


Web Accessibility

An abstract graphic featuring a central white sphere with four colorful, flowing ribbons (yellow, green, blue, and red) extending from it. The background is a light blue gradient with faint, semi-transparent icons representing accessibility: a person in a wheelchair, a large eye, an ear, a hand, and a speaker. Binary code (0s and 1s) is also visible in the background.

**Digital Inclusion Division
Office of the
Government Chief Information Officer**

6 March 2013

(Adapted for COMP 4021 by Dik Lee)

What is Web Accessibility?

- Making website **Content** available for **ALL**
 - Including persons with disabilities (361,000 about 5.2% of total population)

Four Major categories of disabilities

- Physical Impairment
- Hearing Impairment
- Visual Impairment
- Cognitive Impairment

Visual Impairment

Reading with Refreshable Braille Display Device

- Electrical device connected to computer
- Contents of webpage in text format can be converted to Braille (點字) display on the device



Braille Alphabet

A	B	C	D	E	F	G
H	I	J	K	L	M	N
O	P	Q	R	S	T	U
V	W	X	Y	Z		

Visual Impairment

Reading with Screen Reading Software

- Use text-to-speech (TTS) engine to interpret what is displayed on the screen

Reading with Screen Magnification Tools

- Zoom into sections of a screen and change contrast level to assist users with poor or low vision

Physical Impairment

Barrier-free Input Device

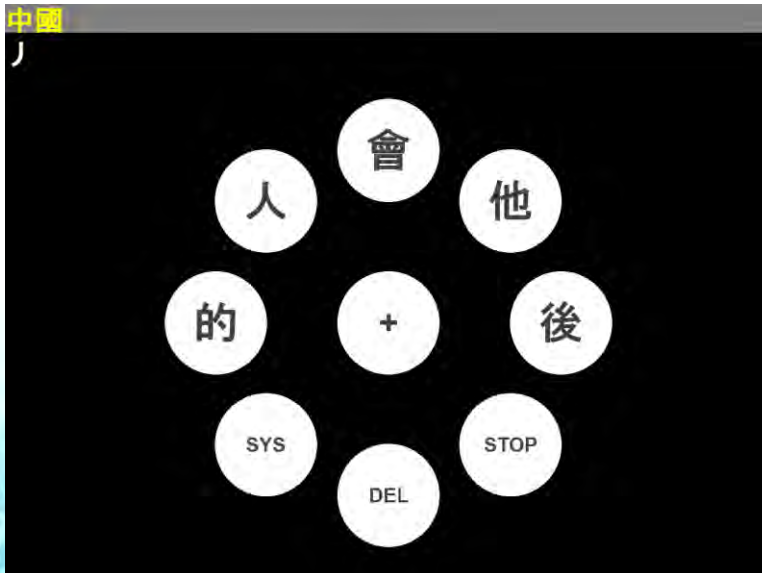
- Special hardware and software for accessing webpages



Physical Impairment

Brain-Computer Interface System

- User concentrates on the characters and strokes displayed which flashed sequentially on the screen
- System monitors brain activity



Hearing Impairment

Provision of content in different mediums

- If information is conveyed in audio, ensure to provide an alternative way to access this information
- Provide a text transcript, subtitles or sign language



Cognitive Impairment

May not require special tools to use websites but some design considerations, e.g.

- Ensure that navigation is consistent throughout a website
- Similar interface elements and similar interactions
- Avoid distractions (e.g. animation, unusual font faces)
- Pair icons or graphics with text to provide contextual cues



Ambiguous meaning



Clear meaning

Common Pitfalls in Web Accessibility

1. No alternatives for non-text content

- Persons with visual impairment cannot perceive the image content



Alt = "Image 1"



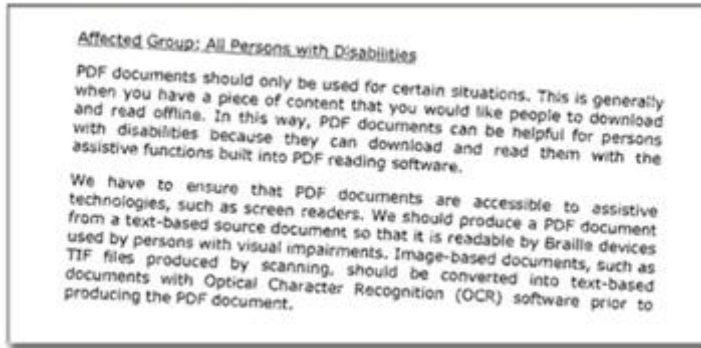
Alt = "Officiating guests attending the Launch Ceremony of the Web Accessibility Recognition Scheme"

- ✓ e.g. contain descriptive text alternative for image

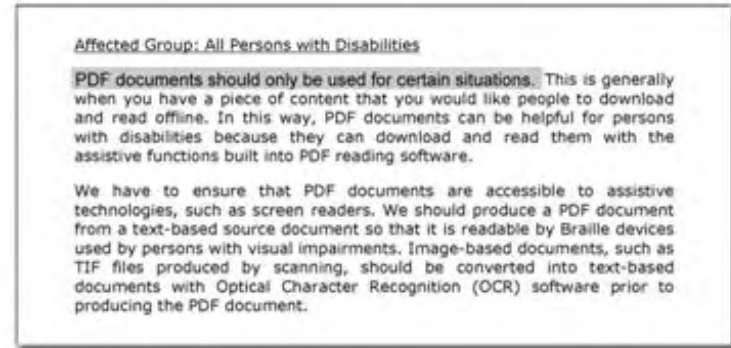
Common Pitfalls in Web Accessibility

2. Inaccessible PDF Files

- Screen reader cannot read the content



Scanned Image not accessible



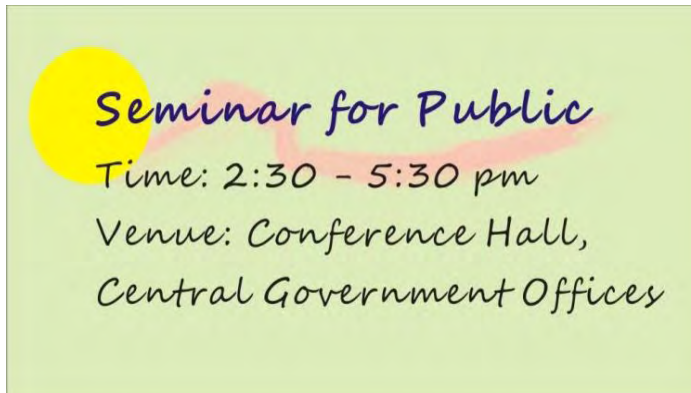
Text-based accessible PDF

- ✓ e.g. use proper PDF generator to produce a PDF document from a text-based source document;
- ✓ use Optical Character Recognition (OCR) software after scanning

