Localization, Internationalization, and Accessibility

Making software that works for everyone

Still September 2016. Eat?

Definitions

- i18n (internationalization): modification of a software or related technologies so that a software can potentially handle multiple languages, customs, and so on in the world.

- L10n (localization): implementation of a specific language for already-internationalized software.

- G11n (globalization): both i18n and L10n.

- A11y (accessibility): making software suitable for people with disabilities

Today

- Requirements can be hard to elicit

- I will prove this to you via tricky examples from an important domain.

- Sometimes you need exactly the right example to reveal a requirement. "Normal" examples hide the requirements.

- As a software engineer, you should know about these specific issues.

Two Messages Today

- Requirements analysis can require detailed domain knowledge.

- Internationalization is hard but important, and specific domain knowledge is helpful.

A Proposal

- Scope: an email system

- Functional requirement: The system shall support use by all users on Earth.

Requirements

- Tell me what I need to do.

Translation

- Look up all the strings in a table. Easy, right?

MessageFormat 2

```
.input {$count :number}
.match $count
0   {{ No items. }}
one {{ 1 item. }}
*   {{ {$count} items. }}
```

Note how Polish has more than two plural categories:

```
.input {$count :number}
.match $count
one    {{Masz {$count} tydzień.}}
few    {{Masz {$count} tygodnie.}}
many   {{Masz {$count} tygodni.}}
other  {{Masz {$count} tygodnia.}}
*      {{Masz {$count} tygodnia.}}
```

Unicode

- You're not using ASCII, are you? 😬

Characters

- Proposed requirement: "When a key is pressed on the keyboard, the character is inserted into the text buffer."

- In which languages is this the right requirement?

- And what language is this document in, anyway?
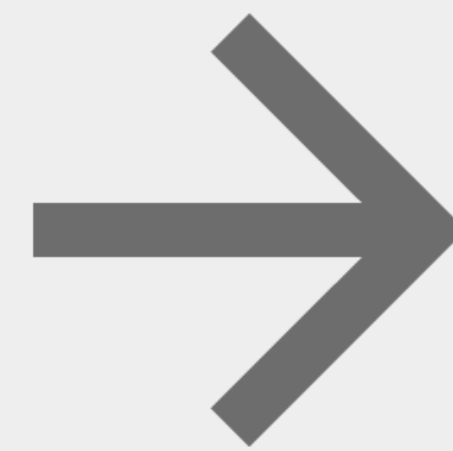
  - Spellchecking…

Chinese

- Type "a"…

Capitalization

- "Users shall be able to make strings ALL-CAPS."

- Not every language uses capitalization.

- Some languages have special word-final character forms (e.g. Hebrew).

- What properties does the *capitalize* operation have?

- Convert to all-caps: straße.   STRASSE or STRAßE

Which One Is Back?

← →

Let's Make a Table.

A Clock

Back to Dates.

- Requirement: ISO 8601 dates?

- Unambiguous, yes.

Japanese Dates

- 平成20年12月31日 = Heisei-20 year, Dec. 31 (Wed)

- Equivalently, 平20/12/31

- Also, 2008年12月31日

- Emperor Hirohito died January 8, 1989.

- How do you write 100 years from now in the Imperial calendar?

Decimal Formats

- 3,14159265359…= π if you are in parts of Europe.

  - 3.000 = 10^3

Keyboard Shortcuts

- Only work if you can type the characters…

- "Save" in French is "Enregistrer"

New	⌘N
Open...	⌘O
Open Recent	▶
Close	⌘W
Save...	⌘S
Duplicate	⇧⌘S
Rename...	
Move To...	
Revert To	▶
Export as PDF...	
Show Properties	⌥⌘P
Page Setup...	⇧⌘P
Print...	⌘P

Nouveau	⌘N
Ouvrir...	⌘O
Ouvrir l'élément récent	▶
Fermer	⌘W
Enregistrer...	⌘S
Dupliquer	⇧⌘S
Renommer...	
Déplacer vers...	
Revenir à	▶
Exporter au format PDF...	
Afficher les propriétés	⌥⌘P
Format d'impression...	⇧⌘P
Imprimer...	⌘P

"Since when does 'enregistrer' start with 'S'??" — French users.

New		⌘N
Open...		⌘O
Open Recent		▶
Close		⌘W
Save...		⌘S
Duplicate		⇧⌘S
Rename...		
Move To...		
Revert To		▶
Export as PDF...		
Show Properties		⌥⌘P
Page Setup...		⇧⌘P
Print...		⌘P

⌘N		חדש
⌘O		פתח...
◀		פתח אחרונים
⌘W		סגור
⌘S		שמור...
⇧⌘S		שכפל
		שינוי שם...
		העבר אל...
◀		חזור לגירסה
		ייצא כ-PDF...
⌥⌘P		הצג מאפיינים
⇧⌘P		הגדרת עמוד...
⌘P		הדפסה...

Time Zones

- What requirements are there for handling global times?

