Persian Input Methods
For Emacs And More Broadly Speaking

شیوه‌هایِ درج به فارسی

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1 Introduction

There are several things we want to accomplish with this document.

1.1 Goal: Widespread Usage of Persian in Emacs

Our first goal in providing this document is to facilitate writing in Persian in the Halaal/Convivial quadrant.

That begins with the promotion of use of Emacs for writing in Persian. Emacs is the *ne plus ultra* Halaal/Convivial multi-lingual user environment in existence today. It is quite simply the best, far surpassing any other currently available toolset. For complete information about Emacs see http://www.gnu.org/software/emacs/.

The word "Halaal" is very strong and very loaded. For our usage and meaning of this word see our document titled, *Introducing Halaal and Haraam into Globish – Based on Moral Philosophy of Abstract Halaal* [4] – معرفیِ حلال و حرام به بقیهی دنیا

For a definition of Halaal Software see our document titled, *Defining Halaal Software and Defining Halaal Internet Services* [3]. This document is also available in Farsi as [5]. – تعریف نرم افزار حلال و تعریف خدمات اینترنتی حلال

Our use of the terms "convivial" and "conviviality" is based on Ivan Illich's *Tools For Conviviality*. For our use of these terms see our document titled, *Introducing Convivial into Globish* [1]. In that document we also define the "Halaal/-Convivial Quadrant."

Emacs has had full Unicode support for many years. Starting with Emacs 24, full native bidi (bidirectional) support is now also available. Multiple Persian input methods are part of the Emacs 24 distribution. These input methods are documented here.

Emacs comes with a rich mail reader, a personal planner, an address book, a calendar, spell checkers for English and Persian, multi-lingual dictionary interfaces and many other tools and packages; all integrated together. Because Emacs supports Persian, all these tools and packages also support Persian.

Most Iranians today use Microsoft Windows products such as MS Word and MS PowerPoint in the Haraam/Industrial quadrant. Microsoft Windows is closed, proprietary software made by an American corporation.

Our goal is to enable and encourage the transition of Iranians from the proprietary Microsoft Windows products in the Haraam/Industrial quadrant, to the far superior Emacs in the Halaal/Convivial quadrant.

This document provides enough information to enable anyone to obtain Emacs and begin using it as her/his Persian user environment.

1.2 Goal: Widespread Adoption of Persian Blee

Our second goal is to promote the use of **Blee** (the **ByStar Libre Emacs Environment** [8]) among Persian speakers in general, and Iranians in particular.

Blee is a layer above Emacs that integrates GNU/Linux capabilities into Emacs, and provides close integration with the ByStar Services. The **ByStar Federation of Autonomous Libre Services** is a unified Halaal services model, unifying and making consistent a large number of services that currently exist in functional isolation. It is a coherent, integrated family of services, providing the user with a comprehensive, all-encompassing Internet experience. For information about Libre Services see our document titled, *Libre Services: A non-proprietary model for delivery of Internet services* [7]. For information about the ByStar Federation see our document titled, *The ByStar Federation of Autonomous Libre Services* [2].

The present document provides enough information to allow a ByStar Autonomous Libre Service owner to use Blee as her/his Persian Halaal Software-Service Continuum.

1.3 Goal: Evaluation of Applicability of farsi-transliterate-banan to other User Environments

Our third goal in producing this document is to encourage adoption of the Multi-Character Persian Reverse Transliteration in other Halaal Digital environments in general, and in Gnome in particular.

This document provides enough information so that in addition to Emacs, implementation of the "Banan Multi-Character Transliteration Persian Input Method" is possible in other user environments.

2 About this Document

The primary URL for this document is: `http://www.persoarabic.org/PLPC/120036`. The pdf format is authoritative.

Distribution of this document is unrestricted. We encourage you to forward it to others.

We can benefit from your feedback. Please let us know your thoughts. You can send us your comments, criticisms and corrections via the URL http://mohsen.1.banan.byname.net/contact, or by email to feedback@ our base domain, which is mohsen.1.banan.byname.net.

We thank you for your assistance.

3 Scope and Context

Use of the Latin character keyboard to input Persian text into machines, and more generally use of the Latin alphabet for writing in Persian, is an old topic with a lot of history. We reference some of this history and prior work later in this document. See Section 8 for more information.

The terminology in this area is often ambiguous or misused, causing confusion when addressing this topic. In this document we will be consistent in our own terminology, taking pains to define the more ambiguous or problematic terms carefully. We do this by providing our own definitions, or by referencing external definitions.

3.1 Persian vs Farsi

Our use of the terms "Persian" and "Farsi" is consistent with the definitions of these terms established by the Society of Iranian Linguists. Their definitions are available at:
http://www.iranianlinguistics.org/page.cgi?page=persian

In the section below titled "Persian Language" we reproduce the relevant parts of their text.

The current implementation of Persian input methods for Emacs is for Farsi only. Thus in the current implementation the terms Persian and Farsi may be considered equivalent, and in the present version of this document we use these terms interchangeably.

We plan to expand the implementation in the future to include other Persian language variations.

3.1.1 The Persian Language

Persian is an Iranian language within the Indo-Iranian branch of the Indo-European languages. It is spoken in Iran, Afghanistan, and Tajikistan and has official-language status in these three countries.

There are three modern varieties of standard Persian:

- The Persian variety spoken in Iran has also been called *Iranian Persian* or *Farsi*. The writing system is an extended version of the Arabic script.

- *Dari Persian* has been used to refer to the Persian language spoken in Afghanistan and Uzbekistan. It uses the same writing system as Iranian Persian.

- *Tajik* or *Tajiki Persian* is the variety used in Tajikistan, Uzbekistan and Russia. Unlike the Persian used in Iran and Afghanistan, it is written in an extended version of the Cyrillic script.

3.2 Terminology

Here we reference the external definitions of various words we will use. Note that our reference to a Wikipedia article in the list below does not necessarily mean that we endorse or conform to their definition; it means only that it exists as an external definition and that we have made the trade-off of mentioning it.

