

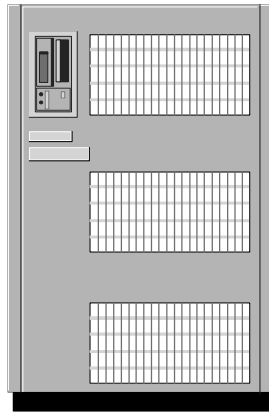
Software Engineering: Application Internationalization Issues

Ibrahim Meru
IBM Globalization Centre of Competency,
IBM Canada Laboratory, Toronto
Session: 8714, Monday 4 March 2002

What is Globalization?

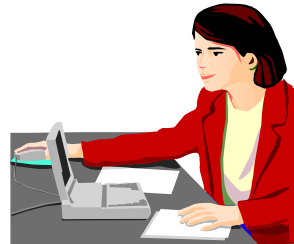
- **Proper design & execution of**
 - ▶ **systems, software, procedures**
 - ▶ **to allow users to work throughout the world, and**
 - ▶ **among people with different languages, business requirements, and cultural practices.**
- **Includes multilingual, multinational, multicultural considerations**

Punctuation



← Order placed for 1000 items.

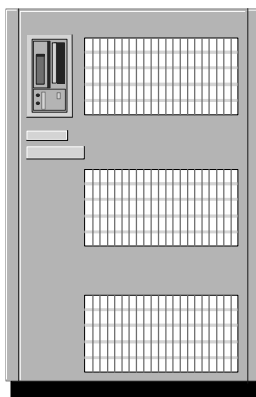
→ Your order is confirmed for 1,000 items.



European Customer

This customer thinks she will only get ONE item!

Order Lost by Miscommunication!



← Can you make my date?

→ We can deliver by 3/4/01.

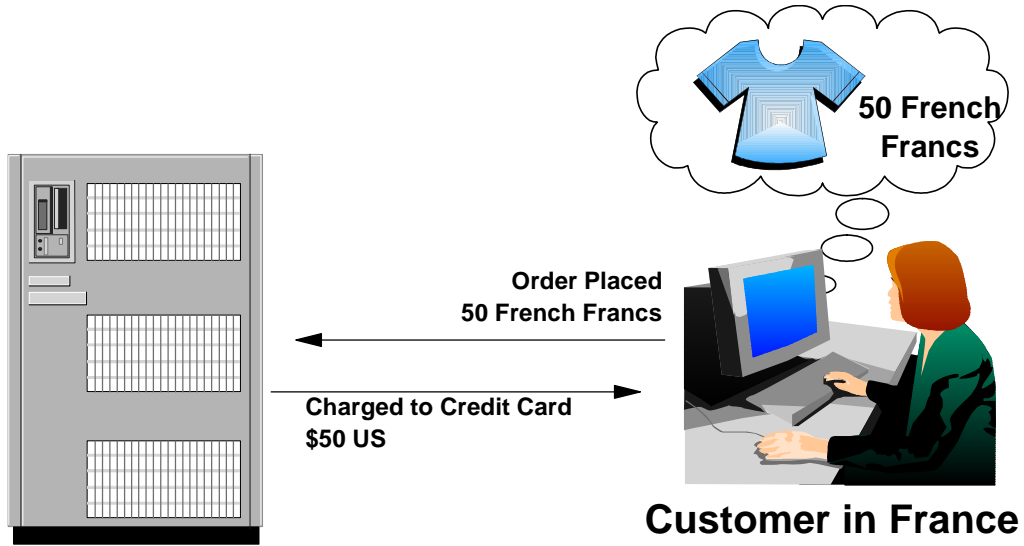
I Need These Brochures Printed by mid March!



Canadian Customer

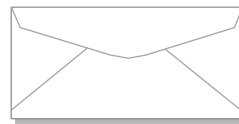
Is this customer's requirement met?

Localize Processes: End-to-End Integration



Is this a satisfied customer?