Common Pitfalls in Web Accessibility

3. Text in Image is not accessible

- Information is not conveyed to all



Text in image



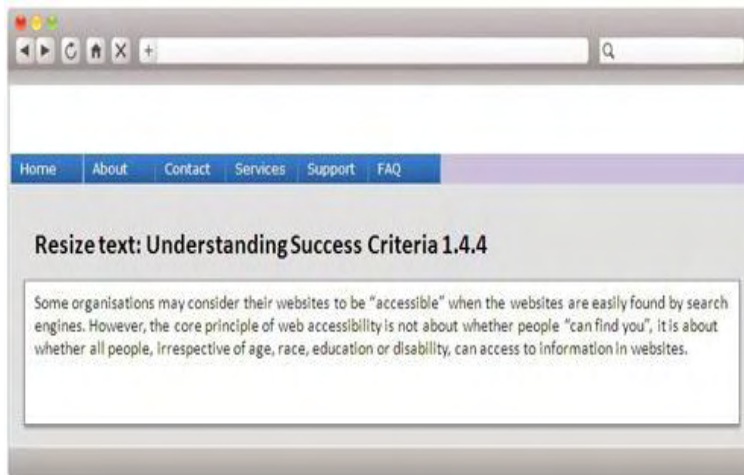
Accessible text on a webpage

- ✓ Avoid to convey information of wide public interest
- ✓ If avoidable, provide descriptive text alternatives

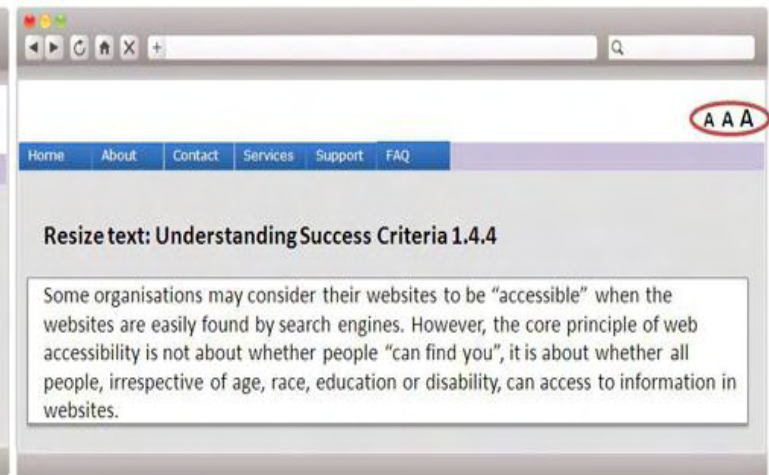
Common Pitfalls in Web Accessibility

4. Small font sizes

- **Persons with low vision cannot read the text**



Cannot resize text



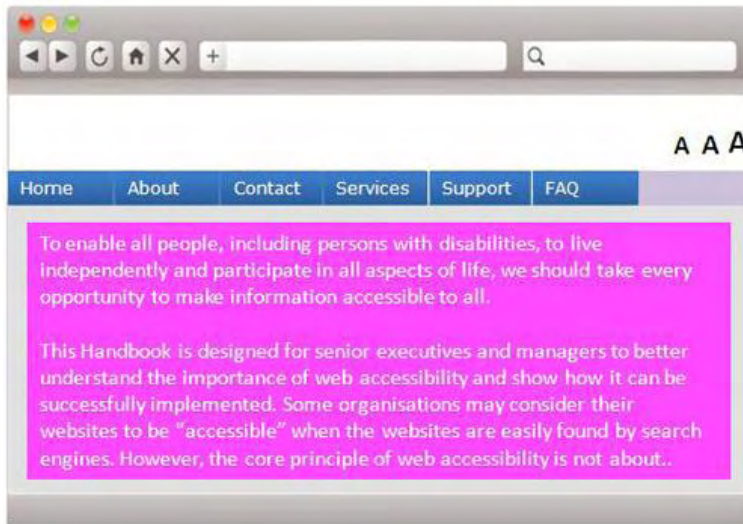
Can resize text

- ✓ e.g. provide text resize function

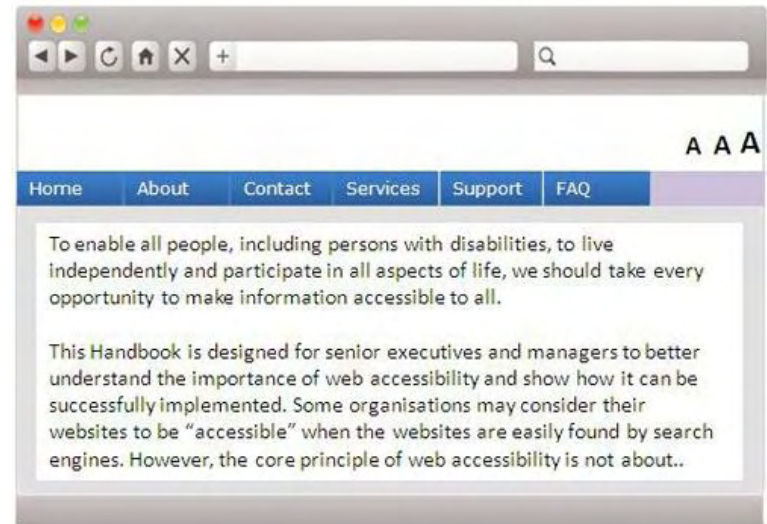
Common Pitfalls in Web Accessibility

5. Insufficient colour contrast

- Persons with low vision have difficulty reading text that does not contrast with its background



