



DCGI

DEPARTMENT OF COMPUTER GRAPHICS AND INTERACTION

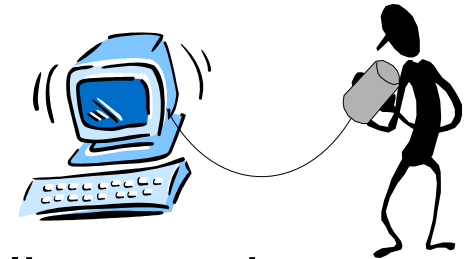
AST LECTURE 3

■ Human

- End-user of an application
- Collaborative environment

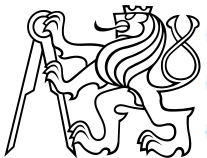
■ Computer

- The device running the application
- Execution often distributed among client and server machines



■ Interaction – two-way communication

- User tells the Computer what to do (commands)
- Computer tells the User what happened (results)



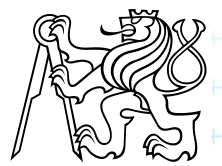
Psychology

Informatics

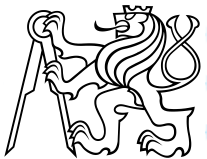
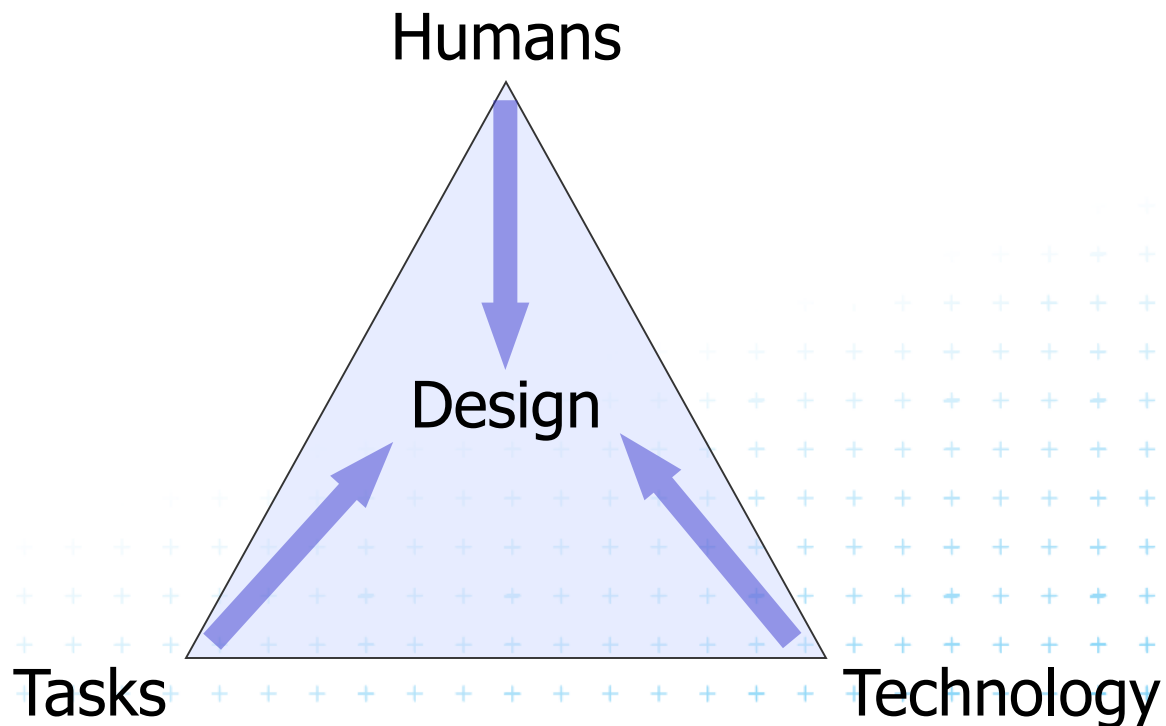


A.Holzinger, TU Graz

Human-Computer Interaction



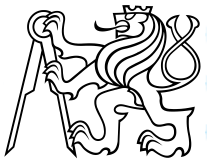
- *Design, Implementation, and Evaluation of the interactive systems from the perspective of use by the **human**.*



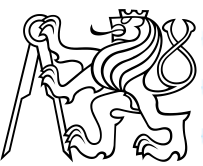
- The part of the technology, allowing people to:
 - Perform their own tasks
 - Interact with the technology
 - Both are indivisible

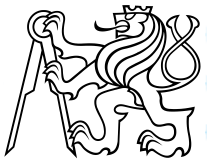
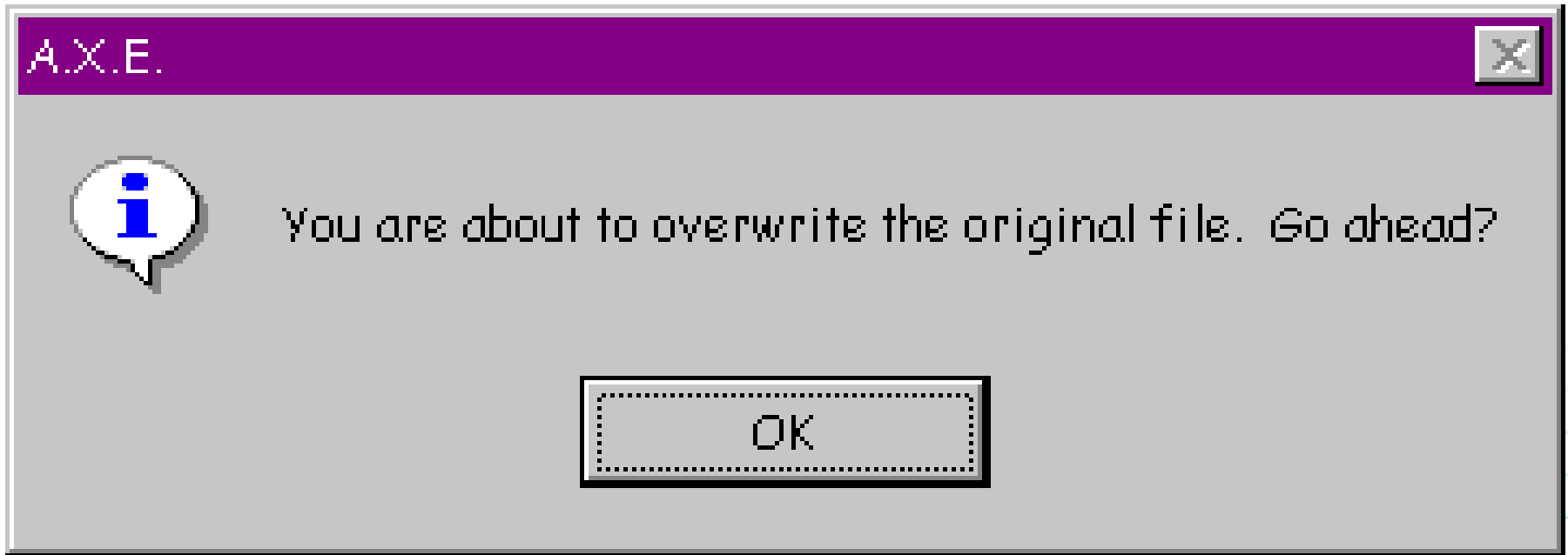