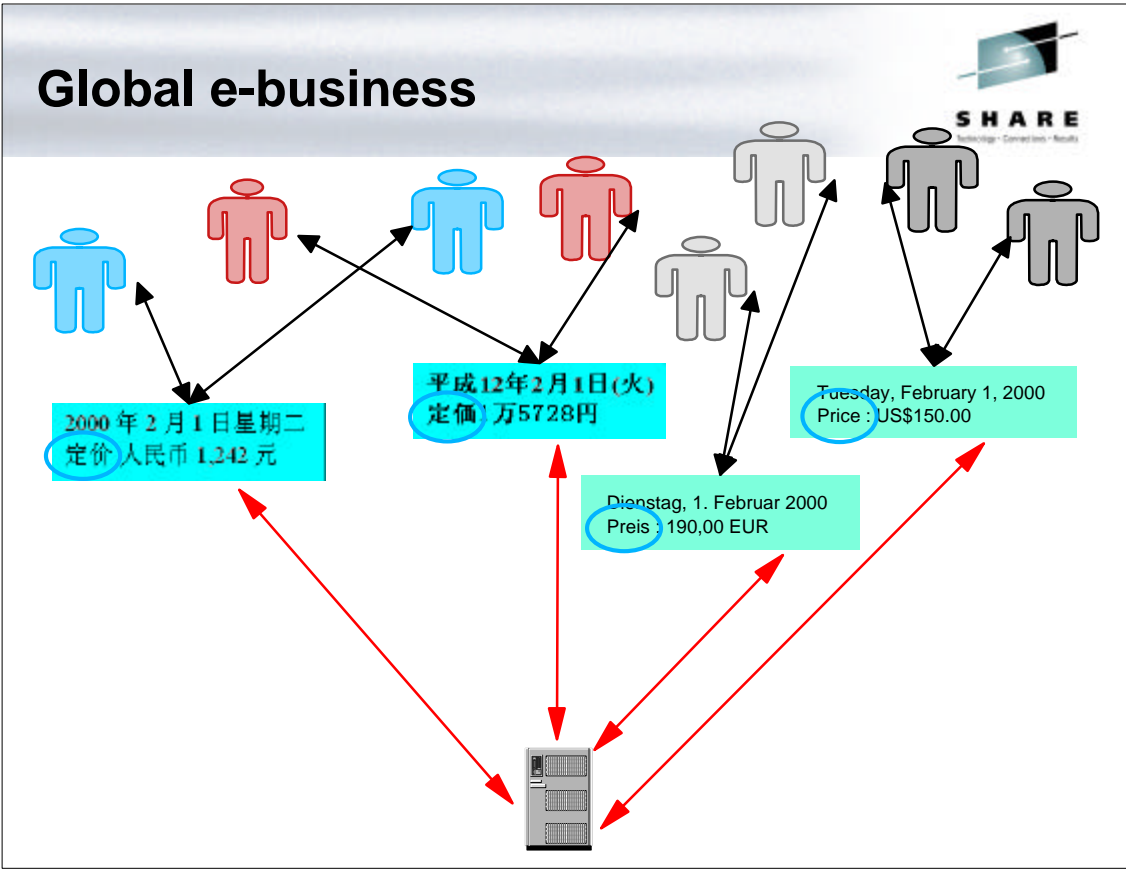
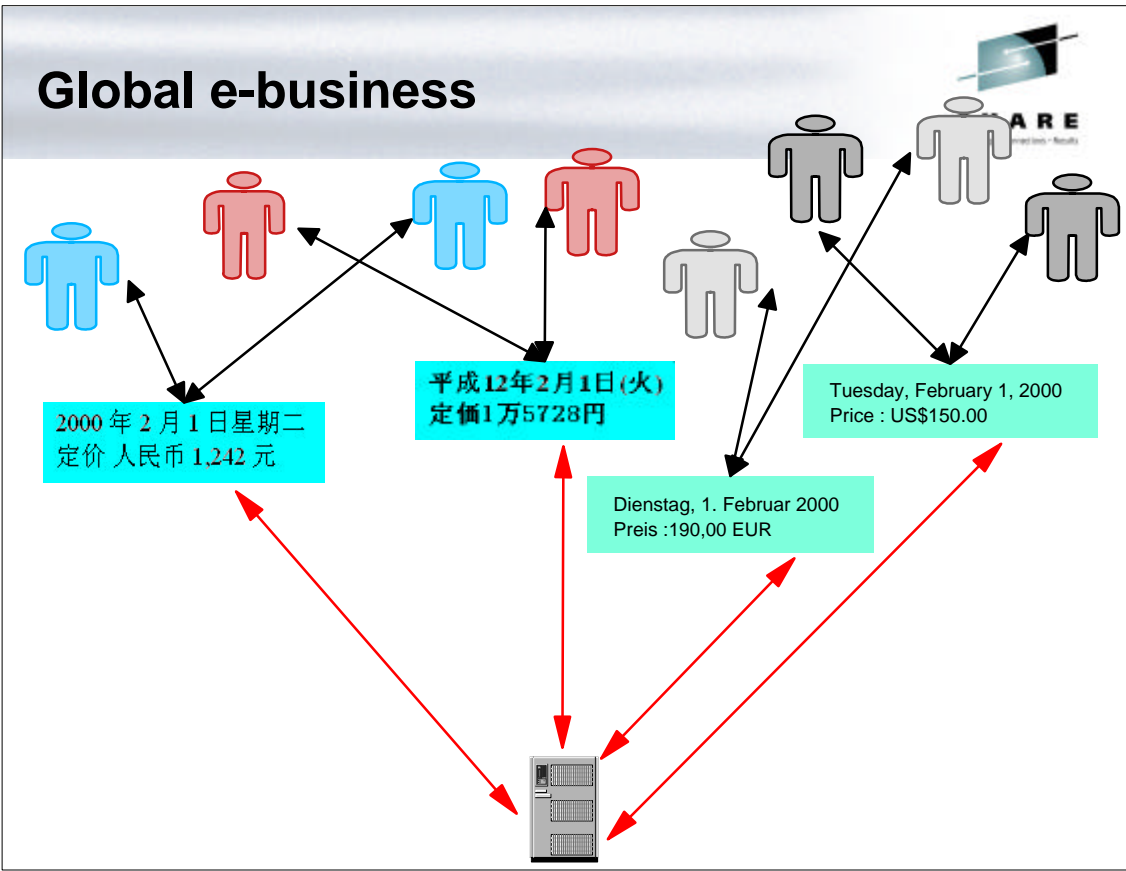
Graphical Images



