

pagr
Deal with multiple git repositories

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1 Concept

This is a literate programming file made to support the pagr project.

This section is reserved for a high-level abstract description of what the pagr is. In particular, the overview should walk through the program flow as much as possible, to ensure clarity of thought before coding begins.

1.1 Overview

This space intentionally left blank. Please fill it in with more details before You actually start coding.

2 Generic Project Files

These files exist in every repository, or should, anyway. As this is a literate programming file, however, they are also included here. While they can mostly stand for themselves, I will add a sentence or two about each, as well as any deviations from the norm for this specific repo.

2.1 README

This is the all-important gateway into the repository. I follow Make a README's specification in all of my projects, as I think it is important to standardize such an outward-facing part of the documentation.

```
# pagr
```

```
One Line Description.
```

```
## Installation
```

```
There are a couple ways to install this package.
```

```
### GNU Guix
```

```
If You use [GNU Guix][a], this package is on [my channel][b]. Once You have it  
set up, You can just run:
```

```
'''  
guix pull  
guix install pagr  
'''
```

```
### Source
```

```
If You don't want to use [GNU Guix][a], You can clone this repo and install it  
Yourself.
```

```
## Usage
```

```
'''bash  
pagr
```

‘‘‘

Contributing

Pull Requests are welcome, as are bugfixes and extensions. Please open issues as needed. If You contribute a feature, needs to be tests and documentation.

License

[AGPL-3.0][c]

[a]: <https://guix.gnu.org/>

[b]: <https://sr.ht/~yewscion/yewscion-guix-channel/>

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If your software can interact with users remotely through a computer network, you should also make sure that it provides a way for users to get its source. For example, if your program is a web application, its interface could display a "Source" link that leads users to an archive of the code. There are many ways you could offer source, and different

solutions will be better for different programs; see section 13 for the specific requirements.

You should also get your employer (if you work as a programmer) or school, if any, to sign a "copyright disclaimer" for the program, if necessary. For more information on this, and how to apply and follow the GNU AGPL, see [<https://www.gnu.org/licenses/>](https://www.gnu.org/licenses/).

2.3 Changelog

All updates to this repository should be logged here. I follow Keep a Changelog's recommendations here, because again, standardization is important for outward-facing documentation.

It's worth noting here that I will keep the links updated to the Sourcehut repository commits, as that is the main place I will be uploading the source to share.

Changelog

All notable changes to this project will be documented in this file.

The format is based on [Keep a Changelog](<https://keepachangelog.com/en/1.0.0/>), and this project adheres to [Semantic Versioning](<https://semver.org/spec/v2.0.0.html>).

[Unreleased]

Added

-

Changed

-

Removed

-

[Unreleased]: <https://git.sr.ht/~yewscion/pagr/log>

2.4 AUTHORS

If You contribute to this repo, Your information belongs in this file. I will attempt to ensure this, but if You'd like to simply include Your information here in any pull requests, I am more than happy to accept that.

This is the list of the pagr project's significant contributors.

```
#
# This does not necessarily list everyone who has contributed code. To see the
# full list of contributors, see the revision history in source control.
Christopher Rodriguez <yewscion@gmail.com>
```

2.5 .gitignore

This is an important file for any git repository. I generate mine using gitignore.io right now, and add to it as needed during work on the project.

The default I normally use include emacs, linux, common lisp, scheme, latex, and autotools. Any other software used should have things added to this file, or in place of this file.

```
# Created by https://www.toptal.com/developers/gitignore/api/emacs,linux,commonlisp,scl
# Edit at https://www.toptal.com/developers/gitignore?templates=emacs,linux,commonlisp
```

```
### Autotools ###
# http://www.gnu.org/software/automake
```

```
Makefile.in
/ar-lib
/mdate-sh
/py-compile
/test-driver
/ylwrap
.deps/
.dirstamp
```

```
# http://www.gnu.org/software/autoconf
```

```
autom4te.cache
/autoscan.log
/autoscan-*.log
/aclocal.m4
/compile
/config.cache
/config.guess
/config.h.in
/config.log
```

```

/config.status
/config.sub
/configure
/configure.scan
/depcomp
/install-sh
/missing
/stamp-h1

# https://www.gnu.org/software/libtool/

/ltmain.sh

# http://www.gnu.org/software/texinfo

/texinfo.tex

# http://www.gnu.org/software/m4/

m4/libtool.m4
m4/ltoptions.m4
m4/ltsugar.m4
m4/ltversion.m4
m4/lt~obsolete.m4

# Generated Makefile
# (meta build system like autotools,
# can automatically generate from config.status script
# (which is called by configure script))
Makefile

### Autotools Patch ###

### CommonLisp ###
*.FASL
*.fasl
*.lisp-temp
*.dfsl
*.pfsl
*.d64fsl