Transliteration – نویسه گردانی: http://en.wikipedia.org/wiki/Transliteration

Romanization: In the context of Persian, this amounts to same thing as transliteration.
http://en.wikipedia.org/wiki/Romanization_of_Persian

Latin vs Roman: In the context of alphabets, we use these terms interchangeably.

Transcription: This term is not used in this document.
http://en.wikipedia.org/wiki/Transcription_(linguistics)

Pinglish/Finglish: An informal and loose transliteration for human-to-human communication. Pinglish is word oriented. The Multi-Character Transliteration Input method is character oriented.

Pinglish Web Services: For example, behnevis.

Persian Multi-Character/Composite Transliteration: Synonymous with Multi-Character Reverse Transliteration Input Method.

Persian Multi-Character/Compos-it Reverse Transliteration: Transliteration was the process by which خ became "kh". Now, the route by which "kh" is becoming خ is reverse-transliteration. But we continue to refer to it as transliteration. farsi-transliterate-banan defined in this document is an example of the Multi-Character Reverse Transliteration Input Method. See Section 5.2 for details.

Input Method / Emacs Input Method: An "input method" is a kind of character conversion designed specifically for interactive input.

Mapping Input Method: This simplest kind of input method works by mapping ASCII letters into another alphabet; this allows you to use one other alphabet instead of ASCII.

Composite Input Method: A more powerful technique is composition: converting sequences of characters into one letter. For example "kh" becomes خ.

3.3 Overview of the Full Picture: The By* Halaal Digital Ecosystem

This document is part of a bigger picture.

We want the world to move towards Halaal Software, and Halaal Internet Services.

The totality of our work is directed towards creation of the **ByStar Halaal Digital Ecosystem**, as a moral alternative to the proprietary American digital ecosystem. An overview of this is provided in our document titled, *The ByStar*

Halaal/Libre Digital Ecosystem: A Moral Alternative to the Proprietary American Digital Ecosystem [6], available online at: http://www.persoarabic.org/PLPC/180016. In that document we present a complete picture for establishing a model and process that can redirect the manner of existence of software and Internet services towards safeguarding humanity. We also describe the framework that is already in place for collaboration and we invite you to participate in this work.

4   Persian With Emacs

This information applies to emacs version 24.2.50.1 or higher.

Enabling Persian in Emacs is very simple.

If you already are an emacs user, you can skip over to section 4.3 and continue reading from there.

If you are completely new to emacs, the information below is sufficient to permit you to install emacs, enable Persian and start using emacs as your Persian user environment.

4.1   About Emacs

Emacs is world's most potent multilingual editor-centered user experience platform. Emacs comes with a rich mail reader, a personal planner, an address book, a calendar, spell checkers for English and Persian, multi-lingual dictionary interfaces and many other tools and packages; all integrated together. Because Emacs supports Persian, all these tools and packages also support Persian.

Some useful links to emacs related resources are included below:

- GNU Emacs home page

- Guided Tour of Emacs

- Emacs manual

- Intro to elisp

- Emacs lisp manual

4.2   Obtaining Emacs

Emacs is halaal/libre/free software.

The primary access page for emacs is:

> http://www.gnu.org/software/emacs/

You can obtain the sources for emacs and build it yourself or you can obtain pre-built binaries.

Instructions for obtaining emacs in various forms and for various platforms are also included below.

4.2.1 Obtaining Emacs Sources

When Emacs 24.3 is released You can obtain the source for emacs 24.3 with:

```
wget http://ftp.gnu.org/pub/gnu/emacs/emacs-24.3.tar.gz
```

The latest version from the repository trunk can be obtained with:

```
git clone git://git.savannah.gnu.org/emacs.git
```

Then you can build emacs from sources by following the instructions.

4.2.2 Binaries For Debian GNU/Linux and Ubuntu

Snapshots of the repository trunk are regularly built for Debian and Ubuntu. You can obtain these from:

```
http://emacs.naquadah.org/
```

Once Emacs 24 is included in distributions of Debian and Ubuntu, all you have to do is:

```
sudo apt-get install emacs
```

4.2.3 Binaries For MS Windows

We do not encourage use of any software on the proprietary/haraam Microsoft Windows platform. From the Halaal Software perspective, use of any software under Windows is at best makruh – مکروه . Use GNU/Linux instead.

Snapshots of the repository trunk are regularly built for MS Windows. You can obtain these from:

```
http://alpha.gnu.org/gnu/emacs/windows/
```

4.3 Obtaining Persian Blee

Blee (the **ByStar Libre Emacs Environment** [8] is a layer above Emacs that integrates GNU/Linux capabilities into Emacs, and provides close integration with the ByStar Services. The **ByStar Federation of Autonomous Libre Services** [2] is a unified Halaal services model, unifying and making consistent a large number of services that currently exist in functional isolation.

Information about obtaining Blee can be found at: http://www.persoarabic.org/PLPC/180004

4.4   Selecting Persian Language

Using Emacs menus, select:
"Options" - "Multilingual Environment" - "Set Language Environment" - "Persian".

Or you can select the Persian language with Emacs commands.

The notation "M-:" in the following commands means you press the "Meta" key (often the Esc key) followed by ":". The "M-:" is then followed by the elisp form. For some commands the "M-:" does not appear; in this case you just need to eval the elisp form.

```
M-: (set-language-environment "Persian")
```

To see language environment settings, using Emacs menus, select:
"Options" - "Multilingual Environment" - "Describe Language Environment" - "Persian".

or invoke the Emacs command:

```
M-: (describe-language-environment "Persian")
```

4.5   Selecting Persian Input Methods

Emacs comes with two built-in Persian input methods:

farsi-isiri-9149: A Persian keyboard based on the Islamic Republic of Iran's ISIRI-9147 specification. See Section 5.1 for details.

farsi-transliterate-banan: An intuitive transliteration keyboard for Farsi. See Section 5.2 for details.

With Plain Emacs

With the language environment set to "Persian", using Emacs menus, select:
"Options" - "Multilingual Environment" - "Toggle Input Method".

Now, your keyboard is configured for Persian as farsi-transliterate-banan.