Poor background contrast



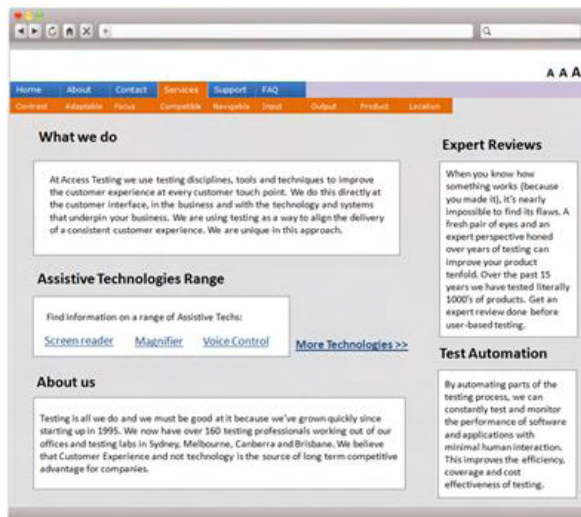
Easier to read with higher contrast

- ✓ e.g. provide sufficient contrast ratio

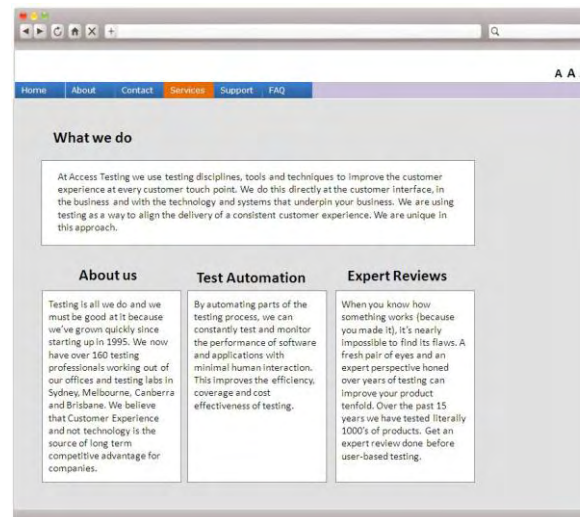
Common Pitfalls in Web Accessibility

6. Complicated website infrastructure

- Persons with cognitive impairment have difficulty reading complex website structures



Complex structures

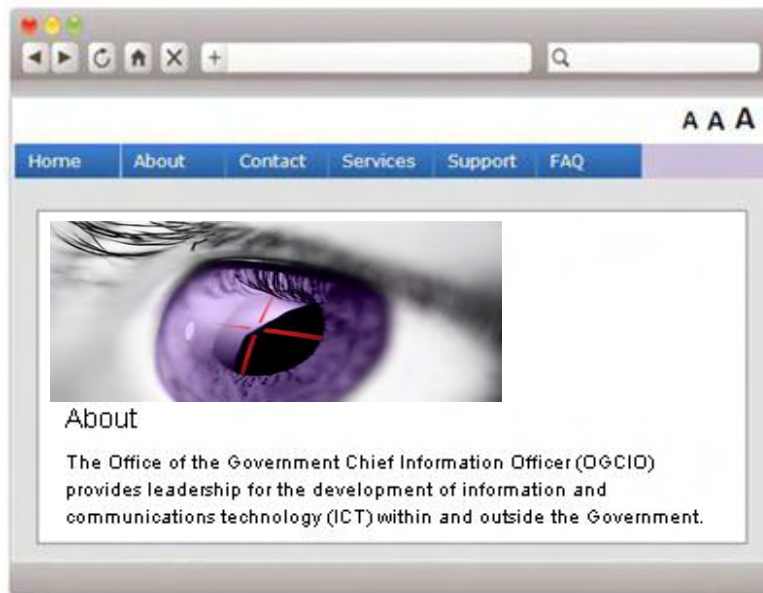


Simple structure

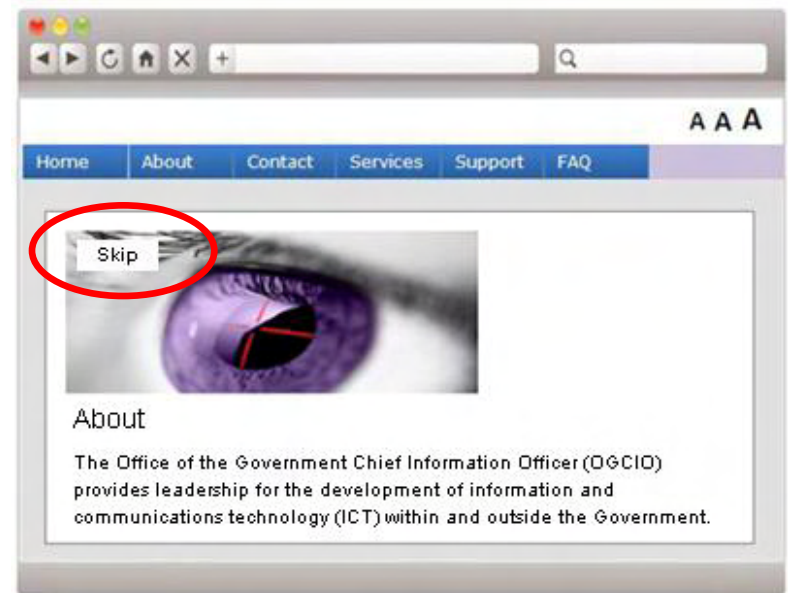
- ✓ e.g. provide simpler and ordered website structure

Common Pitfalls in Web Accessibility

7. Unable to skip inaccessible Adobe Flash and moving objects



Unable to skip



Skip function added

✓ e.g. add a skip function

Common Pitfalls in Web Accessibility

8. Websites with background audio

9. Video without captions and audio description

- **Persons with visual or hearing impairments have difficulty to understand the video**