Culture

Accessibility

	Permanent	Temporary	Situational
Touch	One arm	Arm injury	New parent
Hear	Deaf	Ear infection	Bartender

	Permanent	Temporary	Situational
See	Blind	Cataract	Distracted driver
Speak	Non-verbal	Laryngitis	Heavy accent

https://devblogs.microsoft.com/xamarin/the-journey-to-accessible-apps/
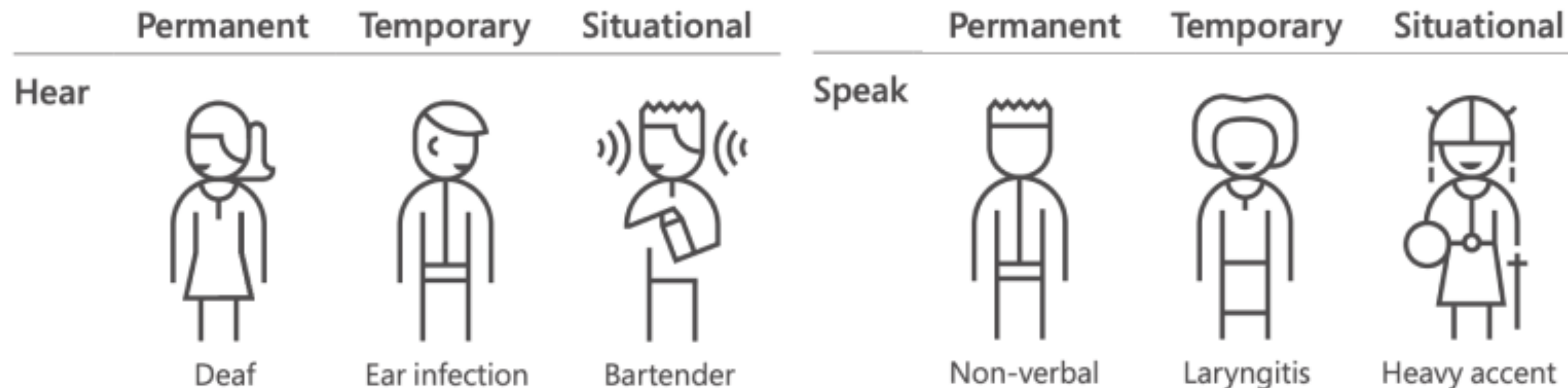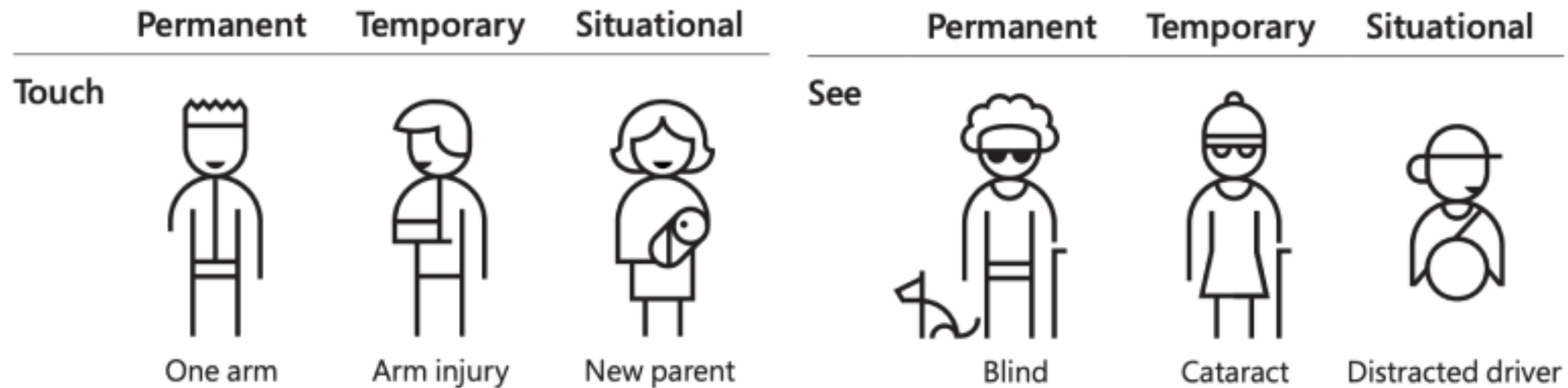
Accessibility Advice

- High contrast; don't rely on color (1/12 of men are color blind)

- Enable keyboard-only use

- Make clickable areas large

- Linear layout (for screen readers)

- Test! Can you use the app with a screen reader?

-

Color Blindness

Normal **Red-Green Color Blind**

For Web Sites

- Structure and organize with headers

- Use descriptive link text (not "click here for information about…")

- Use real text rather than images when possible

- Alternative text for images

A11Y in React

- Use semantic HTML

  - Screen readers need to know meanings

  - What is a div or a span? No idea. Instead use h1, p, button, etc.

- See WAI-ARIA (https://www.w3.org/WAI/standards-guidelines/aria/)

  - Authoring Practices Guide: https://www.w3.org/WAI/ARIA/apg/

Physical Disabilities

- Dexterity limitations (e.g. hand tremors)

- Inability to use keyboard/mouse

  - Control with tongue or blinking (e.g. quadriplegics)

  - Voice control

- Inability to use pointing devices (keyboard OK)

Conclusions

- Requirements affect costs

- But determining requirements can require extensive domain knowledge

- Internationalization domain knowledge is important