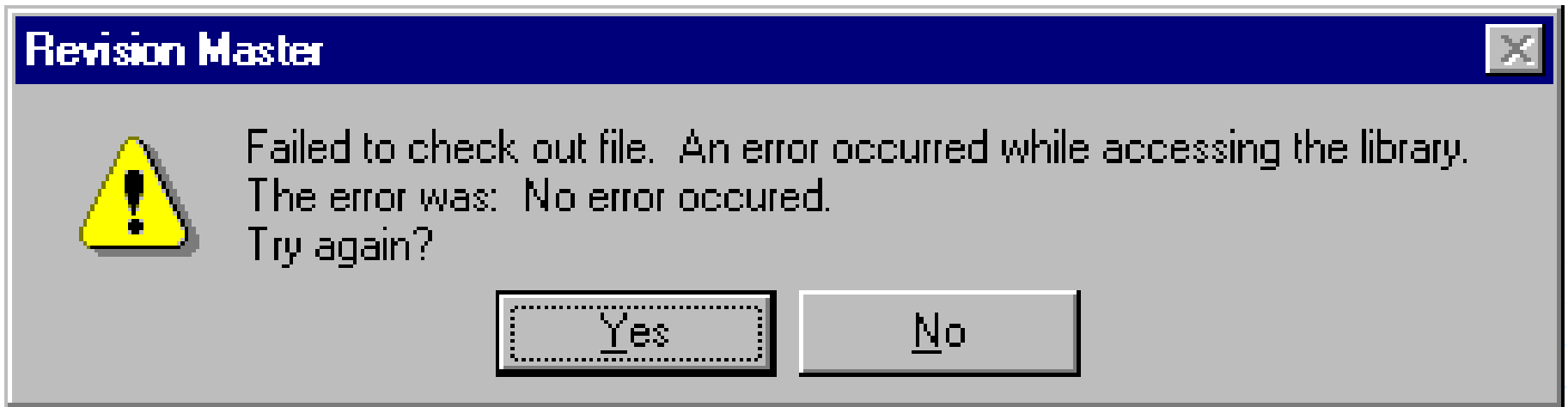
HCI is sometimes understood as the *design, prototyping, evaluation, and implementation* of the UIs for desktop computers.

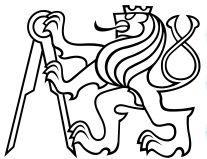


BAD DESIGN – BAD USER INTERFACES





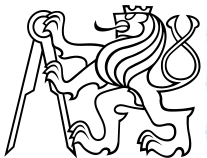




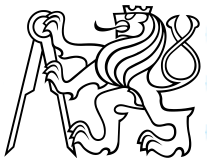
1.2 What is HCI?

“Human Computer Interaction is a discipline concerned with the design, evaluation and implementation of interactive computing systems for human use and with the study of the major phenomena surrounding them.”

- As defined by the Special Interest Group on Human-Computer Interaction (SIGCHI) of the Association for Computing Machinery (ACM)



- 50 years ago the cost of a computer would pay the salaries of 200 programmers for a year
- Today the salary of one programmer for a year will buy 200 computers—each vastly more powerful than the early machines
- Late 70's: smaller and cheaper computers (PC's) used by non-computer experts
 - Now the goal is to make computers easy to use, to save people time

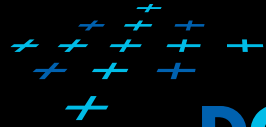


- Interfaces usually designed for ‘average’ user
- Universal design indicates that we take into account many factors (focus on 3)
 - disability
 - age
 - culture



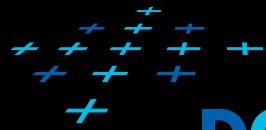
- 10% population has disability that will affect interaction with computers
- Moral and legal responsibility to provide accessible products
- Look at following kinds of impairments
 - sensory
 - physical
 - cognitive





- Federal law to ensure access to IT, including computers and web sites. (1998 Amendment to Rehabilitation Act)
- Disabilities
 - Vision
 - Blind (bill-reader)
 - low-vision
 - color-blind
 - Hearing
 - Deaf
 - Limited hearing
 - Mobility
 - Learning
 - Dyslexia
 - Attention deficient, hemisphere specific, etc.
- Keyboard and mouse alternatives
- Color coding
- Font-size





■ Cognitive

- Developmental, learning disabilities
Memory, perception, problem-solving, and conceptualizing
- Ranges from ADHD to severe retardation
- 20% of the U.S. population affected by mental disorders



■ Visual

- Low-vision, complete or partial blindness, color blind
- 3.4% of the U.S. population



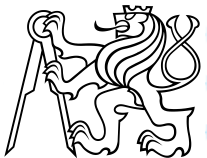
■ Hearing

- Hard hearing, deafness
- Often non-speaking
- 8.2% of the U.S. population



■ Physical

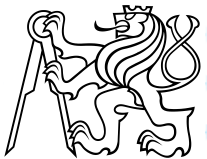
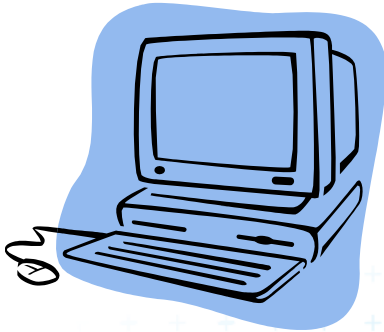
- Paralysis
- Not able to use conventional input devices



Examples of Accessible Features



- Accessible to all people regardless of disability or severity of impairment
- Assistive technology
 - Combination of hardware and software
 - Enables the use of a computer by a person with impairment



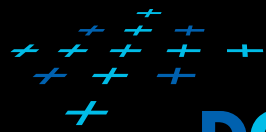
■ 1971

- Trace Center was founded
 - Part of the College of Engineering, University of Wisconsin
 - Address the communication needs of people who are nonspeaking or have severe disabilities

■ 1980's

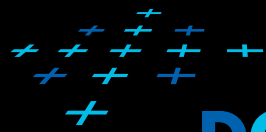
- Personal computers moved in to peoples' houses
- The Trace Center became a leader in making computers accessible to people with all types of disabilities
- 1984 “computer design guidelines” was developed by Trace
- 1980s & 1990s, the Trace Center worked directly with the computer companies to integrate disability access features into their products



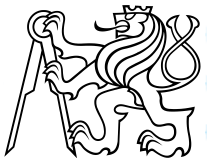


- Contrast
- Text descriptors for web images
- Screen magnification
- Text to Speech (TTS) – JAWS (web pages)
 - Check email on the road, in bright sunshine, riding a bike
- Speech Recognition
- Head mounted optical mice





- Eye Gaze control
- Learning what helps those with disabilities affects everyone
 - Present procedures, directions, and instructions accessible to even poor readers
 - Design feedback sequences that explain the reason for error and help put users on the right track
 - Reinforcement techniques with other devices
- Good target area for a final project!