Legislation / Guideline

Country	Legislation / Guideline
Australia	<ul style="list-style-type: none">• Disability Discrimination Act (DDA) of 1992• WWW Access: DDA Advisory Notes• The Guide to Minimum Website Standards
Canada	<ul style="list-style-type: none">• Canadian Human Rights Act of 1977• The Government of Canada Internet Guide
China	<ul style="list-style-type: none">• 國務院令第622號 - 《無障礙環境建設條例》
United Kingdom	<ul style="list-style-type: none">• The Equality Act 2010• Formal investigation report on Web Accessibility
United States	<ul style="list-style-type: none">• American with Disability Act (ADA)• Section 508 of the Rehabilitation Act• Assistive Technology Act of 1998• Section 255 of the Telecommunications Act of 1996
European Union	<ul style="list-style-type: none">• Accessibility of Public Websites – Accessibility for PWDs: Council Resolutions, 2002

Lawsuit: Australian Olympic Games website

- A person with visual impairment lodged a complaint against Sydney Organising Committee for the Olympic Games 2000
 - No alternative text for image
 - Contained inaccessible image map
- Respondent was ordered to make the website accessible including alternative text on all images and image map links together with other features
- Compensation sum of AU\$20K paid by respondent

Lawsuit: inaccessibility of Target.com

National Federation of the Blind filed a class-action suit with 50,000 names:

- No alternative text for image
- Inaccessible image maps and graphical features
- Required the use of a mouse to complete an online purchase
- In Sep 2006, the Federal District Court sustained the claims against Target.com
- Set a precedent case that retailers must make their websites accessible under the Americans with Disability Act (ADA)
- Target made the website fully accessible
- Settled the class suitcase by set up a fund US\$6M for claims

Local Complaint Cases

- A NGO issued a press release in June 2012
- Complained about inaccessible PDFs published on Government website

選舉處涉歧視殘障



無法在月底前向選舉處申索的人士，將不能在9月投票。

【本報訊】選舉事務處在核實選民登記冊時涉觸犯《殘疾歧視條例》。香港失明人士協進會會長莊陳有昨去信平機會，指選舉事務處在本月15日公佈的臨時選民登記冊及抽樣調查信件，只提供一般文字版本，視障人士無法查閱，隨時在不知情的情況下喪失選民資格。

莊陳有指失明人士看不見選舉事務處發出的抽樣信件，可能連需要核實身份也不知道。「事務處嘅網頁都係只得文字，欠缺無障礙設施，香港話就話無障礙城市，事實仲好落後。」莊陳有已在本月15日去信選舉管理委員會主席馮驊，要求改善，至今仍未獲回覆。

Source: Apple Daily Newspaper

International Standards

- **World Wide Web Consortium (W3C)**
 - **Web Content Accessibility Guidelines (WCAG)** have been developed over the years by W3C
 - Version 1.0 in 1999; version 2.0 in 2008
- <http://www.w3.org/WAI/>

International Standards

- The WCAG consist of four parts —

4 Principles

12 Guidelines

61 Success Criteria

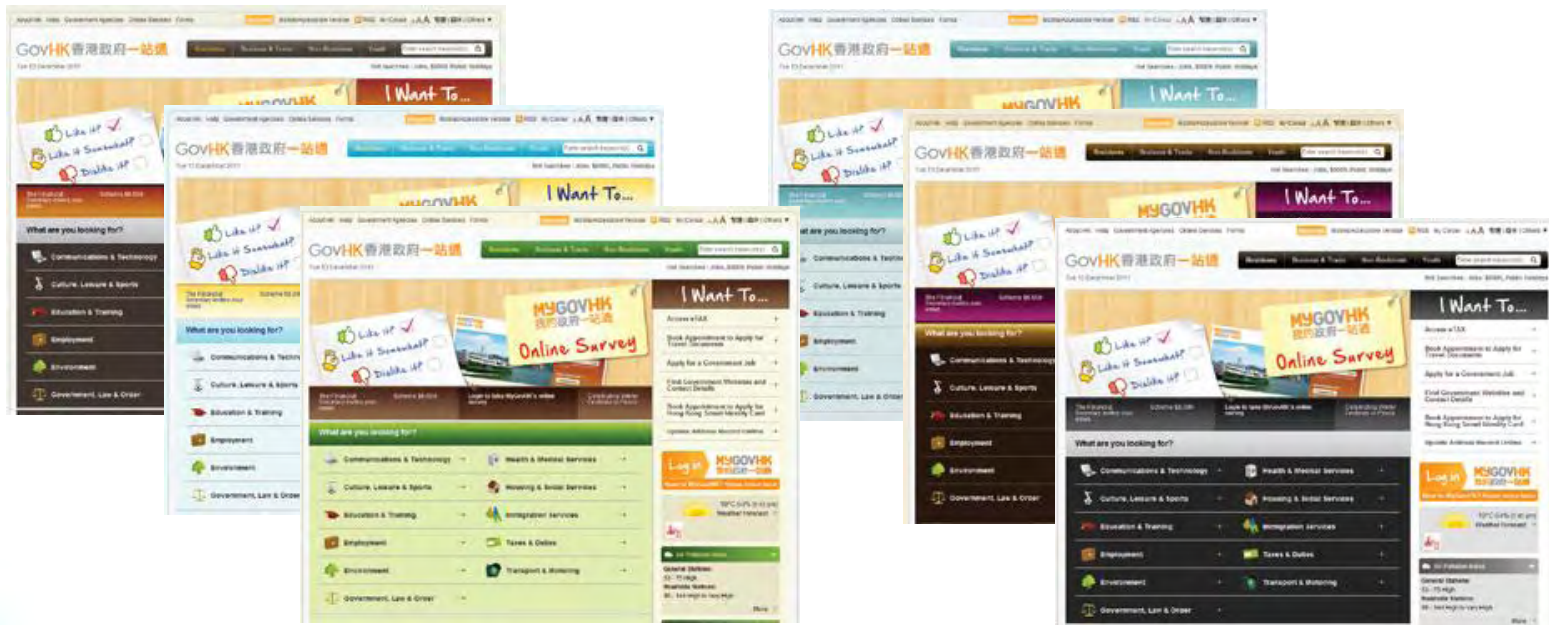
Many Techniques

Principle 1 - Perceivable

- 1.1 **Text Alternatives:** Provide text alternatives for any non-text content so that it can be changed into other forms people need, such as large print, braille, speech, symbols or simpler language
- 1.2 **Time-based Audio and Video Media:** Provide alternatives for time-based media
- 1.3 **Adaptable:** Create content that can be presented in different ways without losing information or structure
- 1.4 **Distinguishable:** Make it easier for users to see and hear content including separating foreground from background

