

# Falsehoods programmers believe about languages

Why localizable software is hard

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**WIKIPEDY**  
De frije ensyklopedy



**ويكيبيديا**  
الموسوعة الحرة



**WIKIPEDIA**  
De vrije encyclopedie



**WIKIPEDIA**  
The Free Encyclopedia



**WIKIPÉDIA**  
L'encyclopédie libre



**維基百科**  
自由的百科全書



**WIKIPEDIA**  
Die freie Enzyklopädie

Truth:  
Languages are hard

	masc.	neut.	fem.	pl.
nominative	<i>der</i>	<i>das</i>	<i>die</i>	
accusative	<i>den</i>			
dative	<i>dem</i>		<i>der</i>	<i>den</i>
genitive	<i>des</i>			

ごだん・五段 verbs

う

~う・~つ・~る ~ぬ・~む・~ぶ ~く/~ぐ ~す	あう・まっ・とる しぬ・よむ・とぶ かぐ/つく かす
-------------------------------------	-------------------------------------

**じしよけい 辞書形**  
**Dictionary or Plain Form**  
 (non-past; habitual or future)

十な (negative imperative)

**Nominalization**  
 (forming noun phrases or gerunds)

十の (emphatic/informal)  
(like こと by default)

十ことができる (able to do ~ing)

十ことがある (occasional occurrence)

十ことにする (to decide to ~)

十ことになる (as a result)

十まえに... (before ~ing...)

十がはやいか ("as soon as")  
 (without intent)

十ともなく (past)

十べき(だ) (idealistic "should")

十まい (formal neg. volitional)

十みたい(だ) ("it seems that ~")

十そう(だ) ("I've heard that ~")

十らしい ("apparently" ~adj)  
(比) + 4.4 / 4.7

みる・たべる

~いる・~える

い

~い・~ち・~り ~に・~み・~び ~き/~ぎ ~し	あい・まち・とり しに・よみ・とび かき/つき かし
-------------------------------------	-------------------------------------

**れんじよけい 連用形**  
**Conjunctive**  
 ~ます stem  
 (Sentence Joining)

十たい (desire) ~い-adj.  
 十たがる (desire) 五段 verb  
 十ほしない (strong neg. desire)

十ながら ("while ~ing")

十がち(だ) ("tends to ~")

十かた-方 ("way of ~ing")

十そう(だ) ("it looks like ~")

十やがる (yakuza super/rude)

十にくい・難しい (difficult to ~)

十やすしい・軽い ("easy to ~")

十すぎる・過ぎる ("too much")

十二 [verb of motion] (go & do)  
speaker's non-speakers

十 [verb] (compound verb)  
 十 [noun] (e.g. 向き, 野み)  
 十の (noun from verb target)

**Polite** (non past)

十ません (negative)

十ました (past)

十ませんでした (past neg.)

十ましよう (volitional)

十まして (connective ~rise)

十ますれば (conditional ~rise)

十なさい・十な (imperative)

み・たべ

~い・~え

あ

~わ・~た・~ら ~な・~ま・~ば ~か/~が ~さ	あわ・また・とら しな・よま・とば かか/つが かさ
-------------------------------------	-------------------------------------

**みぜんけい 未然形**  
**ない form**  
 十ない (negative ~i-adj.)  
 十ないで ("without ~ing")  
 十なくて (neg. te form)  
 十なかつた (neg. ta form)  
 十なければ (neg. concl.)  
 十なからう (neg. vol.)  
 十なくていい ("don't have to ~" - informal)

**Compulsion "must"**

十なくてはいけない + 十くちや  
 Obligation "must have to ~"

十なければならぬ + 十なや  
 十なければいけない

十ず (negative -oid)  
 十ずに ("without ~ing" - formal)

五段	一段
十れる*	十られる*
十せる*	十せられる*
十せられる*	十せられる*

\*new 一段 verbs / \*new 五段 verbs

え

~え・~て・~れ ~ね・~め・~べ ~け/~げ ~せ	あえ・また・とれ しね・よめ・とべ かけ/つげ かせ
-------------------------------------	-------------------------------------

**めいれいけい 命令形**  
**五段 Imperative**

**かていけい 仮定形**

五段	一段
十ば	十れば
十る*	十られる*

\*new 一段 verbs / \*new 五段 verbs

**一般 Imperative**  
 十る (imperative)

お

~お・~と・~ろ ~の・~も・~ほ ~こ/~ご ~そ	あお・また・とろ しの・よも・とほ かこ/つご かそ
-------------------------------------	-------------------------------------