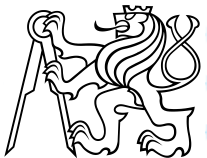


Special type of impaired users = Elderly DCGI

- Reduced
 - Motor skills
 - Perception
 - Vision, hearing, touch, mobility
 - Speed
 - Memory
- Other needs
 - Technology experience is varied (How many grandmothers use email? mothers?)
 - Uninformed on how technology could help them
 - Practice skills (hand-eye, problem solving, etc.)
 - Touch screens, larger fonts, louder sounds



- Screen readers using synthesized speech or braille output devices can provide complete access to text-based interactive applications.
- Ironically rise in use of graphical interfaces reduces possibilities for visually impaired users.
- To extend access use
 - sound
 - touch

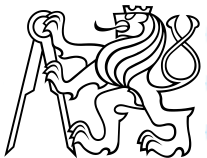


■ Sound

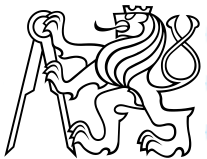
- speech
- earcons and auditory icons to graphical objects

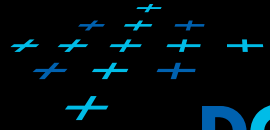
■ Example 1: Outspoken

- Macintosh application
- uses synthetic speech to make other Mac applications available to visually impaired users



- More recent is use of touch in the interface
- Tactile interaction
 - electronic braille displays
 - force feedback devices
 - elements in interface can be touched
 - edges, textures and behavior (pushing a button)
 - requires specialist software
 - more likely major applications will become ‘haptic enabled’ in future

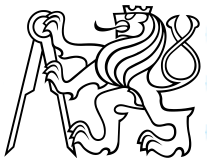




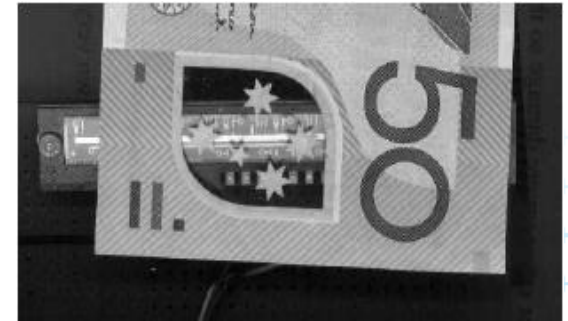
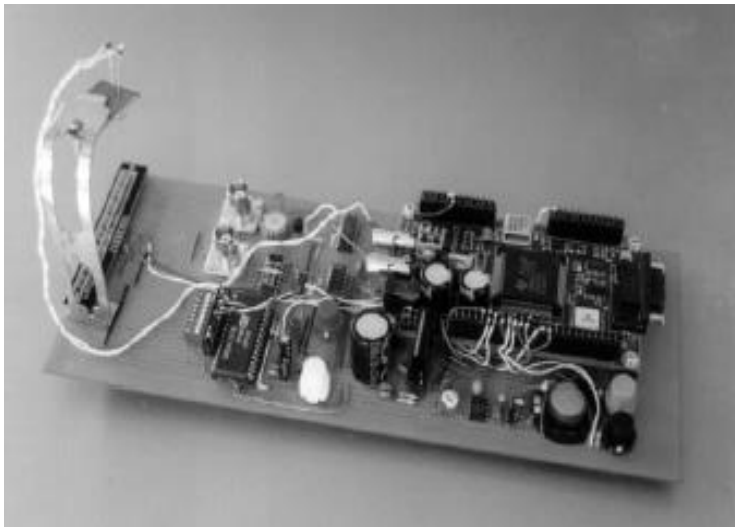




- **Force feedback workspace** ~6.4 W x 4.8 H x 2.8 D in.
> 160 W x 120 H x 70 D mm.
- **Footprint (Physical area device base occupies on desk)** 6 5/8 W x 8 D in.
~168 W x 203 D mm.
- **Weight (device only)** 3 lbs. 15 oz.
- **Nominal position resolution** > 450 dpi.
~ 0.055 mm.

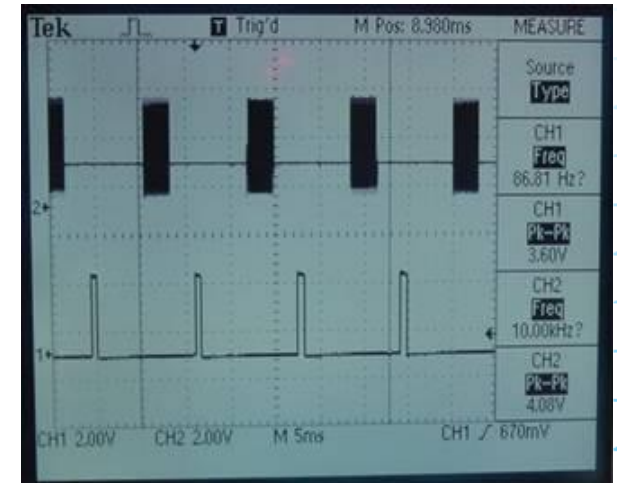
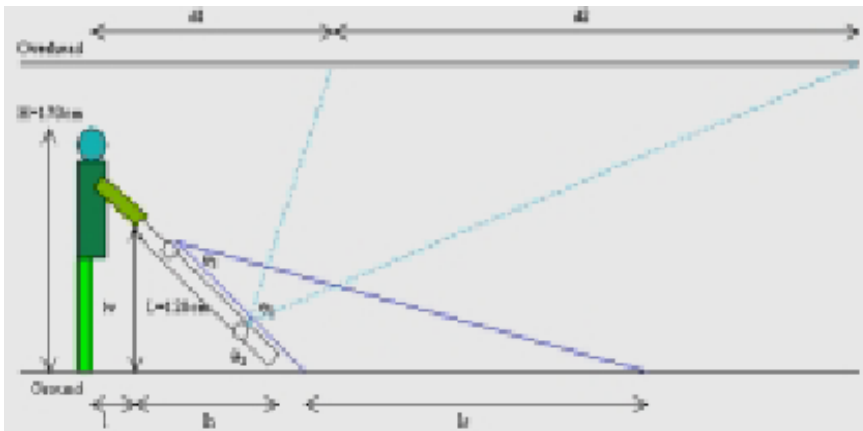


- Australian Polymer notes are of a similar size
 - Hard to distinguish denomination if totally blind
- Utilises the unique pattern in the clear window

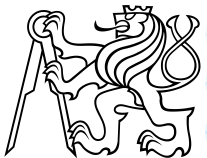


- Augments the standard long cane
 - Warns of
 - Head height obstructions
 - Drop off (e.g. Stairs)
- Simple user interface

QuickTime™ and a Microsoft Video 1 decompressor are needed to see this picture.



