INTERNATIONAL STANDARD

ISO/IEC 8631

Second edition
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Information technology — Program constructs and conventions for their representation

Technologies de l'information — Structures de programmes et normes pour leur représentation

Reference number
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Contents

Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) together form a system for worldwide standardization as a whole. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work.

In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1. Draft International Standards adopted by the joint technical committee are circulated to national bodies for approval before their acceptance as International Standards. They are approved in accordance with procedures requiring at least 75 % approval by the national bodies voting.

International Standard ISO/IEC 8631 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*.

This second edition cancels and replaces the first edition (ISO 8631 : 1986), of which it constitutes a minor revision.

Annex A of this International Standard is for information only.

Introduction

It is accepted that a limited number of distinct constructs combined in a well-defined manner is sufficient to express any process. A program is considered to be well-structured if it is built from the constructs contained in this International Standard and follows the rules of combination.

A program may be viewed at several conceptual levels. At any but the lowest level, one construct may be represented as a number of constructs at a lower level.

Information technology — Program constructs and conventions for their representation

1 Scope

This International Standard is concerned with the expression of procedure oriented algorithms. It

a) defines the nature of program constructs;

b) indicates the manner in which constructs can be combined;

c) provides specifications for a set of constructs;

d) permits the definition of a variety of subsets of the defined constructs.

See annex A for symbolic representations.

2 Definition of program construct

A program construct consists of a set of one or more procedure parts and a control part which may be implicit.

Each procedure part consists of one or more operations to be performed or may be null.

The control part determines the manner in which the procedure parts are to be executed. It can consist of a directive and a set of conditions. The control part then activates or de-activates the procedure part(s) depending on the nature of the directive and the values of the conditions. If there is neither directive nor condition, control is called implicit.

3 How constructs may be combined

The only way in which constructs can be combined to build a well-structured program is by replacing a procedure part of one construct by a complete construct.

4 Specification of constructs

4.1 Imperative construct

This construct contains one procedure part and an implicit control part which determines that the procedure part is executed exactly once.

4.2 Serial construct

This construct contains two or more procedure parts and an implicit control part which determines that the procedure parts are to be executed exactly once in the sequence given.

4.3 Parallel construct

This construct consists of two or more procedure parts and a control part which initiates these procedure parts. Execution of the construct is finished when all initiated procedure parts are completely executed.

4.4 Iterative construct

a) Pre-tested iteration

This construct consists of a procedure part and a control part with one condition, the value of which determines whether the procedure part is executed zero or more times.

b) Post-tested iteration

This construct consists of a procedure part and a control part with one condition, the value of which determines whether the procedure part is executed more than once.

c) Continuous iteration

This construct consists of a procedure part and a control part with an implicit condition which specifies that the procedure part will be repeated indefinitely.

4.5 Selective choice construct

a) Monadic selective

This construct consists of a single procedure part and a control part with one condition, the value of which determines whether or not the procedure part is to be executed.

b) Dyadic selective

This construct consists of two procedure parts and a control part with one condition, the value of which determines which one of the two procedure parts is to be executed.

c) Multiple exclusive selective

This construct consists of a number of procedure parts and a control part with a set of conditions, the values of which determine which one of the procedure parts is to be executed.

d) Multiple inclusive selective

This construct consists of a number of procedure parts and a control part with a set of conditions, the value(s) of which select zero or more procedure parts to be executed in an undefined sequence.

5 Termination

In addition to the termination of a construct as defined by its control part, the execution of a construct may be terminated by a TERMINATION operation placed in one or more procedure parts of the construct. The TERMINATION operation shall identify which construct is to be terminated. If the TERMINATION operation is executed, execution of the identified construct and all its inner constructs will immediately cease.

A TERMINATION operation that would terminate a parallel construct or a multiple inclusive selective construct is undefined.

A TERMINATION operation which terminates an outer construct does not conform to this International Standard.

6 Definition of subsets

The use of a proper subset of the constructs defined in this International Standard and combined in accordance with this International Standard shall be considered to be in conformance with this International Standard.

Use of a construct other than the ones defined in this International Standard which is functionally equivalent to a legitimate composition of constructs defined in this International Standard is in conformance with this International Standard.