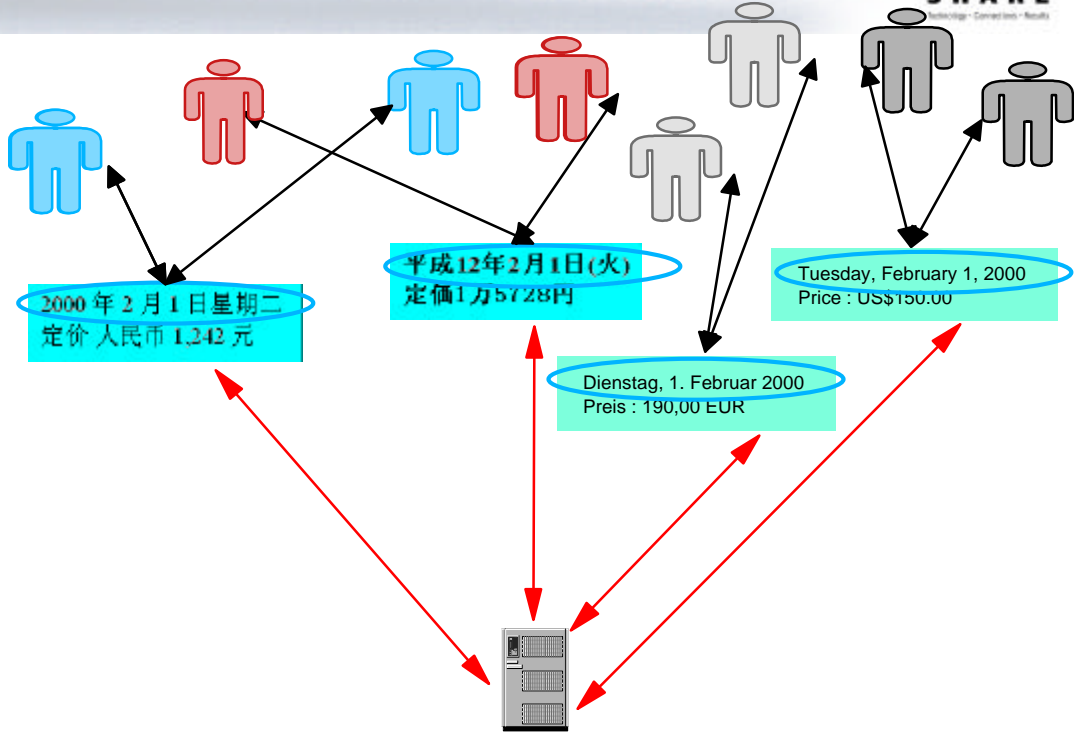
Some images are not recognized worldwide. Others are.