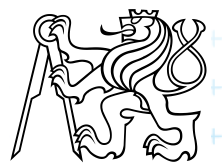
- 8% of the male population
- There are three kinds, one of which is extremely rare
- The most common type is *deuteranopia*, commonly called red/green confusion
- The following slides show how some colored materials would look to a color blind person, simulated by software from Vischeck, Inc.



- Thanks to Vischeck, Inc., for permission to use the examples in the next six slides
- They show what the color images look like to a person with deuteranopia, the most common form of color blindness
- See vischeck.com for lots of information and for free download of software



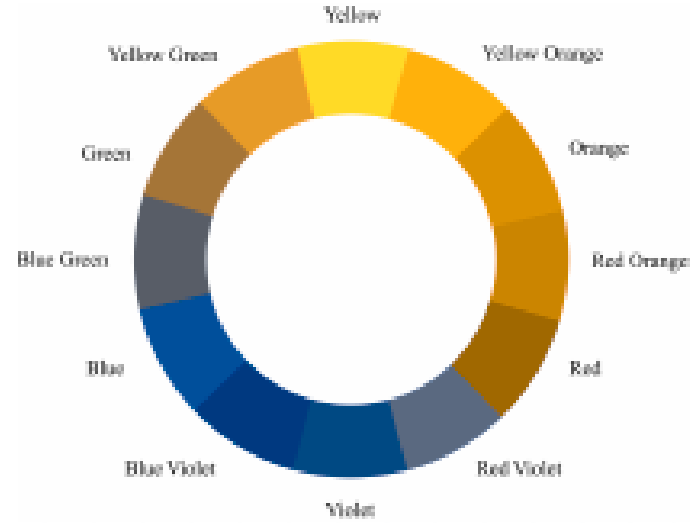
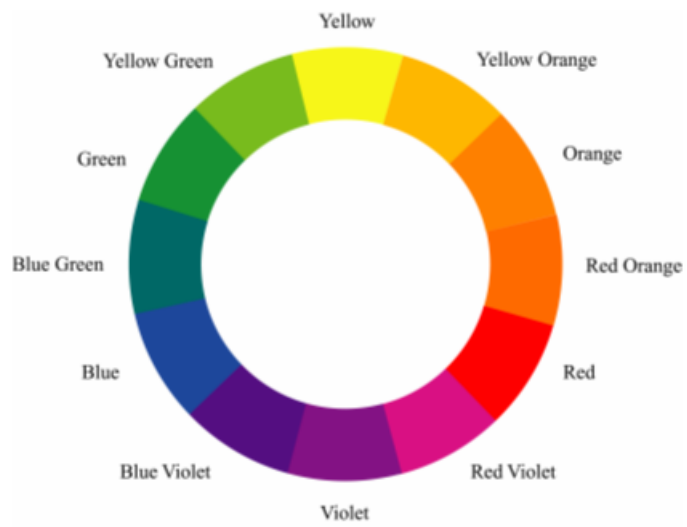
Do you prefer red peppers or green peppers? *How would you pick?*



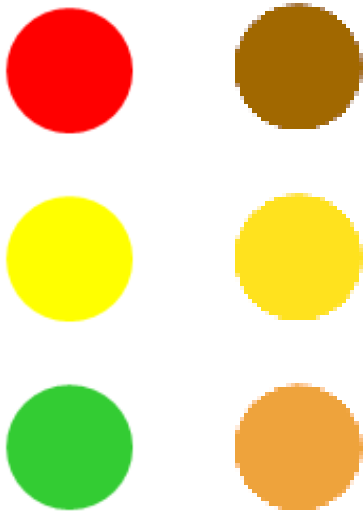
What is a green salad?



A color wheel, to the color blind

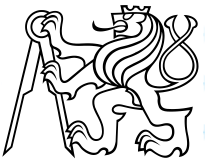


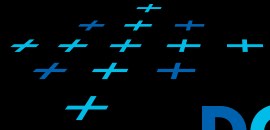
How do traffic lights look to a color blind driver?



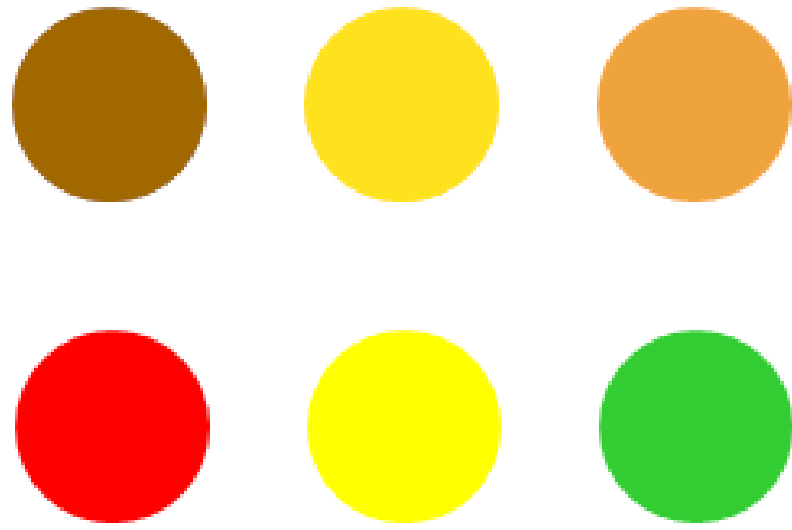
So: learn that red is always on top

Always? Are you sure?

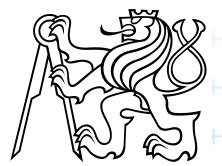




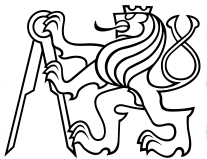
Is red on the right or left?



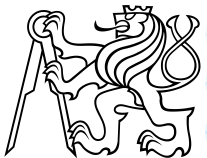
Did you get it right? Are you sure *we* got it right,
or is the red sometimes on the other side?