To activate the ISIRI-9147 keyboard, enter the command:

```
M-: (set-input-method 'farsi-isiri-9149)
```

To activate the transliterate keyboard, enter the command:

```
M-: (set-input-method 'farsi-transliterate-banan)
```

Alternatively you can select these options from the "Options-Multilingual Environment" menu.

To toggle back to the English keyboard type C-\ (hold down the Ctrl key while typing the character \).

To see a description of either input method, use the commands:

```
( describe−input−method  ’ farsi−transliterate−banan )
( describe−input−method  ’ farsi−isiri−9149 )
```

With Persian Blee

Using Persian Blee, just press the F6 key twice. Your input method and language environment (spell checking, dictionaries, etc.) are then all set to Persian.

Press the F6 twice again to toggle back to the English keyboard.

4.6   A Sample Farsi Editing Session

Let's start from scratch and walk through the steps involved in writing a simple sentence both in Farsi and in English.

- Install Emacs 24 on your system based on the information in section 4.1.

- Open a file: (for example "example.fa")
  Menu:"File" - "Visit New File" - "example.fa"

- Select Persian Language (section 4.3)
  Menu: "Options" - "Multilingual Environment" - "Describe Language Environment" - "Persian".

- Select the farsi-transliterate-banan Persian Input Method (section 4.4)
  Menu: "Options" - "Multilingual Environment" - "Toggle Input Method"

- Consider that we want to write:

  حالا، با نرم افزار حلال ميتوانيم به فارسی سالم و خوش بنويسيم.

- Note that we are not writing in pinglish. Ignore the vowels and think of the Persian writing above letter-by-letter.
  Now type:

  ```
  Hala, ba nrm afzar Hlal mitvanim bh farsi salm v khush bnvisim.
  ```

- Toggle back to English C-\ or
  Menu: "Options" - "Multilingual Environment" - "Toggle Input Method"

- Now enter something in English, for example:

  ```
  Now, with Halaal software we can write well in Persian.
  ```

  Note that the empty line between the Farsi paragraph and the English paragraph properly took care of directionality.

- We are done, so let's save the file and close this buffer.
  Menu: "File" - "Save".
  Menu: "File" - "Close".

Kool!

With Emacs, you are using world's most potent multilingual editor-centered user experience platform. And it is Halaal/Libre/Free. And it is Gratis/Free-of-Charge. And it has everything – a Persian spell checker, an email interface, calendar, address book, personal planner, ...

To learn more and explore more, you can try:
Menu: "Help" - "Read the Emacs Manual".
and
Menu: "Help" - "Tutorial".

Also, some Persian specific help is included below.

4.7   Hints for Persian Characters (Unicode) Usage

As you are writing in Persian, you may want to know exactly what Unicode character is at the cursor. To do that place point on the character, then enter the following commands:

```
ctl+x  =
meta+x  describe−char
ctl+u  ctl+x  =
```

For example, to verify consistency between this document and code, place the cursor on the character and with "ctl+x =" verify that the Unicode hex numbers match.

To enter a Unicode character directly in decimal or hex:

```
ctl+x  8  enter
(ucs−insert  #x0635)
(ucs−insert  (string−to−number  "0635"  16))
(ucs−insert  1589)
```

4.8   Hints for bidi Emacs Usage

Sometimes you may want to specify the directionality explicitly (i.e. left-to-right or right-to-left).

With Plain Emacs

Here are some of the basic Emacs bidi controls:

```
(setq  bidi−display−reordering  t)
(setq  bidi−display−reordering  nil)
(setq  bidi−paragraph−direction  'right−to−left)
(setq  bidi−paragraph−direction  'left−to−right)
```

See the Emacs documentation for more.

With Persian Blee

The keystroke combinations F6-1 and F6-2 are bound to toggle display-reordering.

4.9   Multilingualization (M17n) of Spelling Dictionaries

Debian/Ubuntu includes a Persian dictionary that can also be used with Emacs.

With Plain Emacs

First you need to obtain the spelling dictionary. Enter the following command:

```
sudo apt−get −y install aspell−fa
```

Next you need to let Emacs know that you want to use the Persian spelling dictionary.

With Persian Blee

As already noted, pressing the F6 key twice toggles your input method. This also toggles your language environment. ispell/aspell is then configured to work with multiple dictionaries.

So there is nothing else you need to do.

5   Emacs Persian Input Methods

At this time there are two Persian input methods supported in Emacs:

farsi-isiri-9149: A Persian keyboard based on the Islamic Republic of Iran's ISIRI-9147 specification.

farsi-transliterate-banan: An intuitive transliteration keyboard for Farsi.

These are described in the following sections.

5.1   farsi-isiri-9147 Persian Input Method

In Emacs this input method is labeled **farsi-isiri-9147**. It is based on the ISIRI 9147 – 1st edition. ISIRI-9147 defines the layout of Iran's Persian keyboard. See section 6.3 and section 6.1 for more information.

Layers 1, 2 and 3 of ISIRI-9147 are fully implemented with the exception of the Backslash '\' , Alt-Backslash, Shift-Space and Alt-Space keys.

The Backslash key is used to replace کلید با دگر ساز راست (the Alt or Meta key).

Layer 3 is then entered with the Backslash key, and Layer 3 is implemented as two-letter key combinations as specified in ISIRI-9147.

The character corresponding to Backslash is entered with Backslash-Backslash. Alt-Backslash has been moved to Backslash-r. Shift-Space has been moved to Backslash-y. Alt-Space has been moved to Backslash-t.

With these modifications farsi-isiri-9147 is a full implementation of ISIRI-9147. In addition, with these modifications this implementation is ascii input stream based, as well as being a keyboard layout.

If a key on Layer 1 were reserved to replace دگر ساز راست (the Alt or Meta key), then farsi-isiri-9147 would be fully compliant, without needing the above description/modifications.

Perhaps this can be considered a defect in the base ISIRI-9147 specification, to be addressed in the next revision.

All inputs for each Persian letter Unicode for farsi-isiri-9147 are shown in Table 3, Table 4, Table 5, Table 6, Table 7, Table 8, Table 9 and Table 10.

5.2 farsi-transliterate-banan Persian Input Method

In Emacs this input method is labeled **farsi-transliterate-banan**.