**すいりじよけい 推量形**

五段	一段
十う	十よう

**Conditional Idiom**  
 十よかった ("I wish that ~")

**Honorific Verb Form**  
 十+ [連用形] + 十になる 十お  
 十+ [連用形] + 十なさる 十お

**Humble Verb Form**  
 十+ [連用形] + 十する 十お

Alternative English names for verb types:  
 十 is 敬語 verb group II, type B, vowel-stem  
 十 is 敬語 verb group II, type B, consonant-stem  
 Ten are 敬語 verbs in modern Japanese ending with ず, ぶ, ぶ or ぶ. Only 十 is 敬語 verb with ぶ.

十て

て

~って ~んで ~いて/いで ~して	あって・また・とって しんで・よんで・とんで かいて/ついで かにして
-----------------------------	--

**てけい テ形**  
**て form**  
 (Connective, Adverbial, Imp.)

十あげる・くれる・もらう (benefit being given or received)

十いく (continuing change of state)

十いる (continuous/habitual action)

十おくる (preparatory action)

十よかった ("I'm glad that ~")

十みる (try - and see?)

十ほしい・欲しい (favour/request)

十ある (changed state)

十から... (after ~ing ~)

十くる (state change)

十は~いけない? ("must not ~")

十は~ならない? ("must not ~")

十は (suggestive)

十かまわない (permissive)

十もない(です) (commissive)

十も (even if ~)

十すみません (apologetic)

十 [verb stem] (only when 十 is 敬語 verb)  
 十 [verb stem] (only when 十 is 敬語 verb)  
 十 [verb stem] (only when 十 is 敬語 verb)

て/で 一た/だ

**たけい 夕形**  
**た form**  
 Past (action completion)

十から (reason for next clause)

十り+する ("~etc" / "because")

十ら ("When ~")

十ばかり (just happened)

十ほうがいい (suggestive)

いちだん・一段 verbs

る

みる・たべる	み・たべ
~いる・~える	~い・~え

エーロン ビュカナン  
**AERON BUCHANAN'S**  
**日本語の動詞の図 JAPANESE VERB CHART** v2.7

For more information about our chart, see e.g. [https://commons.wikimedia.org/wiki/File:AMB\\_Japanese\\_Verbs.pdf](https://commons.wikimedia.org/wiki/File:AMB_Japanese_Verbs.pdf)

Falsehood #0:  
I don't have to deal with this

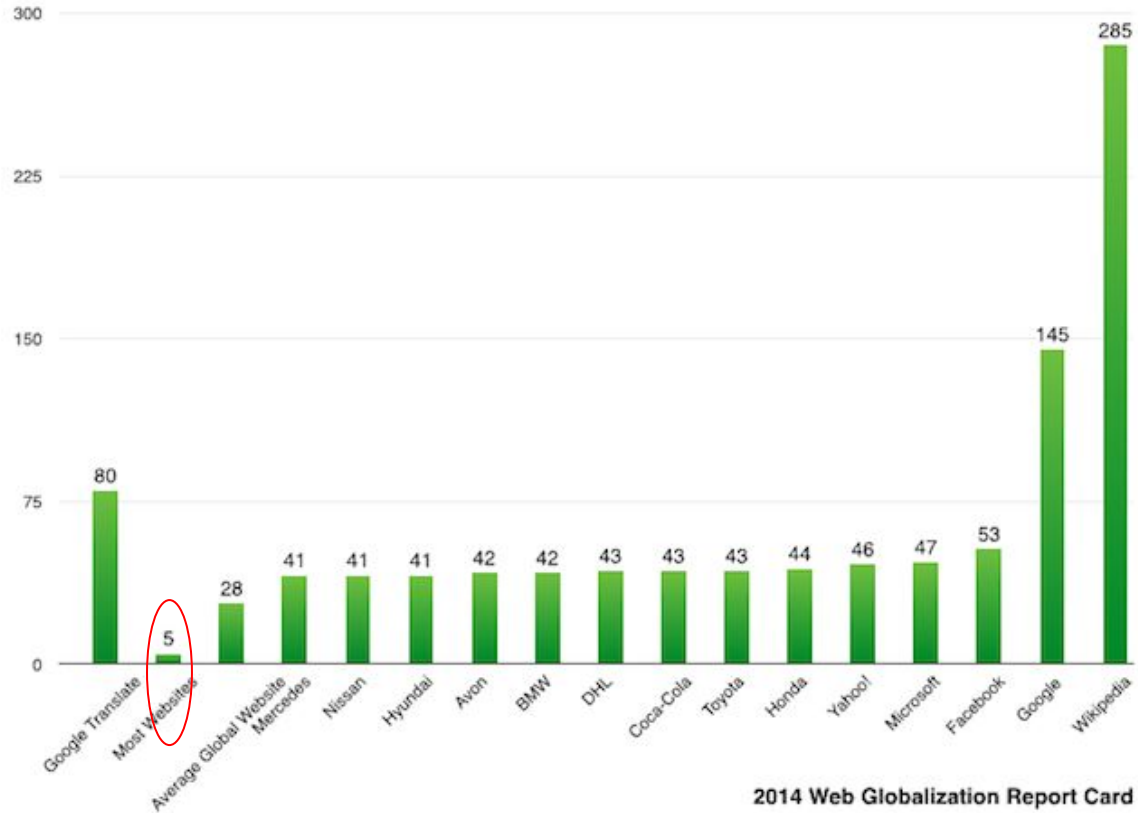
“I presume that it would be only the exceptional Web site that gets localized for English *and* Chinese *and* Italian *and* Arabic *and* Russian, [...] to say nothing of German, Spanish, French, Japanese, Finnish, and Hindi, to name a few languages that benefit from large numbers of programmers or Web viewers or both.”