```

```

*.p64fsl
*.lx64fsl
*.lx32fsl
*.dx64fsl
*.dx32fsl
*.fx64fsl
*.fx32fsl
*.sx64fsl
*.sx32fsl
*.wx64fsl
*.wx32fsl

### Emacs ###
# -*- mode: gitignore; -*-
*~
\#*\#
/.emacs.desktop
/.emacs.desktop.lock
*.elc
auto-save-list
tramp
.\#*

# Org-mode
.org-id-locations
*_archive

# flymake-mode
*_flymake.*

# eshell files
/eshell/history
/eshell/lastdir

# elpa packages
/elpa/

# reftex files
*.rel

```



```
# AUCTeX auto folder
/auto/

# cask packages
.cask/
dist/

# Flycheck
flycheck_*.el

# server auth directory
/server/

# projectiles files
.projectile

# directory configuration
.dir-locals.el

# network security
/network-security.data

### LaTeX ###
## Core latex/pdflatex auxiliary files:
*.aux
*.lof
*.log
*.lot
*.fls
*.out
*.toc
*.fmt
*.fot
*.cb
*.cb2
*.lb

## Intermediate documents:
*.dvi
```

```

*.xdv
*-converted-to.*
# these rules might exclude image files for figures etc.
# *.ps
# *.eps
# *.pdf

## Generated if empty string is given at "Please type another file name for output:"
.pdf

## Bibliography auxiliary files (bibtex/biblatex/biber):
*.bbl
*.bcf
*.blg
*-blx.aux
*-blx.bib
*.run.xml

## Build tool auxiliary files:
*.fdb_latexmk
*.synctex
*.synctex(busy)
*.synctex.gz
*.synctex.gz(busy)
*.pdfsync

## Build tool directories for auxiliary files
# latexrun
latex.out/

## Auxiliary and intermediate files from other packages:
# algorithms
*.alg
*.loa

# achemso
acs-*.bib

# amsthm
*.thm

```

```

# beamer
*.nav
*.pre
*.snm
*.vrb

# changes
*.soc

# comment
*.cut

# cprotect
*.cpt

# elsarticle (documentclass of Elsevier journals)
*.spl

# endnotes
*.ent

# fixme
*.lox

# feynmf/feynmp
*.mf
*.mp
*.t[1-9]
*.t[1-9][0-9]
*.tfm

#(r)(e)ledmac/(r)(e)ledpar
*.end
*.?end
*.[1-9]
*.[1-9][0-9]
*.[1-9][0-9][0-9]
*.[1-9]R
*.[1-9][0-9]R

```

```

*. [1-9] [0-9] [0-9]R
*.eledsec[1-9]
*.eledsec[1-9]R
*.eledsec[1-9] [0-9]
*.eledsec[1-9] [0-9]R
*.eledsec[1-9] [0-9] [0-9]
*.eledsec[1-9] [0-9] [0-9]R

# glossaries
*.acn
*.acr
*.glg
*.glo
*.gls
*.glsdefs
*.lzo
*.lzs
*.slg
*.slo
*.sls

# uncomment this for glossaries-extra (will ignore makeindex's style files!)
# *.ist

# gnuplot
*.gnuplot
*.table

# gnuplottex
*~gnuplottex~

# gregoriotex
*.gaux
*.glog
*.gtex

# htlatex
*.4ct
*.4tc
*.idv

