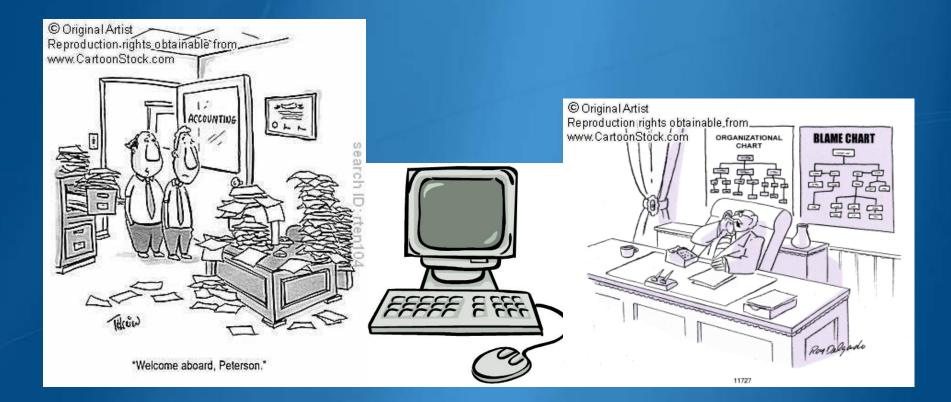
Localizing to right-to-left languages: Main Issues and Best Practices

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- Right-to-Left Languages
- Localizing to right-to-left languages
 - Right-to-left layout
 - Text justification
 - Directionality support
 - Unicode Bidirectional Algorithm
 - Issues and areas of improvements
 - Numbers
- Best Practices
- Summary

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Right-to-left languages Story



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Localizing to RTL Languages RTL Layout

00	Sharing	
▲ ▶ Show All		Q (8)
Computer Name:	Murhaf's MacBook Pro Computers on your local network can access your co Murhafs-MacBook-Pro.local	omputer at: Edit
OnServiceDVD or CD SharScreen SharingFile SharingPrinter SharingScanner SharingScanner SharingWeb SharingRemote LoginRemote ManageRemote Apple EXgrid SharingInternet SharingSluetooth Sharing	When receiving items: Folder for accepted items: When other devices browse: Folder others can browse:	

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Localizing to RTL Languages RTL Layout

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Show All	Q. (8)	الظهار الكل	٩
	F's MacBook Pro rs on your local network can access your computer at: Edit MacBook-Pro.local	بكة المحلية الوصول إلى الكمبيوتر الخاص بك عبر:	اسم الكمبيوتر: [urhaf's MacBook Pro يىكن لاجيزة الكمبيوتر التملة بالشر rhafs-MacBook-Pro.local
On Service	\varTheta Bluetooth Sharing: On	ركة Bluetooth: تشغيل	
 DVD or CD Sharing Screen Sharing 	Use Bluetooth Sharing preferences and set up your computer to share files with other Bluetooth enabled computers and devices.	نفسيلات مشاركة Bluetooth وقم بإعداد الكسبيوتر لمشاركة الملفات مع أجهزة الكسبيوتر والأجهزة تي تدعم تقنية Bluetooth.	مشاركة الشاشة الأخرى الت
File Sharing Printer Sharing	When receiving items: Ask What to Do \$	عند استلام العنامير: (* السؤال عن الإجراءات المطلوبة	مشاركة الملفات مشاركة الطابعة
 Scanner Sharing Web Sharing 	Folder for accepted items: 🔯 Downloads 🛟	مجك للعناصر المقبولة: (* 💿 التنزيلات	مشاركة الماسح الضوئي مشاركة الويب
Remote Login Remote Management	When other devices browse: Ask What to Do \$	عند استعراض الأجهزة الأخرى: (* السؤال عن الإجراءات المطلوية	الإدارة عن بعد
Remote Apple Events Xgrid Sharing	Folder others can browse: 🔯 Public 🗘	مجلد يمكن للآخرين استعراضه: 🗘 💿 عام	مشاركة Agriu
 Internet Sharing Bluetooth Sharing 	Bluetooth Preferences	تقضيلات Bluetooth	مشارکة الإنترنت Metooth مشارکة الافترا
Click the lock to prevent fu	rther changes.	ران.	انقر على القفل للحيلولة دون إجراء مزيد من التغيير

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Localizing to RTL Languages Text Justification

0 0	Security &	& Privacy
Show All		Q
 Send diagnostic & us You can help Apple im and user support by he automatically send Ap from time to time about and how you use it. This information is collected form that does not personal Click on the question mark on the types of data sent. To learn more about Apple http://www.apple.com/prive 	prove its products aving your Mac ple information at how it's working ed anonymously in a ly identify you. & for more information e's Privacy Policy, see:	Firewall Privacy ✓ Enable Location Services Allow the apps below to determine your location.