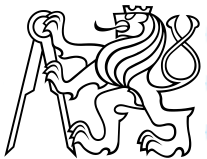
- Hearing impairment may appear to have little impact on use of an interface (or a graphical interface)
- To an extent true (but increase in multi-media applications)



- Computer technology can enhance communication opportunities for people with hearing loss
 - email and instant messaging
 - gesture recognition to translate signing or speech
 - caption audio content
- Also enhances experiences of all users - good universal design

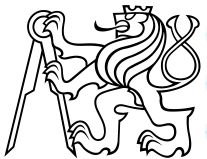


- Users with physical disabilities vary in amount of control and movement they have in hands
- Precise mouse control may be difficult
- Speech input and output is an option (if they can speak without difficulty)

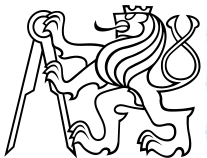


■ Alternatives

- eyegaze system - tracks eye movements to control cursor
- keyboard driver - attaches to user's head
- gesture and movement tracking
- predictive systems (Reactive keyboard) can anticipate commands within context



- Multimedia systems provide a number of tools for communication
 - text-based communication and conferencing systems (slow)
 - synthetic speech
 - can be pre-programmed
 - predictive algorithms
 - anticipate words and fill them in
 - conventions can help provide context
 - smiley face :) for a joke

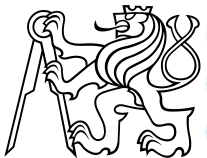


■ Hearing impairments

- Inability to
 - hear certain frequencies
 - Distinguish spoken words
- Profound deafness

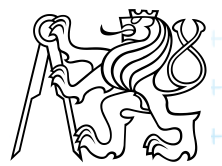
■ Seizure disorders

- Epilepsy
- Light and sound patterns can cause seizures
 - A milder form of the disability results in susceptibility to migraines



HOW TO

(MAKE USER INTERFACES SUITABLE FOR IMPAIRED USERS)



■ Provide undo

- Disabled may be more prone to do things that need undoing

■ Allow increasing font and image size, and font family

- Also allow for zooming in / magnifying

■ Enable of return of settings to defaults

- Needed if fonts have been set to small

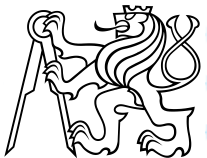
■ Reduce memory load

- Allow taking notes, multiple clipboards, etc.
- Recognition, not recall

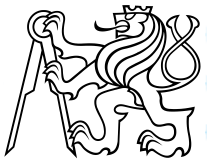


■ Provide easy keyboard access to everything

- Some users have trouble with the mouse
- Ensure the user can tab around all elements in a logical order
- Provide a way around the need to hold down multiple keys at once
- For keyboard shortcuts, give precedence to keys where 'control/command' and a letter key can be held together without too much reaching
- Ensure that there is always an alternative to drag and drop
- Use ESC uniformly to get out of any mode



- Don't make mouse targets too small
 - Allow a preference to make them larger
 - E.g. places to drag in a graphics application
- Provide descriptive text for all visual components
 - E.g. 'alt' html text in an image
 - Provide an option to hide the graphics entirely
- Test call colored elements for accessibility to the colorblind

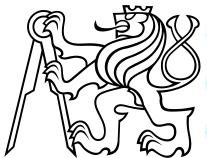


- Allow colours to be changed through a preferences pane
- Increase colour contrast beyond the bare minimum needed for sighted people
- Assume the user will hear no sounds
 - Don't use audio as the sole communication method
- Allow users to configure the volume and frequencies of sounds



■ Use animation and movement with care

- Flashing and blinking or repeated animation can bring on seizures or migraines
 - 2-55 Hz is the problem range
 - If some form of blink is needed, do it in a small area only
 - Other problem movement
 - ‘shaky camera’ videos
 - Certain PowerPoint like ‘transitions’
 - Allow all movement to be turned off
 - Provide alternatives (e.g. text)

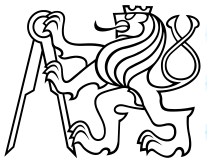


■ Don't rely on timing

- Automated slide slows
 - Some people read too slowly
- Timeouts after no interaction detected
 - Some people write too slowly
- Automated scrolling when dragging
 - Extremely difficult for some people to control

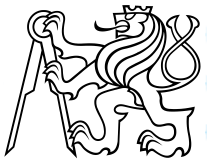
■ Don't rely on mousing over certain areas to get popup information

■ Test your software for use with assistive devices



■ Stephen Hawking

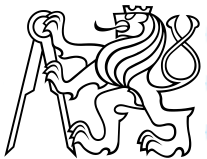
- Professor at Cambridge university
- International icon for science and intelligence
- One of the world's most recognizable disabled people
- Has been suffering from ALS for three decades
- Published a lot of papers and books



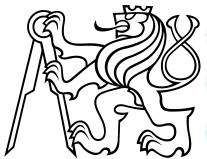
- 1970's
 - Dictating letters to a secretary
 - Gave seminars through an interpreter
- 1985
 - Could only communicate using his eyebrow
 - Equalizer software
 - Uses menus of word
- 1990's
 - He receives a copy of “EZ keys” software
 - Program is based on word prediction
 - Converts text to speech
 - Speeds up communication
 - A laptop and voice synthesizer was installed on his wheelchair
 - He is able to speak in seminars, write papers and books
 - “The only trouble is that it gives me an American accent !”



Accessible Design



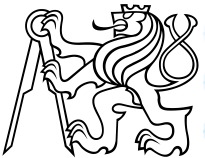
Accessible design - the design of entities that satisfy specific legal mandates, guidelines, or code requirements with the intent of providing accessibility to the entities for individuals with disabilities.



This definition focuses on the legal implications of the term.

