card Symbol.* The symbol shown below represents an I/O function in which the medium is punched cards, including mark sense cards, partial cards, stub cards, mark scan cards, deck of cards, file of cards, and so forth.

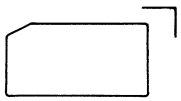


3.3.1.1.1 Specialized Punched Card Symbols. The following symbols may be used to represent a deck of cards or a file of cards.

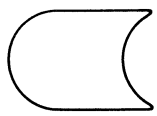
(1) Deck of Cards Symbol. The symbol shown below represents a collection of punched cards.



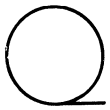
(2) File of Cards Symbol. The symbol shown below represents a collection of related punched card records.



3.3.1.2 *Online Storage Symbol.* The symbol shown below represents an I/O function utilizing any type of online storage, for example, magnetic tape, magnetic drum, magnetic disk.



3.3.1.3 *Magnetic Tape Symbol.* The symbol shown below represents an I/O function in which the medium is magnetic tape.

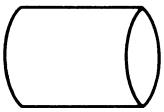


Dimensional Ratio
Width:Height = 1:1

3.3.1.4 *Punched Tape Symbol.* The symbol shown below represents an I/O function in which the medium is punched tape.

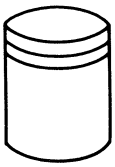
Dimensional Ratio
Width:Height = 1:1/2

3.3.1.5 *Magnetic Drum Symbol.* The symbol shown below represents an I/O function in which the medium is magnetic drum.



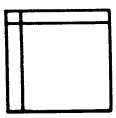
Dimensional Ratio
Width:Height = 5/4:2/3

3.3.1.6 *Magnetic Disk Symbol.* The symbol shown below represents an I/O function in which the medium is magnetic disk.



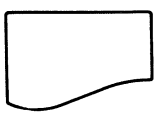
Dimensional Ratio
Width:Height = 2/3:5/4

3.3.1.7 *Core Symbol.* The symbol shown below represents an I/O function in which the medium is magnetic core.



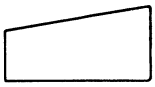
Dimensional Ratio
Width:Height = 1:1

3.3.1.8 *Document Symbol.* The symbol shown below represents an I/O function in which the medium is a document.



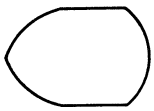
Dimensional Ratio
Width:Height = 1:2/3

3.3.1.9 *Manual Input Symbol.* The symbol shown below represents an input function in which the information is entered manually at the time of processing; for example, by means of online keyboards, switch settings, push buttons.



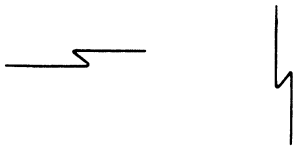
Dimensional Ratio
Width:Height = 1:1/2

3.3.1.10 *Display Symbol.* The symbol shown below represents an I/O function in which the information is displayed for human use at the time of processing, by means of online indicators, video devices, console printers, plotters, and so forth.



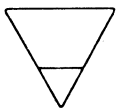
Dimensional Ratio
Width:Height = 1:2/3

3.3.1.11 *Communication Link Symbol.* The symbol shown below represents a function in which information is transmitted by a telecommunication link.



Communication link flow direction is described in detail in 4.4.2.

3.3.1.12 *Offline Storage Symbol.* The symbol shown below represents the function of storing information offline, regardless of the medium on which the information is recorded.

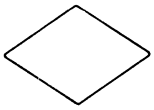


Dimensional Ratio
Width:Height = 1:0.866
(Equilateral)

3.3.2 ***Specialized Process Symbols.*** Specialized process symbols may represent the processing function and, in addition, identify the specific type of operation to be performed on the information. If no specialized symbol exists, the basic process symbol is used.

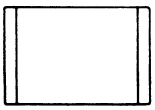
3.3.2.1 *Decision Symbol.* The symbol shown below represents a decision or switch-

ing-type operation that determines which of a number of alternative paths is to be followed.