The ISIRI-9147 Persian keyboard is not well suited to Iranian expatriates living in the West. Persian-speaking expatriates are usually already completely familiar and accustomed to the standard qwerty keyboard, and they don't want to have to learn and adapt to ISIRI-9147. Rather, they expect software to adapt to them.

This is what the farsi-transliterate-banan – "Banan Multi-Character (Reverse) Transliteration Persian Input Method" – accomplishes. This input method addresses the needs of a user who:

- Can write in Farsi (not just speak it).

- Is familiar with and accustomed to the qwerty Latin keyboard.

- Is unfamiliar with ISIRI-9147 and does not wish to learn it.

- Writes and otherwise communicates in mixed Globish/Persian, not pure Persian.

- Is intuitively familiar with the transliteration of Farsi/Persian into Latin based on two-letter phonetic mapping to Persian characters. (For example: gh ق ‗‗ kh خ ‗‗ sh ش ‗‗ ch چ ‗‗ zh ژ).

The transliteration keyboard is intuitive in design, so that the mappings are natural and easy to remember for a Persian writer. It provides equivalent capability to farsi-isiri-9147, allowing input of all characters enumerated in ISIRI-6219.

farsi-transliterate-banan is phonetically oriented. But it is very different from Pinglish. Pinglish is word-oriented, where you sound out the word using Latin letters, including the vowels. **farsi-transliterate-banan** is letter-oriented, where you type the Latin letter(s) closest to the Persian letter, and usually omit vowels.

For some Persian characters there are multiple ways of inputting the same character. For example both "i" and "y" produce ی. For یک "yk", "y" is more natural, and for این "ain", "i" is more natural.

The more commonly used letters are mapped to lower case; the less commonly used letters are mapped to upper case. For example "s" is س while "S" is ص. And "h" is ه while "H" is ح. Table 1 shows these mappings.

Postfix composition is based on "h". The letter "h" is used as a postfix for the following two-character mappings: gh ق – kh خ – sh ش – ch چ – zh ژ – Th ة – Yh ی. Table 2 shows these mappings.

Prefix composition is based on the prefix characters \, & and /.

Prefix letter \ is used for two-character inputs when an alternative form of a letter is desired. For example \– is "÷" while – is "–".

! ۱	۲ ٖ	۳ ُ	۴ ٰ	۵ ٪	۶ َ	&۷	*۸	)۹	(۰	ـ_	+=	ٔ
غ ق	ع ء	ِ	R ر	ت ط	ی ي	و ٓ	ئ ى	ُ	P پ	}]	{[	
	آ اَ	س ص	د آ	ف إ	گ غ	ح ه	ج	ک ك	L ل	؛ :	'''	
		ز ذ	ض ظ	ث ٍ	و ؤ	ب B	ن «	م »	>،	<.	؟/	

Table 1: Banan Transliteration Keyboard Layout for Single Keys

ch چ	kh خ	sh ش	zh ژ	ǵh ق	Gh غ	hh ح	Yh ی	Th ة

Table 2: Banan Transliteration of "h" Postfix Multi Keys Mappings

Prefix letter `&` is used for multi-character inputs when special characters are desired based on their abbreviated name. For example you can enter `‎` to enter the "LEFT-TO-RIGHT MARK" character.

Prefix letter `/` is used to provide two specific characters. `/` is "ZERO WIDTH NON-JOINER" and `//` is `/`.

The letter "h" is used in a number of two-character postfix mappings; for example "sh" ش. So if you need the sequence "s" then "h" you have to repeat the "s". For example: سهم = 's' 's' 'h' 'm'.

Table 1 shows the single-character keyboard layout for farsi-transliterate-banan. It is based on the results of (`describe-input-method 'farsi-transliterate-banan`).

Table 2 shows the multi-character mappings for farsi-transliterate-banan. It is based on the results of (`describe-input-method 'farsi-transliterate-banan`).

All inputs for each Persian letter Unicode for farsi-transliterate-banan are shown in Table 3, Table 4, Table 5, Table 6, Table 7, Table 8, Table 9 and Table 10.

6 Relevant Standards/Specifications

We have put together a repository of standards/specifications which are relevant to Persian input methods. That repository is at: http://www.persoarabic.org/standards

Legitimacy of any of these documents as standards is not our focus or concern. We have included them here because they are relevant and useful.

6.1 ISIRI-6219

Based on Unicode, ISIRI-6219 defines the Farsi Character Set. Its full title is:

فنّاوری اطلاعات ــ تبادل و شیوه‌ی نمایش اطلاعاتِ فارسی بر اساس یونی کُد
استاندارَد ملی ایران ۶۲۱۹ ــ نسخه‌ی نهایی

```
Institute of Standards and Industrial Research of Iran
Information Technology - Persian Information Interchange and Display Mechanism, using Unicode
ISIRI-6219
Final Version
```

