



BSI Standards Publication

Ergonomics of human-system interaction

Part 171: Software accessibility

National foreword

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The UK participation in its preparation was entrusted to Technical Committee PH/9, Applied ergonomics.

A list of organizations represented on this committee can be obtained on request to its committee manager.

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European foreword

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This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by June 2026, and conflicting national standards shall be withdrawn at the latest by June 2026.

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Contents

Page

Foreword	viii
Introduction	ix
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
3.1 Major accessibility related concepts	1
3.2 Concepts relating to interaction	3
3.3 Concepts relating to the user interface	3
3.4 Concepts relating to individualization	6
3.5 Concepts relating to accessibility features	6
3.5.1 Major concepts relating to accessibility features	6
3.5.2 Concepts relating to visual accessibility features	7
3.5.3 Concepts relating to audio accessibility features	8
3.5.4 Concepts relating to audiovisual accessibility features	9
3.5.5 Concepts relating to input features	9
3.5.6 Concepts relating to keyboard-based input features	10
4 Conventions	12
5 Conformance	13
6 Structure and application of this document	13
6.1 External principles and guidance	13
6.1.1 Accessibility principles of the W3C Web Content Accessibility Guidelines (WCAG) 2.2	13
6.1.2 Accessibility principles of the W3C User Agent Accessibility Guidelines (UAAG) 2.0	14
6.2 Accessibility goals of ISO/IEC Guide 71	14
6.3 Organization of guidance in this document	15
6.4 Achieving accessibility	16
7 Goal 1: Achieving suitability for the widest range of users' needs	16
7.1 To recognize that users are included as system users within diverse contexts	16
7.2 To have accessible support for using the system	16
7.2.1 Describe accessibility features	16
7.2.2 Provide accessible support services	16
7.2.3 Provide accessible training material	17
7.2.4 Provide user documentation in accessible electronic form	17
7.2.5 Provide accessible feedback mechanisms	17
7.3 To have the system accessible to an individual with combinations of needs	17
8 Goal 2: Achieving conformity with user expectations needs	18
8.1 To not be surprised by the results of interactions with the system	18
8.1.1 Maintain naming consistency	18
8.1.2 Maintain location and ordering consistency	18
8.1.3 Present user notification using consistent techniques	18
8.1.4 Update equivalent alternatives for media when the media changes	18
8.1.5 Use familiar tactile patterns	19
8.1.6 Manage consistent focus	19
8.1.7 Restore state when regaining focus	19
8.1.8 Follow platform keyboard conventions	19
8.1.9 Managing changes of context	19
8.2 To apply personal knowledge and experience to interact successfully with the system	20
8.3 To provide user assistance for knowledge needed to interact with the system	20
8.4 To provide immediate and easily accessible help or further instructions, where such help can be provided by the system	20

9	Goal 3: Achieving support for individualization needs	20
9.1	To be provided with the way of interacting with a system that best works for them	20
9.2	To choose between the available input and output modalities and their configuration without requiring restart of the system	21
9.2.1	Enable switching of input and output alternatives	21
9.2.2	Enable revising or reassigning controls	21
9.3	To have simultaneous use of alternate interaction modalities	21
9.3.1	Choosing modalities to be simultaneously available	21
9.3.2	Switching between simultaneously available modalities	21
9.3.3	Allow user to select media streams to be presented	21
9.4	To be provided with information on available options for interacting with a system on which to base a choice of interaction methods	21
9.5	To be provided with an accessible means to choose individualization features	22
9.5.1	Enable individualization of user-preference settings	22
9.5.2	Enable adjustment of attributes of common user-interface elements	24
9.5.3	Enable individualization of the user interface	24
9.6	To have individualization features maintained for future uses of the system, until changed by the user	24
9.6.1	Utilize user-preference profiles	24
9.6.2	Provide a means of restoring system defaults	25
9.6.3	Minimize the need to restart for changes	25
9.7	To provide pre-defined preference profiles	25
9.8	To take or give up control of functions that can be performed by either the user or the system	25
9.9	To have the option to use the system with a minimum of setup or configuration	25
9.10	To customize important functionality: a new user accessibility need (UAN)	25
9.10.1	Manage key input functionalities	25
9.10.2	Manage pointer functionalities	27
9.10.3	Manage visual attributes	28
9.10.4	Manage auditory attributes	30
9.10.5	Manage language selection	30
9.10.6	Manage windowing functionalities	31
9.10.7	Manage functionalities providing content alternatives	32
9.10.8	Manage animation functionalities	32
9.10.9	Adjust the scale and layout of user-interface elements as font-size changes	32
10	Goal 4: Achieving approachability needs	33
10.1	To have the system free from any physical barriers	33
10.2	To have the system free from any psychological barriers	33
10.3	To have the system maintain the user's attention	33
10.3.1	Engage the user's attention	33
10.3.2	Enable user rest breaks	33
10.4	To have interaction options clearly presented	33
10.5	To have appropriate levels of privacy and security	34
10.6	To avoid patterns that cause psychological or physical discomfort or disturbance	34
10.6.1	Avoid seizure-inducing flash rates	34
10.7	To use the system remotely as well as directly	34
10.8	To have the system free from environmental barriers	34
11	Goal 5: Achieving perceivability needs	34
11.1	To use a specific sensory modality (or a set of specific modalities) to perceive information	34
11.1.1	To have information presented visually	34
11.1.2	To have visual information available in other modalities	35
11.1.3	To have information presented in auditory form	35
11.1.4	To have audio information available in other modalities	35
11.1.5	To have information in tactile form	36
11.1.6	To have tactile information also available in other modalities	36
11.1.7	To experience information via multiple simultaneous modalities	36
11.2	To have presentation attributes of a modality that match an individual's needs	36

11.2.1	To have presentation attributes specific to the visual modality that match an individual's needs.....	36
11.2.2	To have material printed.....	38
11.2.3	To have sign language perceivable.....	38
11.2.4	To have 3-dimensional visual information presented using only two dimensions.....	38
11.2.5	To have presentation attributes specific to the auditory modality that match an individual's needs.....	38
11.2.6	To select or deselect different audio streams.....	39
11.2.7	To have presentation attributes specific to the tactile modality that match an individual's needs.....	39
11.2.8	To have visual or tactile feedback occur at the same location as the control.....	39
11.3	To distinguish among the different components of information that are being presented.....	39
11.3.1	To distinguish between different components without them interfering with one another.....	39
11.3.2	To prevent actions which would unintentionally decrease information perceivability.....	39
11.3.3	To locate and identify all actionable components without activating them.....	39
11.3.4	To have actionable components look, sound or feel distinctive from non-actionable components.....	40
11.3.5	To have sufficient landmarks and cues to navigate to the necessary locations, functionalities or controls to carry out a task.....	40
11.3.6	To have distinct recognizable signals for different alerts or other messages that use signals.....	40
11.4	To perceive information regardless of environmental or other conditions that might interfere.....	40
11.4.1	To perceive foreground information in the presence of background information.....	40
11.4.2	To avoid distractions that prevent focusing on a task.....	41
11.4.3	To have accessibility features not interfere with perception of standard information.....	41
11.4.4	To have only the content necessary for the current task presented.....	41
11.4.5	To have haptic input and output from devices not interfere with the perception of information.....	41
11.5	To not have one's senses overloaded.....	41
11.6	To have attention drawn to critically important information in the appropriate modality, form, and language.....	42
12	Goal 6: Achieving understandability needs.....	42
12.1	To obtain information on the system and its components and functionalities.....	42
12.1.1	To get an overview and to orient the users to the system and its functions and components.....	42
12.1.2	To obtain and use unique names for every user interface component.....	43
12.1.3	To receive training that supports an individual's cognitive needs.....	46
12.1.4	To receive help that supports an individual's cognitive needs.....	46
12.1.5	To receive recommendations that aid a user's understanding.....	47
12.2	To understand information presented by the system.....	47
12.2.1	To have presented information as easy to understand as possible.....	47
12.2.2	To have individual linguistic requirements supported by the system.....	48
12.2.3	To have individual cultural requirements supported by the system.....	48
12.2.4	To have text alternatives be provided for all non-textual information.....	48
12.2.5	To have information provided pictorially as well as via text.....	50
12.2.6	To customize abstract symbols with alternative representations.....	50
12.2.7	To have language presented in a particular modality and format.....	50
12.3	To have information that supports an individual's cognitive needs.....	51
12.3.1	To have information presented in a manner that supports an individual's styles of reasoning.....	51
12.3.2	To avoid unnecessary high cognitive demands.....	51
12.3.3	To have navigation that supports an individual's thinking style.....	51
12.3.4	To have assistance with remembering and recalling information.....	53