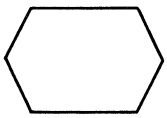
Dimensional Ratio
Width:Height = 1:2/3

3.3.2.2 *Predefined Process Symbol.* The symbol shown below represents a named process consisting of one or more operations or program steps that are specified elsewhere, for example, subroutine or logical unit. Elsewhere means not this set of flowcharts.



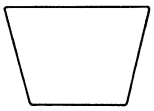
Dimensional Ratio
Width:Height = 1:2/3

3.3.2.3 *Preparation Symbol.* The symbol shown below represents modification of an instruction or group of instructions which change the program itself, for example, set a switch, modify an index register, and initialize a routine.



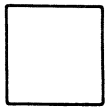
Dimensional Ratio
Width:Height = 1:2/3

3.3.2.4 *Manual Operation Symbol.* The symbol shown below represents any offline process geared to the speed of a human being, without using mechanical aid.



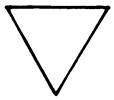
Dimensional Ratio
Width:Height = 1:2/3

3.3.2.5 *Auxiliary Operation Symbol.* The symbol shown below represents an offline operation performed on equipment not under direct control of the central processing unit.



Dimensional Ratio
Width:Height = 1:1

3.3.2.6 *Merge Symbol.* The symbol shown below represents the combining of two or more sets of items into one set.

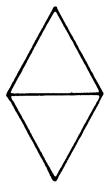


Dimensional Ratio
Width:Height = 1:0.866
(Equilateral)

3.3.2.7 *Extract Symbol.* The symbol shown below represents the removal of one or more specific sets of items from a single set of items.

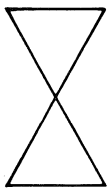
Dimensional Ratio
Width:Height = 1:0.866
(Equilateral)

3.3.2.8 *Sort Symbol.* The symbol shown below represents the arranging of a set of items into a particular sequence.



Dimensional Ratio
Width:Height = 1:1.732

3.3.2.9 *Collate Symbol.* The symbol shown below represents merging with extracting, that is, the formation of two or more sets of items from two or more other sets.

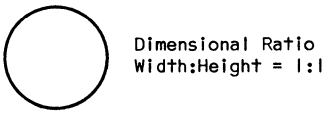


Dimensional Ratio
Width:Height = 1:1.732

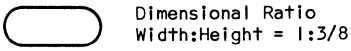
3.4 Additional Symbols

3.4.1 ***Connector Symbol.*** The symbol shown below represents an exit to or an entry from another part of the flowchart. It is a junction in a line of flow. A set of two connectors is used to represent a continued flow direction when the flow is broken by any limitation of the flowchart. A set of two or more connectors is used to represent the junction of several

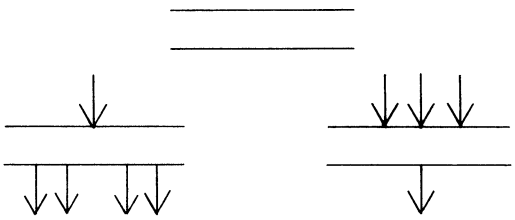
flowlines with one flowline, or the junction of one flowline with one of several alternate flowlines.



3.4.2 ***Terminal, Interrupt Symbol.*** The symbol shown below represents a terminal point in a flowchart, for example, start, stop, halt, delay, or interrupt.



3.4.3 ***Parallel Mode Symbol.*** The symbol shown below represents the beginning or end of two or more simultaneous operations.



4. Symbol Use in Flowcharting

4.1 Symbol Shape. The actual shapes of the symbols used should conform closely enough to those shown to preserve the characteristics of the symbol. The curvature of the lines and the angles formed by the lines may vary slightly from those shown in this standard so long as the shapes retain their uniqueness.

4.2 Symbol Size. Flowchart symbols are distinguished on the basis of shape, proportion, and size in relation to other symbols. Proportion of a given symbol is defined by the rectangle in which that symbol can be inscribed. Dimension and relative size of these rectangles are given with each symbol by a pair of numbers (width: height).