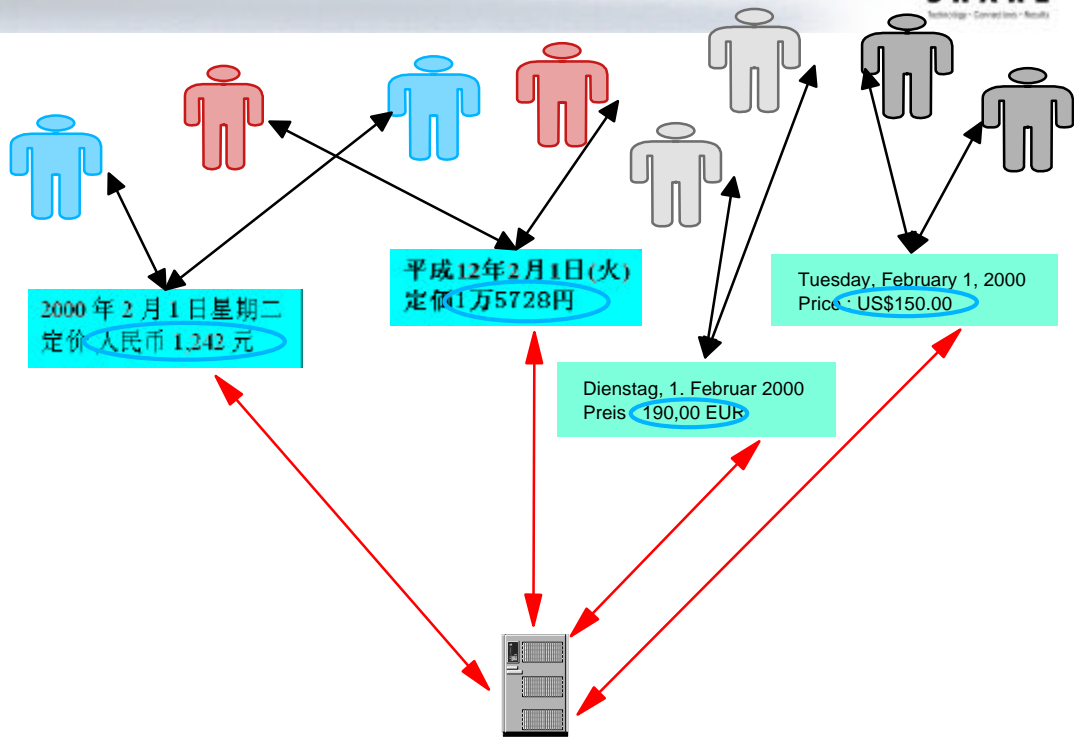
These hand signals mean different things around the world
• Each one is extremely rude somewhere.