12.4	To have the steps for completing tasks optimized to match an individual's needs and clearly explained.....	53
12.4.1	Optimize the number of steps required for any task.....	53
12.5	To have cues to support the individual in completing tasks.....	53
12.5.1	Provide notification about toggle-key status.....	53
12.5.2	Provide implicit or explicit designators.....	54
12.5.3	Provide notification of progress.....	54
12.6	To have feedback showing the results of actions.....	54
12.7	To have sufficient time to interact with the system.....	54
12.7.1	To have sufficient time to understand displayed or presented information.....	54
12.7.2	To have information necessary to plan actions available in advance.....	55
12.7.3	To plan a series of actions in advance.....	55
12.8	To access support when needed.....	55
13	Goal 7: Achieving controllability needs.....	55
13.1	To use a specific sensory modality (or a set of specific sensory modalities) for inputs to the system.....	55
13.1.1	To have alternate modalities of input to the system.....	55
13.1.2	To use the tactile modality as a source of inputs to the system.....	56
13.1.3	To use sound as a source of inputs.....	56
13.1.4	To use visual recognition as a source of inputs.....	57
13.2	To control attributes of an input or interaction modality to match an individual's needs.....	57
13.2.1	To have acceptable input or interaction attributes specific to the tactile modality.....	57
13.2.2	To have acceptable input or interaction attributes specific to the auditory modality.....	57
13.2.3	To have acceptable input or interaction attributes specific to the visual modality.....	57
13.2.4	To position system components and devices in suitable locations for their use.....	57
13.3	To use a specific interaction method to provide inputs to the system.....	57
13.3.1	Keyboard-based interactions.....	57
13.3.2	Pointer-based interactions.....	59
13.3.3	Speech-based interactions.....	59
13.3.4	Gesture-based interactions.....	60
13.4	To perform the task using specific types of action.....	60
13.4.1	To have a means of shifting the focus from one interface component to another interface component.....	60
13.4.2	To perform the task using various parts of the body.....	61
13.4.3	To have a method to fully operate the system that does not require simultaneous actions.....	61
13.4.4	To interact with the system at one's own pace.....	62
13.4.5	To have a method to fully operate the system that does not require direct body contact.....	64
13.4.6	To have specific interaction features: a new user accessibility need (UAN).....	64
13.5	To perform supporting and maintenance tasks related to the use of the system that other users are expected to undertake.....	67
13.6	To control the environment (to the extent possible) to prevent interference with performing the task.....	67
13.6.1	General.....	67
13.6.2	Avoid interference with accessibility features.....	67
13.7	To access the controls that allow them to turn on and adjust the built-in accessibility features.....	68
13.7.1	Make controls for accessibility features discoverable and operable.....	68
13.7.2	Inform user of accessibility feature "On" or "Off" status.....	68
13.7.3	Inform user of accessibility feature activation.....	68
13.7.4	Provide capability to use preference settings across locations.....	68
13.8	To have a suitable level of autonomy.....	69
14	Goal 8: Usability.....	69
14.1	To be provided a means to successfully accomplish tasks.....	69
14.2	To avoid making mistakes in completing tasks.....	69
14.3	To complete tasks in an efficient manner relative to one's own abilities.....	69

14.4	To perform tasks with a minimum of physical exertion	69
14.5	To perform tasks with a minimum of cognitive exertion.....	69
14.6	To operate the system without becoming fatigued	70
14.7	To complete tasks within the available time	70
14.8	To be satisfied with the outcome of interacting with the system.....	70
14.9	To have comparable satisfaction that the system is worth using to that of other users.....	70
15	Goal 9: Error tolerance.....	70
15.1	To have confidence that using the system will be free from negative consequences or unacceptable risks.....	70
15.1.1	Avoiding negative consequences.....	70
15.1.2	Avoiding motion sickness.....	70
15.1.3	Avoiding unexpected major changes.....	70
15.2	To explore a system without unintentionally activating components or their functionalities	71
15.2.1	Support exploration without unintentionally activating functions	71
15.2.2	Safeguard against inadvertent activation or deactivation of accessibility features.....	71
15.3	To accomplish tasks in spite of the occurrence of errors.....	71
15.3.1	Allow warning or error information to persist.....	71
15.4	To detect when errors have been made	71
15.4.1	Notify the user when errors are detected	71
15.4.2	Provide information about the error that has occurred.....	71
15.5	To recover from errors made from interacting with the system	71
15.5.1	Facilitate navigation to the location of errors.....	71
15.5.2	Assist with error correction.....	71
15.6	To reset a system to an earlier or original condition as a means of responding to errors.....	72
15.7	To avoid errors by making negative consequences be obvious, easy to avoid, and difficult to trigger	72
16	Goal 10: Equitable use.....	72
16.1	To use a system in a manner that is as similar as possible to other users	72
16.2	To use a system in a manner that is equivalent to that of other users, even if the manner of use is different.....	72
16.3	To have available alternate ways of interacting with a system that match a user's needs.....	72
16.3.1	Provide alternative means of interaction that match users' needs.....	72
16.3.2	Provide alternatives when assistive technology (AT) is not operable.....	73
17	Goal 11: Compatibility with other systems	73
17.1	To use their own assistive products or assistive technology (AT) to interact with all the functionalities of the system.....	73
17.1.1	Make interactions available to assistive technology (AT).....	73
17.1.2	Make user-interface element information available to assistive technologies.....	73
17.1.3	Make feedback and messages available to assistive technology (AT).....	74
17.1.4	Make event notification available to assistive technologies	74
17.1.5	Enable communication between software and assistive technology (AT)	75
17.1.6	Use standard accessibility services.....	75
17.1.7	Allow assistive technology (AT) to change focus and selection	76
17.1.8	Allow assistive technology (AT) to access resources	76
17.1.9	Use system-standard input and output.....	76
17.1.10	Enable appropriate presentation of tables.....	76
17.1.11	Accept the installation of keyboard and pointing device emulators.....	77
17.1.12	Allow assistive technology (AT) to monitor output operations.....	77
17.2	To have the interaction between the system and assistive technology be without interference.....	77
17.2.1	Support combinations of assistive technologies.....	77
17.2.2	Avoid interference between assistive technologies.....	77
17.3	To have specific accessibility functions available at all times, without disruption	77
17.3.1	Pass through of system functions.....	77
17.3.2	Restore hidden accessibility functions.....	78
Annex A (informative) W3C web content accessibility guidelines (WCAG) 2.2 success criteria.....		79

Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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This document was prepared by Technical Committee ISO/TC 159, *Ergonomics*, Subcommittee SC 4, *Ergonomics of human-system interaction*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 122, *Ergonomics*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This second edition cancels and replaces the first edition (ISO 9241-171:2008), which has been technically revised.

The main changes are as follows:

- alignment to the user accessibility needs in ISO/IEC 29138-1 in [Clauses 7](#) to [17](#);
- addition of references to accessibility-related standards in [Clauses 7](#) to [17](#);
- addition of annexes for mapping this document to other documents containing accessibility-related guidance in [Annexes A](#) to [C](#).

A list of all parts in the ISO 9241 series can be found on the ISO website.

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Introduction

Accessibility is an important consideration in the design of products, systems, environments and facilities because it affects the range of people who are able to use them and use them easily. The more accessible a design, the wider the range of people who will find it usable.

The purpose of this document is to provide guidance on the design of the software of interactive systems so that those systems achieve as high a level of accessibility as possible. Designing human-system interactions to increase accessibility promotes increased effectiveness, efficiency and satisfaction for people having a wide variety of capabilities and preferences. Accessibility is therefore strongly related to the concept of usability (see ISO 9241-11).

The most important approaches to increasing the accessibility of a human-system interface are:

- meeting accessibility goals and user accessibility needs (see ISO/IEC 29138-1);
- adopting a human-centred approach to design (see ISO 9241-210);
- following a context-based design process;
- providing the capacity for individualization;
- offering individualized user instruction and training.

Accessibility goals and features must be incorporated into the design as early as possible, when it is relatively inexpensive compared to the cost of modifying products to make them accessible once they have been designed. As well as providing guidance for achieving that, this document addresses the increasing need to consider social and legislative demands for ensuring accessibility by the removal of barriers that prevent people from participating in life activities such as the use of environments, services, products and information.

This document is applicable to software that forms part of interactive systems used in the home, in leisure activities, in public situations and at work. Requirements and recommendations are provided for system design, appearance and behaviour, as well as specific accessibility issues, thereby complementing a wide range of International Standards (referenced in this document), as well as reflecting the goals outlined in ISO/IEC Guide 71.

Accessibility is an issue that affects many groups of people and many different environments. The intended users of interactive systems are consumers or professionals: people in the home, people at school, engineers, clerks, salespersons, web designers, etc. The individuals in such target groups vary significantly in terms of physical, sensory and cognitive abilities and each group will include people with different abilities. People with disabilities do not form a specific group that can be separated out and then disregarded. The differences in capabilities can arise from a variety of factors that serve to limit the capability to engage in the activities of daily living and are a “universal human experience”. Therefore, accessibility addresses a widely defined group of users including:

- people with physical, sensory and cognitive impairments present at birth or acquired during life;
- elderly people who can benefit from new products and services but who experience reduced physical, sensory and cognitive capacities;
- people with temporary disabilities, such as a person with a broken arm or someone who has forgotten his or her glasses;
- people who experience difficulties in particular situations or environments, such as a person who works in a noisy environment or has both hands occupied by other activities.

