



REGARDING CHEESE

A SOFTWARE ENGINEERING DISCUSSION

It is September 2016. Eat?



05 12 16
179 12

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.

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?

Unicode

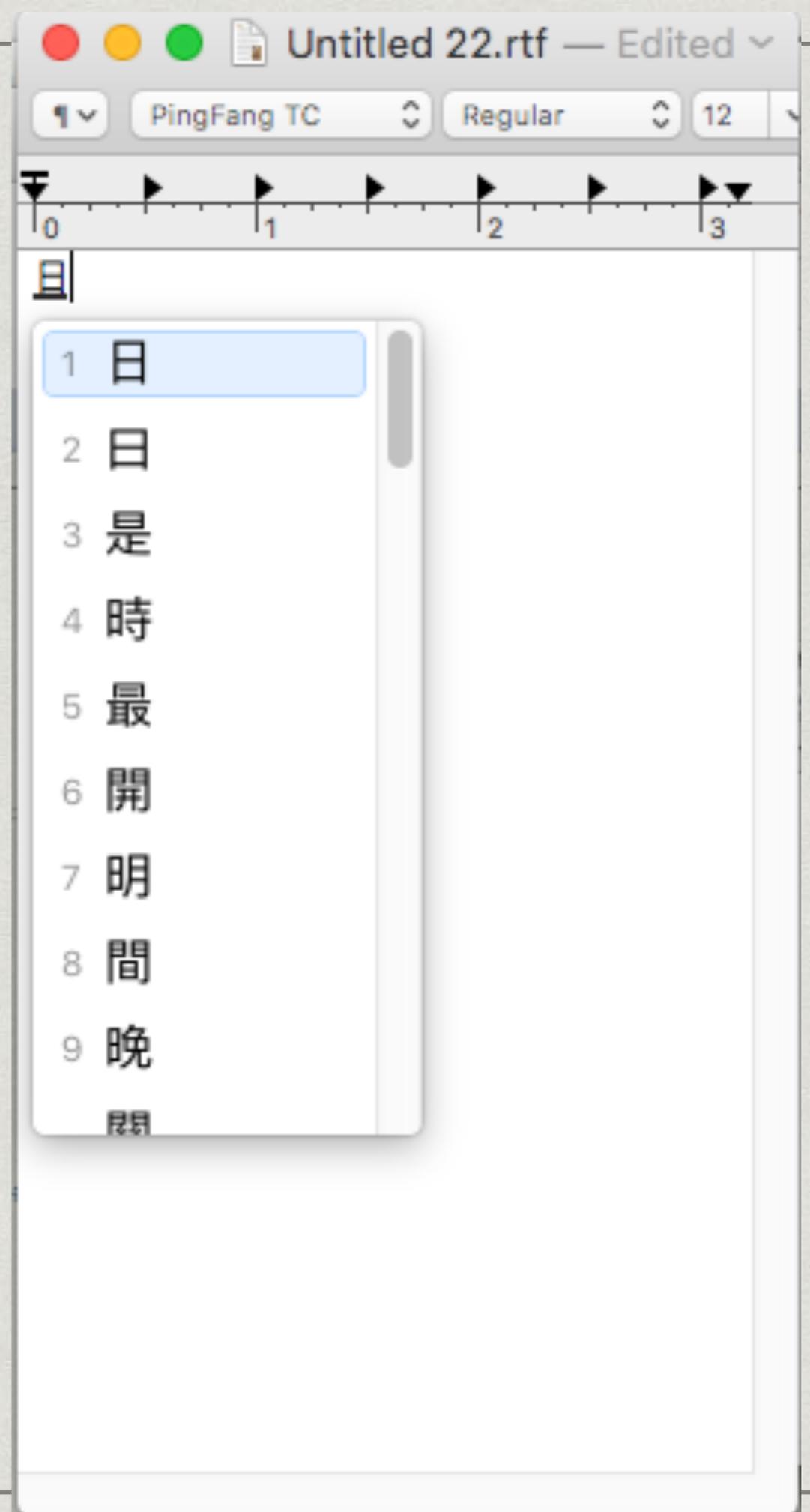
- * You're not using ASCII, are you? 😬

Characters

- * 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.
- * What properties does the *capitalize* operation have?
- * Convert to all-caps: straÙe.

Let's make a table.

Which one is Back?



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

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



Conclusions

- * Requirements affect costs
- * But determining requirements can require extensive domain knowledge
- * Internationalization domain knowledge is important