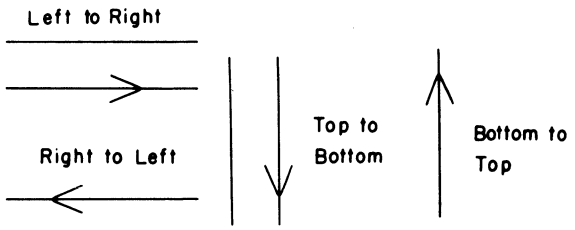
The size of each symbol may vary, but the dimensional ratio of each symbol shall be maintained.

Flowchart symbols are formed by straight and curved line segments. When prepared automatically by machine, they may be formed by patterns of successively printed graphic symbols (asterisks, periods, and so forth) which exhibit the characteristic shapes.

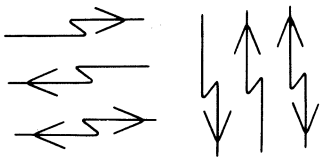
4.3 Symbol Orientation. The orientation of each symbol on a flowchart should be the same as shown in Section 3, Flowchart Symbols.

4.4 Flow Direction. Flow direction is represented by lines drawn between symbols.

4.4.1 ***Flowline.*** Normal direction of flow is from left to right and top to bottom. When the flow direction is not left to right or top to bottom, open arrowheads shall be placed on reverse-direction flowlines. When increased clarity is desired, open arrowheads can be placed on normal-direction flowlines. When flowlines are broken due to page limitation, connector symbols shall be used to indicate the break. When flow is bidirectional, it can be shown by either single or double lines, but open arrowheads shall be used to indicate both normal-direction flow and reverse-direction flow.



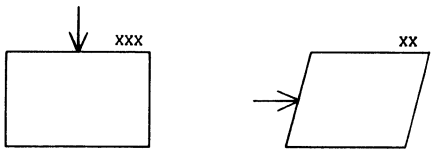
4.4.2 ***Communication Link.*** Unless otherwise indicated, the direction of communication link flow is left to right and top to bottom. Open arrowheads are necessary on symbols for which the flow opposes the above convention. An open arrowhead may also be used on any line whenever increased clarity will result.



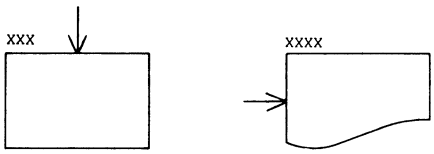
4.5 Flowchart Text. Descriptive information with each symbol shall be presented so as to read from left to right and top to bottom regardless of the flow direction.

4.6 Symbol Identification. (See Appendix.) The identifying notation assigned to a symbol, other than a connector, shall be placed above

the symbol and to the right of its vertical bisector.



4.7 Symbol Cross Reference. (See Appendix.) Identifying notation(s) of other elements of documentation (including this set of flowcharts) shall be placed above the symbol and to the left of its vertical bisector.



4.8 Connector Referencing

4.8.1 ***Connector Common Identification.*** A common identifier, such as an alphabetic character, number, or mnemonic label, is placed within the outconnector and its associated inconnector.

4.8.2 ***Cross Referencing Connectors.*** (See Appendix.) Additional cross referencing between associated connectors is achieved by placing the chart page(s), coordinates, or other identifier(s) of the associated connectors above and to the left of the vertical bisector of each connector.

4.9 Symbol Striping. Striping is a means of indicating that a more detailed representation of a function is to be found elsewhere in the same set of flowcharts. This representation differs from a predefined process symbol which need not be represented in detail in the same set of flowcharts.

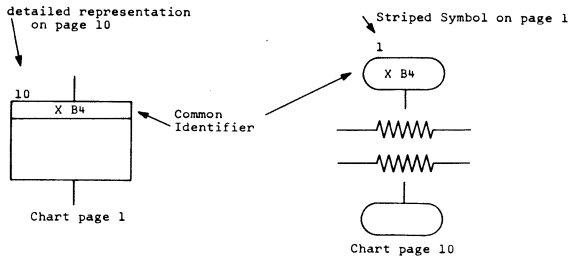
4.9.1 ***Striped Symbol.*** A horizontal line is drawn within, completely across, and near the top of the symbol, and a reference to the detailed representation is placed between that line and the top of the symbol.