This document recognizes that some users of software will need assistive technologies in order to use a system. In the concept of designing software to be accessible, this includes the capability of a system to provide connections to, and enable successful integration with, assistive technologies, in order to increase the number of people who will be able to use the interactive system. Guidance is provided on designing

software that integrates with common assistive technologies as effectively as possible. Accessibility can be provided by a combination of both software and hardware controlled by software. This does not mean that every product will be usable by every consumer. There will always be a minority of people who will need adaptations or specialized products. This document emphasizes the goals of maximizing the number of users and striving to increase the level of accessibility that these users experience.

This document serves the following types of users:

- designers of user interface development tools and style guides to be used by interface designers;
- user interface designers, who will apply the guidance during the development process;
- developers, who will apply the guidance during the design and implementation of system functionality;
- those responsible for implementing solutions to meet end-user needs;
- buyers, who will reference this document during product procurement;
- evaluators, who are responsible for ensuring that products are in accordance with this document.

The ultimate beneficiary of this document will be the end-user of the software. Although it is unlikely that end-users will read this document, its application by designers, developers, buyers and evaluators will provide user interfaces that are more accessible. This document concerns the development of software for user interfaces. However, those involved in designing the hardware aspects of user interfaces can also find it useful when considering the interactions between software and hardware aspects.

Ergonomics of human-system interaction —

Part 171: Software accessibility

1 Scope

This document specifies requirements and gives guidelines for designing accessible software for people with the widest range of physical, sensory and cognitive abilities, including those who are temporarily or situationally disabled, and the elderly. It addresses software considerations for accessibility that complement general design for usability as addressed by parts of the ISO 9241 series, especially ISO 9241-11 and ISO 9241-210.

This document is applicable to the accessibility of interactive systems. It addresses a wide range of software (e.g. home, mobile, office, web, learning support and library systems). It promotes the increased usability of systems for a wider range of users in the widest range of contexts of use.

This document does not apply to the behaviour of, or requirements for, assistive technologies (including assistive software), but it does address the use of assistive technologies as an integrated component of interactive systems.

It is intended for use by those responsible for the specification, design, development, evaluation and procurement of software platforms and software applications.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

3.1 Major accessibility related concepts

3.1.1

accessibility

extent to which products, systems, services, environments and facilities can be used by people from a population with the widest range of user needs, characteristics and capabilities to achieve identified goals in identified contexts of use

Note 1 to entry: Context of use includes direct use or use supported by assistive technologies.

[SOURCE: ISO 9241-112:2025, 3.11]

3.1.2

user accessibility need

UAN

user need related to features or attributes that are necessary for a system to be accessible

Note 1 to entry: User accessibility needs vary over time and across contexts of use.

Note 2 to entry: User accessibility needs are transformed into user accessibility requirements considering the context of use, user priorities, trade-offs with other system requirements and constraints.

[SOURCE: ISO/IEC 29138-1:2018, 3.10, modified — "User requirements" replaced by "user accessibility requirements" in Note 2 to entry.]

3.1.3

usability

extent to which a system, product or service can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use

Note 1 to entry: The "specified" users, goals and context of use refer to the particular combination of users, goals and context of use for which usability is being considered.

Note 2 to entry: The word "usability" is also used as a qualifier to refer to the design knowledge, competencies, activities and design attributes that contribute to usability, such as usability expertise, usability professional, usability engineering, usability method, usability evaluation, usability heuristic.

[SOURCE: ISO 9241-11:2018, 3.1.1]

3.1.4

effectiveness

accuracy and completeness with which users achieve specified goals

[SOURCE: ISO 9241-11:2018, 3.1.12]

3.1.5

efficiency

resources used in relation to the results achieved

Note 1 to entry: Typical resources include time, human effort, costs and materials.

[SOURCE: ISO 9241-11:2018, 3.1.13]

3.1.6

satisfaction

extent to which the user's physical, cognitive and emotional responses that result from the use of a system, product or service meet the user's needs and expectations

Note 1 to entry: Satisfaction includes the extent to which the user experience that results from actual use meets the user's needs and expectations.

Note 2 to entry: Anticipated use can influence satisfaction with actual use.

[SOURCE: ISO 9241-11:2018, 3.1.14]

3.1.7

diverse contexts

differing contexts of use and differing economic, cultural and organizational conditions

[SOURCE: ISO/IEC Guide 71:2014, 2.8]

3.1.8

diverse users

individuals with differing abilities and characteristics or accessibility needs

[SOURCE: ISO/IEC Guide 71:2014, 2.3]

3.1.9

information and communication technology ICT

technology for gathering, storing, retrieving, processing, analysing and transmitting information

[SOURCE: ISO/IEC 30071-1:2019, 3.2.5]

3.2 Concepts relating to interaction

3.2.1

shortcut

operation that invokes an action without displaying intermediate information (e.g. menus) or requiring pointer movement or any other user activity

[SOURCE: ISO/IEC 20071-5:2022, 3.18]

3.2.2

activation

initiation of the function of a selected user-interface element

EXAMPLE When a mouse is used, the activation function is performed by double clicking on a mouse button.

[SOURCE: ISO/IEC 11581-10:2010, 3.1, modified — "Icon" replaced with "user-interface element" and "or by a shortcut" removed.]

3.2.3

feedback

output presented to the user by the system in reaction to the user's input or a system event

Note 1 to entry: Feedback can be presented in one or more of the visual, auditory, or tactile modalities.

[SOURCE: ISO 9241-13:1998, 3.6, modified — Note 1 to entry added.]

3.2.4

natural language

language that is, or that was, in active use in a community of people, the rules of which are mainly deduced from the usage

3.3 Concepts relating to the user interface

3.3.1

platform software

collection of software components that runs on an underlying software or hardware layer, and that provides a set of software services to applications that allow them to be isolated from the underlying software or hardware layer

EXAMPLE 1 Operating system, device driver, windowing system, software toolkit.

Note 1 to entry: A particular software component can play the role of a platform in some situations and not in others.

EXAMPLE 2 A browser can function both as an application and as platform software.

Note 2 to entry: For the purposes of this document, software refers to both platform software and application software.

[SOURCE: ISO/IEC 13066-1:2011, 2.20, modified — Only the first sentence of Note 1 to entry retained, and addition of Note 2 to entry and Examples 1 and 2.]

3.3.2

closed functionality

system that does not allow user connection or installation of assistive technology that has programmatic access to the full user interface

Note 1 to entry: This can be because of policy, system architecture, physical constraints or for any number of other reasons.

3.3.3

user interface

all components of an interactive system that provide information and controls for the user to accomplish specific tasks with the interactive system

[SOURCE: ISO 9241-110:2020, 3.10]

3.3.4

view

user interface instance

portion of the user interface that is presented at one time during the use of an interactive system

Note 1 to entry: Although the word view is typically associated with visual information, it is used synonymously with (user interface) instance. In those situations, it is not limited to visual renderings and can include renderings of information presented via auditory or tactile modalities or some combination of these.

EXAMPLE 1 A web page.

EXAMPLE 2 An individual screen within an app.

[SOURCE: ISO 9241-115:2024, 3.5.6]

3.3.5

content

interactive or non-interactive user-interface element containing information represented by text, image, video, sound, or other media

[SOURCE: ISO/IEC/IEEE 23026:2023, 3.1.5, modified — "object" replaced by "user-interface element".]

3.3.6

user-interface element

user-interface object

entity of the user interface that is presented to the user by the software

EXAMPLE Text, graphic, control.

Note 1 to entry: User-interface elements can be interactive or not.

Note 2 to entry: Both entities relevant to the task and entities of the user interface are regarded as user-interface elements. A user-interface element can be a visual representation or an interaction mechanism for a task object (such as a letter, sales order, electronic part or wiring diagram) or a system object (such as a printer, hard disk or network connection). It can be possible for the user to directly manipulate some of these user-interface elements.

Note 3 to entry: User-interface elements in a graphical user interface include such things as basic objects (such as window title bars, menu items, push buttons, image maps, and editable text fields) or containers (such as windows, grouping boxes, menu bars, menus, groups of mutually exclusive option buttons, and compound images that are made up of several smaller images). User-interface elements in an audio user interface include such things as menus, menu items, messages, and action prompts.

3.3.7

actionable component

user-interface element that can receive input from a user

Note 1 to entry: All actionable components are intended to do something with the input that they receive, whether it is to process it, pass it on to some other component of the system, or provide it back to the user.

Note 2 to entry: Some common actionable components include controls and data entry fields.

[SOURCE: ISO/IEC 29138-1: 2018, 3.12, modified — "user interface component" replaced with "user-interface element", and Note 2 to entry added.]