Global e-business



Global e-business



Terminology



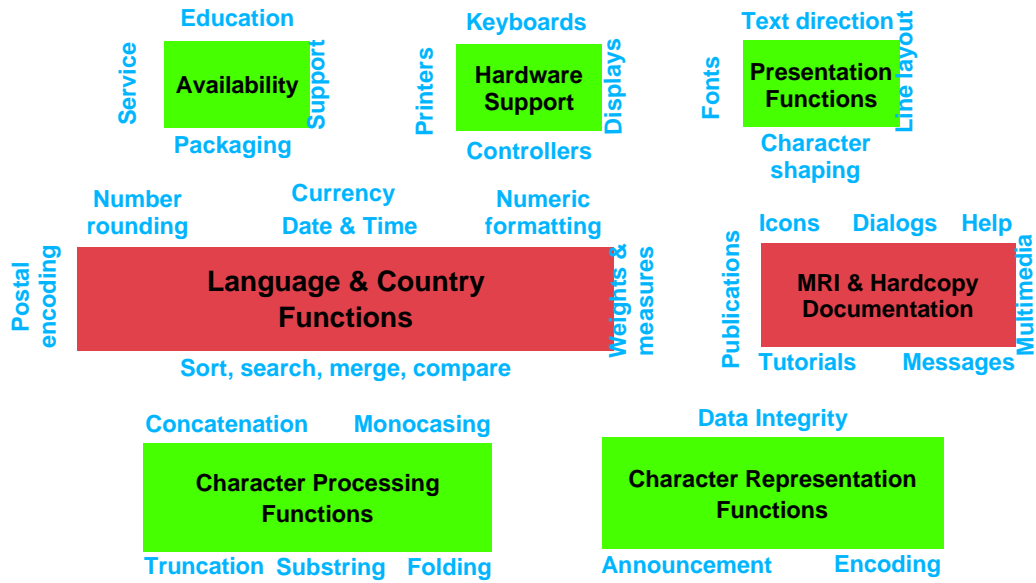
- **Internationalization - I18N**
 - ▶ **Making an application independent of any particular language or culture**
- **Localization - L10N**
 - ▶ **Implementing a country/territory/region-specific or culture-specific version of an i18n application**
- **Globalization**
 - ▶ **G11N = I18N + L10N + multilingual support**
 - **Application can handle users from multiple countries/regions and languages (simultaneously)**

Globalization Support

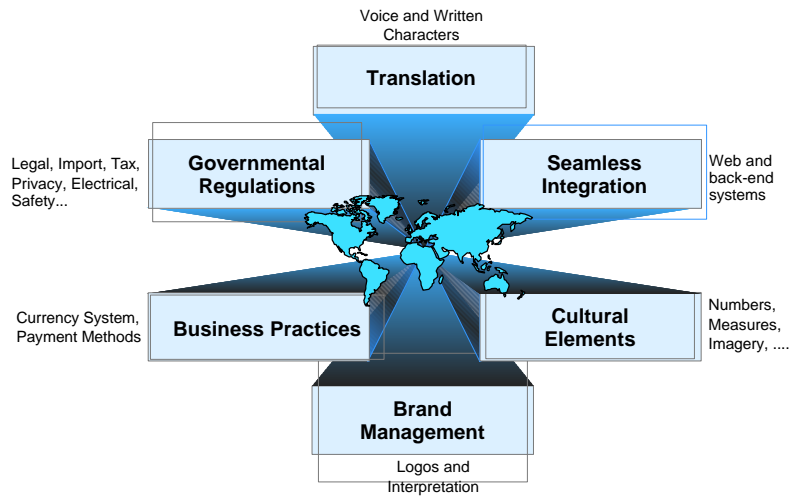


- **Support for**
 - ▶ **Input methods, character sets & code pages**
 - ▶ **Rendering of complex scripts**
 - ▶ **Linguistic & cultural support during presentation, entry and processing, eg.,**
 - **Date & time formats**
 - **Numeric & monetary formats**
 - **left-to-right and right-to-left text**
 - ▶ **Correct sort & search**
 - ▶ **Language & cultural selectability**
 - ▶ **Unicode support**

Scope of Globalization



Localization Aspects



*The process of adapting a product or service for use in a.....
.....specific national, linguistic and cultural context*