Principle 1 - Perceivable

- Example - Sufficient colour contrast 4.5 : 1



www.gov.hk

Principle 2 - Operable

- 2.1 **Keyboard Accessible:** Make all functionality available from a keyboard
- 2.2 **Enough Time:** Provide users enough time to read and use content
- 2.3 **Seizures:** Do not design content in a way that is known to cause seizures
- 2.4 **Navigable:** Provide ways to help users navigate, find content, and determine where they are

Principle 2 - Operable

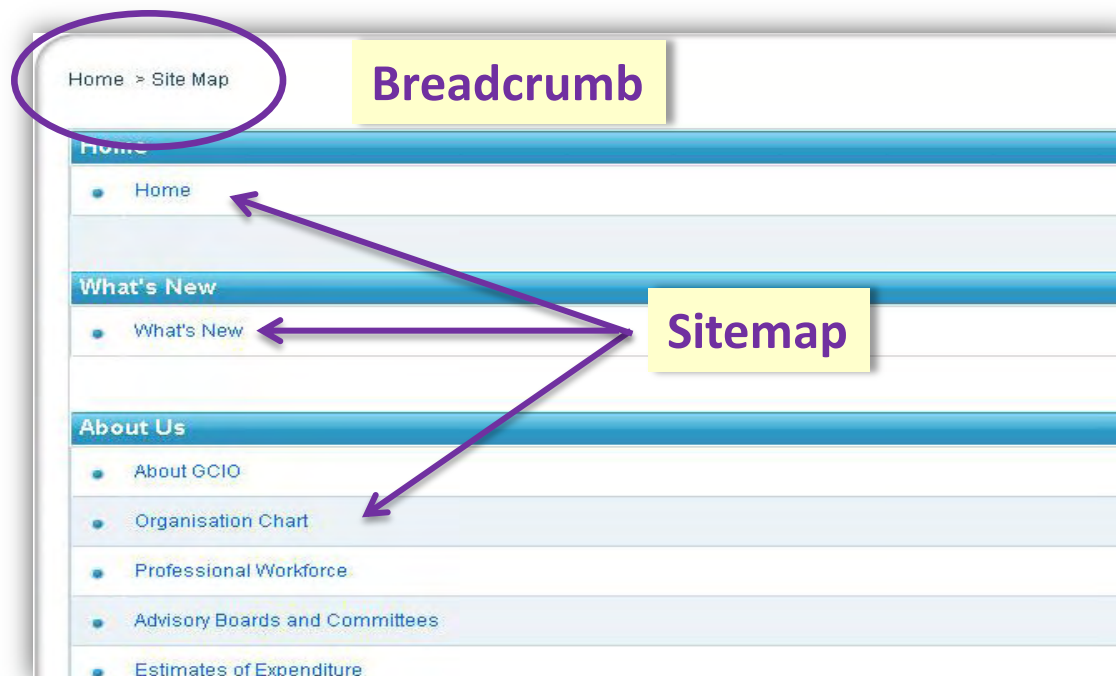
- Example - Provide users enough time to read and use content



www.ogcio.gov.hk

Principle 2 - Operable

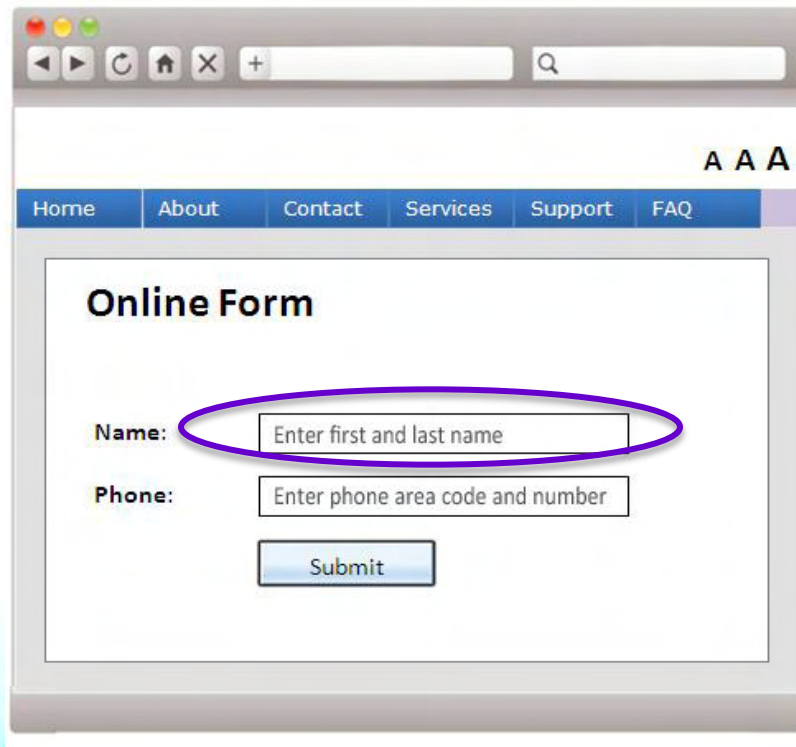
- Example - More than one way to help users navigate and find content