فارسی	farsi transliterate banan	Emacs ISIR 9147	Uni-code Hex	Unicode Name	نامِ نویسه
ء	W	M	0621	ARABIC LETTER HAMZA	حرف فارسی همزه
آ	A	H	0622	ARABIC LETTER ALEF WITH MADDA ABOVE	حرف فارسی الف با کلاه
ا	a	h	0627	ARABIC LETTER ALEF	حرف فارسی الف
أ	\a	G	0623	ARABIC LETTER ALEF WITH HAMZA ABOVE	حرف فارسی الف با همزه بالا
ب	b	f	0628	ARABIC LETTER BEH	حرف فارسی ب
پ	p	m	067e	ARABIC LETTER PEH	حرف فارسی پ
ت	t tt	j	062a	ARABIC LETTER TEH	حرف فارسی ت
ث	c cc	e	062b	ARABIC LETTER THEH	حرف فارسی ث
ج	j	[	062c	ARABIC LETTER JEEM	حرف فارسی جیم
چ	ch	]	0686	ARABIC LETTER TCHEH	حرف فارسی چ
ح	H hh	p	062d	ARABIC LETTER HAH	حرف فارسی ح
خ	kh	o	062e	ARABIC LETTER KHAH	حرف فارسی خ
د	d	n	062f	ARABIC LETTER DAL	حرف فارسی دال
ذ	Z	b	0630	ARABIC LETTER THAL	حرف فارسی ذال
ر	r	v	0631	ARABIC LETTER REH	حرف فارسی ر
ز	z zz	c	0632	ARABIC LETTER ZAIN	حرف فارسی ز
ژ	zh	C	0698	ARABIC LETTER JEH	حرف فارسی ژ
س	s ss	s	0633	ARABIC LETTER SEEN	حرف فارسی سین
ش	sh	a	0634	ARABIC LETTER SHEEN	حرف فارسی شین
ص	S	w	0635	ARABIC LETTER SAD	حرف فارسی صاد
ض	x	q	0636	ARABIC LETTER DAD	حرف فارسی ضاد
ط	T TT	x	0637	ARABIC LETTER TAH	حرف فارسی طا
ظ	X	z	0638	ARABIC LETTER ZAH	حرف فارسی ظا
ع	w	u	0639	ARABIC LETTER AIN	حرف فارسی عین
غ	q Gh G GG	y	063a	ARABIC LETTER GHAIN	حرف فارسی غین
ف	f	t	0641	ARABIC LETTER FEH	حرف فارسی ف
ق	gh Q	r	0642	ARABIC LETTER QAF	حرف فارسی قاف
ک	k kk	;	06a9	ARABIC LETTER KEHEH	حرف فارسی کاف
گ	g gg	'	06af	ARABIC LETTER GAF	حرف فارسی گاف
ل	l	g	0644	ARABIC LETTER LAM	حرف فارسی لام
م	m	l	0645	ARABIC LETTER MEEM	حرف فارسی میم
ن	n	k	0646	ARABIC LETTER NOON	حرف فارسی نون
و	u v	,	0648	ARABIC LETTER WAW	حرف فارسی واو
ؤ	V	A	0624	ARABIC LETTER WAW WITH HAMZA ABOVE	حرف فارسی واو با همزه بالا
ه	h Hh	i	0647	ARABIC LETTER HEH	حرف فارسی ه
ی	i y	d	06cc	ARABIC LETTER FARSI YEH	حرف فارسی ی
ئ	I	S	0626	ARABIC LETTER YEH WITH HAMZA ABOVE	حرف فارسی ی با همزه بالا

Table 3: Main Letters: Mapping of Persian Unicode to farsi-transliterate-banan – Matching Table 5 of isiri-6219

فارسی	farsi transliterate banan	Emacs ISIR 9147	Uni-code Hex	Unicode Name	نامِ نویسه
إ	F	F	0625	ARABIC LETTER ALEF WITH HAMZA BE-LOW	حرف فارسی الف با همزه پایین
آ	D	\h	0671	ARABIC LETTER ALEF WASLA	حرفَ الف وصل
ك	K	Z	0643	ARABIC LETTER KAF	حرفَ کافَ عربی
ة	Th	Z	0629	ARABIC LETTER TEH MARBUTA	حرف ت گرد
ي	Y YY	D	064a	ARABIC LETTER YEH	حرف ی عربی نقطه دار
ی	Yh	V	0649	ARABIC LETTER ALEF MAKSURA	حرف ی عربی بی نقطه

Table 4: Arabic Letters: Mapping of Persian Unicode to farsi-transliterate-banan – Matching Table 6 of isiri-6219

فارسی	farsi transliterate banan	Emacs ISIR 9147	Uni-code Hex	Unicode Name	نامِ نویسه
۰	0	0	06f0	EXTENDED ARABIC-INDIC DIGIT ZERO	رقم فارسی صفر
۱	1	1	06f1	EXTENDED ARABIC-INDIC DIGIT ONE	رقم فارسی یک
۲	2	2	06f2	EXTENDED ARABIC-INDIC DIGIT TWO	رقم فارسی دو
۳	3	3	06f3	EXTENDED ARABIC-INDIC DIGIT THREE	رقم فارسی سه
۴	4	4	06f4	EXTENDED ARABIC-INDIC DIGIT FOUR	رقم فارسی چهار
۵	5	5	06f5	EXTENDED ARABIC-INDIC DIGIT FIVE	رقم فارسی پنج
۶	6	6	06f6	EXTENDED ARABIC-INDIC DIGIT SIX	رقم فارسی شش
۷	7	7	06f7	EXTENDED ARABIC-INDIC DIGIT SEVEN	رقم فارسی هفت
۸	8	8	06f8	EXTENDED ARABIC-INDIC DIGIT EIGHT	رقم فارسی هشت
۹	9	9	06f9	EXTENDED ARABIC-INDIC DIGIT NINE	رقم فارسی نه
٫	\/	/	066b	ARABIC DECIMAL SEPARATOR	ممیز فارسی
٬	\,	U	066c	ARABIC THOUSAND SEPARATOR	جدا کننده هزارهای فارسی
٪	%	%	066a	ARABIC PERCENT SIGN	درصد فارسی
+	+	+	002b	PLUS SIGN	علامت به اضافه
−	−	−	2212	MINUS SIGN	علامت منها
×	*	^	066a	MULTIPLICATION SIGN	علامت ضرب
÷	\−	~	00f7	DIVISION SIGN	علامت تقسیم
>	<	>	003c	ARABIC LESS THAN SIGN	علامت کوچکتر
=	=	=	003d	EQUAL SIGN	علامت مساوی
<	>	<	003e	ARABIC GREATER THAN SIGN	علامت بزرگتر

Table 5: Digits and Math Signs: Mapping of Persian Unicode to farsi-transliterate-banan – Matching Table 4 of isiri-6219