Globalization Scope



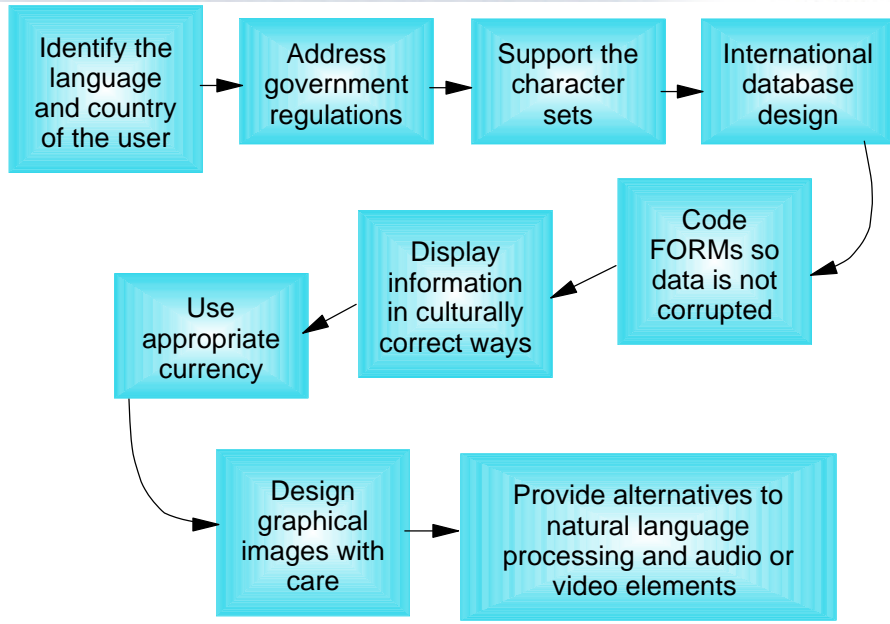
- **User Interface**
 - Translatable text, syntax, gender, punctuation, plurals . . .
- **Culture**
 - Numeric, currency, date/time, calendar, sort order, page sizes, icons, colour . . .
- **Accessibility of characters**
 - á Æ ç È ñ Ô ß Ð \$ ¢ ¥ £ Rs, non-latin . . .
- **Character sets, Coded Character sets**
 - SBCS, DBCS, Unicode, ISO-8859-1, Shift-JIS

Negative Consequences

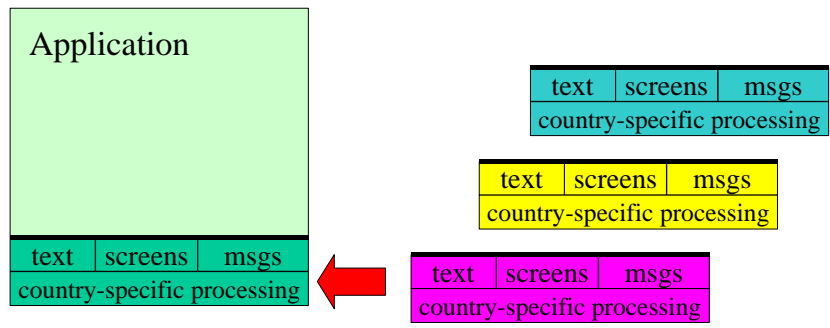


- **Economic**
 - ▶ Translation cost, Product failure
 - cultural formats, icons, data interchange
- **Usability, Cultural**
 - "01/02/03"
 - 240.125 vs. 240,125
 - Billion, Trillion, Lakh, Crore
- **Data Interchange**
 - £125,000 ---> \$125,000
- **Data Validation**
 - Pepé, Müller, D'Angelo, Von Braun