3.3.8

non-actionable component

user-interface element that only provides output to the user and that cannot receive input from the user

[SOURCE: ISO/IEC 29138-1: 2018, 3.13, modified — "user interface component" replaced with "user-interface element".]

3.3.9

control

<noun> user-interface element that can be interacted with by the user

3.3.10

icon

user interface symbol representing an object and/or function of the computer system

Note 1 to entry: The concept of a symbol is used in the most generic of senses and can be rendered in various modalities. Renderings of these user interface symbols include visual (graphical) icons, auditory icons, and tactile icons.

[SOURCE: ISO/IEC 11581-10:2010, 3.4, modified — Note 1 to entry removed, Note 2 to entry renumbered.]

3.3.11

landmark

user-interface element that is used to assist the user in navigating the user interface

Note 1 to entry: Landmarks can be provided by the software or created by users.

3.3.12

cursor

visual indication of where the user interaction via keyboard (or equivalent input device) will occur

Note 1 to entry: Screen readers use virtual cursors.

[SOURCE: 9241-400:2007, 3.5.2, modified — Note 1 to entry added.]

3.3.13

label

short descriptive title for an entry or read-only field, table, control or object

Note 1 to entry: In some applications, labels are classified as protected fields.

Note 2 to entry: Labels include headings, field prompts, descriptive text (e.g. icon labels).

[SOURCE: ISO 9241-125:2017, 3.11, modified — "other user-interface element" replaced with "object" and "read-only fields" changed with "protected fields".]

3.3.14

name

user-interface element name

word or phrase associated with a user-interface element and that is used to identify the element to the user (in a visual, auditory, or tactile manner)

Note 1 to entry: Names are most useful when they are the primary word or phrase by which the on-screen instructions, software documentation and the user refer to the element, and when they do not contain the type or status of the user-interface element.

Note 2 to entry: The name attribute can possibly be presented to users but is available to assistive technologies, in contrast with label. For the purposes of this document, label refers to the presented title for a user-interface element. Textual labels are often a visual display of the name.

Note 3 to entry: When a textual label is provided, it generally presents the name or a shortened version of the name. Not all user-interface elements have labels, however. In those cases, the names would be available to assistive technologies (or sometimes by tool tips, etc.).

Note 4 to entry: Names are not to be confused with internal identifiers (ID), which can be used by software and are possibly not designed to be understood by humans.

3.3.15

accelerator

code or abbreviation for a menu option or control label used for keyboard selection

EXAMPLE "O", "C", "S", "P", "V" as shown in the menu in [Figure 1](#).

O Open
C Close
S Save
P Print
V Paste

Figure 1 — Examples of accelerators

3.4 Concepts relating to individualization

3.4.1

individualization

modification of interaction and presentation of information to suit the individual capabilities and needs of users

3.4.2

accessibility setting

setting to make the user interface more accessible for people with disabilities

EXAMPLE A setting is provided to turn large text or screen magnification ON for people with low vision.

Note 1 to entry: There are three types of accessibility settings:

- the settings for operating system;
- the settings for application by operating system;
- the settings inside of application.

[SOURCE: ISO/IEC 20071-5:2022, 3.2]

3.4.3

accessibility setting mode

user interface where the user adjusts accessibility settings

Note 1 to entry: A user can access almost all the accessibility settings and adjustments for the accessibility features through this mode.

[SOURCE: ISO/IEC 20071-5:2022, 3.3]

3.5 Concepts relating to accessibility features

3.5.1 Major concepts relating to accessibility features

3.5.1.1

accessibility feature

characteristic of an interactive system explicitly designed to support users experiencing specific barriers

3.5.1.2

assistive technology

AT

equipment, product system, hardware, software or service that is used to increase, maintain or improve the capabilities of individuals

Note 1 to entry: Assistive technology (AT) is an umbrella term that is broader than assistive products.

Note 2 to entry: Assistive technology can include assistive services, and professional services needed for assessment, recommendation, and provision.

Note 3 to entry: Where ICT does not support directly connected assistive technology, but which can be operated by a system connected over a network or other remote connection, such a separate system (with any included assistive technology) can also be considered assistive technology.

EXAMPLE Braille display, screen reader, screen magnification software, eye tracking device.

[SOURCE: ISO/IEC Guide 71: 2014, 2.16, modified — Abbreviation, Note 3 to entry, and example added.]

3.5.2 Concepts relating to visual accessibility features

3.5.2.1

text alternative

alternative text

textual description or representation of an image

Note 1 to entry: By storing this description or representation in text format, it is able to be rendered in any available modality.

Note 2 to entry: The main audience of text alternatives are the users of screen reading features.

Note 3 to entry: Text alternatives are often provided to screen reader users in the form of primary and secondary alternative texts of an image.

Note 4 to entry: Generally, "text alternative" is used to refer to any text alternative, while "alternative text" is used to refer to text alternatives for images that are contained in attributes of an image.

[SOURCE: ISO/IEC 20071-11:2019, 3.1.1]

3.5.2.2

screen magnifier

assistive technology that allows users to operate a software system with an enlarged presentation of screen content

Note 1 to entry: Users control the screen magnifier separately from the system by keyboard, pointing device, or gesture.

Note 2 to entry: Screen magnifiers can enlarge content up to 500 % or more. They provide additional visual features such as inverse video, colour replacement, and monitoring for system notifications and events.

Note 3 to entry: Some screen magnifiers also support text-to-speech.

[SOURCE: ISO/IEC 20071-5:2022, 3.16]

3.5.2.3

contrast

difference in perception between two or more parts of the user interface that are in direct relation to each other (e.g. simultaneously or successively)

Note 1 to entry: Contrast can occur in visual, auditory, or tactile modalities.

EXAMPLE 1 Some visual contrasts include: brightness, colour, texture.

EXAMPLE 2 Some auditory contrasts can include: volume, frequency.

EXAMPLE 3 Some tactile contrasts can include: vibration frequency, vibration amplitude.

3.5.2.4

colour scheme

set of colour assignments used for rendering user-interface elements

Note 1 to entry: "Colour" refers to a combination of hue, saturation, and brightness.

3.5.2.5

screen reader

assistive technology that controls the system and provides information and feedback without the need for a visual display

Note 1 to entry: Screen readers display information through text-to-speech or dynamic braille output. Control is provided through keyboard or gestures.

Note 2 to entry: Screen readers rely on a data stream from the system that includes information from applications such as the name, role, status, and value of a user-interface element. This information stream is referred to as the accessibility tree.

Note 3 to entry: Screen readers provide system feedback through auditory cues based on the user's preferences. For example, feedback to changes between focus and browse modes, keypresses, gesture operations, etc.

[SOURCE: ISO/IEC 20071-5:2022, 3.17]

3.5.3 Concepts relating to audio accessibility features

3.5.3.1

SoundSentry™¹⁾

feature providing a visual signal to indicate when the device is generating a sound

EXAMPLE screen flash, caption bar flash.

Note 1 to entry: SoundSentry™ is a feature for individuals who cannot hear system sounds (due to hearing loss, a noisy environment, or an environment where sound is not allowed, such as a library or classroom). SoundSentry™ works by monitoring the system sound hardware and providing a user-selectable indication whenever sound activity is detected. Note that this feature cannot usually discriminate between different sounds, identify the sources of sounds, or provide a useful alternative for speech output or information encoded in sounds. Applications can support the ShowSounds™ feature to provide the user with a useful alternative to information conveyed using sound. SoundSentry™ is a system-level fallback for applications that do not support ShowSounds™.

[SOURCE: ISO/IEC 20071-5:2022, 3.21]

3.5.3.2

ShowSounds™²⁾

user-configurable system flag that is readable by application software and is intended to inform ShowSounds™-aware applications that all information conveyed audibly should also be conveyed visually

Note 1 to entry: ShowSounds™ is a feature for users who cannot clearly hear speech or cannot distinguish between sounds from a device (due to hearing loss, noisy environment, or an environment where sound is not allowed, such as a library or classroom). For example, a message or icon can be displayed when a sound is used to indicate that new mail has arrived.

[SOURCE: ISO/IEC 20071-5:2022, 3.19]

1) SoundSentry™ is the trademark of a product supplied by the University of Wisconsin. This information is given for the convenience of users of this document and does not constitute an endorsement by ISO of the product named. Equivalent products may be used if they can be shown to lead to the same results.

2) ShowSounds™ is the trademark of a product supplied by the University of Wisconsin. This information is given for the convenience of users of this document and does not constitute an endorsement by ISO of the product named. Equivalent products may be used if they can be shown to lead to the same results.

3.5.4 Concepts relating to audiovisual accessibility features

3.5.4.1

caption

transcription of audio content, visually presented together with the content in the language of the audiovisual content

Note 1 to entry: Captions include speech and non-speech information.

Note 2 to entry: Captions are often suitable for use as an alternative or a complement to the audio content.