4.9.2 ***First Symbol of Detailed Representation.*** The terminal symbol shall be used as the first and last symbols of the detailed representation. The first terminal symbol contains an identification which also appears in the striped symbol, as indicated in 4.9.1.

4.9.3 ***Cross Referencing of Striped Symbol and Detailed Representation.*** (See Appendix.) A reference to the location of the detailed representation within the flowchart is placed above and to the left of the vertical bisector of the striped symbol. A reference to the striped symbol is placed above and to the left of the vertical bisector of its associated terminal symbol.

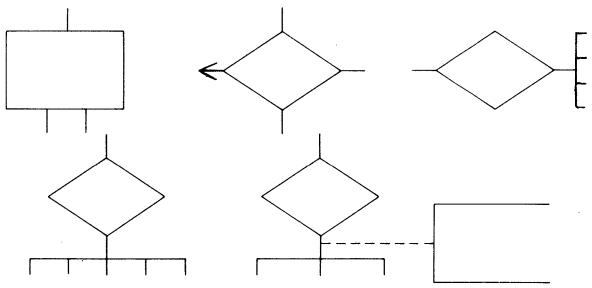
Example: Striped Symbol and Detailed Representation

Striped Symbol *Detailed Representation*

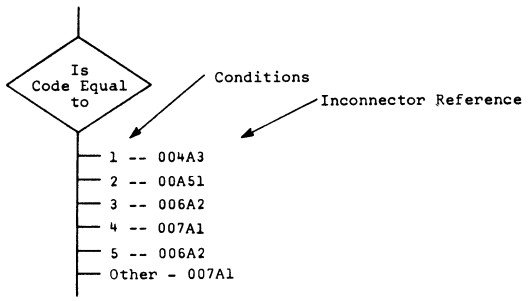


4.10 Multiple Exits

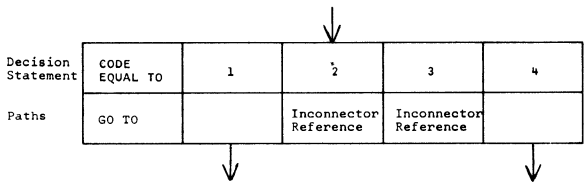
4.10.1 ***Symbol Exits.*** Multiple exits from a symbol shall be shown by several flowlines from the symbol to other symbols or by a single flowline from the symbol which branches into the appropriate number of flowlines.

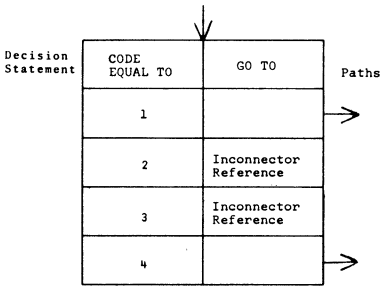


4.10.2 ***Multiple Logic Paths.*** Each exit from a symbol shall be identified to show the logic path which it represents. The logic paths may be represented by a table that indicates their associated conditions and the inconnector references.



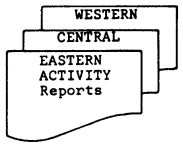
4.11 Branching Table. A branching table may be used in lieu of a decision symbol to depict a decision function. The table is composed of a statement of the decision to be made, a list of the conditions which can occur, and the path to be followed for each condition. The terms "Decision Statement" and "Paths" are not part of the standard. The "GO TO" section contains either an inconnector reference or a single flowline exiting to another symbol. Examples of branching table formats are shown below.

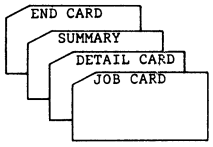


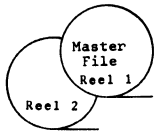


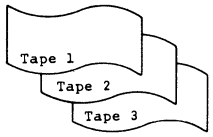
4.12 Repetitive Representation of the Same Media

4.12.1 ***Multiple Symbols.*** As an alternative to a single symbol with appropriate text, the same input/output symbols may be shown in an overlay pattern to illustrate the use or creation of multiple media or files, for example, number of copies, types of printed reports, types of punched card formats, multiple magnetic tape reels.