“I presume that it would be only the exceptional Web site that gets localized for English *and* Chinese *and* Italian *and* Arabic *and* Russian, [...] to say nothing of German, Spanish, French, Japanese, Finnish, and Hindi, to name a few languages that benefit from large numbers of programmers or Web viewers or both.”

*(top 10 languages, >200M speakers)*



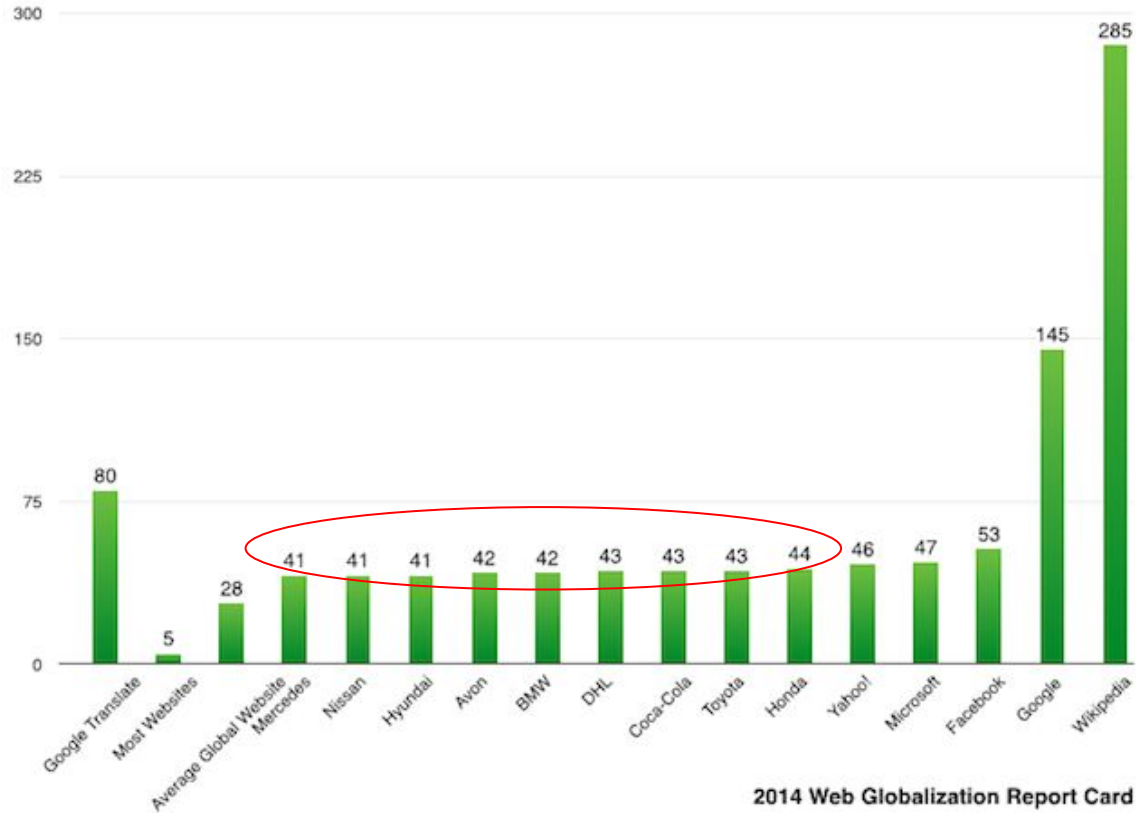
## Language Leaders: 2014



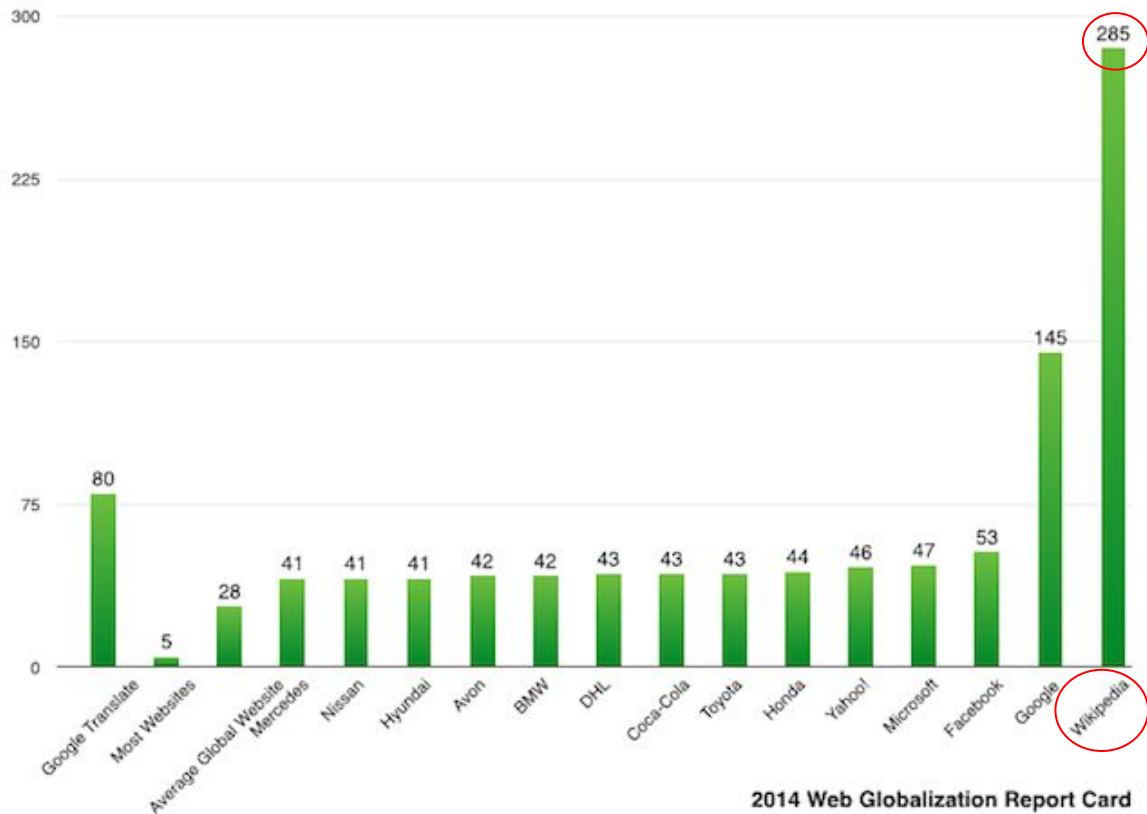
2014 Web Globalization Report Card

<http://globalbydesign.com/2014/04/07/wikipedia-and-the-internet-language-chasm/>

## Language Leaders: 2014



## Language Leaders: 2014



維基百科  
自由的百科全書

# Things that aren't cool anymore

- Two-digit years
- 32-bit timestamps
- Not using version control
- Rolling your own crypto
- Not internationalizing your code

# Side note: confusing acronyms

Locale = language + region (e.g. en-US)

l10n = localization: translating/adapting for a *specific* locale

i18n = internationalization: infrastructure/code that enables l10n *generally*

# Side note: confusing ~~acronyms~~ *numeronyms*

Locale = language + region (e.g. en-US)

I10n = localization: translating/adapting for a *specific* locale

  
**10** chars

i18n = internationalization: infrastructure/code that enables I10n *generally*

  
**18** chars

Falsehood #1:

I can still put English strings in my code

# GNU gettext

In hello.c:

```
printf(gettext("Hello, world!\n"));
```

In nl.po:

```
#: src/hello.c:42
```

```
msgid "Hello, world!\n"
```

```
msgstr "Hallo, wereld!\n"
```

*(also hello.pot but that one isn't interesting)*



# MediaWiki

In SpecialUserLogin.php:

```
$title = wfMessage( 'loginsuccesstitle' )->text();
```

In en.json:

```
"loginsuccesstitle": "Logged in",
```

In nl.json:

```
"loginsuccesstitle": "Aangemeld",
```

# Advantages of named messages

- Same English text can be translated differently in different contexts
- Messages can be reused where it does make sense
- Message documentation can be more specific about context
- Developers are reminded that i18n is a thing
- Hardcoded English is a red flag → harder to forget i18n

# Yes really, message documentation!

In qqq.json:

```
"loginsuccesstitle": "The title of the page saying that you  
are logged in. The content of the page is the message  
{msg-mw|Loginsuccess}}.\n{{Identical|Log in}}",
```

- Fake language code lets us put docs outside the code → more detailed docs
- Docs explain context and parameters
- CI fails on undocumented messages (`grunt-banana-checker`)

Falsehood #2:  
sprintf-style parameters are fine

# Parameter order

```
printf(gettext("%d matches in %d files"), matches, files);
```

What if the translation looks like "%d files with %d matches"?

# Parameter order

```
printf(gettext("%d matches in %d files"), matches, files);
```

What if the translation looks like "%d files with %d matches"?

MediaWiki uses numbered parameters:

```
"This page was last edited on $1, at $2."
```

jQuery Globalize uses the ICU message format:

```
"This page was last edited on {1}, at {2}."
```

```
"This page was last edited on {date}, at {time}."
```

Falsehood #3:

Displaying/parsing numbers is simple

# Decimal and thousand separators

English: 1,234,567.89



# Decimal and thousand separators

English: 1,234,567.89

Spanish: 1.234.567,89

# Decimal and thousand separators

English: 1,234,567.89

Spanish: 1.234.567,89

French: 1 234 567,89

# Decimal and thousand separators

English: 1,234,567.89

Spanish: 1.234.567,89

French: 1 234 567,89 (U+00A0 NO-BREAK SPACE)

# Decimal and thousand separators

English: 1,234,567.89

Spanish: 1.234.567,89

French: 1 234 567,89 (U+00A0 NO-BREAK SPACE)

German<sup>(\*)</sup>: 1'234'567,89

# Decimal and thousand separators

English: 1,234,567.89

Spanish: 1.234.567,89

French: 1 234 567,89 (U+00A0 NO-BREAK SPACE)

German<sup>(\*)</sup>: 1'234'567,89

(\*) As spoken in Switzerland

# Thousand separators

English:           1,234,567,890

# Thousand separators

English: 1,234,567,890

English<sup>(\*)</sup>: 1,23,45,67,890

# Thousand separators

English: 1,234,567,890

English<sup>(\*)</sup>: 1,23,45,67,890

(\*) As spoken in India



# ~~Thousand~~ Group separators

English: 1,234,567,890

English<sup>(\*)</sup>: 1,23,45,67,890

(\*) As spoken in India

- $10^3$  = thousand
- $10^6$  = million
- $10^9$  = billion

- $10^3$  = thousand
- $10^5$  = lakh
- $10^7$  = crore

But apart from separators,  
they're just numbers, right?

English: 1,234,567,890

English: 1,234,567,890

Lao: ໑,໒໓໔,໕໖໗,໘໙໐ (U+0ED1 LAO DIGIT ONE etc)

Burmese: ၁, ၂၃၄, ၅၆၇, ၈၉၀

English:	1,234,567,890
Lao:	໑,໒໓໔,໕໖໗,໘໙໐
Burmese:	၁, ၂၃၄, ၅၆၇, ၈၉၀
Bengali:	১, ২৩, ৪৫, ৬৭, ৮৯০

English: 1,234,567,890  
Lao: ໑, ໒, ໓, ໔, ໕, ໖, ໗, ໘, ໙, ໐  
Burmese: ၁, ၂, ၃, ၄, ၅, ၆, ၇, ၈, ၉, ၀  
Bengali: ১, ২, ৩, ৪, ৫, ৬, ৭, ৮, ৯, ০

