Human Computer Interaction

Internationalization

Lecture # 9b

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Internationalization

- Supporting users
  - Speaking different languages
  - Different cultural conventions

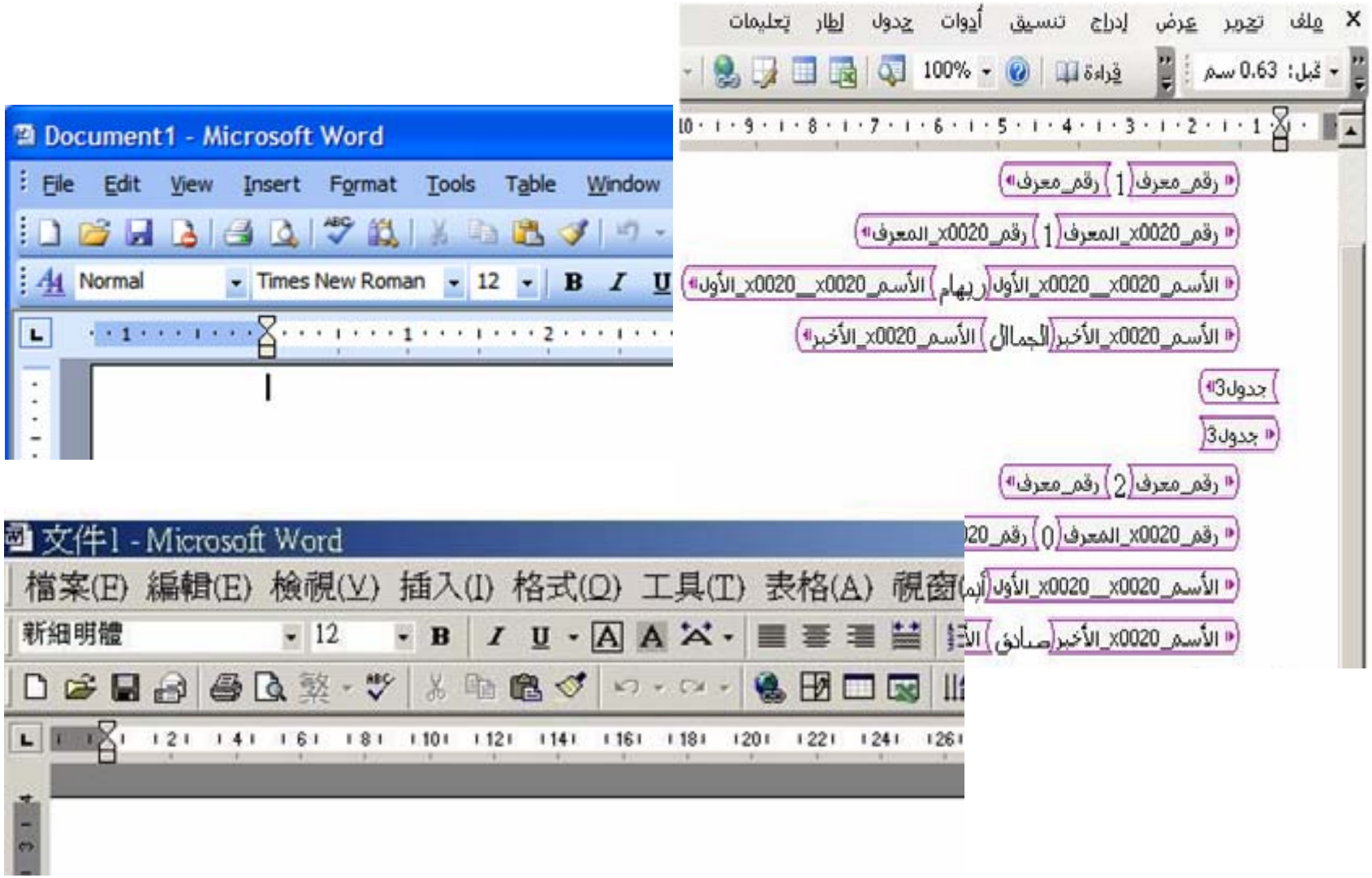
Internationalization is the process of designing a software application so that it can be adapted to various languages and regions without engineering changes

i18n

Localization

Localization is the process of adapting internationalized software for a specific region or language by adding locale-specific components and translating text.

L10n


Document1 - Microsoft Word
File Edit View Insert Format Tools Table Window
Normal Times New Roman 12
文件1 - Microsoft Word
檔案(F) 編輯(E) 檢視(V) 插入(I) 格式(O) 工具(T) 表格(A)
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ملف تحرير عرض إدراج تنسيق أدوات جدول إطار تعليمات
100% قراءة
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جدول3
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رقم_معرف 2 رقم_معرف
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الأسم_0020x_الأول الأسم_0020x_الأول
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Internationalization