Design Considerations



Single Source, Single Executable

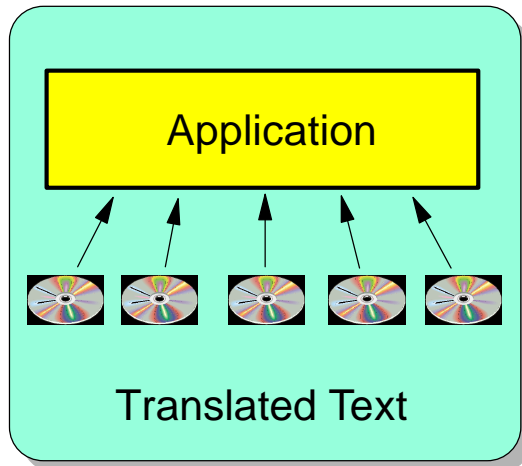


- Handle multiple languages etc. within the same application.
- Universal text encoding using Unicode
- Consistent but localized user interface by using locales

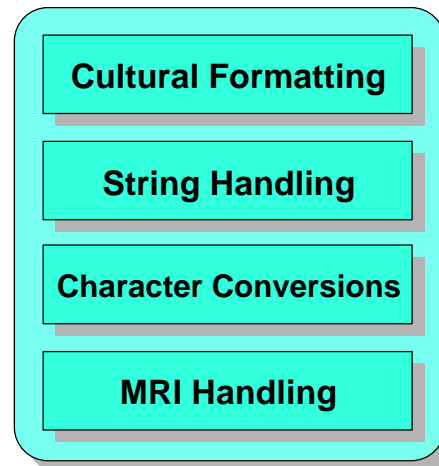
Single Source, Single Executable



Product Supplied



Platform Supplied



DON'T . . .



- **...hard code text in source code**
- **...refer to culture-specific standards**
 - Melon-yellow, Florida Marlins Blue
 - Monarch envelopes
- **... use slang, jargon, humour, sarcasm, colloquialism, metaphors**
 - difficult to translate, require user to understand originating culture
- **... form plurals by adding "(s)" to indicate either singular or plural form. Use both forms if necessary**
- **...construct messages from parts of sentences**

DO . . .



- Provide for expansion of text as a result of translation

Number of characters (including spaces and punctuation marks within the string)	Additional space required
Up to 10	100% to 200%
11 to 20	80% to 100%
21 to 30	60% to 80%
31 to 50	40% to 60%
51 to 70	31% to 40%
Over 70	30%

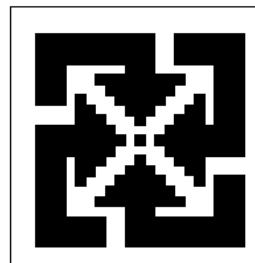
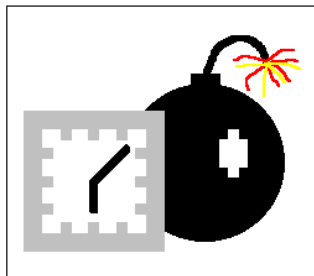
- Permit variables used in messages/text to assume any position and order

English	<code>printf("Return code %d was returned by function %s.\n", iRC, *pcFunctionName);</code>
German	<code>printf("Die Funktion %s endete mit dem Fehlercode %d.\n", iRC, *pcFunctionName);</code>

DO . . .



- Remember, Icons and Clip-art are translatable
- Ensure your icons are not offensive



- Avoid humour - does not translate well!

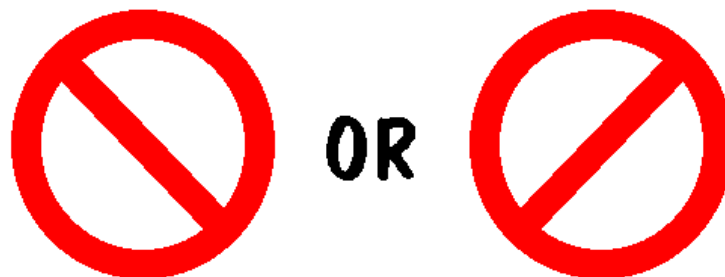
DO . . .



- **Be Prepared to change colours**
 - **Be aware that colours are interpreted differently between regions**

Country	Red	Blue	Green	Yellow	White
USA	Danger	Masculinity	Safety	Cowardice, Caution	Purity
China	Happiness	Heavens, Clouds	Heavens, Clouds	Imperial, Power	Purity, Death
Egypt	Death	Virtue, Faith, Truth	Strength, Fertility	Happiness, Prosperity	Joy
France	Aristocracy	Freedom, Peace	Criminality	Temporary	Neutrality
India	Life, Creativity		Prosperity, Fertility	Success	Purity, Death
Japan	Danger, Anger	Villainy	Future, Youth, Energy	Grace, Nobility	Death

Is your icon incorrect?