↑ Not 8      ↑ Not 9

English:	1,234,567,890
Lao:	໑,໒໓໔,໕໖໗,໘໙໐
Burmese:	၁, ၂၃၄, ၅၆၇, ၈၉၀
Bengali:	১,২৩,৪৫,৬৭,৮৯০
Arabic:	١.٢٣٤.٥٦٧.٨٩٠

English: 1,234,567,890  
Lao: ໑,໒໓໔,໕໖໗,໘໙໐  
Burmese: ၁, ၂၃၄, ၅၆၇, ၈၉၀  
Bengali: ১, ২৩, ৪৫, ৬৭, ৮৯০  
Arabic: ١٠٢٣٤٠٥٦٧٠٨٩٠

(U+066C ARABIC THOUSANDS SEPARATOR)

(U+0660 ARABIC-INDIC DIGIT ZERO)



English:	1,234,567,890
Lao:	໑,໒໓໔,໕໖໗,໘໙໐
Burmese:	၁, ၂၃၄, ၅၆၇, ၈၉၀
Bengali:	১,২৩,৪৫,৬৭,৮৯০
Arabic:	١.٢٣٤.٥٦٧.٨٩٠
	١٠٢٣٤'٥٦٧'٨٩٠

# What this means

Special functions for formatting numbers:

```
wfMessage ( 'foo' ) -> numParams ( $bar ) -> text ()
```

And for parsing them:

```
$this -> getLanguage () -> parseFormattedNumber ( $foo )
```

```
> parseInt( '89' )
```

```
< 89
```

---

```
> parseInt( '89' )
```

```
< NaN
```

---

Falsehood #4:

“3 *file(s) selected*” isn’t so bad

Now you can say that this example is really esoteric. And you are right! This is exactly how we felt about this problem and decide that it does not weight that much. The solution for the above problem could be very easy:

```
printf ("%s %d", gettext ("number:"), number_of_errors)

printf (number_count == 1 ? gettext ("you should see %d number")
      : gettext ("you should see %d numbers"),
      number_count)
```

We believe that we can solve all conflicts with this method. If it is difficult one can also consider changing one of the conflicting string a little bit. But it is not impossible to overcome.

# Plurals in English

n = 1	singular	1 house
otherwise	plural	2 houses, 3 houses, ...

# Plurals in Hebrew


n = 1	singular	שנה
n = 2	dual	2 שנתיים
n = 3..10	plural	3 שנים, 4 שנים, ...
otherwise	sometimes singular, sometimes plural, sometimes both OK	11 שנה, 20 שנה

# Plurals in Welsh

n = 0	zero	0 <b>cŵn</b> , 0 <b>cathod</b>
n = 1	singular	1 <b>ci</b> , 1 <b>gath</b>
n = 2	dual	2 <b>gi</b> , 2 <b>gath</b>
n = 3	“few”	3 <b>chi</b> , 3 <b>cath</b>
n = 6	“many”	6 <b>chi</b> , 6 <b>chath</b>
otherwise	“other”	11 <b>ci</b> , 11 <b>cath</b>



# Plurals in Welsh

Yes, really: 

**U+0175** (LATIN SMALL LETTER W WITH CIRCUMFLEX)

n = 0	zero	0 <b>cŵn</b> , 0 <b>cathod</b>
n = 1	singular	1 <b>ci</b> , 1 <b>gath</b>
n = 2	dual	2 <b>gi</b> , 2 <b>gath</b>
n = 3	“few”	3 <b>chi</b> , 3 <b>cath</b>
n = 6	“many”	6 <b>chi</b> , 6 <b>chath</b>
otherwise	“other”	11 <b>ci</b> , 11 <b>cath</b>

# Plurals in Icelandic

$n \bmod 10 = 1$ && $n \bmod 100 \neq 11$	singular	1 dagur, 21 dagur
otherwise	plural	2 dagar, 11 dagar

# Plurals in Polish

$n = 1$	singular	1 miesiąc
$n \bmod 10 = 2..4 \ \&\&$ $n \bmod 100 \neq 12..14$	“few”	2 miesiące
otherwise	“other”	5 miesięcy

*(according to CLDR there's also a fourth form for fractions, but I'm restricting myself to integers here)*

# Ordinals in English

$n \bmod 10 = 1 \ \&\&$ $n \bmod 100 \neq 11$	-st	1st, 21st, 31st, 101st, 121st
$n \bmod 10 = 2 \ \&\&$ $n \bmod 100 \neq 12$	-nd	2nd, 22nd, 32nd, 102nd, 122nd
$n \bmod 10 = 3 \ \&\&$ $n \bmod 100 \neq 13$	-rd	3rd, 23rd, 33rd, 103rd, 123rd
otherwise	-th	4th, 5th, 11th, 12th, 13th, 111th, 112th, 113th