www.ogcio.gov.hk

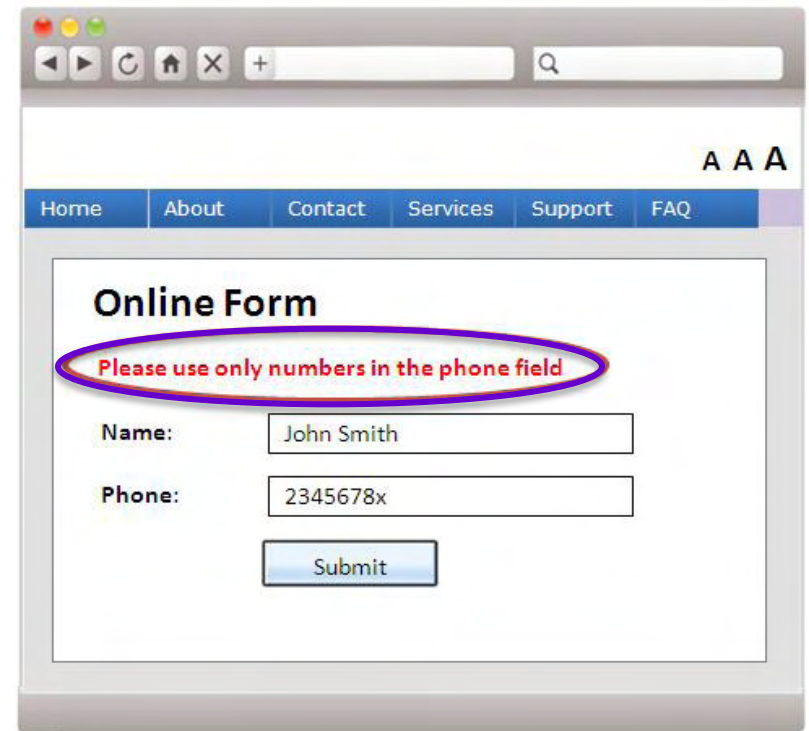
Principle 3 – Understandable

- Example - Clear label with cue and error identification



A screenshot of a web browser displaying an "Online Form". The browser window has a standard address bar and navigation buttons. The page has a navigation menu with links: Home, About, Contact, Services, Support, and FAQ. The form itself is titled "Online Form" and contains two input fields. The first field is labeled "Name:" and has a placeholder text "Enter first and last name". The second field is labeled "Phone:" and has a placeholder text "Enter phone area code and number". A "Submit" button is located below the phone field. A purple oval is drawn around the "Name:" label and its corresponding input field, highlighting the input assistance.

Input assistance

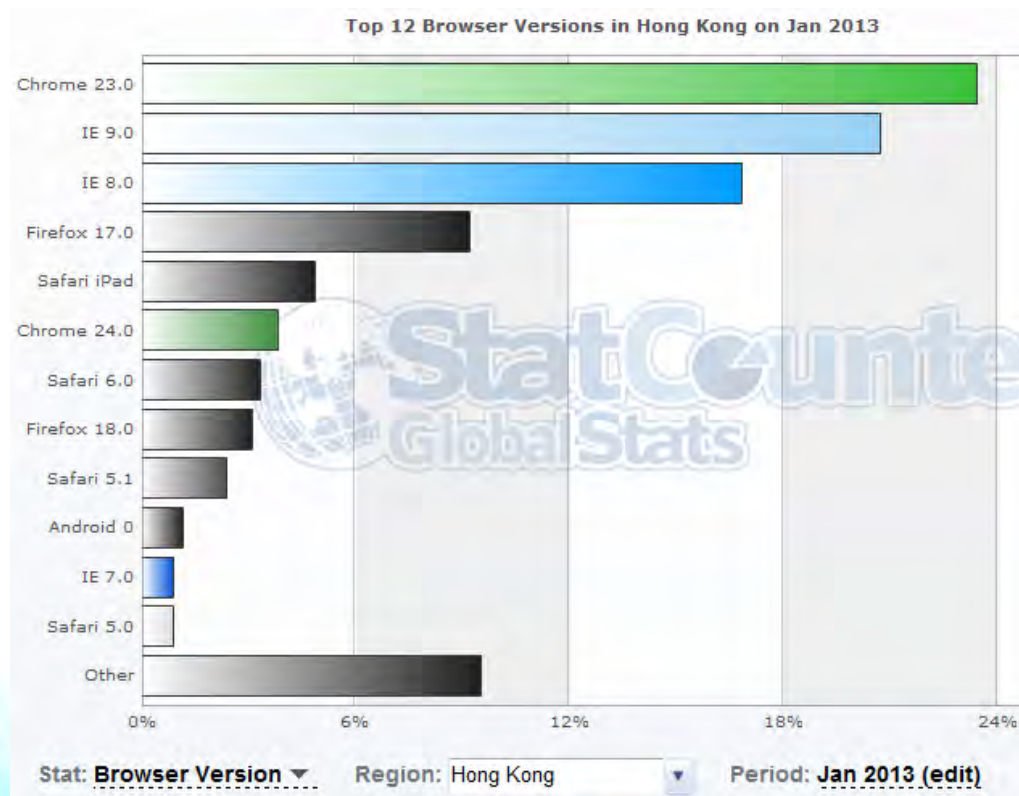


A screenshot of the same "Online Form" as the previous one, but with error identification. The "Name:" field now contains the text "John Smith". The "Phone:" field contains the text "2345678x". A red error message, "Please use only numbers in the phone field", is displayed above the phone field and is circled with a purple oval. The "Submit" button remains below the phone field.