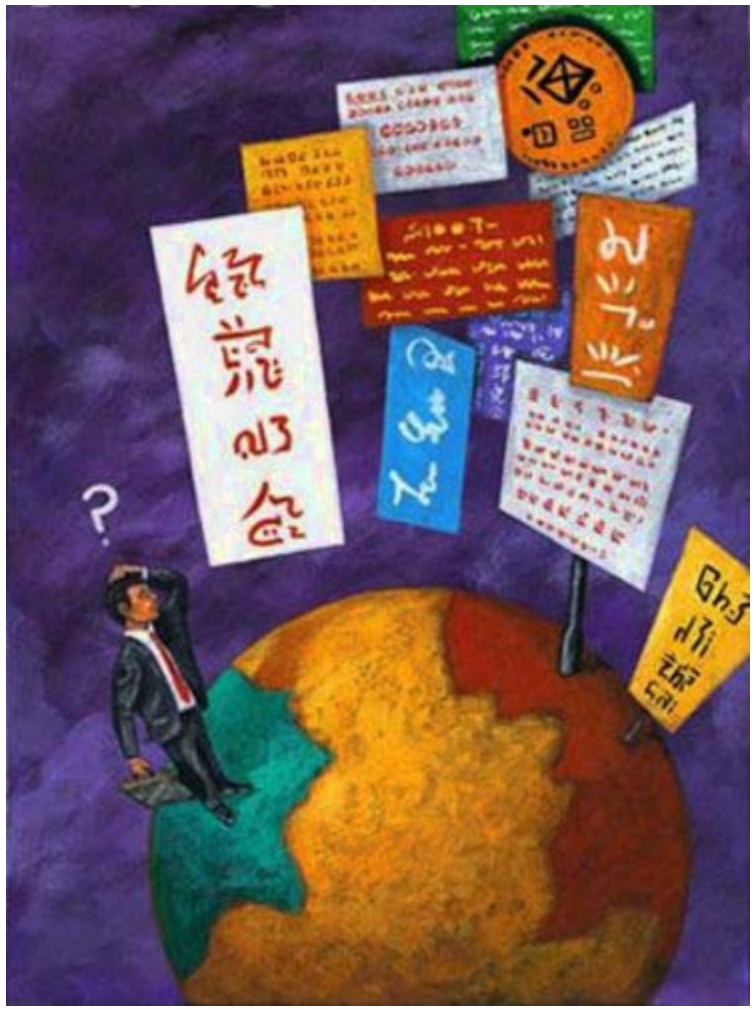
- Separate the language-specific parts of the interface from the rest of the code so that those parts can be easily replaced.
- Translation
  - Usually done by nonprogrammers

Internationalization

- Much harder than merely knowing the words to substitute
- Bilingual members of your design team
  - May be fluent in the other language, but not sufficiently immersed in the **culture**

Internationalization - Challenges

- Language
- Cultural



Language - Translation

- Every piece of text that might be shown to the user is a potential candidate for translation
- Examples
  - Error Messages: '*FileNotFoundException*'
  - Components: JButton b = new JButton("Cancel")

Language - Different Scripts

- Cyrillic

Все люди рождаются свободными

- Chinese

人人生而自由，在尊嚴和權利上一律

- Greek

Όλοι οι άνθρωποι γεννιούνται

- Arabic

يولد جميع الناس أحراراً متساوين في الكرامة

Language - Text Direction

- Many languages do not read left-to-right
  - Arabic, Herbew right-to-left
  - Affects screen layout, icons etc.

Herbew version of Firefox

Language – Spelling Variants

- Spelling variants for different countries where the same language is spoken
- Example
  - *Localization* (US, CA)
  - *Localisation* (GB, AU)

Language – Writing Conventions

- Numbers
  - US/UK 72,350.36
  - France 72 350,36
  - Germany 72.350,36
- Dates
  - US 12/31/2010 (M/D/Y)
  - Rest 31/12/2010 (D/M/Y)

Cultural Conventions - Color

	US	China
White		
Red		

Cultural Conventions

- Names and Titles
- Govt. Assigned Numbers
  - Social Security Number, National Tax Number
- Telephone numbers, Postal Codes
- Currency
  - Symbol, Positions
- Weights and Measures
- Paper Size

Cultural Conventions - Icons

- Icons - Metaphors

Cultural Conventions - Icons

- Objects may look different in different countries

Internationalization - Support

Internationalization - Support

- Message Files
- Character Sets & Encodings
- Formatting Libraries
- Separating Structure from Presentation

Message Files

- Separate localizable message from source code
- Resource Bundles in Java
  - Textual messages stored separately from the code
  - Application can be localized simply by replacing those text messages
  - The messages are referred to by names
    - bundle.getString(“file-menu-label”)

Message Files

- Human translators generate message file for each locale
  - No need to read code files or recompile
- Messages with Dynamics parts can be tricky
  - “<N> users have visited since <Date>”
    - 0 users, 1 user, 10 users
  - Indicate position of Dynamic parts
    - Error at line {0} of file {1} (English)
    - Erreur: {1}: {0} (French)

Character Sets

- ASCII
  - A-Z, a-z, 0-9, Punctuation, Control characters
- Latin
  - ASCII + Accented alphabet
- Unicode
  - Latin + Greek, Cyrillic, CJK, …

Encoding

- A character set is an abstract set of possible characters
- Encoding maps each character in a character set to a number
  - ASCII: A-Z maps to 65-90

Formatting Libraries

- Library support for parsing and printing dates, numbers, currencies etc.
- Java
  - NumberFormatter
  - DateFormatter

Separating Structure from Presentation

- Replaceable Images and Icons
  - Might need translation if contain text
- Colors
  - Might need to change – cultural conflicts

References

- User Interface Design and Implementation, Prof. Robert Miller - MIT