

Aim

To generalize or to translate text in some way, such that, when a user selects a particular locale, the application switches its strings/output to the language described by that locale. For example if I select a locale hi_IN (hi->Hindi; IN->India), the output/strings of this application should be displayed in Hindi.

This is done using the concept of a Message Catalog, which is a database of strings in some file. Gettext supports Message Catalogs in the form of MO files (.mo). These MO files are binary files which store strings for different applications for different locales. When an application runs, all the strings are extracted from application's MO file(s) based on a certain locale. This extraction at run-time is done using gettext functions described in gettext framework.

STEP-1

Write the program below, in which gettext("c format string") function has the responsibility of extracting (for "How are you?\n" in English) an equivalent translated string("आप कैसे हैं?\n" in Hindi), at runtime, in local script of the language describe by a locale (e.g. hi_IN for Hindi belonging to country India). The general practice is to use macros like _("String") instead of gettext("String") in order to save number of letters we type in.



```
File Edit View Search Terminal Help
[03/27/2021 07:09] seed@ubuntu:~/ucs638/enviromentvars/langfun$ ls
test.c
[03/27/2021 07:09] seed@ubuntu:~/ucs638/enviromentvars/langfun$ cat test.c
#include<libintl.h>
#include<locale.h>
#include<stdio.h>


#define _(String) gettext (String)

int main()
{
    setlocale(LC_ALL, "");
    bindtextdomain("test", "/usr/share/locale");
    textdomain("test");
    printf(_("How are you?\n"));
    return 0;
}
[03/27/2021 07:09] seed@ubuntu:~/ucs638/enviromentvars/langfun$
```

STEP-2

Create a new directory named po/

Extract the strings in a POT (test.pot) file.

A terminal window with a Ubuntu background. The terminal shows a series of commands and their outputs. The user is in the directory ~/ucs638/enviromentvars/langfun. They list files, create a directory 'po', change to it, and then use 'xgettext' to create a POT file from 'test.c'.

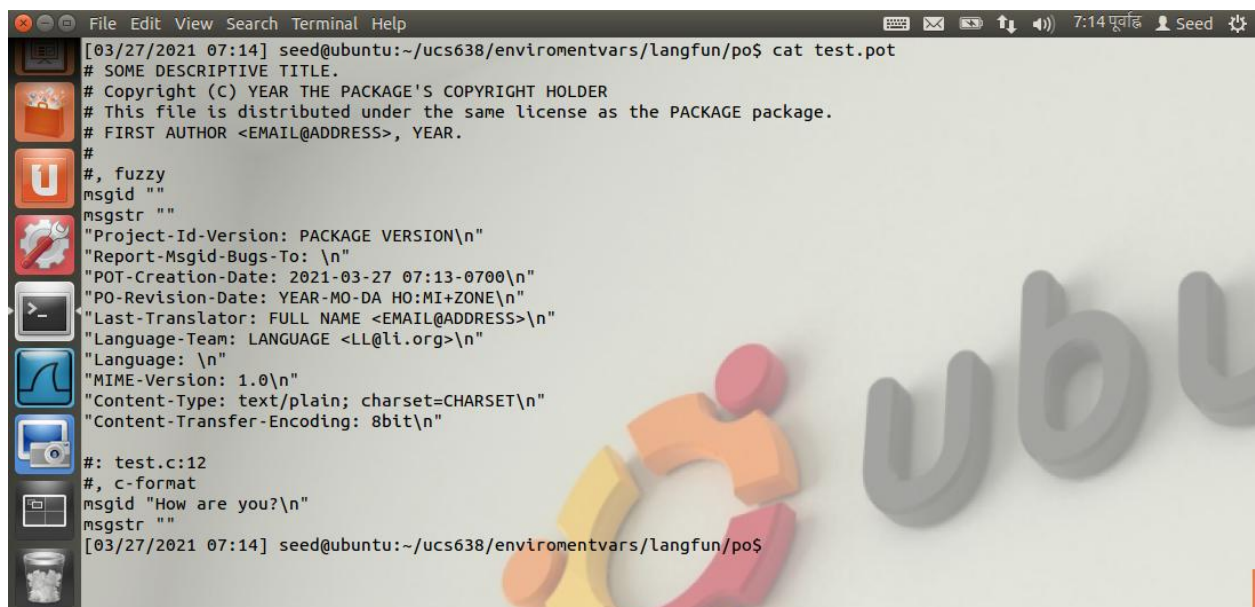
```
[03/27/2021 07:12] seed@ubuntu:~/ucs638/enviromentvars/langfun$ ls
test.c
[03/27/2021 07:12] seed@ubuntu:~/ucs638/enviromentvars/langfun$ mkdir po
[03/27/2021 07:12] seed@ubuntu:~/ucs638/enviromentvars/langfun$ ls
po  test.c
[03/27/2021 07:12] seed@ubuntu:~/ucs638/enviromentvars/langfun$ xgettext -d test -o po/test.pot -k_ -s test.c
[03/27/2021 07:13] seed@ubuntu:~/ucs638/enviromentvars/langfun$ cd po
[03/27/2021 07:13] seed@ubuntu:~/ucs638/enviromentvars/langfun/po$ ls
test.pot
[03/27/2021 07:13] seed@ubuntu:~/ucs638/enviromentvars/langfun/po$
```