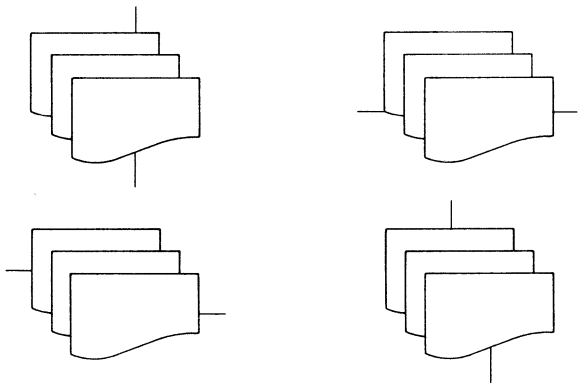




4.12.2 ***Overlay Pattern.*** The overlay pattern must be drawn from front to back with the first symbol as the entire I/O symbol. The center line of the second symbol must be offset up or down from the horizontal center line and to the right or left of the vertical center line of the first symbol. Similarly, the third symbol must be offset in the same direction from the second symbol; the fourth from the third; and so on for any remaining symbols.

4.12.3 ***Priority Representation.*** When the multiple symbols represent an ordered set, the ordering shall be from front (first) to back (last).

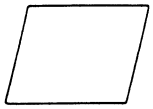
4.12.4 ***Flowlines with Repetitive Symbols.*** Flowlines may enter or leave from any point on the overlay symbols. The priority or sequential order of the multiple symbols (as outlined in 4.12.3) is not altered by the point at which the flowline(s) enters or leaves.