Annex A
(informative)

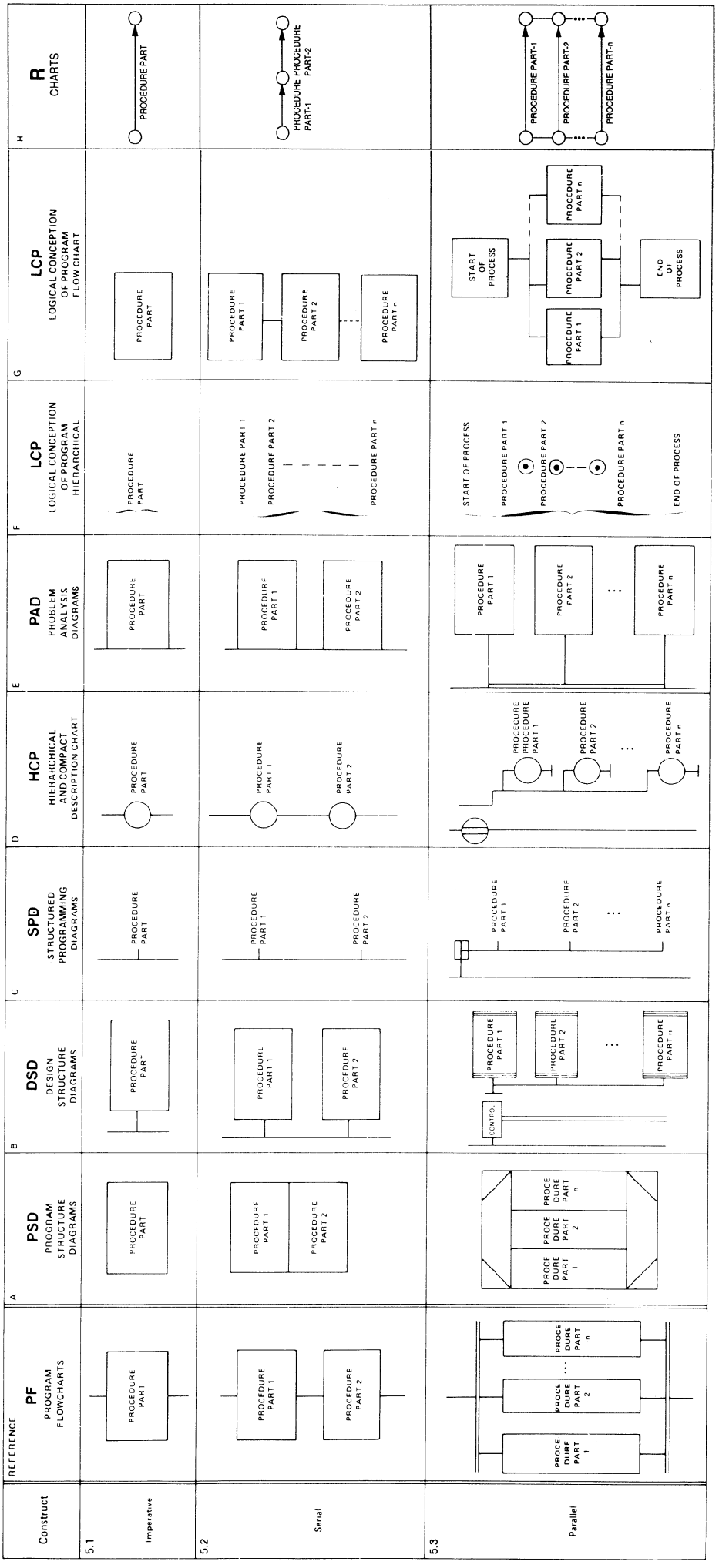
Charting notations for program constructs

The following charting notations for program constructs in columns A to G are examples of applicable graphic representations.