```

```

*.lg
*.trc
*.xref

# hyperref
*.brf

# knitr
*-concordance.tex
# TODO Uncomment the next line if you use knitr and want to ignore its generated tikz
# *.tikz
*-tikzDictionary

# listings
*.lol

# luatexja-ruby
*.ltjruby

# makeidx
*.idx
*.ilg
*.ind

# minitoc
*.maf
*.mlf
*.mlt
*.mtc[0-9]*
*.slf[0-9]*
*.slt[0-9]*
*.stc[0-9]*

# minted
_minted*
*.pyg

# morewrites
*.mw

```

```
# newpax
*.newpax

# nomencl
*.nlg
*.nlo
*.nls

# pax
*.pax

# pdfpcnotes
*.pdfpc

# sagetex
*.sagetex.sage
*.sagetex.py
*.sagetex.scmd

# scrwfile
*.wrt

# svg
svg-inkscape/

# sympy
*.sout
*.sympy
sympy-plots-for-*.tex/

# pdfcomment
*.upa
*.upb

# pythontex
*.pytxcode
pythontex-files-*/

# tcolorbox
*.listing
```

```
# thmtools
*.loe

# TikZ & PGF
*.dpth
*.md5
*.auxlock

# titletoc
*.ptc

# todonotes
*.tdo

# vhistory
*.hst
*.ver

# easy-todo
*.lod

# xcolor
*.xcp

# xmpincl
*.xmpi

# xindy
*.xdy

# xypic precompiled matrices and outlines
*.xyc
*.xyd

# endfloat
*.ttt
*.fff

# Latexian
```

```

TSWLatexianTemp*

## Editors:
# WinEdt
*.bak
*.sav

# Texpad
.texpadtmp

# LyX
*.lyx~

# Kile
*.backup

# gummi
*.swp

# KBibTeX
*~[0-9]*

# TeXnicCenter
*.tps

# auto folder when using emacs and auctex
./auto/*
*.el

# expex forward references with \gathertags
*-tags.tex

# standalone packages
*.sta

# Makeindex log files
*.lpz

# xwatermark package
*.xwm

```



```

# REVTeX puts footnotes in the bibliography by default, unless the nofootinbib
# option is specified. Footnotes are the stored in a file with suffix Notes.bib.
# Uncomment the next line to have this generated file ignored.
#*Notes.bib

### LaTeX Patch ###
# LIPIcs / OASIcs
*.vtc

# glossaries
*.glstex

### Linux ###

# temporary files which can be created if a process still has a handle open of a deleted
.fuse_hidden*

# KDE directory preferences
.directory

# Linux trash folder which might appear on any partition or disk
.Trash-*

# .nfs files are created when an open file is removed but is still being accessed
.nfs*

### Scheme ###
*.ss~
*.ss#*
.*.ss

*.scm~
*.scm#*
.*.scm

# End of https://www.toptal.com/developers/gitignore/api/emacs,linux,commonlisp,scheme

# Custom Add-ons

```

```
*~
```

```
# Add any binaries/preinstall files here.
```

3 Language Project Files

These files vary based on the programming languages used in a project. Otherwise, basically the same as above: Files that need to exist for the project, but don't include code outside of defining the project in some abstract way.

That said, Guile Scheme doesn't use a project file of any kind (outside of things like guile-hall).

Instead, I've opted to use GNU Autotools, as I already was familiar with this setup.

3.1 Bootstrap

First, we need to bootstrap our setup using `autoreconf`. I use a script to automate this process, but it is really just a single command that needs to be run.

```
echo "Bootstrapping Autotools...";  
autoreconf --verbose --install --force;
```

3.2 Configure

That said, it's not much good if there is no `configure.ac` file for it to use as a guide.

3.2.1 Initialize

We'll initialize autotools with the following: the name of our project, the current version, a contact email for bug reports, an expected tarball name, and the homepage (which will be the sourcehut mirror of our repo).

```
dnl Process this file with autoconf  
AC_INIT([pagr],  
        [0.0.1],  
        [yewscion@gmail.com],  
        [pagr-0.0.1.tar.gz],  
        [https://sr.ht/~yewscion/pagr])
```

3.2.2 Configure Options

Next, we need to set some `./configure` specific variables.