Icon Design



- **Avoid humour, puns, slang, special, mythological, and religious symbols in icons.**
 - ▶ Require user to understand subtleties of originating language, culture
 - ▶ E.G.,
 - North American culture **OWL = wisdom**
 - Some Asian countries **OWL = stupidity**

DO . . .



- **Use correct terminology**
 - ▶ billion, trillion
 - ▶ Christian Name, First Name, Last Name, Given Name, Family Name
- **Be consistent with terminology**

Hit
Tap
Strike
Press
Type
Depress
Mash

the key to

input
enter
type in

the data.



What about erase, discard, delete, purge, clear?

DO . . .

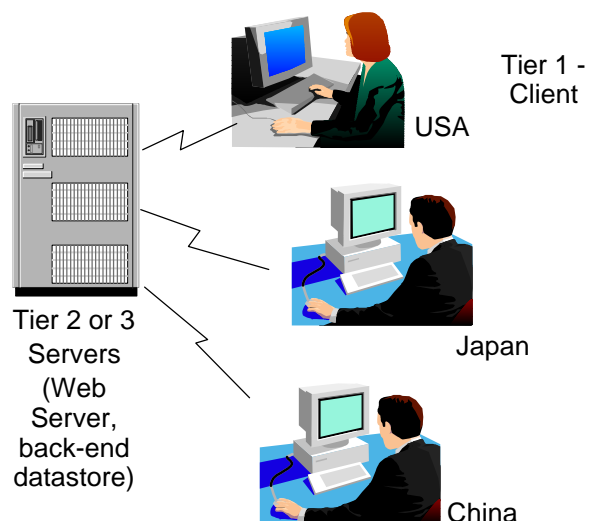


- **Keep sentences as short and simple as possible**
- **Allow user to select the date and time format**
- **Allow user to select calendar format**
- **Allow user to select paper size**
- **Allow user to select numeric and monetary formats**

Summary



- Respect the clients language and cultural preferences
 - Identify the client preferences
- Maintain data integrity between systems
 - Code FORMS carefully
- Design for international usability
- Prepare for translation up-front



Summary

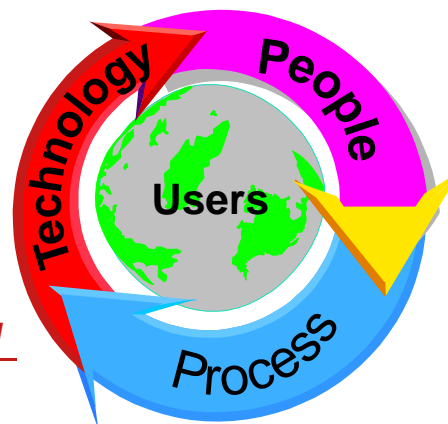


- **A Global Solution MUST**
 - ▶ Support the user's form of writing
 - ▶ Employ the user's conventional methods of expressing dates, times, numbers, measures, addresses, personal names . . .
 - ▶ Provide messages and graphics that are clear, familiar and inoffensive
 - ▶ Ideally, communicate in the user's natural language

Excellence in Total User Experience



- *UCD: Make IT Easy!*
- *ID: Make IT Clear!*
- *G11N: Make IT Global!*



Salamat
Tagalog



Terima Kasi
Indonesian, Malay

ขอบคุณ
Thai

धन्यवाद
Hindi

감사합니다
Korean

Gracias
Spanish

شكراً
Arabic

תודה רבה
Hebrew

Obrigado
Brazilian
Portuguese

நன்றி
Tamil

Thank You
English

Спасибо
Russian

Grazie
Italian

ありがとうございました
Japanese

Danke
German

多谢
Simplified Chinese

Merci
French

多謝
Traditional Chinese