Localizing to RTL Languages Text Justification

مىومىية 0 0 0	\varTheta 🔿 🔿 Security	y & Privacy
الظهار الكل	Show All	٩
 جبير بعن (بعبر) FileVault عام إرسال بيانات التشخيص والاستخدام إلى Apple إرسال بيانات التشخيص والاستخدام إلى منتجاتها ودعم المستخدم عن طريق قيام الـ Mac الخاص بك ودعم المستخدم عن طريق قيام الـ Mac الخاص بك بإرسال معلومات حول كيفية عمله وكيفية استخدامك له إلى Apple تلقائياً من وقت إلى أخر. يتم جمع هذه العلومات دون الإفصاح عن الهوية وبحيث لا يتم التعرف عليك شخصياً. قم بالنقر فوق علامة الاستفهام للحصول على مزيد من العلومات حول 	General FileVault Send diagnostic & usage data to Apple You can help Apple improve its products and user support by having your Mac automatically send Apple information from time to time about how it's working and how you use it. • This information is collected anonymously in a form that does not personally identify you.	t Firewall Privacy C Enable Location Services Allow the apps below to determine your location.
أنواع البيانات التي يتم إرسالها. • لمرفة المزيد حول سياسة الخصومية الخاصة بـ Apple، راجع: http://www.apple.com/privacy	 Click on the question mark for more information on the types of data sent. To learn more about Apple's Privacy Policy, see: <u>http://www.apple.com/privacy</u> 	 Indicates an app that has requested your location within the last 24 hours.
(?)	Click the lock to make changes.	?

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Directionality Support Bidirectional Text

Left-to-right text:

Doubt is a pain too lonely to know that faith is his twin brother.

Right-to-left text:

.rehtorb niwt sih si htiaf taht wonk ot ylenol oot niap a si tbuoD

Bidirectional text:

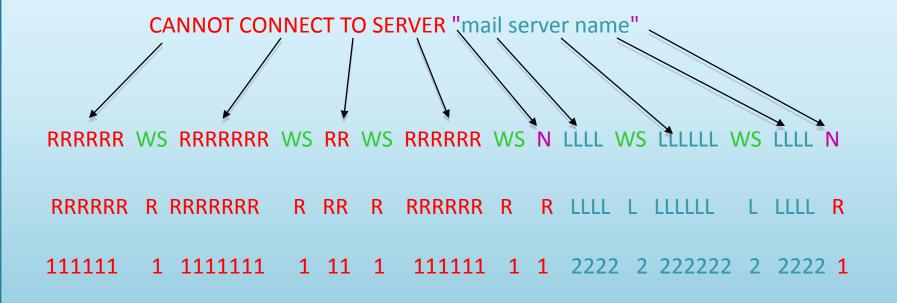
Doubt is a pain too lonely to know rehtorb niwt sih si htiaf taht.

Directionality Support Unicode Bidirectional Algorithm (UBA)

Text is always entered in the same way
Different languages have different character flow

Reorder the characters and define their directionality properties (R, L, N...etc)
Set of rules to produce the final correct visual representation

Directionality Support Unicode Bidirectional Algorithm *Example*



Directionality Support Unicode Bidirectional Algorithm - Issues

 Correct layout for most of the cases Issues with some cases due to: • Paragraph direction isn't detected correctly • Complicated nesting of strings of different types • Strings with special nature such as part numbers, names ...etc • Ambiguous strings even for human eye

Directionality Support Unicode Bidirectional Algorithm - Issues **Examples**

Incorrect Paragraph Direction (Base Direction)

Apple شركة أمريكية متعددة الجنسيات شركة أمريكية متعددة الجنسيات Apple

Directionality Support Unicode Bidirectional Algorithm - Issues **Examples**

Weak Characters

شركة Yahoo!



Directionality Support Unicode Bidirectional Algorithm - Issues **Examples**

Weak Characters 2

قطع الاتصال (PPTP) VPN قطع الاتصال (VPN (PPTP) Directionality Support Unicode Bidirectional Algorithm – Directional Codes

Invisible characters to help UBA showing the correct layout
Explicit directional codes manually added to enforce the correct layout

Directionality Support Unicode Bidirectional Algorithm – Directional Codes - Pitfalls

> a)Manually Added b)Not trivial to use c)Invisible! d)Need to check them at runtime

Directionality Support Areas of improvements

Finding patterns in the cases that usually need help
Detect those patterns in the early stages by parsing the strings
Deal with those cases in a special way by UBA

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Localizing to RTL Languages Numbers

Some scripts use different numbers
Localizing numbers can be tricky
Support for localized numerals in web is very little

 $(1, 7, 7, \xi, 0, 7, V, \Lambda, 9, \cdot)$ (1, 2, 3, 4, 5, 6, 7, 8, 9, 0)

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Best Practices

- Support of RTL Layout
- Avoid composed strings
- Avoid weak and neutral characters
- Don't enforce text direction
- Support of localized numbers
- Support of different locales

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Summary

Need to pay extra attention when localizing to RTL languages
Current support for RTL languages is very good
Some improvements can be added to overcome persistent issues

Localizing to RTL Languages

Thank you

Murhaf Hossari