`AC_CONFIG_SRCDIR`: This is a file we expect to be in the directory that `configure` is being called in, used as a safety check.

`AC_CONFIG_AUX_DIR`: Commonly specified directory for auxillary scripts, in case it is needed.

`AM_INIT_AUTOMAKE`: Set Up Automake, with sane defaults for C.

```
AC_CONFIG_SRCDIR([pagr.org])
AC_CONFIG_AUX_DIR([build-aux])
AM_INIT_AUTOMAKE([-Wall -Werror foreign])
```

3.2.3 Guile Options

Now we'll set up Guile, in the same way as above.

`GUILE_PKG`: This specifies the version of Guile we are looking for with `pkg-config`.

`GUILE_PROGS`: This macro looks for programs `guile` and `guild`, setting variables `GUILE` and `GUILD` to their paths, respectively.

`GUILE_SITE_DIR`: This looks for Guile's "site" directories. The variable `GUILE_SITE` will be set to Guile's "site" directory for Scheme source files (usually something like `PREFIX/share/guile/site`).

```
GUILE_PKG([3.0])
GUILE_PROGS
if test "x$GUILD" = "x"; then
    AC_MSG_ERROR(['guild' binary not found;
    please check Your guile installation.])
fi
GUILE_SITE_DIR
```

3.2.4 Wrap Up

Specify the files that need to be processed, and process them. Commit with `AC_OUTPUT`.

```
AC_CONFIG_FILES([Makefile])
AC_CONFIG_FILES([pre-inst-env], [chmod +x pre-inst-env])
AC_OUTPUT
```

3.3 Make

Now we can move on to configuring how the project is made.

3.3.1 Guile

There are some Guile-specific things that made sense to keep in their own file, and so we'll just include that file here.

```
include guile.am
```

3.3.2 Sources

These are the source files that will be installed as libraries.

```
SOURCES = \  
cdr255/pagr.scm
```

3.3.3 Additional Dist Files

These files are the files that should be installed alongside the rest of the program, for documentation purposes. This includes the unaltered binary scripts, the `bootstrap` file and `pre-inst-env.in` files, and the `README.md` should be included here.

```
EXTRA_DIST = \  
README.md \  
bootstrap \  
pre-inst-env.in \  
bin/pagr.scm
```

3.3.4 Binaries

There aren't really guile binaries, but there are scripts I use as though they were binaries, the ones that actually use the functions I write that are installed as libraries.

```
bin_SCRIPTS = \  
pagr
```

3.3.5 Tests

We can specify the tests we want run with `make test`.

```
TESTS=run-tests
```

3.3.6 Cleaning Targets

We also have to specify how make should clean up. Here is the set of heuristics that is often quoted for what should be removed where:

- If make built it, and it is commonly something that one would want to rebuild (for instance, a .o file), then **mostlyclean** should delete it.
- Otherwise, if make built it, then **clean** should delete it.
- If configure built it, then **distclean** should delete it.
- If the maintainer built it (for instance, a .info file), then **maintainer-clean** should delete it. However maintainer-clean should not delete anything that needs to exist in order to run ‘./configure && make’.

The associated variables are `MOSTLYCLEANFILES`, `CLEANFILES`, `DISTCLEANFILES`, and `MAINTAINERCLEANFILES`.

```
#MOSTLYCLEANFILES +=
```

```
CLEANFILES += \
  pagr \
  cdr255/pagr.scm \
  pagr
```

```
DISTCLEANFILES = \
  config.status \
  config.log \
  Makefile \
  run-tests \
  basic-tests.log
```

```
#MAINTAINERCLEANFILES +=
```

3.3.7 Actual Work

1. Binaries We should replace the shebang that calls `/usr/bin/env` with the actual guile path on the target machine. That's the main process here, which is mostly accomplished with the following call to `sed`:

```
sed -e 's,#!\usr\bin\env -S guile -e main -s,#!$(GUILE) \\\,g'
```