STEP-3

Change directory to po/

A new file 'test.pot' will be created in it.

pot (portable object template) extensions for user interface text translation files. These use the GNU Gettext format. . pot files are templates that contain source text.

A terminal window showing the contents of the 'test.pot' file using the 'cat' command. The output shows a standard GNU Gettext POT file header with metadata and the first translation entry for 'How are you?'.

```
[03/27/2021 07:14] seed@ubuntu:~/ucs638/enviromentvars/langfun/po$ cat test.pot
# SOME DESCRIPTIVE TITLE.
# Copyright (C) YEAR THE PACKAGE'S COPYRIGHT HOLDER
# This file is distributed under the same license as the PACKAGE package.
# FIRST AUTHOR <EMAIL@ADDRESS>, YEAR.
#
#, fuzzy
msgid ""
msgstr ""
"Project-Id-Version: PACKAGE VERSION\n"
"Report-Msgid-Bugs-To: \n"
"POT-Creation-Date: 2021-03-27 07:13-0700\n"
"PO-Revision-Date: YEAR-MO-DA HO:MI+ZONE\n"
"Last-Translator: FULL NAME <EMAIL@ADDRESS>\n"
"Language-Team: LANGUAGE <LL@li.org>\n"
"Language: \n"
"MIME-Version: 1.0\n"
"Content-Type: text/plain; charset=CHARSET\n"
"Content-Transfer-Encoding: 8bit\n"
#: test.c:12
#, c-format
msgid "How are you?\n"
msgstr ""
[03/27/2021 07:14] seed@ubuntu:~/ucs638/enviromentvars/langfun/po$
```

STEP-4

This POT file is copied as PO (.po) file in respective language folder (hi/) and then translated. Corresponding to every string adjacent to 'msgid' there is a translated string (in local script), adjacent to 'msgstr'.

The core of each PO file is made of pairs of the source text (that which is found in the code) and target text (the translated text).

Msgid "How are you?"
msgstr "आप कैसे हैं?"

A directory with the name of your language is created (in this case hindi).

This language name should be probably a 2-digit/3-digit code listed for your language in ISO 639-1.

1. http://www.loc.gov/standards/iso639-2/php/code_list.php for reference.

ISO 639-2 Code	ISO 639-1 Code	English name of Language	French name of Language	German name of Language
aar	aa	Afar	afar	Danakil-Sprache
abk	ab	Abkhazian	abkhaze	Abchasisch