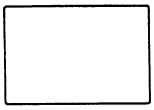
5. Summary of Flowchart Symbols

Basic Symbols

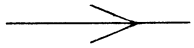
Input/Output



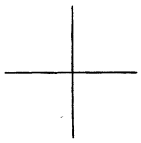
Process



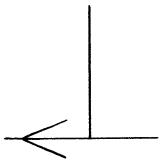
Flowline



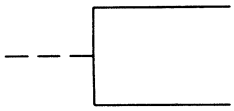
Crossing of Flowlines



Junction of Flowlines

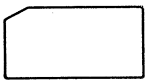


Annotation, Comment

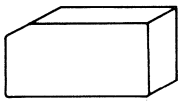


Specialized Input/Output Symbols

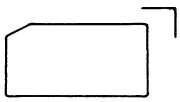
Punched Card



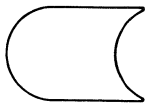
Deck of Cards



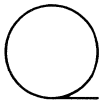
File of Cards



Online Storage

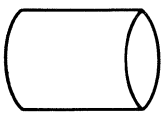


Magnetic Tape

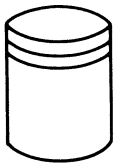


Punched Tape

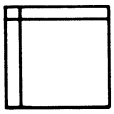
Magnetic Drum



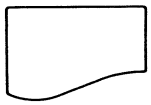
Magnetic Disk



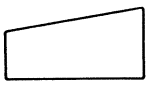
Core



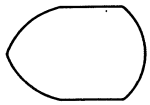
Document



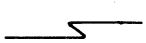
Manual Input



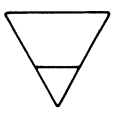
Display



Communication Link

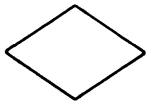


Offline Storage

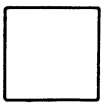


Specialized Process Symbols

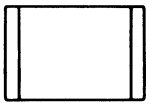
Decision



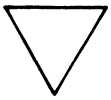
Auxiliary Operation



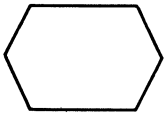
Predefined Process



Merge

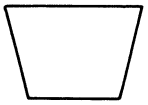


Preparation

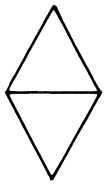


Extract

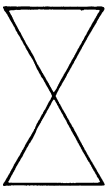
Manual Operation



Sort



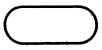
Collate



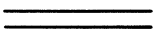
Additional Symbols

Connector

Terminal



Parallel Mode



Appendix

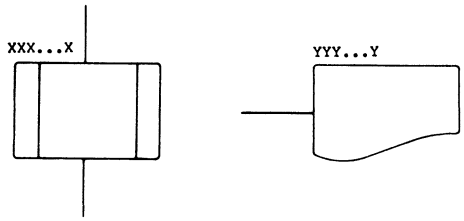
(This Appendix is not part of American National Standard Flowchart Symbols and Their Usage in Information Processing, X3.5-1970, but is included for information purposes only.

International Considerations

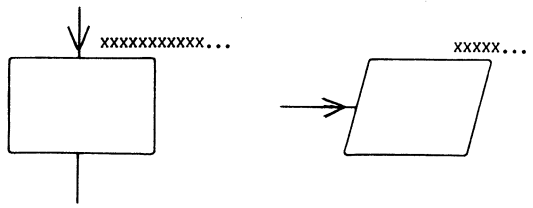
At its meeting of June 7, 1968, in Amsterdam, ISO/TC 97/SC 7 agreed to a set of flowchart symbol conventions based on the American National Standard. A First Draft Proposal, Use of Flowchart Symbols in Flowcharting, ISO/TC 97/SC 7 (Secretariat-25) 56 was prepared. Based on the report of the U.S. delegates to the SC 7 meeting, it is felt that there may be a conflict between sections 4.6, 4.7, 4.8.2, and 4.9.3 of this American National Standard and the SC 7 First Draft Proposal. The applicable sections of the ISO First Draft Proposal are as follows.

3. Identification of Symbols (Other than Flowchart Text)

3.1 Symbol Name. This is a symbol identifier, always of a predetermined maximum number of characters, which identifies the symbol for reference purposes (for example, to a program listing) and which shall be placed above and to the left of the symbol as shown.



3.2 Symbol Description. This is any other information (for example, for description, elaboration, or other cross-referencing, to provide improved understanding of the function of that part of the system) which, being generally of an undetermined number of characters, shall be placed above and to the right of the symbol as shown.



American National Standards for Information Processing

X3.1-1976 Synchronous Signaling Rates for Data Transmission

X3.2-1970 (R1976) Print Specifications for Magnetic Ink Character Recognition

X3.3-1970 (R1976) Bank Check Specifications for Magnetic Ink Character Recognition

X3.4-1977 Code for Information Interchange

X3.5-1970 Flowchart Symbols and Their Usage in Information Processing

X3.6-1965 (R1973) Perforated Tape Code for Information Interchange

X3.9-1978 FORTRAN

X3.11-1969 Specification for General Purpose Paper Cards for Information Processing

X3.14-1973 Recorded Magnetic Tape for Information Interchange (200 CPI, NRZI)

X3.15-1976 Bit Sequencing of the American National Standard Code for Information Interchange in Serial-by-Bit Data Transmission

X3.16-1976 Character Structure and Character Parity Sense for Serial-by-Bit Data Communication in the American National Standard Code for Information Interchange

X3.17-1977 Character Set and Print Quality for Optical Character Recognition (OCR-A)

X3.18-1974 One-Inch Perforated Paper Tape for Information Interchange

X3.19-1974 Eleven-Sixteenths-Inch Perforated Paper Tape for Information Interchange

X3.20-1967 (R1974) Take-Up Reels for One-Inch Perforated Tape for Information Interchange

X3.21-1967 Rectangular Holes in Twelve-Row Punched Cards

X3.22-1973 Recorded Magnetic Tape for Information Interchange (800 CPI, NRZI)

X3.23-1974 Programming Language COBOL

X3.24-1968 Signal Quality at Interface between Data Processing Terminal Equipment and Synchronous Data Communication Equipment for Serial Data Transmission