Note 3 to entry: In some countries, captions are called “subtitles for the deaf or hard of hearing (SDH)”.

[SOURCE: ISO/IEC 20071-20:2025, 3.1.10]

3.5.4.2

subtitle

translation of spoken content, visually presented together with the content in a language other than the source language of the audiovisual content

Note 1 to entry: Subtitles assume the viewer can hear but cannot understand the language of the spoken content or the speech is not entirely clear.

Note 2 to entry: Subtitles can be used to transcribe on-screen text written in the source language.

Note 3 to entry: In some countries, captions are called “subtitles”. Dialogue-only subtitles differ from captions in that captions convey not only the content of spoken dialogue but also equivalents for non-speech information needed to understand the audiovisual content (see ISO/IEC 40500).

Note 4 to entry: Subtitles can include non-speech information.

[SOURCE: ISO/IEC 20071-20:2024, 3.1.11]

3.5.4.3

audio description

descriptive audio

audiovisual content described in an audio modality

Note 1 to entry: Audio description can also be used to describe locations, directions, and objects.

Note 2 to entry: Audio description can be used to describe sound not easily identified or coming from an unknown source or location.

[SOURCE: ISO/IEC 20071-20:2024, 3.1.12]

3.5.5 Concepts relating to input features

3.5.5.1

time out

<accessibility feature> feature that automatically sets an access feature to "off" after an adjustable time when no input activity occurs

3.5.5.2

on-screen keyboard

virtual keyboard displayed on any type of screen

Note 1 to entry: On-screen keyboards are one specific type of virtual keyboards, probably the most common, that use a screen to display a visual keyboard.

Note 2 to entry: This type of virtual keyboard can be used on personal computer's screens, on feature phones, mobile phones and tablets, TVs, kiosks, whiteboards.

[SOURCE: ISO/IEC 22121-2:2023, 3.1]

3.5.5.3

keyboard emulator

software or hardware that generates input identical to that from a keyboard

Note 1 to entry: A keyboard emulator can provide a representation of keys (e.g. on-screen keyboard) or use alternative input methods (e.g. voice recognition).

EXAMPLE Platform-based on-screen keyboards, speech input, and handwriting, wherever are all input methods that, when used, provide output that applications recognize as keystroke input.

3.5.5.4

keyboard equivalent

key or key combination that provides access to a function usually activated by a pointing device, voice input or other input or control mechanism

3.5.5.5

pointing device

device that translates a human controlling operation to a controlling operation on the interactive system

Note 1 to entry: Depending on the applied technology, not only machine devices but also parts of the human body (e.g. fingers, arms) can currently be used as pointing devices.

Note 2 to entry: Almost any hardware can be used to control a pointer with the appropriate software.

[SOURCE: ISO 9241-161:2016, 3.15, modified — "display" replaced with "interactive system" and Note 2 to entry replaced.]

3.5.5.6

voice command

spoken instruction to control the information and communication technology (ICT) system

[SOURCE: ISO/IEC 30122-1:2016, 4.1]

3.5.5.7

focus

current assignment of the input from the keyboard or equivalent to a user-interface element

3.5.5.8

pointer

graphical symbol that is moved on the screen according to operations with a pointing device

Note 1 to entry: Users can interact with elements displayed on the screen by moving the pointer to that location and starting a direct manipulation.

3.5.6 Concepts relating to keyboard-based input features

3.5.6.1

shortcut key

shortcut keys

hot keys

key combinations which invoke a shortcut

3.5.6.2

modifier key

keyboard key that changes the action or effect of another key or a pointing device

EXAMPLE 1 Moving the focus with the shift key held down, thereby extending the current selection in the direction of cursor movement rather than merely moving the position of the cursor.

EXAMPLE 2 Pressing "C", to obtain the input of that character, pressing "Ctrl+C" to obtain the "Copy" function.

3.5.6.3**latch**

mode in which any modifier key remains logically pressed (active) in combination with a single subsequent non-modifier keypress or pointing-device button action

Note 1 to entry: Latch is a function that can be implemented by various means, including sticky keys.

3.5.6.4**lock**

persistent mode in which one or more modifier keys or pointing-device buttons remain logically pressed (active) until lock mode for the key or button is turned off

Note 1 to entry: Unlike latch, which affects only keyboard and pointing device actions, lock will affect any software that uses the modifier key(s) to alter its behaviour.

Note 2 to entry: Lock mode is usually turned off explicitly by the user but can also be turned off at other times such as at system shutdown or restart.

3.5.6.5**StickyKeys™³⁾**

feature that allows users to press key combinations (e.g. Ctrl-Alt-Delete) sequentially rather than having to hold them all down together

Note 1 to entry: StickyKeys™ is designed for people who cannot use both hands, or who use a dowel or stick to type. StickyKeys™ works with those keys defined as “modifier” keys, such as the Shift, Alt and Ctrl keys. Usually the StickyKeys™ status is shown on-screen at the user's option.

[SOURCE: ISO/IEC 20071-5:2022, 3.22]

3.5.6.6**SlowKeys™⁴⁾**

feature to ignore all keys that are bumped or pressed briefly

Note 1 to entry: SlowKeys™ is designed for users who have extra, uncontrolled movements that cause them to strike surrounding keys unintentionally when typing. Keystrokes are accepted only if keys are held down for a user-specifiable period of time.

[SOURCE: ISO/IEC 20071-5:2022, 3.20]

3.5.6.7**BounceKeys™⁵⁾**

feature that only accepts a single keystroke at a time from a key

Note 1 to entry: BounceKeys™ is designed for users with tremor or lack of dexterity that causes them to inadvertently strike a key extra times when pressing or releasing the key. Once a key is released it will not accept another stroke of the same key until a (user-settable) period of time has passed. BounceKeys™ has no effect on how quickly a person can type a different key.

[SOURCE: ISO/IEC 20071-5:2022, 3.5]

3) StickyKeys™ is the trademark of a product supplied by the University of Wisconsin. This information is given for the convenience of users of this document and does not constitute an endorsement by ISO of the product named. Equivalent products may be used if they can be shown to lead to the same results.

4) SlowKeys™ is the trademark of a product supplied by the University of Wisconsin. This information is given for the convenience of users of this document and does not constitute an endorsement by ISO of the product named. Equivalent products may be used if they can be shown to lead to the same results.

5) BounceKeys™ is the trademark of a product supplied by the University of Wisconsin. This information is given for the convenience of users of this document and does not constitute an endorsement by ISO of the product named. Equivalent products may be used if they can be shown to lead to the same results.

3.5.6.8**FilterKeys™⁶⁾**

BounceKeys™ and SlowKeys™ features combined

Note 1 to entry: The term FilterKeys™ is sometimes used for the BounceKeys™ and SlowKeys™ features packaged together. Some implementations make these two features mutually exclusive. However, they can also both be active at the same time (though SlowKeys™ will dominate).

[SOURCE: ISO/IEC 20071-5:2022, 3.6]

3.5.6.9**MouseKeys™⁷⁾**

feature that allows the user to control the mouse cursor and operate the mouse buttons via the keyboard (e.g. the numeric keypad)

Note 1 to entry: MouseKeys™ is designed for users who are physically unable to use a mouse.

[SOURCE: ISO/IEC 20071-5:2022, 3.11]

3.5.6.10**RepeatKeys™⁸⁾**

feature to control auto-repeat which evokes the same effect of repetitional key push by one push, repeat onset and repeat rate of keys

Note 1 to entry: RepeatKeys™ is designed to allow use of devices by people who cannot move quickly enough when pressing keys to keep them from auto repeating. The feature to adjust repeat onset, repeat rate and to turn auto-repeat off is usually included as part of most keyboard system settings (see [D.3.7](#)). If the features is not included, RepeatKeys™ provides them. RepeatKeys™ also ensures that the repeat delay and repeat interval can be personalized (if the standard maximum value for either of the regular key repeat settings is not long enough).

[SOURCE: ISO/IEC 20071-5:2022, 3.15, modified — Note 1 to entry with first "are" replaced with "is" and "these features are" replaced with "the feature is".]

3.5.6.11**ToggleKeys™⁹⁾**

feature alerting the user when the state of a locking key has changed

Note 1 to entry: ToggleKeys™ is a feature for users who cannot see the visual keyboard status indicators for locking (toggle) keys such as Caps Lock, Scroll Lock, Num Lock, etc. ToggleKeys™ provides an auditory signal, such as a high beep, to alert the user that a toggle key such as the Caps Lock has been locked, and a separate signal, such as a low beep, to alert the user that a toggle key has been unlocked.

[SOURCE: ISO/IEC 20071-5:2022, 3.27]

4 Conventions

This clause is reserved for ITU use in the ITU-T version of this standard.

6) FilterKeys™ is the trademark of a product supplied by the University of Wisconsin. This information is given for the convenience of users of this document and does not constitute an endorsement by ISO of the product named. Equivalent products may be used if they can be shown to lead to the same results.