Error identification

Principle 4 – Robust

- Compatibility with browsers



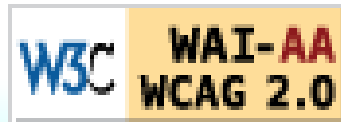
<http://gs.statcounter.com/>

WCAG - Conformance

- Latest version of W3C WCAG 2.0 promulgated in end 2008
- There are three Levels of conformance –

Level A 25 success criteria	Level AA +13 success criteria	Level AAA +23 success criteria
Basic	Recommended	Ideal

Level AA Conformance



WCAG - Conformance

- Example - Audio and Video Requirements

	Level A	Level AA	Level AAA
Pre-recorded Audio only	Text-transcript		Sign language
Pre-recorded Video only	Text-transcript / audio track		Sign language
Pre-recorded Video	Captions + (audio description / text transcript)	Captions + audio description	Extended audio description + Text description + Sign language
Live Video		Captions	
Live Audio only			Live text caption / provide a link to a text transcript of a prepared script

Governments Websites adopting WCAG

Country	Standard	Timeline to achieve standard
New Zealand	WCAG 2.0 Level AA	June 2010
United Kingdom	WCAG 1.0 Level AA	March 2011
Hong Kong	WCAG 2.0 Level AA	January 2013
Canada	WCAG 2.0 Level AA	July 2013
Singapore	WCAG 1.0 and key aspects of WCAG 2.0	December 2013
Australia	WCAG 2.0 Level A & AA	December 2014

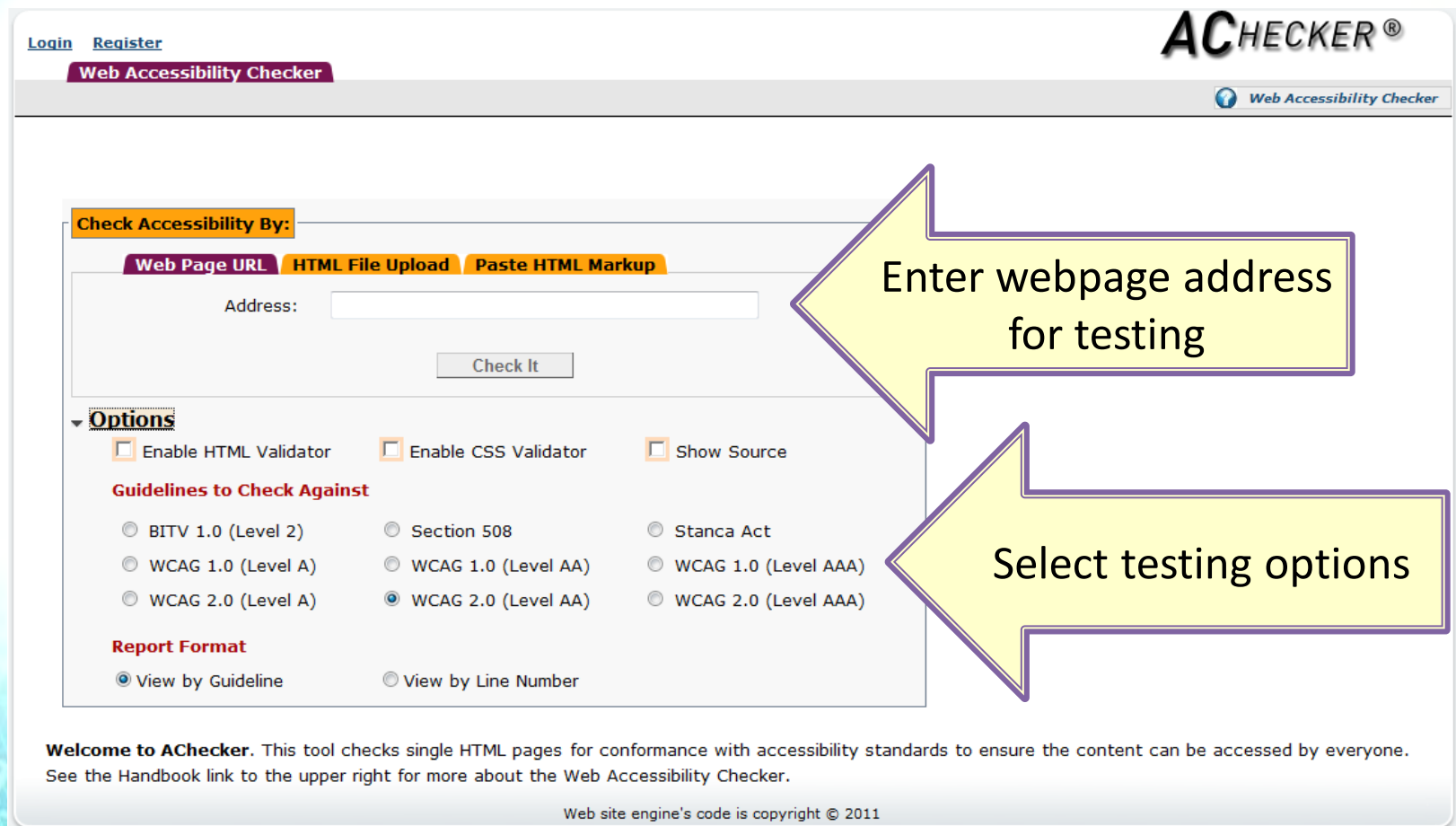
Testing Techniques

1. Code scanning

- Many accessibility issues can be detected automatically using specialist software and tools
- Example tools –
 - AChecker
 - WAVE
 - PDF Accessibility Checker

Code Scanning

- <http://achecker.ca/checker/index.php>



The screenshot shows the AChecker Web Accessibility Checker interface. At the top, there are links for 'Login' and 'Register', and the 'Web Accessibility Checker' title. The main section is titled 'Check Accessibility By:' and has three tabs: 'Web Page URL', 'HTML File Upload', and 'Paste HTML Markup'. The 'Web Page URL' tab is active, showing an 'Address:' input field and a 'Check It' button. Below this is an 'Options' section with checkboxes for 'Enable HTML Validator', 'Enable CSS Validator', and 'Show Source'. Under 'Guidelines to Check Against', there are radio buttons for BITV 1.0 (Level 2), WCAG 1.0 (Level A), WCAG 2.0 (Level A), Section 508, WCAG 1.0 (Level AA), WCAG 2.0 (Level AA) (which is selected), Stanca Act, WCAG 1.0 (Level AAA), and WCAG 2.0 (Level AAA). Under 'Report Format', there are radio buttons for 'View by Guideline' (selected) and 'View by Line Number'. Two yellow callout arrows are present: one pointing to the 'Address:' input field with the text 'Enter webpage address for testing', and another pointing to the 'Options' section with the text 'Select testing options'.