فارسی	farsi transliterate banan	Emacs ISIR 9147	Unicode Hex	Unicode Name	نامِ نویسه
			0020	SPACE	فاصله
.	.	.	002e	FULL STOP	نقطه
:	:	:	003a	COLON	دونقطه
!	!	!	0021	EXCLAMATION POINT	علامت تعجب
…	\.	\m	2026	HORIZONTAL ELLIPSIS	سه نقطه فارسی
‒	-	-	2010	HYPHEN	خط تیره
‒	-	-	002d	MINUS OR HYPHEN	تیره منها
						007c	VERTICAL BAR	خط عمودی
/	//	/	002f	SLASH	خط اریب
\	\ \\	\\	005c	BACKSLASH	خط اریب وارو
*	*	*	002a	ASTERISK	ستاره
(	)	(	0028	ARABIC OPENING PARANTHESIS	پرانتز باز
)	(	)	0029	ARABIC CLOSING PARANTHESIS	پرانتز بسته
[	]	O	005b	ARABIC OPENING BRACKET	کروشه باز
]	[	P	005d	ARABIC CLOSING BRACKET	کروشه بسته
{	}	{	007b	ARABIC OPENING BRACE	آکولاد باز
}	{	}	007d	ARABIC CLOSING BRACE	آکولاد بسته
«	\> M	K	00bb	RIGHT-POINTING DOUBLE ANGLE QUOTATION MARK	گیومه باز
»	\< N	L	00ab	LEFT-POINTING DOUBLE ANGLE QUOTATION MARK	گیومه بسته

Table 6: Common Punctuation Marks: Mapping of Persian Unicode to farsi-transliterate-banan – Matching Table 2 of isiri-6219

فارسی	farsi transliterate banan	Emacs ISIR 9147	Unicode Hex	Unicode Name	نامِ نویسه
،	,	T	060c	ARABIC COMMA	ویرگول فارسی
؛	;	Y	061b	ARABIC SEMICOLON	نقطه ویرگول فارسی
؟	?	?	061f	ARABIC QUESTION MARK	علامت سوال فارسی
ـ	_	J	0640	ARABIC TATWEEL	کشیدگی فارسی

Table 7: Persian Punctuation Marks: Mapping of Persian Unicode to farsi-transliterate-banan – Matching Table 3 of isiri-6219

فارسی	farsi transliterate banan	Emacs ISIR 9147	Uni-code Hex	Unicode Name	نامِ نویسه
	J ‍		200d	ZERO WIDTH JOINER	اتصال مجازی
	‎		200e	LEFT-TO-RIGHT MARK	نشانه چپ به راست
	‏		200f	RIGHT-TO-LEFT MARK	نشانه راست به چپ
	&ls ;		2028	LINE SEPARATOR	جدا کننده سطرها
	&ps;		2029	PARAGRAPH SEPARATOR	جدا کننده بندها
	&lre;		202a	LEFT-TO-RIGHT EMBEDDING	زیر متن چپ به راست
	&rle;		202b	RIGHT-TO-LEFT EMBEDDING	زیر متن راست به چپ
	&pdf;		202c	POP DIRECTIONAL FORMATTING	پایان زیر متن
	&lro;		202d	LEFT-TO-RIGHT OVERRIDE	زیر متن اکیداً چپ به راست
	&rlo;		202e	RIGHT-TO-LEFT OVERRIDE	زیر متن اکیداً راست به چپ
	&bom;		feff	BYTE ORDER MARK	نشانه ترتیب بایت‌ها

Table 8: Control Mark Ups: Mapping of Persian Unicode to farsi-transliterate-banan – Matching Table 1 of isiri-6219

فارسی	farsi transliterate banan	Emacs ISIR 9147	Uni-code Hex	Unicode Name	نامِ نویسه
	^	U	064e	ARABIC FATHA	زبر
	e	Y	0650	ARABIC KASRA	زیر
	o	T	064f	ARABIC DAMMA	پیش ـــ ضمه
	#	R	064b	ARABIC FATHATAN	دو زبر
	E	E	064b	ARABIC KASRATAN	دو زیر
	O	W	064c	ARABIC DAMMATAN	دو پیش
	~	I	0651	ARABIC SHADDA	تشدید
	@	Q	0652	ARABIC SUKUN	ساکن
	U	X	0653	ARABIC MADA	مد
	`	N	0654	ARABIC HAMZA ABOVE	همزه فارسی بالا
	C	\n	0655	ARABIC HAMZA BELOW	همزه فارسی پایین
	$	V	0670	ARABIC LETTER SUPERSCRIPT ALEF	الف مقصوره

Table 9: Persian Signs: Mapping of Persian Unicode to farsi-transliterate-banan – Matching Table 7 of isiri-6219

فارسی	farsi transliterate banan	Emacs ISIR 9147	Unicode Hex	Unicode Name	نامِ نویسه
@	\@		0040	COMMERCIAL AT	علامت در
0	\0		0030	DIGIT ZERO	رقم صفر لاتین
1	\1		0031	DIGIT ONE	رقم یک لاتین
2	\2		0032	DIGIT TWO	رقم دو لاتین
3	\3		0033	DIGIT THREE	رقم سه لاتین
4	\4		0034	DIGIT FOUR	رقم چهار لاتین
5	\5		0035	DIGIT FIVE	رقم پنج لاتین
6	\6		0036	DIGIT SIX	رقم شش لاتین
7	\7		0037	DIGIT SEVEN	رقم هفت لاتین
8	\8		0038	DIGIT EIGHT	رقم هشت لاتین
9	\9		0039	DIGIT NINE	رقم نه لاتین

Table 10: Extensions: Mapping of Persian Unicode to farsi-transliterate-banan

فارسی	Banan Reverse Translit	Emacs ISIR 9147	Unicode Hex	Unicode Name	نامِ نویسه عربی
ةٔ			06c0	ARABIC LETTER HEH WITH YEH ABOVE	حرفِ ه اردو با همزهی بالا
٠			0660	ARABIC-INDIC DIGIT ZERO	رقم صَفر عربی
١			0661	ARABIC-INDIC DIGIT ONE	رقم یک عربی
٢			0662	ARABIC-INDIC DIGIT TWO	رقم دو عربی
٣			0663	ARABIC-INDIC DIGIT THREE	رقم سه عربی
٤			0664	ARABIC-INDIC DIGIT FOUR	رقم چهار عربی
٥			0665	ARABIC-INDIC DIGIT FIVE	رقم پنج عربی
٦			0666	ARABIC-INDIC DIGIT SIX	رقم شش عربی
٧			0667	ARABIC-INDIC DIGIT SEVEN	رقم هفت عربی
٨			0668	ARABIC-INDIC DIGIT EIGHT	رقم هشت عربی
٩			0669	ARABIC-INDIC DIGIT NINE	رقم نه عربی

Table 11: Forbidden Characters: Mapping of Persian Unicode to farsi-transliteration-banan − − Matching Table 8 of isiri-6219

Published at:
http://www.isiri.org/portal/files/std/6219.htm
and republished at:
http://www.persoarabic.org/Repub/fpf-isiri-6219

6.2 Suggested Enhancements For ISIRI-6219

During the process of developing farsi-transliterate-banan we studied ISIRI-6219. Here are some of our comments and some suggestions.