Accessible design derives its legal meaning from:

- Americans with Disabilities Act (ADA)**
- Section 255 of the Telecommunication's Act of 1996**
- Section 508 amendments to the Workforce Investment Act of 1998**

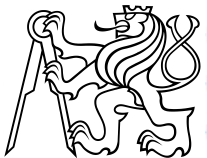


These laws also state that either

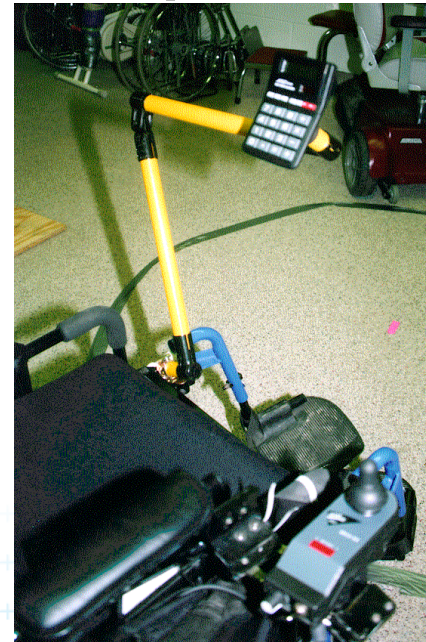
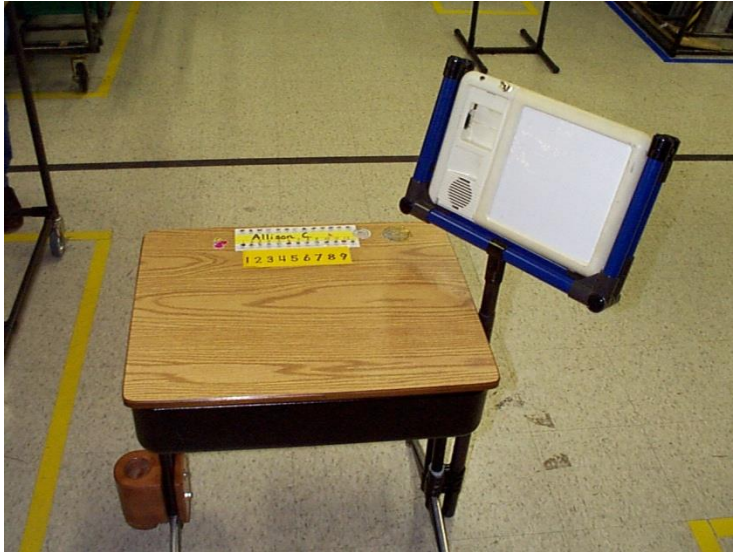
- **products need to be compatible with assistive technology devices used by people with disabilities**

or

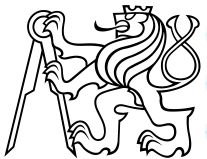
- **products are able to be modified so as to be rendered accessible**



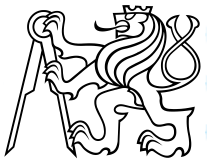
Note: systems may be designed so that they are not accessible, but with specific modifications be made accessible to individuals with specific disabilities.



Such modifications are termed *accommodations* and characterize the process of adaptable design.



Adaptable Design



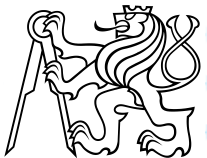
Adaptable design - features are modifications made to the standard design for the purpose of making the design usable for an individual, as needed.



This definition focuses on modifications made to existing entities which make the entity accessible to people with disabilities.



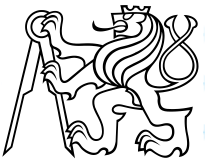
- **Van conversion provides wheelchair accessibility for occupants.**
- **Vans are a standard, non- wheelchair accessible, design. After modifications, vans are wheelchair accessible.**
- **Van accommodation is not required or mandated by any law, code or guidelines; hence, it is not considered accessible design, but adaptable design.**



How adaptable design differs from accessible design:

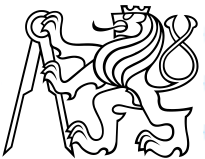
- adaptable design is not mandated by laws

- adaptable design focuses on modifying an existing standard design



How adaptable design differs from universal design:

- universal design creates products and services that are accessible and usable without adaptations
 - adaptable design focuses on modifying an existing standard design
 - universal design occurs at the beginning of the design process
 - adaptable design occurs after the design process is complete and the product has been produced
-



Specific Interactions



- Provides access to information through more than one mode of interaction
- Sight is predominant and most interactive systems use visual channel as primary presentation
 - graphics
 - text,
 - video
 - animation



■ Sound important

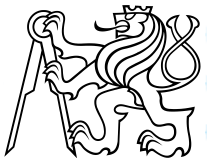
- keeps us aware of surroundings
- provides clues and cues to switch our attention
- music - also auditory
 - convey and alter moods
 - conjure up visual images
 - evoke atmospheres

■ Touch

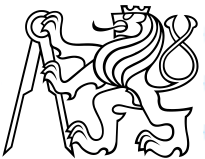
- tactile feedback to operate tools
- hold and move tools, instruments, pens



- Taste and smell
 - less appreciated
 - check food if bad, detect early signs of fire, ...



- Human-human everyday interaction multi-modal
- Each sense provides different information to make whole
- Want Human-computer interaction to be multi-modal
 - visual channel can get overloaded
 - provide richer interaction
 - provide redundancy for an equivalent experience to all



- **Contributes to usability**
 - **Audio confirmation**
 - changes in key clicks
 - error occurrences
 - **Provide information when visual attention elsewhere**
 - **...or environment has visual limitations**
 - **Dual presentation through sound and vision supports universal design**
 - enables access to visual and hearing impaired
 - **Two kinds: speech and nonspeech**
-



■ Language complex

– structure

- pronunciation

 - phonemes - atomic elements of speech (40 in English)

 - prosody - alteration in tone and quality

 - co-articulation - phonemes sound different next to others

 - allophones - differences in sound in phonemes

 - morphemes - smallest unit of language that has meaning

- grammar



– Speech recognition

- Useful when hands are occupied
- **Alternative means of input** for users with visual, physical and cognitive impairment
- single-user systems; require training
- **barriers**
 - background noise
 - redundant and meaningless noise ('uh')
 - variations between individuals and regional accents
- **Examples**
 - speech-based word processors
 - telephone -based systems
 - interactive systems that give feedback



■ Speech Synthesis

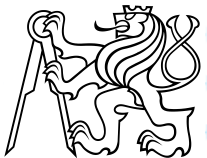
– Complementary to speech recognition

– Problems

- monotonous - doesn't sound natural
- canned messages - not too bad, prosody can be hand coded
- spoken output cannot be reviewed or browsed easily
- intrusive (more noise or equipment)

– Application areas

- blind or partially sighted
accessible output medium (screen readers)
- assist those with disabilities affecting their speech
predefined messages can be stored



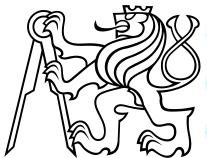
■ Un-interpreted speech

- **Speech does not have to be recognized by computer to be useful**
- **Examples:**
 - Fixed pre-recorded messages
 - human prosody and pronunciation quality is low
 - example: announcements in airport
 - Voice mail
 - Audio annotations
- Can be **digitally sped up** without changing pitch



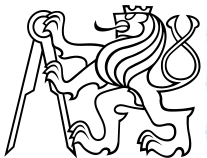
- Assimilated quickly
- Learned regardless of language
- Require less attention
- Uses:
 - indications of changes or errors in interactive system
 - provide status changes
 - sound representation of actions and objects
 - provide confirmation
 - give redundant information