The main executable is included here to speed up single-program development, but the basic pattern is the same no matter how many executable scripts are in the repository.

```
pagr: src/exe.scm
sed -e 's,#!\usr\bin\env -S guile -e main -s,#!$(GUILE) \\\,g' \
< $(srcdir)/src/exe.scm > ./pagr
chmod +x pagr
```

2. Libraries The libraries contain the bulk of the code that is part of this project. We'll do the same as above, include the main library as an example of the form.

```
cdr255/pagr.scm:
mkdir -pv cdr255/
cat < $(srcdir)/src/main.scm \
> cdr255/pagr.scm
```

3. Tests

```
run-tests:
sed -e 's,#!\usr\bin\env -S guile -e main -s,#!$(GUILE) \\\,g' \
< $(srcdir)/test/maintests.scm \
> run-tests
chmod +x run-tests
guile -C ./ ./run-tests
```

3.3.8 Cleanup

3.4 guile.am

```
moddir = $(datadir)/guile/site/$(GUILE_EFFECTIVE_VERSION)
```

```

godir = $(libdir)/guile/$(GUILE_EFFECTIVE_VERSION)/site-ccache

GOBJECTS = $(SOURCES:%.scm=%.go)

nobase_dist_mod_DATA = $(SOURCES) $(NOCOMP_SOURCES)
nobase_go_DATA = $(GOBJECTS)

# Make sure source files are installed first, so that the mtime of
# installed compiled files is greater than that of installed source
# files. See
# <http://lists.gnu.org/archive/html/guile-devel/2010-07/msg00125.html>
# for details.
guile_install_go_files = install-nobase_goDATA
$(guile_install_go_files): install-nobase_dist_modDATA

CLEANFILES = $(GOBJECTS)
GUILE_WARNINGS = -Wunbound-variable -Warity-mismatch -Wformat
SUFFIXES = .scm .go
.scm.go:
$(AM_V_GEN)$(top_builddir)/pre-inst-env $(GUILD) \
compile $(GUILE_WARNINGS) -o "$@" "$<"

```

3.5 pre-inst-env.in

```

#!/bin/sh

abs_top_srcdir="'cd "@abs_top_srcdir@" > /dev/null; pwd'"
abs_top_builddir="'cd "@abs_top_builddir@" > /dev/null; pwd'"

GUILE_LOAD_COMPILED_PATH="$abs_top_builddir${GUILE_LOAD_COMPILED_PATH:+:}$GUILE_LOAD_COMPILED_PATH"
GUILE_LOAD_PATH="$abs_top_builddir:$abs_top_srcdir${GUILE_LOAD_PATH:+:}$GUILE_LOAD_PATH"
export GUILE_LOAD_COMPILED_PATH GUILE_LOAD_PATH

PATH="$abs_top_builddir:$PATH"
export PATH

exec "$@"

```

4 Code

Finally, we've gotten to the actual code!

4.1 Library

Well, almost, anyway. First, let's declare the top of each file as defining a specific module, and add any top-of-the-file comments. I refer to these blocks as the *preamble* of each file.

4.1.1 Preamble

This is the top of that file.

```
(define-module (pagr)
  :use-module (ice-9 ftw)
  :export (pagr))
```

4.1.2 Get the Items in a Directory

We'll start with some utility functions. First, a function that will let us gather all of the files in a specified directory.

```
(define (directory->list directory)
  "Build a list of files in a specified directory.
```

Arguments

=====

DIRECTORY <string>: The name of the directory in question.

Returns

=====

A <list> of <strings> representing the files inside of that directory.

Side Effects

=====

Depends on the directory's state.

"

```
  (map
    (lambda (x)
      (string-append directory "/" x))
```



```
(map
  car
  (cddr (file-system-tree directory))))
```

4.1.3 Is this a Git Repo?

We only care about git repos right now, so if there's no `/.git/` we need to ignore the directory.

```
(define (repository? directory)
  "Test whether a directory is a git repository."
```

Arguments
=====

DIRECTORY <string>: The directory to check.