Check Accessibility By:

Web Page URL **HTML File Upload** **Paste HTML Markup**

Address:

Options

☐ Enable HTML Validator ☐ Enable CSS Validator ☐ Show Source

Guidelines to Check Against

☐ BITV 1.0 (Level 2) ☐ Section 508 ☐ Stanca Act

☐ WCAG 1.0 (Level A) ☐ WCAG 1.0 (Level AA) ☐ WCAG 1.0 (Level AAA)

☐ WCAG 2.0 (Level A) ☒ WCAG 2.0 (Level AA) ☐ WCAG 2.0 (Level AAA)

Report Format

☒ View by Guideline ☐ View by Line Number

Welcome to AChecker. This tool checks single HTML pages for conformance with accessibility standards to ensure the content can be accessed by everyone. See the Handbook link to the upper right for more about the Web Accessibility Checker.

Web site engine's code is copyright © 2011

Code Scanning

- Sample report - no known problem

The screenshot displays the ACHECKER Web Accessibility Checker interface. At the top, there are links for [Login](#) and [Register](#), and the site title **Web Accessibility Checker**. The main heading is **ACHECKER®**. Below this, there's a navigation bar with [Web Accessibility Checker](#) and a small globe icon. The main content area is divided into two sections. The first section, titled **Check Accessibility By:**, has three tabs: **Web Page URL** (selected), **HTML File Upload**, and **Paste HTML Markup**. Under the **Web Page URL** tab, there's a text input field labeled "Address:" containing `http://www.cityu.edu.hk`, and a **Check It** button. Below this is a link for [Options](#). The second section, titled **Accessibility Review**, shows the results of the scan. It includes a link for [Accessibility Review \(Guidelines: WCAG 2.0 \(Level AA\)\)](#), an **Export Format:** dropdown menu set to **PDF**, a **Report to Export:** dropdown menu set to **All**, and a **Get File** button. Below these are five tabs: **Known Problems(0)** (selected), **Likely Problems (2)**, **Potential Problems (505)**, **HTML Validation**, and **CSS Validation**. The **Known Problems(0)** tab is highlighted with a red border and contains the message: **✔ Congratulations! No known problems.**

Code Scanning

- Sample report – known web accessibility problem

Accessibility Review

Accessibility Review (Guidelines: [WCAG 2.0 \(Level AA\)](#))

Known Problems(9)

Likely Problems (1)

Potential Problems (215)

1.1 Text Alternatives: Provide text alternatives for any non-text content

Success Criteria 1.1.1 Non-text Content (A)

Check 1: [img element missing alt attribute.](#)

Repair: Add an `alt` attribute to your `img` element.

2.4 Navigable: Provide ways to help users navigate, find content, and determine where they are.

Success Criteria 2.4.4 Link Purpose (In Context) (A)

Check 174: [Anchor contains no text.](#)

Repair: Add text to the `a` element or the `title` attribute of the `a` element or,

❌ *Line 228, Column 39:*

Testing Techniques

2. Visual review: Tools include Vischeck and Colour Contrast Check

- <http://www.vischeck.com/vischeck/> shows you what things look like to someone who is colour blind



www.ogcio.gov.hk



Looks to a person with a red/green color deficit (deuteranopia)

Colour Contrast Check

- http://snook.ca/technical/colour_contrast/colour.html
- Text has a contrast ratio of at least 4.5 : 1 between the background and the foreground

Foreground Colour:
#007897
Red:
Green:
Blue:
Hue (°):
Saturation (%):
Value (%):

Background Colour:
#F1F1F1
Red:
Green:
Blue:
Hue (°):
Saturation (%):
Value (%):

Results

This is example text. **Some of it bolded.**
Some of it italicized.

Brightness Difference: (>= 125)	153.34
Colour Difference: (>= 500)	452
Are colours compliant?	sort of..
Contrast Ratio	4.5
WCAG 2 AA Compliant	YES
WCAG 2 AA Compliant (18pt+)	YES
WCAG 2 AAA Compliant	NO
WCAG 2 AAA Compliant (18pt+)	YES

Testing Techniques

3. Manual testing with screen readers

- Navigate website and access the content through the screen readers
- Example tools – Jaws, NVDA and VoiceOver

4. Manual testing with other assistive technologies

- Screen magnification tools and voice control tools
- Example tools – ZoomText and Dragon Naturally Speaking

5. Human testing

Policy in Hong Kong

- Government has been implementing web accessibility guidelines since 1999
- Internal guidelines has been updated to follow latest international standard - W3C WCAG 2.0
- Require all government websites including thematic websites, except archive materials, to achieve [W3C WCAG 2.0 Level AA](#) conformance by **January 2013** within practicable means
- Ask quasi-government and public service organisations to take corresponding action



Capability Building

Webforall Portal: www.webforall.gov.hk

- Illustration examples of success criteria (WCAG 2.0 Levels A & AA)
http://www.ogcio.gov.hk/en/community/web_accessibility/handbook/live_example.htm
- Presentation slides of seminars / technical workshops
- Government's best practices
- Web Accessibility Handbook
- Web Designers' Corner
- Frequently Asked Questions



Capability Building

Web Accessibility Handbook

- Introduction and basic principles
- Top 10 concerns from persons with disabilities
- All WCAG 2.0 success criteria
- Success criteria checklist
- Testing techniques
- Introduction of testing tools



Web Accessibility Recognition Scheme

Two-tier Accreditation System

- **1st tier (Silver Award)**
 - Websites incorporating basic web accessibility features
- **2nd tier (Gold Award)**
 - Websites incorporating basic and key features
- Accreditation logos will be granted to awardees for display in their accredited websites
- The accreditation needs to be renewed annually



What you can help?

- Develop awareness, attribute and mindset on web accessibility in your organization
 - Observe latest guidelines and standards
 - Adopt web accessibility designs in institution
 - Help business partners or clients aware of the importance and relevant skills
 - Encourage and incorporate web accessibility elements in design stage in information and communication systems, products and services
 - Uphold the professional ethics
- “I had never thought about it ...” is not an excuse