- Two Kinds - auditory icons and earcons
-



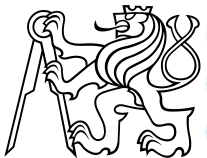
■ Auditory icons

- Use **natural sounds** to represent types of objects and actions
- **Example: Mac's SonicFinder**
 - crumpling paper when putting file in wastebasket
- **Problem:** Some objects or actions don't have a natural sound

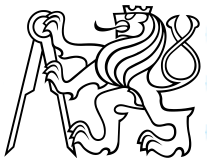
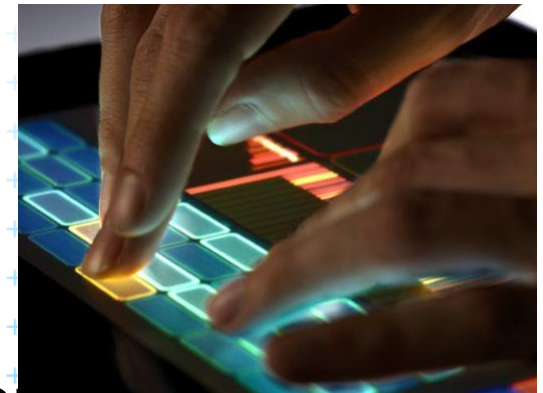


■ Earcons

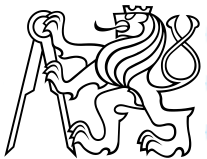
- **use structure**- combinations of notes (motives) to represent actions and objects
- **vary** according to rhythm, pitch, timbre, scale and volume
- **hierarchically structured**
 - compound earcons - combine motives
‘create’ and ‘file’
 - family earcons - ‘error’ family
 - makes learning easier
- even lack of musical ability has little effect on ability to remember earcons



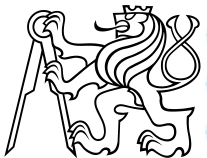
- Touch both sends and receives information
- Touch in the interface is haptic interaction
- Two areas:
 - cutaneous - tactile sensations through skin
 - vibrations against skin; temperature, texture
 - kinesthetics - perception of movement and position
 - resistance or force feedback
- Entertainment or training
- Tactile devices
 - electronic braille display
 - force feedback devices in VR equipment



- Handwriting provides textural and graphical input
- Technology for recognition
 - digitizing tablet
 - sampling problems
 - electronic paper - thin screen on top
- Recognizing handwriting
 - variation among individuals (even day-to-day)
 - co-articulation - letters are different next to others
 - cursive more difficult

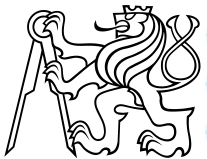
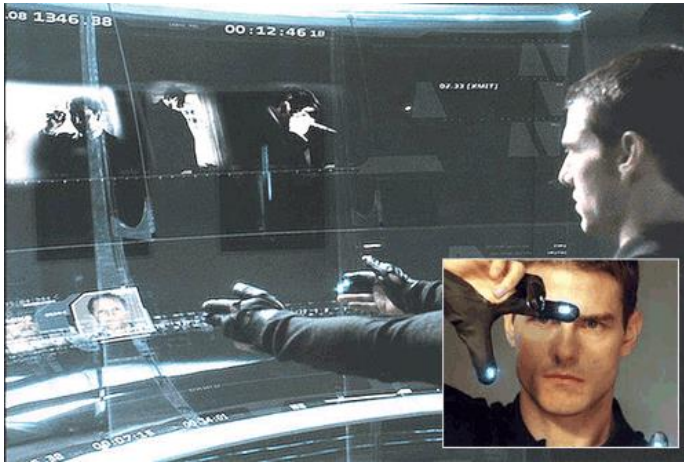


- Subject in multi-modal systems recently
- Involves controlling computer with movements
 - Put that there
- Good situations
 - no possibility for typing (VR)
 - supports people with hearing loss (sign language)
- Technology expensive
 - computer vision
 - data glove (intrusive)

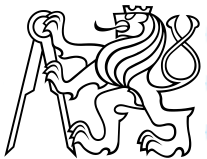


■ Problems

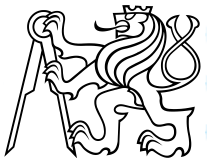
- Gestures user dependent
 - variation
 - co-articulation
- segmenting gestures difficult



- Web accessibility encompasses all disabilities that affect access to the Web, including visual, auditory, physical, speech, cognitive, and neurological disabilities.

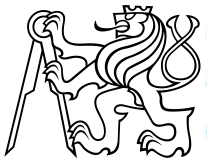


- Web accessibility also benefits people without disabilities.
 - Includes designing Web sites and software that are flexible to meet different user needs, preferences, and situations.
 - Benefits people such as those using a slow Internet connection, people with “temporary disabilities” such as a broken arm, and people with changing abilities due to aging.



Why is it important?

- The Web is an increasingly important resource in many aspects of life: education, employment, government, commerce, health care, recreation, and more.
- Accessibility provides equal access and equal opportunity to people with disabilities.
- An accessible Web can also help people with disabilities more actively participate in society.
- Web accessibility is often required by law.





W3C Home

Web Accessibility Initiative (WAI) Home
Introducing Accessibility
■ Introduction to Accessibility
>> ■ Essential Components
■ How People with Disabilities Use the Web
■ Contact Inaccessible Websites
■ Handouts
Guidelines & Techniques
Managing Accessibility
Evaluating Accessibility
WAI Groups
About WAI

- WAI Site Map
- Help with WAI Site
- 繁體中文 Translations
- **RSS** About RSS
- Search

Introduction to Web Accessibility

See also: [Accessibility - W3C](#)

What is Web Accessibility

Web accessibility means that people with disabilities can use the Web. More specifically, Web accessibility means that people with disabilities can perceive, understand, navigate, and interact with the Web, and that they can contribute to the Web. Web accessibility also benefits others, including [older people](#) with changing abilities due to aging.

Web accessibility encompasses all disabilities that affect access to the Web, including visual, auditory, physical, speech, cognitive, and neurological disabilities. The document "**How People with Disabilities Use the Web**" describes how [different disabilities affect Web use](#) and includes [scenarios of people with disabilities using the Web](#).

Millions of people have disabilities that affect their use of the Web. Currently most Web sites and [Web software](#) have **accessibility barriers** that make it difficult or impossible for many people with disabilities to use the Web. As more accessible Web sites and software become available, people with disabilities are able to use and contribute to the Web more effectively.