Returns
=====

Truthy if the `/.git/` directory is found. False otherwise.

Side Effects
=====

Depends on Directory contents.
"

```
(member (string-append directory "/.git") (directory->list directory)))
```

4.1.4 Gather Git Repos

Now we build a list of all git repos (that is, folders with a `.git/` folder inside of them) inside of a specified directory.

```
(define (find-git-repos directory)
  "Build a list of git repositories inside a specific directory."
```

Arguments
=====

DIRECTORY <string>: The directory to check for git repositories.

Returns
=====

A <list> of <strings>, representing the repositories found inside of the directory.

Side Effects

=====

Depends on the Directory's contents.

"

(filter repository? (directory->list directory)))

4.1.5 Push a Git Repo

We'll start by defining how to push a single repository. This part relies on git being in the path.

```
(define* (push-git-repo repository remote #:optional (branch "trunk"))
  "Call system git to push a git repository."
```

Arguments

=====

REPOSITORY <string>: The name of the directory the repository lives in locally.

REMOTE <string>: The name of the remote to which we are pushing.

TRUNK <string>: The name of the branch to push. Defaults to \"trunk\".

Returns

=====

A <string> representing the git command's exit status.

Side Effects

=====

Relies on outside binary (git)."

```
(narrate-directory-push repository)
(display (string-append "git -C " repository " push " remote " " branch "\n"))
(system (string-append "git -C " repository " push " remote " " branch)))
```

4.1.6 Push All Git Repos (pagr)

This is the reason we are here!

```
(define* (push-all-git-repos directory remote #:optional (branch "trunk"))
  "Push all git repositories inside of a directory to a specified remote."
```

```

Arguments
=====
DIRECTORY <string>: The directory to look for repos inside.
REMOTE <string>: A remote to push the repos to.
BRANCH <string>: Which branch to push.

Returns
=====
<undefined>

Side Effects
=====
Entirely based on side effects.
"

(greet-the-user directory)
(map
  (lambda (repo)
    (push-git-repo repo remote branch))
  (find-git-repos directory))
(farewell-the-user))

```

4.1.7 Narration

These functions all have the same purpose: Communicate to the user what is happening.

1. Greeting

```

(define (greet-the-user directory)
  "Tell the user what we're doing."

Arguments
=====
DIRECTORY <string>: The directory we are working in.

Returns
=====
<undefined>

```

Side Effects

=====

Displays a message to the user.

"

```
(display (string-append "Beginning push of all git repos in " directory " now!\n"))
```

2. Pushing

```
(define (narrate-directory-push directory)
```

```
  "Tell the user what directory we are pushing, so errors can be caught.
```

Arguments

=====

DIRECTORY <string>: The directory being pushed.

Returns

=====

<undefined>

Side Effects

=====

Displays a message to the user.

"

```
(display (string-append "Pushing " directory " now!\n")))
```

3. Farewell

```
(define (farewell-the-user)
```

```
  "Say goodbye to the user.
```

Arguments

=====

<none>

Returns

=====

<undefined>

Side Effects

=====

Displays a message to the user."

```
(display "All directories pushed!\n"))
```

4.2 Executable

4.2.1 Preamble

This is the top of that file.

```
#!/usr/bin/env -S guile -e main -s
-e main -s
!#
(use-modules (cdr255 pagr))
```

4.2.2 Usage

Rather than clutter the main function with the usage message, let's define it here for future use.

```
(define my-usage-message (string-append
  "Usage: pagr.scm DIRECTORY REMOTE\n\n"

  "Explanation of Arguments:\n\n"

  "  DIRECTORY: The directory in which all of the git\n"
  "              repositories reside.\n"
  "  REMOTE:    The name of the remote branch to which\n"
  "              all git repositories found should be\n"
  "              pushed.\n\n"

  "This program is entirely written in GNU Guile Scheme,\n"
  "and You are welcome to change it how You see fit.\n\n"

  "Guile Online Help: <https://www.gnu.org/software/guile/>\n"
  "Local Online Help: 'info guile'\n"))
```

4.2.3 Main Function

```
(define (main args)
  (let ((arguments (cdr args)))
    (cond ((not (equal? (length arguments) 2))
           (display my-usage-message))
          ((not (file-exists? (car arguments)))
           (format #t "ERROR: ~a does not exist!~%" (car arguments)))
          (else
           (push-all-git-repos (car arguments) (cadr arguments))))))
```

4.3 Legacy

This project actually grew out of my scripts repository, and here is the script's original code for historical sake.

