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BUREAU OF INDIAN STANDARDS
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मसौदा भारतीय मानक

सूचना प्रौद्योगिकी- प्रोग्रामिंग भाषाएं – ऐडा

(द्वसरा पुनरीक्षण)

Draft Indian Standard

Information Technology — Programming Languages — Ada

(Second Revision)

ICS 35.060

Data Management System Sectional Committee, LITD 15	**Last Date for Comments: 11 April 2025**

NATIONAL FOREWORD

(Formal clauses will be added later)

This draft Indian Standard (Second Revision) which is identical to 'ISO/IEC 8652: 2023 Information Technology — Programming Languages — Ada' issued by the International Organization Standardization (ISO) and International Electrotechnical Commission (IEC) will be adopted by the Bureau of Indian Standards (BIS) on the recommendations of the Data Management System Sectional Committee and approval of the Electronics and Information Technology Division Council.

This Standard was originally published in 1993 which was identical with ISO 8652:1987 ‘Programming language — Ada’. The first revision of this standard was published in 2018 which was identical with ISO/IEC 8652: 2012 ‘Information technology — Programming languages — Ada’. The second revision of this standard has been undertaken to align it with the latest version of ISO/IEC 8652: 2023.

The main changes are as follows:

— improved support for parallel execution is provided via the introduction of parallel loops, parallel blocks, parallel container iteration, and parallel reduction;

— more precise specification of subprogram interfaces is supported via the new aspects Global, Global'Class, and Non blocking. The Global aspects, in particular, help to determine whether two constructs can safely execute in parallel;

— Pre and Post aspects can now be specified for access-to-subprogram types and for generic formal subprograms; a post condition for the default initialization of a type can be specified using the new Default_Initial_Condition aspect;

— the behavior of many predefined container operations is now more precisely specified by using pre- and post condition specifications instead of English descriptions; a restricted (“stable”) view for most containers is introduced to support more efficient iteration;

— more flexible uses of static expressions are supported via the introduction of static expression functions along with fewer restrictions on static strings;

— the Image attribute is supported for nonscalar types, and a user-specifiable attribute Put_Image is provided, which determines the value of the Image attribute for a user-defined type;

— the use of numeric and string literals is generalized to allow their use with other categories of types, via the new aspects Integer Literal, Real_Literal, and String_Literal;

— array and record aggregates are made more flexible: index parameters are allowed in an array aggregate to define the components as a function of their array index; discriminants can be defined more flexibly within an aggregate for a variant record type;

— new types of aggregates are provided: delta aggregates to allow the construction of a new object by incremental updates to an existing object; container aggregates to allow construction of an object of a container type by directly specifying its elements;

— a shorthand is provided, using the token '@', to refer to the target of an assignment statement in the expression defining its new value;

— declare expressions are provided that permit the definition and use of local constants or re namings, to allow a large expression to be simplified by defining common parts as named entities;

— support for lightweight iteration is added via the introduction of procedural iterators;

— support for the map-reduce programming strategy is added via the introduction of reduction expressions;

— for constructs that use iterators of any sort, a filter can be specified that restricts the elements produced by the iteration to those that satisfy the condition of the filter;

— predefined packages supporting arbitrary-precision integer and real arithmetic are provided;

— the Jorvik profile is introduced to support hard real-time applications that want to go beyond the restrictions of the Ravenscar profile.

The text of ISO/IEC Standard may be approved as suitable for publication as an Indian Standard without deviations. Certain conventions and terminologies are, however, not identical to those used in Indian Standards. Attention is particularly drawn to the following:

a) Wherever the words ‘International Standard’ appear referring to this standard, they should be read as ‘Indian Standard’, and

b) Comma (,) has been used as a decimal marker while in Indian Standards, the current practice is to use a point (.) as the decimal marker.

In this adopted standard, reference appears to certain International Standards for which Indian Standards also exist. The corresponding Indian Standards, which are to be substituted in their respective places, are listed below along with their degree of equivalence for the editions indicated. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies:

International Standards	Corresponding Indian Standard	Degree of Equivalence
ISO/IEC 3166-1: 2020 Codes for the representation of names of countries and their subdivisions — Part 1: Country codes	IS 14836 (Part 1) : 2020 ISO 31066-1 : 2013 Codes for the Representation of Names of Countries and their Subdivisions Part 1 Country Codes (Second Revision)	Identical with ISO 31066-1 : 2013

The technical committee has reviewed the provisions of the following International Standard referred in this adopted draft standard and has decided that it is acceptable for use in conjunction with this standard. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies:-

International Standard	Title
ISO 639-3 : 2007	Codes for the representation of names of languages — Part 3: Alpha -3 code for comprehensive coverage of languages
ISO/IEC 10646 : 2011	Information technology — Universal Multiple-Octet Coded Character Set (UCS)

Scope of ISO/IEC 8652: 2023 is as follows:

"This document specifies the form and meaning of programs written in Ada. Its purpose is to promote the portability of Ada programs to a variety of computing systems.

This document specifies:
— The form of a program written in Ada;
— The effect of translating and executing such a program;
— The manner in which program units can be combined to form Ada programs;
— The language-defined library units that a conforming implementation is required to supply;
— The permissible variations in conformance to the rules of this document, and the manner in which they are to be documented;
— Those violations of the requirements of this document that a conforming implementation is required to detect, and the effect of attempting to translate or execute a program containing such violations;

— Those violations of the requirements of this document that a conforming implementation is not required to detect.

This document does not specify:
— The means whereby a program written in Ada is transformed into object code executable by a processor;

— The means whereby translation or execution of programs is invoked and the executing units are controlled;
— The size or speed of the object code, or the relative execution speed of different language constructs;
— The form or contents of any listings produced by implementations; in particular, the form or contents of error or warning messages;
— The effect of unspecified execution;
— The size of a program or program unit that will exceed the capacity of a particular conforming implementation."

Note: - The Technical content of this document has not been enclosed as these are identical with the corresponding ISO/IEC Standard. For details please refer to ISO/IEC 8652: 2023 or kindly contact

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