7) MouseKeys™ is the trademark of a product supplied by the University of Wisconsin. This information is given for the convenience of users of this document and does not constitute an endorsement by ISO of the product named. Equivalent products may be used if they can be shown to lead to the same results.

8) RepeatKeys™ is the trademark of a product supplied by the University of Wisconsin. This information is given for the convenience of users of this document and does not constitute an endorsement by ISO of the product named. Equivalent products may be used if they can be shown to lead to the same results.

9) ToggleKeys™ is the trademark of a product supplied by the University of Wisconsin. This information is given for the convenience of users of this document and does not constitute an endorsement by ISO of the product named. Equivalent products may be used if they can be shown to lead to the same results.

5 Conformance

Conformance with this document is achieved by:

- identifying whether or not individual recommendations are applicable within the context of use of the interactive system;
- explaining why individual recommendations are not applicable;
- stating whether or not the applicable recommendations have been followed.

If a product or system is claimed to have met the applicable recommendations, the procedure used to determine how they have been met or followed should be specified. The detail to which the procedure is specified is a matter of negotiation between the involved parties.

The recommendations in this document can apply to different types of interactive systems, including:

- complete interactive systems (composed of hardware and software);
- complete software systems (composed of various combinations of system and application software);
- specific system software (that are designed to serve various specific application software);
- specific application software;
- specific user agent software (that are designed to work with various sets of content);
- specific packages of content (such as: Web sites or pages, electronic documents).

The type of interactive system involved is an important consideration in determining the applicability of the individual recommendations.

A report on the applicability and application of recommendations shall report for each recommendation on:

- a) the applicability of the recommendation (a “should” statement) that determine whether it is applicable or not-applicable;
- b) why each not-applicable recommendation is not applicable (e.g. because it is not applicable to the particular type of interactive system being reported on);
- c) how each applicable recommendation has been met by the system.

If an interactive system is claimed to have met the applicable recommendations in this document, the procedure used in establishing requirements for the software accessibility shall be specified. The level of specification of the procedure is a matter of negotiation between the involved parties.

6 Structure and application of this document

6.1 External principles and guidance

6.1.1 Accessibility principles of the W3C Web Content Accessibility Guidelines (WCAG) 2.2

The W3C Web Accessibility Initiative (WAI) develops web accessibility guidelines for the different components: Web Content Accessibility Guidelines (WCAG), User Agent Accessibility Guidelines (UAAG), and Authoring Tool Accessibility Guidelines (ATAG).

The W3C's Web Content Accessibility Guidelines (WCAG) focus exclusively on the accessibility of content in the Web, and not on the totality of accessibility of software. However, because of their wide recognition and use, it is important that the principles that they are based on are also reflected in considerations of the wider accessibility of software.

WCAG is structured around the following four principles.

- a) 1. Perceivable: Information and user interface components must be presentable to users in ways they can perceive.
- b) 2. Operable: User interface components and navigation must be operable.
- c) 3. Understandable: Information and the operation of user interface must be understandable.
- d) 4. Robust: Content must be robust enough that it can be interpreted by a wide variety of user agents, including assistive technologies.

NOTE 1 ISO/IEC 40500 contains a version of WCAG 2.0.

NOTE 2 While WCAG focuses on web content, most of its guidance can be generalized to accessibility considerations that apply to all software.

6.1.2 Accessibility principles of the W3C User Agent Accessibility Guidelines (UAAG) 2.0

The W3C's User Agent Accessibility Guidelines (UAAG) focus exclusively on the accessibility of presenting Web content. They work with WCAG to provide a comprehensive set of accessibility guidance relating to web based information technology, but not on the totality of accessibility of software. However, because of their wide recognition and use, it is important that the principles that they are based on are also reflected in considerations of the wider accessibility of software.

UAAG is structured around three principles that are parallel to Principles 1, 2, and 3 of WCAG 2.2 and 2 additional principles specific to user agents.

- a) 1. Perceivable: Ensure that the user interface and rendered content are perceivable.
- b) 2. Operable: Ensure that the user interface is operable.
- c) 3. Understandable: Ensure that the user interface is understandable.
- d) 4. Programmable: Facilitate programmatic access.
- e) 5. Conformant: Conforms with applicable specifications and conventions.

NOTE While UAAG focuses on web user agents, most of its guidance can be generalized to accessibility considerations that apply to all software.

6.2 Accessibility goals of ISO/IEC Guide 71

ISO/IEC Guide 71 created a set of 11 accessibility goals as a superset of various sets of accessibility and accessibility-related principles (including WCAG and UAAG). It identifies the following accessibility goals in its [Clause 6](#).

- a) Suitability for the widest range of users: A system is suitable for the widest range of users if it meets the needs of diverse users in diverse contexts.
- b) Conformity with user expectations: A system conforms to user expectations if it is predictable based on the user's past experience, the context of use, laws and standards, or commonly accepted conventions.
- c) Support for individualization: A system supports individualization if its components, functions or operations can be tailored to meet the needs of individual users.
- d) Approachability: A system is approachable if diverse users can overcome any physical or psychological barriers and physically or remotely access it to accomplish the task.
- e) Perceivability: A system is perceivable if diverse users in diverse contexts can sense the information and functionalities it presents (this includes the WCAG principle of perceivable).

- f) Understandability: A system is understandable if its information and functionalities are interpretable by diverse users (this includes the WCAG principle of understandable).
- g) Controllability: A system is controllable if the user is able to initiate and complete the interaction(s) required to accomplish the task (this includes the WCAG principle of operable).
- h) Usability: A system is usable if it supports diverse users in their diverse contexts to accomplish their tasks with effectiveness, efficiency and satisfaction.
- i) Error tolerance: A system has error tolerance if despite predictable errors, diverse users can complete the intended task or activity with either no, or minimal, corrective action or negative consequences.
- j) Equitable use: A system provides equitable use if it allows diverse users to accomplish tasks in an identical manner whenever possible or in an equivalent manner when an identical manner is not possible.
- k) Compatibility with other systems: A system provides compatibility if it allows diverse users to use other systems as a means to interact with it to accomplish the task (this includes the WCAG principle of robust).

NOTE Many of these accessibility goals are based on the interaction principles found in ISO 9241-110.

These goals are not mutually exclusive, but used together they can identify a broad set of user accessibility needs. ISO/IEC Guide 71 also identifies a number of typical user accessibility needs that correspond to individual usability goals that are expanded and elaborated on in ISO/IEC 29138-1.

6.3 Organization of guidance in this document

This document organizes guidance based on the ISO/IEC Guide 71 accessibility goals and the user accessibility needs (UAN) related to these goals in ISO/IEC 29138-1.

The titles of many of the subclauses are based on UAN from ISO/IEC 29138-1. The wording of some UANs has been revised to be clearer or more consistent.

All of the UANs from ISO/IEC 29138-1 are included here, even the few that do not apply to software, to demonstrate that they all have been considered as sources of potential guidance for this document.

UANs are used as the headings of many subclauses and can be distinguished by their starting with "To" and being worded from the user's perspective. Some guidance appears directly below a UAN, while if multiple recommendations apply to a single UAN, they are placed in separate subclauses beneath the UAN. Their headings start with an imperative word and are worded from the perspective of recommendations on the system.

NOTE ISO/IEC 29138-1 provides additional information on these user accessibility needs, including information on why they are important for accessibility. This document does not duplicate such information from ISO/IEC 29138-1. Rather, this document focuses on recommendations to help meet those established user accessibility needs.

Where new UANs appeared to be appropriate, clauses have been added and the titles have indicated "a new user accessibility need (UAN)".

[Annex A](#) provides a mapping between the success criterion of WCAG 2.2 and the guidance in this document to assist users of this guidance in making claims of conformance to WCAG 2.2.

[Annex B](#) provides a mapping between the success criterion of UAAG 2.0 and the guidance in this document to assist users of this guidance in making claims of conformance to UAAG 2.0.

[Annex C](#) provides a mapping between ISO 9241-171:2008 (the previous version of this document) and the guidance in this document to assist users of the old version.

[Annex D](#) provides information on various accessibility features.

6.4 Achieving accessibility

To achieve accessibility, it is necessary to provide support in different parts of the system of software, which includes platform software (the operating system and associated layers, and toolkits) and other software (such as most applications) that run on and make use of services provided by platform software.

While much can be done to improve accessibility in the design of an application, it is not possible to provide all of the input and output support that users require in every circumstance at the application level alone. To the extent that any particular part of the software is dependent upon a level below it for its operational characteristics, it is necessary to ensure that the lower levels enable the implementation of recommended accessibility characteristics in any layers that depend upon them. Similarly, accessibility characteristics implemented by the platform can require cooperation from layers running on top of them in order to be fully effective. The majority of the requirements and recommendations given in [Clauses 7](#) to [17](#) demand that the issue be addressed at more than one level of the software system if the particular requirement or recommendation is to be satisfied.