# Plural handling

MediaWiki:

```
"Undelete {{PLURAL:$1|one edit|$1 edits}}",
```

```
"odtwórz {{PLURAL:$1|1 wersję|$1 wersje|$1 wersji}}"
```

```
"{{PLURAL:$1|one edit|$1 edits|0=no edits}} found"
```

# Plural handling

ICU / jQuery Globalize:

```
"Undelete {edits,plural, one{one edit} plural{# edits}}"
```

```
"odtwórz {edits,plural, one{1 wersję} few{# wersje}  
many{# wersji}}"
```

```
"{edits,plural, one{one edit} plural{# edits} =0{no edits}}  
found"
```

Falsehood #5:

It doesn't matter who the user is

English:

"confirmable-confirm": "Are you sure?",

French:

"confirmable-confirm": "Êtes-vous sûr?",



# Gender matters

English:

"confirmable-confirm": "Are you sure?",

French (*male*):

"confirmable-confirm": "Êtes-vous **sûr**?",

French (*female*):

"confirmable-confirm": "Êtes-vous **sûre**?",

# Gender syntax (MediaWiki)

English (no-op gender as hint to translators):

```
"Are {{GENDER:$1|you}} sure?"
```

French:

```
"Êtes-vous {{GENDER:$1|sûr|sûre}}?"
```

# Gender syntax (MediaWiki)

Useful in English too:

```
"$1 mentioned {{GENDER:$2|you}} on  
{{GENDER:$1|his|her|their}} talk page"
```

French varies on the other user ("you") instead:

```
"$1 vous a {{GENDER:$2|mentionné|mentionnée}} sur sa page de  
discussion"
```

# Gender syntax (ICU)

```
Êtes-vous {gender, select, male{sûr} female{sûre}  
other{sûr}}?
```

## Internationalisation

Language:

en - English

How do you  
prefer to be  
described?

- (When mentioning you, the software will use gender neutral words whenever possible)
- She edits wiki pages
- He edits wiki pages

Setting this preference is optional. The software uses its value to address you and to mention you to others using the appropriate grammatical gender. This information will be public.

Falsehood #6:  
I can concatenate messages

# "Lego messages" considered harmful

Messages should be full sentences. Don't do things like this:

```
"born-in-month": "This user was born in the month of",  
"january": "January",  
...  
"december": "December",
```

```
msg( 'born-in-month' ) + ' ' + msg( month ) + '.'
```

# "Lego messages" considered harmful

String concatenation outside the control of the translator = problem

Use parameters instead:

```
"born-in-month": "This user was born in the month of $1.",
```

```
monthname = msg( month );
```

```
msg( 'born-in-month', monthname )
```



Falsehood #7:  
People write this way --->



ابحث في ويكيبيديا

مزيد ▾



التاريخ

عدل

اقرأ

نقاش

الصفحة الرئيسية



ويكيبيديا  
الموسوعة الحرة

الصفحة الرئيسية

الأحداث الجارية

أحدث التغييرات

أحدث التغييرات الأساسية

تصفح

المواضيع

أبجدية

بوابات

مقالة عشوائية

تصفح بدون إنترنت

مشاركة

اتصل بالموسوعة

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فيس بوك تويتر تويتر انستغرام

[اغلاق]

محتوى مميز · التصنيفات · فهرس أبي



تصفح كل البوابات

# مَرْحَبًا بِكُمْ فِي وِكِيبيديَا

الموسوعة الحرة التي يستطيع الجميع تحريرها. توجد الآن 524,279 مقالة بالعربية.

عن ويكيبيديا · مرحبا بالزوار الجدد · كيفية تعديل الصفحات · حقوق النشر · أسئلة · مساعدة

السبت 10 يونيو/ حزيران 2017، الموافق 15 رمضان 1438 هـ

## في الأخبار



● **8 يونيو** – حزب المحافظين البريطاني الحاكم، الذي ترأسه رئيسة الوزراء تيريزا ماي (في الصورة)، يخسر أغلبية المقاعد في البرلمان في الانتخابات العامة، لكنه يبقى أكثر الأحزاب تمثيلاً.