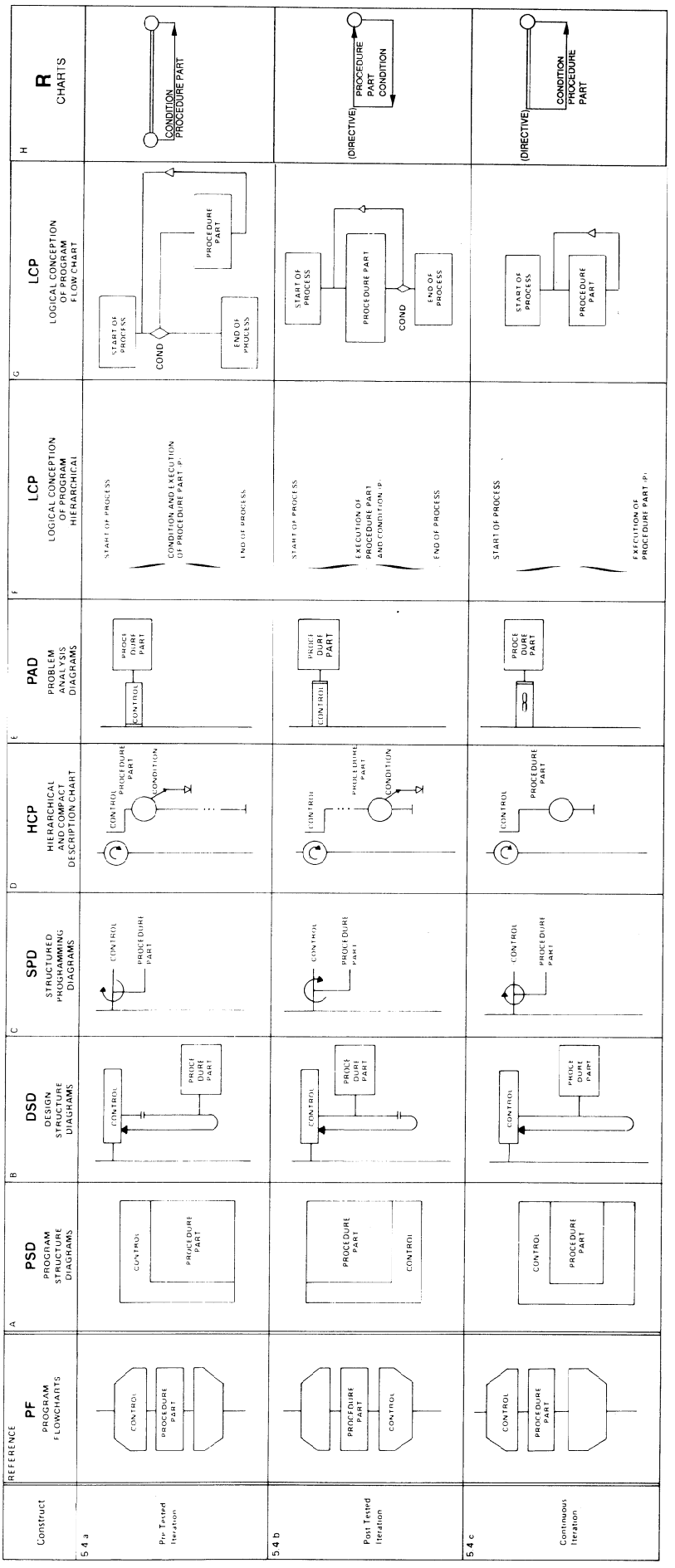
The "Reference" column uses the symbols of ISO 5807 and is included for reference only.

Symbols from the various columns should not be intermixed.