These dependencies can occur in relation to different layers in the platform (e.g. window management on top of process management and screen drawing, which are on top of hardware drivers) and in relation to the applications that are mounted on the platform. Applications themselves can have layers that result in dependencies arising within different levels of the application.

Most of the provisions given in this document apply to all software that implements or contributes to the software user interface, regardless of whether or not it is part of the platform. Some are only applicable to portions of platform software (such as guidelines about low-level input, window management or system-wide behaviour). For example, the platform is the general means by which accessibility features that involve control of hardware devices, in particular those involving input, are implemented and controlled. Similarly, other provisions possibly only apply to software that displays user-interface elements, generates sounds, or exhibits other specific behaviours. In these cases, the applicable layers or type of software is indicated in the text of the requirement or recommendation and can further be elaborated upon in accompanying notes.

7 Goal 1: Achieving suitability for the widest range of users' needs

7.1 To recognize that users are included as system users within diverse contexts

The software should enable users to know which accessibility needs will be met and in which contexts they will be met.

EXAMPLE The software provides a means for the users to review accessibility settings.

7.2 To have accessible support for using the system

7.2.1 Describe accessibility features

The software should provide users with documentation of accessibility feature.

EXAMPLE 1 The software's user assistance includes an explanation of each feature that supports accessibility.

EXAMPLE 2 The user interface of the software provides explanations of the most commonly used accessibility features.

NOTE UAAG 2.0 guideline 3.2.2 contains further information on this recommendation relating to web user agents.

7.2.2 Provide accessible support services

Technical support and client support services for software should accommodate the communication needs of end-users with disabilities.

NOTE This includes calls from relay services, that have different phone numbers than the actual customer that is expected by technical support or the client support service.

EXAMPLE 1 In countries where relay services are not provided free of charge, a company contracts with a relay service to assist the technical support process by providing real-time translation between the company's support staff and deaf customers who use text or video telephones to allow them to communicate in text or sign language. A similar service provides re-voicing for people whose speech is difficult to understand. The company also trains its technical support staff in how to optimize conversation through relay services.

EXAMPLE 2 On-line help or documentation provided on the software company's web site is designed to conform to published guidelines for making web content accessible.

EXAMPLE 3 Application helpdesk operators are trained on the accessibility features so that they are able to guide a user through the process of carrying out a task or rectifying a fault entirely through the keyboard interface, without the need for any mouse click operations.

EXAMPLE 4 A company provides a dedicated telephone line for its customers who use telecommunications devices for the deaf, and trains support staff on their use and etiquette so that users can communicate directly (rather than through relay) with customers support personnel.

EXAMPLE 5 An interactive voice response (IVR) system provides software support services that are accessible to text telephone users.

7.2.3 Provide accessible training material

If training is provided as part of the product, the training materials should meet applicable accessibility standards.

7.2.4 Provide user documentation in accessible electronic form

All user documentation and "Help" should be delivered in an electronic form that meets applicable documentation accessibility standards. This documentation should be provided with the product, or upon request on a timely basis and without extra cost.

NOTE 1 The category of "users" includes administrators. For software development software, "users" will include software developers.

EXAMPLE External documentation for the software is available in an accessible format (e.g. accessible pdf, e-Pub)

NOTE 2 UAAG 2.0 guideline 3.2.1 contains further information on this recommendation relating to Web User Agents.

7.2.5 Provide accessible feedback mechanisms

The software should provide an accessible means for users to report issues with using the software (including accessibility issues) and to receive responses from the organization supplying the interactive system.

NOTE UAAG 2.0 guideline 5.1.5 contains further information on this recommendation relating to Web User Agents.

7.3 To have the system accessible to an individual with combinations of needs

The software should enable users to select the combination of accessibility features that best meet their personal needs.

NOTE Different people have different combinations of abilities, disabilities, and needs that are not well served by stereotypes that assume designs focused on a single disability.

EXAMPLE Solutions designed for the deaf or for the blind often do not work for the deaf-blind.

8 Goal 2: Achieving conformity with user expectations needs

8.1 To not be surprised by the results of interactions with the system

8.1.1 Maintain naming consistency

The user-interface elements of the software should use consistent naming for elements that have the same functionality or purpose.

EXAMPLE The software consistently uses the label "update" rather than change or modify, when presenting a function that stores changes to its data records.

NOTE WCAG 2.2 guideline 3.2.4 contains further information on this recommendation relating to Web Content.

8.1.2 Maintain location and ordering consistency

The software should use consistent location and ordering relative to the primary user-interface element and other user-interface elements.

EXAMPLE 1 The software presents all of its menus ordered from most frequently chosen to least frequently chosen, as identified in user research that went into the development of the interactive system.

EXAMPLE 2 The help button is consistently positioned on the top right of all screens within the software.

EXAMPLE 3 Navigation components at the application level are located consistently and in the same internal order on all screens.

NOTE WCAG 2.2 guidelines 3.2.3 and 3.2.6 contain further information on this recommendation relating to web content.

8.1.3 Present user notification using consistent techniques

- a) Alerts, warnings, and other user notification should be presented by software using consistent techniques that enable a user to locate them and identify the category of the information (e.g. alerts versus error messages).

EXAMPLE 1 Following a "beep", a positioning message is provided in a consistent place that allows the user having low vision to look for and find the error message more easily.

EXAMPLE 2 Every error message occurs in a dialog box, while every informative (non-error) message appears in the bottom left of a window. The consistent position of error messages allows users who are viewing only part of the screen through magnification to predict where particular types of information are likely to be found.

- b) A screen reader may be programmed to read a message automatically as long as it appears in a consistent manner in a particular screen location.

EXAMPLE 3 Notification that a form field is mandatory or read-only is displayed on the status bar. "On" tabbing to the control, the message is automatically picked up by a screen reader that has been programmed to monitor this area of the window.

8.1.4 Update equivalent alternatives for media when the media changes

Software should enable equivalent alternatives (e.g. captions, or auditory descriptions of the visual track of a multimedia presentation) to be updated when the content of a media presentation changes.

EXAMPLE When the audio portion of an "interactive tour" video is corrected, the accompanying captions and audio description are corrected at the same time.

8.1.5 Use familiar tactile patterns

The software should use commonly accepted tactile patterns for presenting tactile messages.

NOTE A person without special knowledge in tactile coding (Braille-code, Morse-code, etc.) will be mostly well experienced in tactile pattern of daily life.

EXAMPLE Bursts of tactile vibrations are designed to have a pattern similar to that of a ringing bell.

8.1.6 Manage consistent focus

The software should only change focus as a result of explicit user requests.

NOTE UAAG 2.0 guideline 3.3.1 contains further information on this recommendation relating to Web User Agents.

8.1.7 Restore state when regaining focus

When a window regains focus, the software should restore the focus, selection and active modes to the values they had before the window lost the focus, except when the user explicitly requests otherwise.

NOTE Some user actions can return focus to a window and then move the focus to a specific element within that window automatically or change the state of the window.

EXAMPLE 1 Focus is currently on the third button in a window until focus is switched to another window. When the focus returns to the original window, focus is returned to the third button in that window.

EXAMPLE 2 During editing of the contents of a spreadsheet cell, focus is switched to another window. When the user returns to the original window, the application is still in editing mode, the same text is selected, and the cursor is at the same end of the selected text as it was before the window lost focus.

EXAMPLE 3 On some platforms, the user can position the pointer over a window that does not have the focus, and click on a control in that window, thereby moving the focus to that window and then to the control that the user clicked.

8.1.8 Follow platform keyboard conventions

The software should follow keyboard-access conventions established by the platform software on which it is run.

NOTE 1 The platform conventions normally include the assignment of implicit designators, modifier keys and shortcut keys.

NOTE 2 This does not preclude the provision of additional keyboard shortcuts and techniques in addition to those that are platform conventions.

NOTE 3 Keyboard conventions can be established by the operating system or by a separate graphical user interface layer.

EXAMPLE 1 An application follows the system conventions that “Alt” is used to indicate the use of implicit designators when held down, and to activate the application main menu when pressed and released.

EXAMPLE 2 An application avoids reassigning the key combination used by the operating system to activate the MouseKeys™ feature (see [D.3.6](#)).

EXAMPLE 3 An application uses the “Esc” key to cancel its custom dialog and message boxes, because this follows the convention established by the operating system.

NOTE 4 UAAG 2.0 guideline 2.1.5 contains further information on this recommendation relating to Web User Agents.

8.1.9 Managing changes of context

a) When a user-interface element receives focus, the software should only change context as a result of an explicit user request.

NOTE 1 WCAG 2.2 guideline 3.2.1 contains further information on this recommendation relating to Web Content.

- b) The software should not automatically change the context when a user interacts with a user-interface element, unless the user explicitly accepts the impact of activating the user-interface element.

NOTE 2 WCAG 2.2 guideline 3.2.2 contains further information on this recommendation relating to Web Content.