6.2.1 Clear labeling of ISIRI-6219 as the definition of Farsi Character Set

ISIRI-6219 does many things. It defines the Farsi Character Set and it also includes translation of various global specifications.

ISIRI-6219 does not clearly say that it primarily defines Iran's Farsi Character Set.

On the title page and early in the specification it should explicitly make it clear that ISIRI-6219 defines the Farsi Character Set for Iran. Something along the lines of:

مجموعه نویسهٔ استاندارد ایران برای تبادل اطلاعات، استاندارد ملی ۶۲۱۹ مؤسسهٔ استاندارد و تحقیقات صنعتی ایران است که مبتنی بر یونی کد است.

Being the definition of Farsi Character Set, it should then require that all Farsi Input Methods make it clear that they provide for full support of the Farsi Character Set. And if an input method provides for anything more than ISIRI-6219, those extensions should be explicitly marked as extensions. This is not happening between ISIRI-9147 and ISIRI-6219 today. Specification of farsi-transliterate-banan input method in this document is based on the ISIRI-6219 Farsi Character Set tables. Conformance of farsi-transliterate-banan is explicitly made clear and extensions are explicit.

6.2.2 Missing At Sign – '@'

ISIRI-6219 does not include '@' as part of the Farsi Character Set.

Moving towards use of Internationalized Domain Name (IDN) and use of – ایران. – requires '@' for email addresses. This alone makes '@' important enough for inclusion in ISIRI-6219.

6.3 ISIRI-9147

ISIRI-9147 defines the layout of Iran's Persian keyboard. Its full title is:

فنّاوریِ اطلاعات ــ چیدمان حروف و علائم فارسی بر صفحه کلید رایانه

استانداردِ ملی ایران ۹۱۴۷ ــ چاپ اول

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Institute of Standards and Industrial Research of Iran
Information Technology - Layout of Persian Letters and Symbols on Computer Keyboards
ISIRI 9147 -- 1st edition
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Published at:
http://www.isiri.org/portal/files/std/9147.pdf
and republished at:
http://www.persoarabic.org/Repub/fpf-isiri-9147

6.4 Suggested Enhancements For ISIRI-9147

Design and specification of ISIRI-9147 is overly tactical. While ISIRI-9147 specifies a keyboard layout, it should strategically leave the door open to more.

Today, a keyboard specification needs to be more than just a layout for a physical keyboard. It is not to be viewed as the sole input method and as such should consider co-habitation topics related to harmony with other input methods.

Difficulties of ISIRI-9147 in fitting well into a multilingual editor such as emacs include:

6.4.1 Entry into Layer 3 with a Layer 1 Key instead of Alt

Specification of ISIRI-9147 provides access to layer 3 through the Alt key.

The Alt key may not be available in some environments – as the Alt key is often an integral part of multilingual editors such as emacs. When the Alt key is not available and when the input model supports 2 letter compositions, entry into layer 3 can be made through a reserved layer 1 key.

So, we suggest reserving the Backslash key to replace the Alt key in such environments. And moving Alt-Backslash to Backslash-r.

6.4.2 Alternates For Shift-Space and Alt-Space

We suggest providing equivalents for Shift-Space and Alt-Space. In our implementation we have placed them at layer 3 as Backslash-y and Backslash-t.

6.4.3 Explicit Identification of Extensions Beyond ISIRI-6219

In its layer 3, ISIRI-9147 goes well beyond ISIRI-6219 without explicitly identifying the extensions. This damages the purpose of ISIRI-6219.

7 The Broader Scope Of farsi-transliterate-banan

Aside from farsi-transliterate-banan, all Persian input methods today are keyboard layout oriented or are single character transliteration mapping input methods. More often now the keyboard layouts conform to ISIRI-9147.

While that convergence point is good and great, we can also be using more powerful input method models.

In this day and age it makes good sense to adopt the more powerful composition input method instead of the simple mapping method. Here we are proposing that farsi-transliterate-banan as defined in Table 3, Table 4, Table 5, Table 6, Table 7, Table 8, Table 9 and Table 10 be considered a convergence point for Persian composition input methods.

For example, in Gnome, where we currently only have file:///usr/share/X11/xkb/symbols/ir, it would be nice to also implement the equivalent of farsi-transliterate-banan.

We would very much like to collaborate towards that goal.

8 History and Previous Work

Use of the Latin character keyboard to input Persian text into machines, and more generally use of the Latin alphabet for writing in Persian, is an old topic with a lot of history.