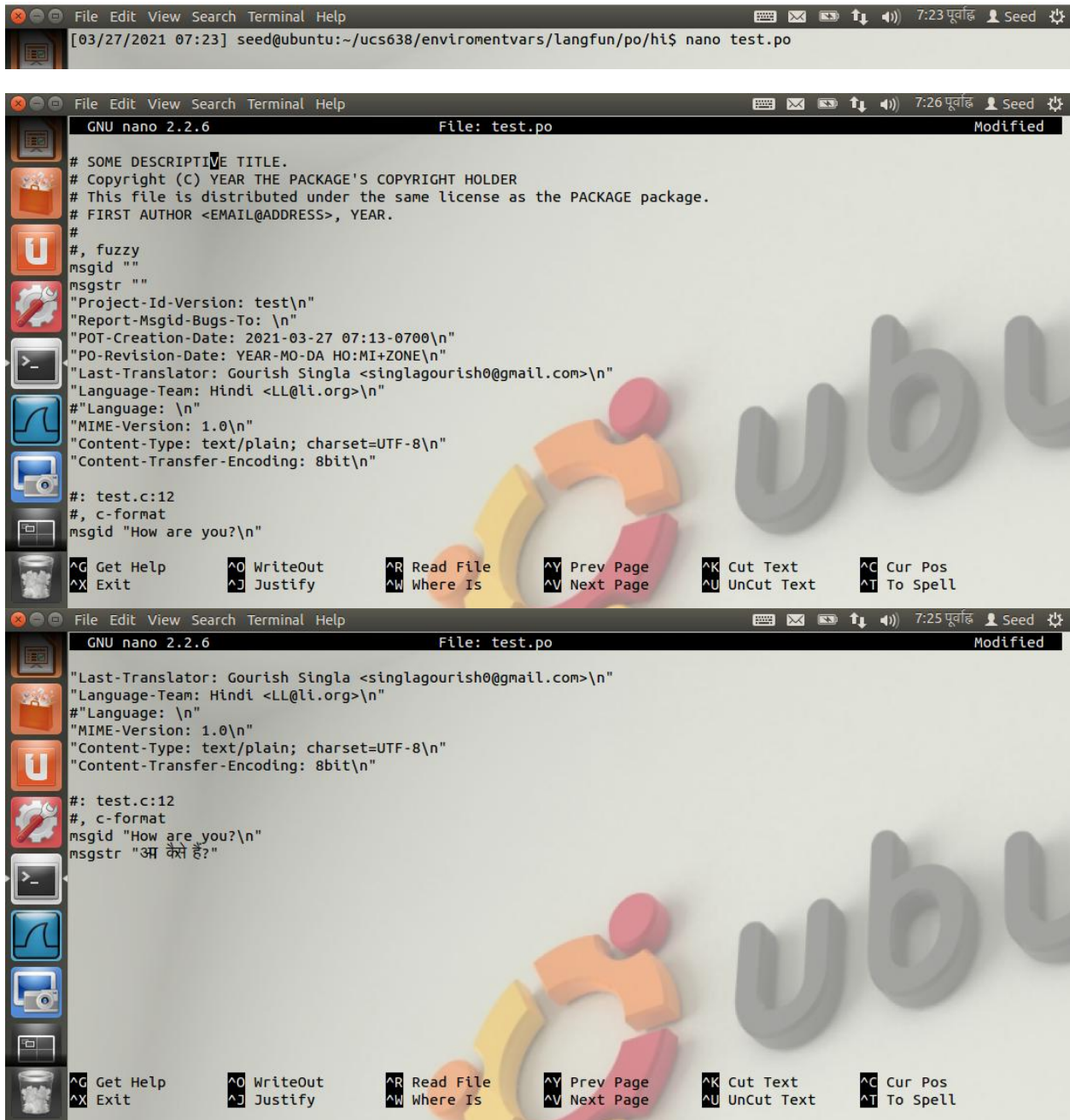
hin	hi	Hindi	hindi	Hindi
hit		Hittite	hittite	Hethitisch



```
[03/27/2021 07:14] seed@ubuntu:~/ucs638/enviromentvars/langfun/po$ ls
test.pot
[03/27/2021 07:14] seed@ubuntu:~/ucs638/enviromentvars/langfun/po$ mkdir hi
[03/27/2021 07:14] seed@ubuntu:~/ucs638/enviromentvars/langfun/po$ ls
hi test.pot
[03/27/2021 07:14] seed@ubuntu:~/ucs638/enviromentvars/langfun/po$ cp test.pot hi/test.po
[03/27/2021 07:15] seed@ubuntu:~/ucs638/enviromentvars/langfun/po$ cd hi
[03/27/2021 07:15] seed@ubuntu:~/ucs638/enviromentvars/langfun/po/hi$ ls
test.po
[03/27/2021 07:15] seed@ubuntu:~/ucs638/enviromentvars/langfun/po/hi$
```