- c) The software may provide a mechanism to turn off any system-initiated changes of context (leaving only user-initiated changes available).

NOTE 3 WCAG 2.2 guideline 3.2.5 contains further information on this recommendation relating to Web Content.

8.2 To apply personal knowledge and experience to interact successfully with the system

The software should make use of the user's personal knowledge and experience to successfully interact with the system.

EXAMPLE 1 The software uses terminology that typical users will understand and provides help for understanding terms that some users might not be familiar with.

EXAMPLE 2 The software uses terminology and interactions that are similar to those in common applications (such as word processing, e-mail, and social media).

NOTE Users typically expect consistency across patterns of activation.

8.3 To provide user assistance for knowledge needed to interact with the system

The software should provide training or other forms of user assistance that provide the user with knowledge to successfully interact with the system.

NOTE This is especially important for those features of the system that are not similar to those used in common applications (such as word processing, e-mail, and social media).

8.4 To provide immediate and easily accessible help or further instructions, where such help can be provided by the system

The software should provide the user accessible user assistance for performing the tasks for which the software is intended to be used.

NOTE While pre-programmed user assistance can assist many users, some users can be best served via the availability of live user assistance (e.g. from trained customer service personnel available on-line).

EXAMPLE 1 The software provides context-sensitive help that explains how to accomplish tasks that are related to the current context of the application.

EXAMPLE 2 Live assistance is available via chatting with a customer service representative.

9 Goal 3: Achieving support for individualization needs

9.1 To be provided with the way of interacting with a system that best works for them

The software should provide means for individualization by the user to meet the different needs of different users.

NOTE Different users will have different needs, which if not met will reduce the accessibility of the system.

9.2 To choose between the available input and output modalities and their configuration without requiring restart of the system

9.2.1 Enable switching of input and output alternatives

The software should enable users to switch among the available input and output alternatives without requiring them to reconfigure or restart the system or applications.

NOTE This capability aids users with different abilities who are working together on the same system.

EXAMPLE 1 A person uses his or her system only through the keyboard, using keyboard substitutes for mouse actions. Another user working on the same system can use the mouse and type in text. The system does not have to be restarted in between each session.

EXAMPLE 2 One user points with a mouse to an icon for a document on the screen and says “print” to print the document while another user clicks on the document and keys in CTRL+P to print it. Still another uses the “Print” item in the “File” menu to print the document.

9.2.2 Enable revising or reassigning controls

The software should enable controls to be revised to different user-interface elements that can perform the same control action or to be reassigned to other existing controls.

NOTE Reassigning a control to another existing control is sometimes referred to as remapping.

9.3 To have simultaneous use of alternate interaction modalities

9.3.1 Choosing modalities to be simultaneously available

The software should provide the user with a means to select which modalities are to be used simultaneously.

9.3.2 Switching between simultaneously available modalities

The software should provide the user with a means to easily switch between any two simultaneously available modalities of interaction.

9.3.3 Allow user to select media streams to be presented

The software should enable users to select which media streams are presented by the user interface.

EXAMPLE 1 A user decides to view a captioned video with the audio turned off because he or she cannot determine the appropriate volume and does not want to disturb others.

EXAMPLE 2 A user makes a selection to turn off background sound in a video presentation where the voiceover is in a separate media stream from the background sound, which is possible because the voiceover and the background sound are in separate media streams.

9.4 To be provided with information on available options for interacting with a system on which to base a choice of interaction methods

The software should provide the user with information on available individualization choices.

EXAMPLE 1 The software provides information that informs the user on available individualization choices and how to access and set them.

EXAMPLE 2 The software provides information on current values of individualization choices and whether they are based on system defaults, user choices, or system-initiated adaptations to user actions.

9.5 To be provided with an accessible means to choose individualization features

9.5.1 Enable individualization of user-preference settings

9.5.1.1 Make settings easily adjustable

When the software enables the user to set personal preferences, these settings should be easily adjustable.

EXAMPLE 1 A software application allows users to configure and save settings for font size and style within a particular window.

NOTE 1 It is very important to use system-wide user preference settings provided by the platform, in addition to any preference settings for product-specific options.

EXAMPLE 2 A software application allows a user to choose the number and size of icons displayed at any one time.

NOTE 2 Requiring users to hand edit a configuration file is not an easy method for individualizing preference settings because it is too easy for the user to accidentally enter invalid values or otherwise corrupt the file.

EXAMPLE 3 A user chooses preference settings through a graphical user interface, rather than directly editing the configuration files.

NOTE 3 Business considerations related to consistency of operations, performance-based considerations, safety, privacy, and security concerns can all lead to some necessary restriction by system administrators of the user's capability to modify the behaviour and appearance of user-interface elements in certain contexts. Administrators need to show restraint in limiting user control. Not all options or preferences settings are appropriate for such administrative control.

NOTE 4 Administrators within this business environment can make specific permission profiles for users that require more flexibility in their options or preference settings for usability and accessibility.

9.5.1.2 Allow users to choose visual or tactile alternatives for audio output

If the hardware supports visual or tactile output, platform software should enable users to choose to have task-relevant audio output (including alerts) presented in visual form, tactile form, auditory form or some combination of these forms, and software running on such systems should support those options.

NOTE This feature involving visual output is commonly called ShowSounds™ (see [D.3.10](#)).

EXAMPLE 1 By default, a beep is provided when an error message has been displayed or a status message has been updated. For users who have chosen to receive visual feedback, a flashing border on a dialog box is provided in conjunction with a warning tone.

EXAMPLE 2 Explanatory text is provided in a dialog box when a distinctive audio (alert or other) is played.

EXAMPLE 3 Software that provides voice output provides closed captions as text that can be displayed on systems providing "closed caption" support or displayed by braille devices through assistive software.

EXAMPLE 4 A user's device vibrates when an error message has been displayed or a status message has been updated.

EXAMPLE 5 A user's device that supports a camera, also allows the camera to flash when a message has been received.

9.5.1.3 Provide a visual information mode usable by users with low visual acuity

The software should provide at least one mode for visual information usable by users with corrected visual acuity between 20/70 and 20/200, without relying on audio.

NOTE One possibility is that the software magnifies what is shown on the screen. Another is to enable the user to change the size of fonts and icons.

EXAMPLE 1 An operating system provides a "large print" setting that enlarges the fonts, lines and controls by a factor of 2 to make them easier to see. It also provides a magnifier to further enlarge a portion of the screen.

EXAMPLE 2 An application allows font sizing and word wrap to allow documents to be enlarged up to a 72-point font size.

9.5.1.4 Provide colour schemes designed for people with disabilities

The software should provide a means to select from one or more additional colour schemes, beyond the default colour scheme, designed for use by people with different needs for colours and contrasts.

NOTE 1 If the platform software already provides this facility, the application can utilize it.

NOTE 2 People have different colour needs that can affect their use of displays.

NOTE 3 There can be users needing different colour schemes than those provided. It can be useful for a user to be able to adjust a colour scheme to their particular needs as long as they can easily return to a default colour scheme. See also [Clause 9.10.3.3](#).

EXAMPLE 1 Dark mode schemes are provided that reduce the brightness of a white background on a display, that helps users viewing the display in a dark environment.

EXAMPLE 2 High-contrast monochrome schemes are provided, including one using a light foreground on a dark background and another using a dark foreground on a light background. The software system also includes schemes that avoid the use of colours that can confuse users having common forms of colour blindness, cataracts, macular degeneration or other visual impairments.

9.5.1.5 Enable control of audio volume

The software should enable users to control the volume of audio output.

NOTE If software generates audio output, it is preferable that it provide its own control that adjusts the volume of its own audio output relative to other software and any system-wide volume setting.

EXAMPLE A user has a multimedia player application and a phone with an alert tone. The user adjusts the first application's volume control to a low setting and the second's volume control to a high setting. The second now sounds louder than the first. When the user reduces system-wide volume setting in the operating system's global preferences, the second application remains louder than the first, even though they are both reduced in volume.

9.5.1.6 Enable separate control of individual audio streams

Where audio information is presented in different audio tracks, the software should enable the user to select, deselect, and control the individual volume of different audio tracks that are presented.

NOTE This can be very important as the presentation of some tracks can obscure the presentation of other tracks.

9.5.1.7 Enable adjustment of audio output

The software should enable users to adjust the attributes of task-relevant audio output such as frequency, speed and sound content.

NOTE The range of adjustment will be constrained by the sounds that a system can produce.

EXAMPLE 1 A user can replace the sounds associated with various events and notifications, allowing him or her to choose sounds that he or she is able to distinguish.

EXAMPLE 2 A user can alter the speed of speech from a synthesizer to enhance understanding.

9.5.1.8 Enable tactile output to be adjusted

The software should allow users to adjust tactile output parameters to prevent discomfort, pain or injury.

EXAMPLE A user with reduced haptic perception can individually adjust an upper limit for the tactile output of a force feedback system.