● **7 يونيو** – رئيس إقليم كردستان مسعود برزاني يعلن عن تحديد يوم 25 سبتمبر المقبل موعداً لإجراء استفتاء حول استقلال إقليم كردستان عن العراق.

● **7 يونيو** – مصرع 122 شخصاً بعد سقوط طائرة عسكرية ميانمارية في بحر اندامان.

● **7 يونيو** – هجومان مسلحان متزامنان يستهدفان مبنى مجلس الشورى وضريح



## مقالة اليوم المختارة

روبن ريانا فينتي، المعروفة باسم الشهرة ريانا، هي مغنية بربادوسية، وممثلة، ومصممة أزياء ولدت في سانت مايك، بربادوس، وبدلت مهنة ريانا الغنية عندما التقت بالمنتج الموسيقي إيفان روجرز من خلال أصدقاء مقربين في أواخر سنة 2003.

عندما بلغت ربيعها السادس عشر، انتقلت ريانا إلى الولايات المتحدة لممارسة مهنة الغناء والبدء في تسجيل بعض الأشرطة التجريبية بتوجيه من المنتج الموسيقي إيفان روجرز. تم إرسال شريطها التجريبي إلى العديد من شركات التسجيل. تم إرسال شريطها التجريبي إلى العديد من شركات التسجيل. تم إرسال شريطها التجريبي إلى العديد من شركات التسجيل.

שפת

הממשק:

he - עברית

(באזכורים שלך בממשק, המערכת תשתמש במידת האפשר

איזה תיאור בלשון שאינה תלוית־מגדר)

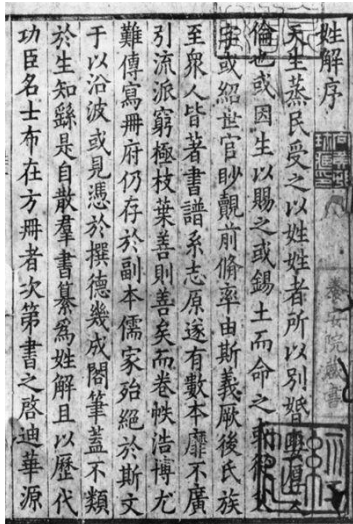
היא עורכת דפים בוויקי מתאים לך?

הוא עורך דפים בוויקי

לא חובה למלא העדפה זו. המערכת משתמשת במידע הזה כדי לפסות אליך/אלייך ולציין את שם המשתמש שלך במין הדקדוקי הנכון. המידע יהיה ציבורי.

# Language directionality

- Left-to-right (LTR): most languages
- Right-to-left (RTL): Arabic, Hebrew, Persian, a few others
- Top-to-bottom (TTB): Classical Chinese; sometimes modern Chinese too
  - Restaurant signs etc are often TTBRTL



# CSS and RTL

```
.foobar {  
  float: right;  
  margin-left: 5px;  
  padding: 0.5em 1em 0.25em 0;  
  background-position-x: 25%;  
}
```

# CSS and RTL

```
.foobar {  
  float: right;  
  margin-left: 5px;  
  padding: 0.5em 1em 0.25em 0;  
  background-position-x: 25%;  
}
```

# CSSJanus

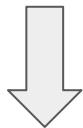
Tool that flips CSS around

```
.foobar {  
  float: right;  
  margin-left: 5px;  
  padding: 0.5em 1em 0.25em 0;  
  background-position-x: 25%;  
}
```

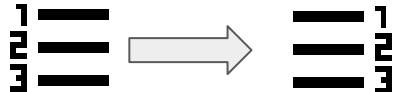
```
.foobar {  
  float: left;  
  margin-right: 5px;  
  padding: 0.5em 0 0.25em 1em;  
  background-position-x: 75%;  
}
```

# CSSJanus: flip images

```
.icon-bulletList {  
  background-image: url(bulletList-ltr.svg);  
}
```



```
.icon-bulletList {  
  background-image: url(bulletList-rtl.svg);  
}
```





## Bidirectional text

**Tel Aviv-Yafo** (Hebrew: תֵּל אָבִיב-יָפוֹ),

For all the "fun" this causes, see <http://rtl.wtf>

Keep Calm and  
i18n all the things

# Resources

- jQuery Globalize: <https://github.com/globalizejs>
  - Now with React plugin
- MediaWiki i18n documentation: <https://www.mediawiki.org/wiki/Localisation>
  - Contains generally applicable advice
- CSSJanus: <https://cssjanus.github.io/>
- RTL craziness: <http://rtl.wtf>