فارسى	Dehdari	Buckwal	ArabTeX	Uni-Dec	Uni-Hex	UTF-8	Isi3342	CP1256	Uni-Name
ا	A	A	A	1575	0627	d8a7	c1	c7	ARABIC LETTER ALEF
ب	b	b	b	1576	0628	d8a8	c3	c8	ARABIC LETTER BEH
پ	p	P	p	1662	067e	d9be	c4	81	ARABIC LETTER PEH
ت	t	t	t	1578	062a	d8aa	c5	ca	ARABIC LETTER TEH
ث	V	v	_t	1579	062b	d8ab	c6	cb	ARABIC LETTER THEH
ج	j	j	j	1580	062c	d8ac	c7	cc	ARABIC LETTER JEEM
چ	c	J	^c	1670	0686	da86	c8	8d	ARABIC LETTER TCHEH
ح	H	H	.h	1581	062d	d8ad	c9	cd	ARABIC LETTER HAH
خ	x	x	x	1582	062e	d8ae	ca	ce	ARABIC LETTER KHAH
د	d	d	d	1583	062f	d8af	cb	cf	ARABIC LETTER DAL
ذ	L	*	_d	1584	0630	d8b0	cc	d0	ARABIC LETTER THAL
ر	r	r	r	1585	0631	d8b1	cd	d1	ARABIC LETTER REH
ز	z	z	z	1586	0632	d8b2	ce	d2	ARABIC LETTER ZAIN
ژ	J	J	^z	1688	0698	da98	cf	8e	ARABIC LETTER JEH
س	s	s	s	1587	0633	d8b3	d0	d3	ARABIC LETTER SEEN
ش	C	$	^s	1588	0634	d8b4	d1	d4	ARABIC LETTER SHEEN
ص	S	S	.s	1589	0635	d8b5	d2	d6	ARABIC LETTER SAD
ض	D	D	.d	1590	0636	d8b6	d3	d6	ARABIC LETTER DAD
ط	T	T	.t	1591	0637	d8b7	d4	d8	ARABIC LETTER TAH
ظ	Z	Z	.z	1592	0638	d8b8	d5	d9	ARABIC LETTER ZAH
ع	E	E	`	1593	0639	d8b9	d6	da	ARABIC LETTER AIN
غ	G	g	.g	1594	063a	d8ba	d7	db	ARABIC LETTER GHAIN
ف	f	f	f	1601	0641	d981	d8	dd	ARABIC LETTER FEH
ق	q	q	q	1602	0642	d982	d9	de	ARABIC LETTER QAF
ك	K	k	k	1603	0643	d983	fd	df	ARABIC LETTER KAF
گ	g	G	g	1711	06af	daaf	db	90	ARABIC LETTER GAF
ل	l	l	l	1604	0644	d984	dc	e1	ARABIC LETTER LAM
م	m	m	m	1605	0645	d985	dd	e3	ARABIC LETTER MEEM
ن	n	n	n	1606	0646	d986	de	e4	ARABIC LETTER NOON
و	u	w	U	1608	0648	d988	df	e6	ARABIC LETTER WAW
ه	h	h	h	1607	0647	d987	e0	e5	ARABIC LETTER HEH
ي	y	y	I	1610	064a	d98a	fe	ed	ARABIC LETTER YEH
	a	a	a	1614	064e	d98e	f0	f3	ARABIC FATHA
ُ	o	u	o	1615	064f	d98f	f2	f5	ARABIC DAMMA
	e	i	e	1616	0650	d990	f1	f6	ARABIC KASRA
آ	]			'A	1570	0622	d8a2	c0	c2	ARABIC LETTER ALEF WITH MADDA ABOVE
ا			A	a	1575	0627	d8a7	c1	c7	ARABIC LETTER ALEF # Initial
ة	P	p	T	1577	0629	d8a9	fc	c9	ARABIC LETTER TEH MARBUTA
ک	k	k	k	1705	06a9	daa9	da	98	ARABIC LETTER KEHEH
ی	i	i	I	1740	06cc	db8c	e1		ARABIC LETTER FARSI YEH
٫	M	'	'|	1569	0621	d8a1	c2	c1	ARABIC LETTER HAMZA
	X		H-i	1728	06c0	db80		c0	ARABIC LETTER HEH WITH YEH ABOVE
ئ	I	}	'y	1574	0626	d8a6	fb	c6	ARABIC LETTER YEH WITH HAMZA ABOVE
ؤ	U	&	U'	1572	0624	d8a4	fa	c4	ARABIC LETTER WAW WITH HAMZA ABOVE
	N	F	aN	1611	064b	d98b	f3	f0	ARABIC FATHATAN
٫	~	~	xx	1617	0651	d991	f6	f8	ARABIC SHADDA
،	,	,	,	1548	060c	d88c	ac	a1	ARABIC COMMA
؛	;	;	;	1563	061b	d89b	bb	ba	ARABIC SEMICOLON
؟	?	?	?	1567	061f	d89f	bf	bf	ARABIC QUESTION MARK
٪	%	%	%	1642	066a	d9aa	a5		ARABIC PERCENT SIGN
				0032	0020	20	a0	20	SPACE
.	.	.	.	0046	002e	2e	a6	2e	FULL STOP
			\\	0010	000a	0a	0a	0a	LINEFEED
»	{		\lq	0171	00ab	ab	e7	ab	LEFT-POINTING DOUBLE ANGLE ...
»	}		\rq	0187	00bb	bb	e6	bb	RIGHT-POINTING DOUBLE ANGLE ...
-			\hspace{0ex}	8204	200c	e2808c	a1	9d	ZERO WIDTH NON-JOINER

Table 12: Jon Dehdari's Pre-Unicode Character Set Mappings

Jon Dehdari has assembled a table that summarizes previous work in this area. We have reproduced it here as Table 12.

Because of the widespread adoption of Unicode, this previous work is now largely obsolete.

Most transliteration previous work (Legally's ArabTeX, Buckwal, Dehdari, …) consists mostly of single character mappings.

The farsi-transliterate-banan input method documented here is distinctly different from these past transliteration methods with respect to wide use of compositions in general and with regard to the "h" postfix composition in particular.

9   Colophon

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- Emacs is our editor-based user environement

- TeX, LaTeX, XeTeX, XeLaTeX is our document processor

- The Emacs bidi (bidirectional) capability is used to write in mixed Persian and Globish

- The xepersian LaTeX package is used to process Persian documents

- The LaTeX beamer package is used to prepare presentation slides

- The Emacs auctex mode is used to create documents in LaTeX

- Aspell via Emacs is used for spell checking in Persian/Farsi and Globish/English

- Dict via Emacs is used for dictionary and thesarus lookup in multiple languages

- Conversion from LaTeX to html is accomplished through HeVea and tex4ht

- Libre Office is used for creating figures and illustrations

- CVS via Emacs is used for version control

- The Emacs Gnus and qmail facilities are used for emailing out drafts and receiving feedback

- Integration with ByStar Services is through BLEE (the ByStar Libre Emacs Environment)

These Libre-Halaal software tools collectively represent a deeply integrated environment that is far superior in capability to any Haraam software. We question why so many people continue to use the clumsy and ineffective Microsoft Proprietary-Haraam software when such a vastly superior alternative is available.

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