STEP-5

Make the necessary changes to the test.po file.



```
File Edit View Search Terminal Help
[03/27/2021 07:23] seed@ubuntu:~/ucs638/enviromentvars/langfun/po/hi$ nano test.po

GNU nano 2.2.6 File: test.po Modified
# SOME DESCRIPTIVE TITLE.
# Copyright (C) YEAR THE PACKAGE'S COPYRIGHT HOLDER
# This file is distributed under the same license as the PACKAGE package.
# FIRST AUTHOR <EMAIL@ADDRESS>, YEAR.
#
#, fuzzy
msgid ""
msgstr ""
"Project-Id-Version: test\n"
"Report-Msgid-Bugs-To: \n"
"POT-Creation-Date: 2021-03-27 07:13-0700\n"
"PO-Revision-Date: YEAR-MO-DA HO:MI+ZONE\n"
"Last-Translator: Gourish Singla <singlagourish@gmail.com>\n"
"Language-Team: Hindi <LL@li.org>\n"
#"Language: \n"
"MIME-Version: 1.0\n"
"Content-Type: text/plain; charset=UTF-8\n"
"Content-Transfer-Encoding: 8bit\n"
#: test.c:12
#, c-format
msgid "How are you?\n"

^G Get Help      ^O WriteOut      ^R Read File     ^Y Prev Page     ^K Cut Text      ^C Cur Pos
^X Exit          ^J Justify       ^W Where Is     ^V Next Page     ^U UnCut Text   ^T To Spell

File Edit View Search Terminal Help
GNU nano 2.2.6 File: test.po Modified
"Last-Translator: Gourish Singla <singlagourish@gmail.com>\n"
"Language-Team: Hindi <LL@li.org>\n"
#"Language: \n"
"MIME-Version: 1.0\n"
"Content-Type: text/plain; charset=UTF-8\n"
"Content-Transfer-Encoding: 8bit\n"
#: test.c:12
#, c-format
msgid "How are you?\n"
msgstr "अम कैसे है?"

^G Get Help      ^O WriteOut      ^R Read File     ^Y Prev Page     ^K Cut Text      ^C Cur Pos
^X Exit          ^J Justify       ^W Where Is     ^V Next Page     ^U UnCut Text   ^T To Spell
```


STEP-6

Create an MO (.mo) file. → `msgfmt test.po -o test.mo`

In root mode copy the MO file to `/usr/share/locale/hi/LC_MESSAGES/`.

A terminal window showing the execution of commands to create and copy a message catalog. The background features a faint Ubuntu logo.

```
[03/27/2021 07:29] seed@ubuntu:~/ucs638/enviromentvars/langfun/po/hi$ msgfmt test.po -o test.mo
[03/27/2021 07:29] seed@ubuntu:~/ucs638/enviromentvars/langfun/po/hi$ ls
test.mo  test.po
[03/27/2021 07:29] seed@ubuntu:~/ucs638/enviromentvars/langfun/po/hi$ sudo cp test.mo /usr/share/locale/hi/LC_MESSAGES/
[sudo] password for seed:
[03/27/2021 07:30] seed@ubuntu:~/ucs638/enviromentvars/langfun/po/hi$ cd ../../
[03/27/2021 07:31] seed@ubuntu:~/ucs638/enviromentvars/langfun$ ls
po  test.c
[03/27/2021 07:31] seed@ubuntu:~/ucs638/enviromentvars/langfun$
```

STEP-7

Compile the test.c file.

Now if the object file test is run, it displays the simple English

A terminal window showing the compilation and execution of a C program. The background features a faint Ubuntu logo.

```
[03/27/2021 07:31] seed@ubuntu:~/ucs638/enviromentvars/langfun$ ls
po  test.c
[03/27/2021 07:31] seed@ubuntu:~/ucs638/enviromentvars/langfun$ gcc -o test test.c
[03/27/2021 07:31] seed@ubuntu:~/ucs638/enviromentvars/langfun$ ./test
How are you?
[03/27/2021 07:31] seed@ubuntu:~/ucs638/enviromentvars/langfun$
```

STEP-8

The respective environment variables (LANG,LC_ALL) are required to be set to the locale for hindi language.

A screenshot of a terminal window on an Ubuntu system. The window title is "File Edit View Search Terminal Help". The terminal shows the following commands and output:

```
[03/27/2021 08:21] seed@ubuntu:~/ucs638/enviromentvars/langfun$ export LANG=hi_IN  
[03/27/2021 08:21] seed@ubuntu:~/ucs638/enviromentvars/langfun$ export LC_ALL=hi_IN  
[शनिवार 27 मर्च 2021 08:21] seed@ubuntu:~/ucs638/enviromentvars/langfun$ ./test  
आ कैसे हैं?  
[शनिवार 27 मर्च 2021 08:21] seed@ubuntu:~/ucs638/enviromentvars/langfun$
```

The background of the terminal window shows the Ubuntu logo and the word "ubuntu" in large, 3D letters. The system clock in the top right corner shows 8:21 AM on 03/27/2021.