Web accessibility also **benefits** people *without* disabilities. For example, a key principle of Web accessibility is designing Web sites and software that are flexible to meet different user needs, preferences, and situations. This **flexibility** also benefits people *without* disabilities in certain situations, such as people using a slow Internet connection, people with "temporary disabilities" such as a broken arm, and people with changing abilities due to aging. The document "[Developing a Web Accessibility Business Case for Your Organization](#)" describes many different benefits of Web accessibility, including **benefits for organizations**.

Why Web Accessibility is Important

The Web is an increasingly important resource in many aspects of life: education, employment, government, commerce, health care, recreation, and more. It is essential that the Web be accessible in order to provide **equal access** and **equal opportunity** to people with disabilities. An accessible Web can also help people with disabilities more actively participate in society.

The Web offers the possibility of **unprecedented access to information and interaction** for many people with disabilities. That is, the

Page Contents

- [What is Web Accessibility](#)
- [Why Web Accessibility is Important](#)
- [Making the Web Accessible](#)
- [For More Information](#)
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- 日本語 Translations
- **RSS** About RSS
- Search

Overview of the Web Accessibility Initiative (WAI) Slides

NOTE: The slides were last updated in 2005. Some of the information is out of date. Updated information is available from the WAI home page www.w3.org/WAI/

Overview of the Web Accessibility Initiative

The [Overview of the Web Accessibility Initiative HTML slides](#) introduce:

- Web accessibility
- The importance and impact of an accessible Web to people with disabilities and without disabilities
- The World Wide Web Consortium (W3C) and the Web Accessibility Initiative (WAI)
- Resources to help make the Web accessible
- Actions to promote Web accessibility

How to Use the HTML Slides

The four buttons at the top right of each slide (except the Table of Contents) control the slides as follows:

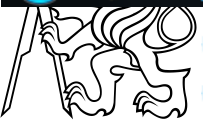
Button	Action	Access Key
	Go to previous slide	P
	Go to contents list	C
	Toggle through six choices of font size and font/background color	S

Page Contents

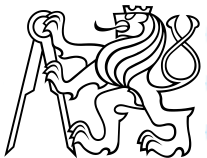
- ▾ [Overview of the Web Accessibility Initiative \(WAI\)](#)
- ▾ [How to Use the HTML Slides](#)
- ▾ [Using the Slides for Presentations](#)
- ▾ [Who Develops the WAI Overview Slides](#)

Links to Slides

- ▾ [Table of Contents](#)
- ▾ [Beginning of slides](#)
- ▾ [All slide content in one HTML page](#)

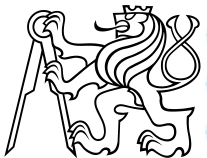


- Content.
 - Including text, images, and sounds, code or markup that defines structure, presentation.
- Web browsers, media players, and other user agents.
- Assistive technology.
 - Screen readers, alternative keyboards, switches, scanning software, etc.
- Users' knowledge, experiences, and adaptive strategies using the Web.

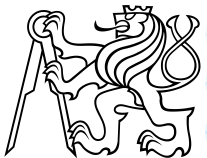


- **ISO/IEC Guide 71:2001** *Guidelines to address the needs of older persons and people with disabilities when developing standards*
 - Identifies areas in need of accessibility consideration
 - Sensory abilities; Physical abilities; Cognitive abilities; Allergies
 - Revision has just started
 - Focus shifting to inclusive design

- **ISO TR 22411:2008** *Ergonomic data and ergonomic guidelines for the application of ISO/IEC Guide 71 to products and services to address the needs of older persons and persons with disabilities*
 - A second version is now under development
 - It needs to coordinate with new version of Guide 71



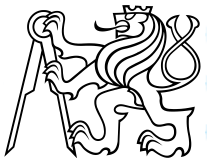
- **ISO/IEC TRs 29138** *Information technology — Accessibility considerations for people with disabilities*
 - **Part 1:** 2009 *User needs summary*
 - currently 150 needs identified (with very little duplication)
 - **Part 2:** 2009 *Standards inventory*
 - Currently organized in 6 categories
 - 102 Accessibility Focused
 - 191 Related
 - **Part 3:** 2009 *Guidance on user needs mapping*
 - Updates are currently underway
 - To be published as “information documents” rather than TR’s
 - Information also to be placed in a publicly available database



- **ISO 9241-20:2008** *Accessibility guidelines for information/communication technology (ICT) equipment and services*
- **ISO/IEC 13066-1:2011** *Information Technology — Interoperability with Assistive Technology (AT) Part 1: Requirements and recommendations for interoperability*
- **ISO 9241-171:2008** *Guidance on software accessibility*
- **ISO/IEC 29136:(2012)** *Accessibility of personal computer hardware*
- **ISO/IEC 24756: 2009** *Information technology — Framework for specifying a common access profile (CAP) of needs and capabilities of users, systems, and their environments*



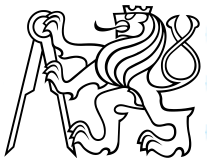
- **ISO/IEC 24751** *Individualized Adaptability and Accessibility in E-learning, Education and Training*
 - **Part 1:** 2008 *Framework and reference model*
 - **Part 2:** 2008 *"Access for all" personal needs and preferences for digital delivery*
 - **Part 3:** 2008 *"Access for all" digital resource description*
 - **Part 9:** NP *"Access for all" personal user interface preferences*
 - **Part 10:** NP *"Access for all" user interface characteristics*
 - **Part 11:** CD *"Access for all" personal needs and preferences for non- digital resources*
 - **Part 12:** CD *"Access for all" non-digital resource description*
 - **Part 13:** CD *"Access for all" personal needs and preferences for LET events*
 - **Part 14:** CD *"Access for all" LET events description*



- **ISO/IEC 24786:** 2010 *Accessible user interface for accessibility settings*
- **ISO/IEC 13066 Accessibility API Technical Reports**
 - Current TR's under development:
 - **Part 2:** 2012 *Windows automation framework accessibility API*
 - **Part 3:** 2012 *I-Accessible2 accessibility API*
 - **Part 4:** 2013 *Linux/UNIX graphical environments accessibility API*
 - **Part 6:** 2013 *Java accessibility API*
- **ISO/IEC 20071** *User interface component accessibility*
 - **Part 11:**2012 – *TR Guidance on creating alternative text for images*



- **Moving from accessibility standard to mainstream standard**
 - **ISO/IEC 19766:** 2007 *Guidelines for the design of icons and symbols to be accessible to all users – Including the elderly and persons with disabilities*
NOTE: ISO/IEC19766 is already replaced and completely incorporated within:
- **ISO/IEC 11581-10:** 2010 *Information Technology — User Interface Icons — Framework and General Guidance*
- **Inclusion in a new mainstream standard**
 - **ISO 9241-129:** 2010 *Guidance on individualization*



Thanks for your attention!

Material from
Authors of Human Computer Interaction
Alan Dix, et al, Kate Dehbashi