CHARTING NOTATIONS FOR PROGRAM CONSTRUCTS

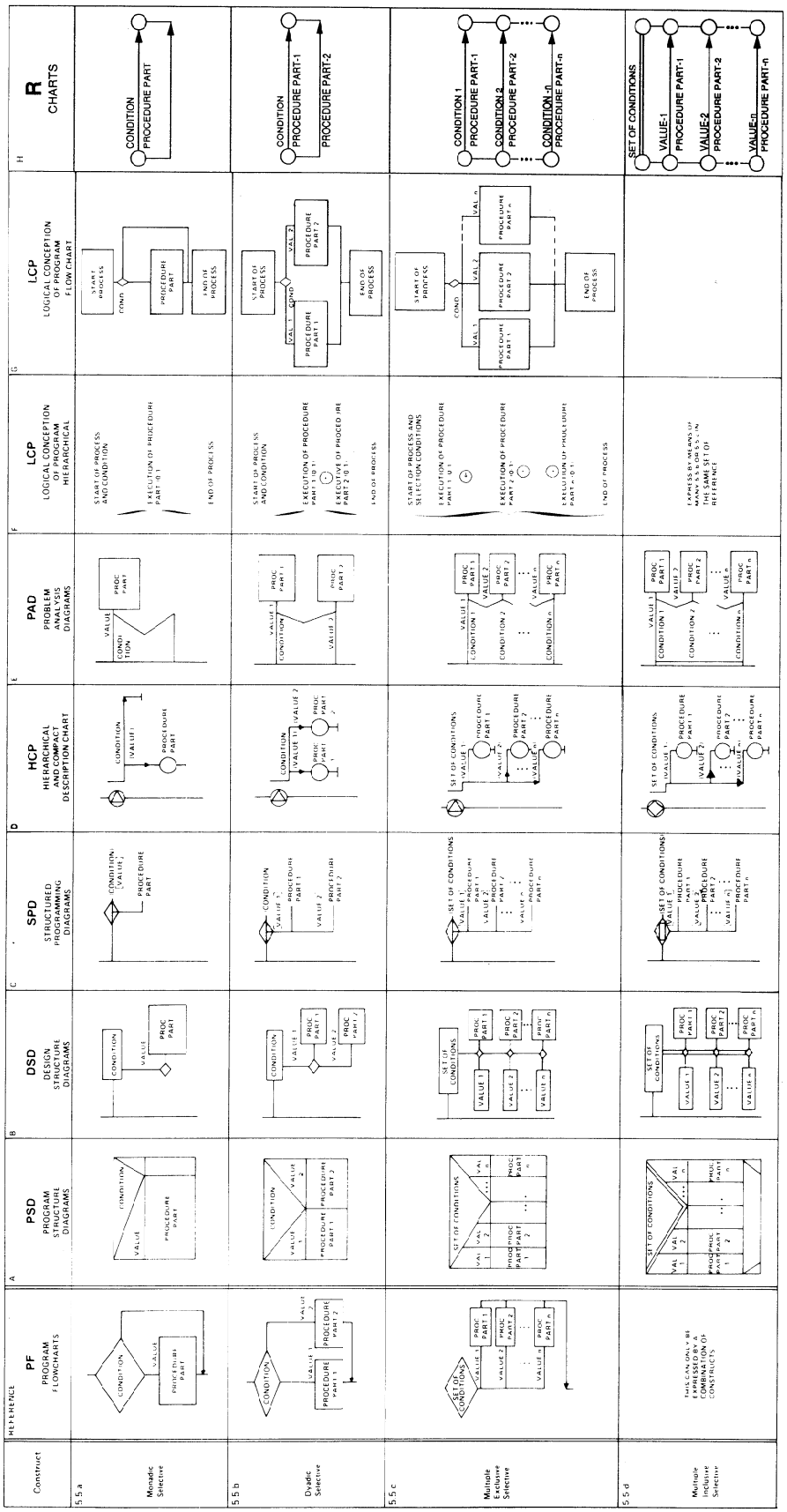


CHARTING NOTATIONS FOR PROGRAM CONSTRUCTS
ITERATIVE CHOICE CONSTRUCTS



CHARTING NOTATIONS FOR PROGRAM CONSTRUCTS

SELECTIVE CHOICE CONSTRUCTS



CHARTING NOTATIONS FOR PROGRAM CONSTRUCTS

Construct	REFERENCE **PF** PROGRAM FLOWCHARTS	A **PSD** PROGRAM STRUCTURE DIAGRAMS	B **DSD** DESIGN STRUCTURE DIAGRAMS	C **SPD** STRUCTURED PROGRAMMING DIAGRAMS	D **HCP** HIERACHICAL AND COMPACT DESCRIPTION CHART	E **PAD** PROBLEM ANALYSIS DIAGRAMS	G **LCP** LOGICAL CONCEPTION OF PROGRAM	H **R** CHARTS
6 Termination Operation	CONSTRUCT IDENT	CONSTRUCT IDENTIFICATION	CONSTRUCT IDENT	CONSTRUCT IDENTIFICATION	CONSTRUCT IDENTIFICATION	CONSTRUCT IDENT	INTEGRATED INTO ALL THE OTHER REPRESENTATIONS	#
Member bodies proposing and maintaining the sets of symbols	ISO 5807	NETHERLANDS NATIONAL STANDARD NEN 1422 GERMANY NATIONAL STANDARD DIN 66261	UNITED KINGDOM BRITISH STANDARD BS 6224	JAPAN INFORMATION PROCESSING SOCIETY OF JAPAN IPSJ SC7 82 12 4 IPSJ SC7 82 12 3 IPSJ SC7 82 12 5			AFNOR Z67 102	GOST 19.005-85
Notes	THIS SET OF SYMBOLS IS FOR REFERENCE AND COMPARISON ONLY	1 A COMPLETE PROGRAM, A CONSTRUCT OR A PROCEDURE PART ALL HAVE THE OUTLINE OF A RECTANGLE THUS SECTION 4 OF THE STANDARD IS ACHIEVED ENTIRELY BY SUBDIVISION OF RECTANGLES I E NO CONNECTING FLOW LINES ARE USED 2 IN ALL SELECTIVE CHOICE SYMBOLS, THE LOWER POINT OF THE CONDITION TRIANGLE MUST NOT COINCIDE WITH EITHER OF THE TWO SIDES OF THE CONSTRUCT 3 IN ALL CASES THE RECTANGLE OF TERMINATION OPERATION MUST REPLACE A COMPLETE PROCEDURE PART OF A CONSTRUCT					1 ALL THE REPRESENTATIONS ARE ALSO ABLE TO DESCRIBE THE DATA TO BE OBTAINED OR TO BE USED 2 THE SYMBOL ⊙ OF STRUCTURE 5.3 INDICATES THE INDEPENDENCE OF THE PROCEDURES BEING CARRIED OUT SIMULTANEOUSLY THE SYMBOL ⊕ OF STRUCTURE 5.5 INDICATES THE EXCLUSION OF THE PROCEDURES 3 THE REPRESENTATION OF AN ENTIRE PROGRAM (OR DATA SET) IS CARRIED OUT BY INTERMIXING THESE STRUCTURES	

UDC 681.3.06

Descriptors : data processing, programming (computers), computer programs.

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