X3.25-1976 Character Structure and Character Parity Sense for Parallel-by-Bit Data Communication in the American National Standard Code for Information Interchange

X3.26-1970 Hollerith Punched Card Code

X3.27-1978 Magnetic Tape Labels and File Structure for Information Interchange

X3.28-1976 Procedures for the Use of the Communication Control Characters of American National Standard Code for Information Interchange in Specified Data Communication Links

X3.29-1971 Specifications for Properties of Unpunched Oiled Paper Perforator Tape

X3.30-1971 Representation for Calendar Date and Ordinal Date for Information Interchange

X3.31-1973 Structure for the Identification of the Counties of the United States for Information Interchange

X3.32-1973 Graphic Representation of the Control Characters of American National Standard Code for Information Interchange

X3.34-1972 Interchange Rolls of Perforated Tape for Information Interchange

X3.36-1975 Synchronous High-Speed Data Signaling Rates between Data Terminal Equipment and Data Communication Equipment

X3.37-1977 Programming Language APT

X3.38-1972 (R1977) Identification of States of the United States (Including the District of Columbia) for Information Interchange

X3.39-1973 Recorded Magnetic Tape for Information Interchange (1600 CPI, PE)

X3.40-1976 Unrecorded Magnetic Tape for Information Interchange (9-Track 200 and 800 CPI, NRZI, and 1600 CPI, PE)

X3.41-1974 Code Extension Techniques for Use with the 7-Bit Coded Character Set of American National Standard Code for Information Interchange

X3.42-1975 Representation of Numeric Values in Character Strings for Information Interchange

X3.43-1977 Representations of Local Time of the Day for Information Interchange

X3.44-1974 Determination of the Performance of Data Communication Systems

X3.45-1974 Character Set for Handprinting

X3.46-1974 Unrecorded Magnetic Six-Disk Pack (General, Physical, and Magnetic Characteristics)

X3.47-1977 Structure for the Identification of Named Populated Places and Related Entities of the States of the United States for Information Interchange

X3.48-1977 Magnetic Tape Cassettes for Information Interchange (3.810-mm [0.150-in] Tape at 32 bpmm [800 bpi], PE)

X3.49-1975 Character Set for Optical Character Recognition (OCR-B)

X3.50-1976 Representations for U.S. Customary, SI, and Other Units to Be Used in Systems with Limited Character Sets

X3.51-1975 Representations of Universal Time, Local Time Differentials, and United States Time Zone References for Information Interchange

X3.52-1976 Unrecorded Single-Disk Cartridge (Front Loading, 2200 BPI), General, Physical, and Magnetic Requirements

X3.53-1976 Programming Language PL/I

X3.54-1976 Recorded Magnetic Tape for Information Interchange (6250 CPI, Group Coded Recording)

X3.55-1977 Unrecorded Magnetic Tape Cartridge for Information Interchange, 0.250 Inch (6.30 mm), 1600 bpi (63 bpmm), Phase Encoded

X3.56-1977 Recorded Magnetic Tape Cartridge for Information Interchange 4 Track, 0.250 Inch (6.30 mm), 1600 bpi (63 bpmm), Phase Encoded

X3.57-1977 Structure for Formatting Message Headings for Information Interchange Using the American National Standard Code for Information Interchange for Data Communication Systems Control

X3.58-1977 Unrecorded Eleven-Disk Pack General, Physical, and Magnetic Requirements

X3.60-1978 Programming Language Minimal BASIC

X3.61-1978 Representation of Geographic Point Locations for Information Interchange

X3.62-1979 Paper Used in Optical Character Recognition (OCR) Systems

X3.64-1979 Additional Controls for Use with American National Standard Code for Information Interchange

X3.66-1979 Advanced Data Communication Control Procedures (ADCCP)

X3.73-1980 Single-Sided Unformatted Flexible Disk Cartridge (for 6631-BPR Use)

X3.77-1980 Representation of Pocket Select Characters in Information Interchange

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X3/TRI-77 Dictionary for Information Processing (Technical Report)

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New York, N.Y. 10018