4.3.1 Library

```
(define-module (push-all-git-repos)
  :use-module (ice-9 ftw)
  :export (push-all-git-repos))

(define (directory->list directory)
  "Returns a list containing the names of each file in the given directory."
  (map
   (lambda (x)
     (string-append directory "/" x))
   (map
    car
    (cddr (file-system-tree directory)))))

(define (repository? directory)
  "Tests to see if the given directory is a git repository."
  (member (string-append directory "/.git") (directory->list directory)))

(define (find-git-repos directory)
  "Returns a list of all git repositories currently inside of DIRECTORY."
  (filter repository? (directory->list directory)))

(define (push-git-repo repository remote)
  "Calls system's git to push REPOSITORY to REMOTE."
  (narrate-directory-push repository)
  (display (string-append "git -C " repository " push " remote " trunk\n"))
  (system (string-append "git -C " repository " push " remote " trunk")))
```

```

(define (greet-the-user)
  "Display a greeting to the user."
  (display "Beginning push of all git repos in ~/Documents now!\n"))
(define (narrate-directory-push directory)
  "Tell the user we are pushing the given DIRECTORY"
  (display (string-append "Pushing " directory " now!\n")))
(define (farewell-the-user)
  "Bid the user farewell."
  (display "All directories pushed!\n"))

(define (push-all-git-repos directory remote)
  "Pushes all Git Repositories inside of DIRECTORY"
  (greet-the-user)
  (map
   (lambda (repo)
     (push-git-repo repo remote))
   (find-git-repos directory))
  (farewell-the-user))

```

4.3.2 Executable

```

#!/usr/bin/env -S guile -e main -s
-e main -s
!#
(use-modules (push-all-git-repos))
(define (main args)
  (let ((arguments (cdr args)))
    (cond ((not (equal? (length arguments) 2))
           (display (string-append
                     "Usage: pagr.scm DIRECTORY REMOTE\n\n"

                     "Explanation of Arguments:\n\n"

                     "  DIRECTORY: The directory in which all of the git\n"
                     "              repositories reside.\n"
                     "  REMOTE:   The name of the remote branch to which\n"
                     "              all git repositories found should be\n"
                     "              pushed.\n\n")))))

```

```

        "This program is entirely written in GNU Guile Scheme,\n"
        "and You are welcome to change it how You see fit.\n\n"

        "Guile Online Help: <https://www.gnu.org/software/guile/>\n"
        "Local Online Help: 'info guile'\n"))))
((not (file-exists? (car arguments)))
 (format #t "ERROR: ~a does not exist!~%" (car arguments)))
(else (push-all-git-repos (car arguments) (cadr arguments))))))

```

5 Tests

It's important to me to use Unit Testing throughout my development process, oftentimes before I actually implement a specific feature. I guess I subscribe to the notion of TDD, whether through habit or preference.

5.1 Main Tests

Anyway, all related files will live under `test/`, and the main file should be called `maintests.scm`.

5.1.1 Preamble

We require the files defined above, as well as SRFI-64 for a testing framework.

```

#!/usr/bin/env -S guile -e main -s
-e main -s
!#
(use-modules ((srfi srfi-64))) ;; For Unit Testing
(load "pagr.scm")

```

Then we move on to the actual tests.

5.1.2 Basic Tests

```

(define (basic-tests)
  ;; Initialize and give a name to a simple testsuite.
  (test-begin "basic-tests")
  ;; Test our Hello World Function's Output to be as expected.
  (test-equal "Hello World!\n" (with-output-to-string say-hello))
  ;; End the test.
  (test-end "basic-tests"))

```


5.1.3 Main

```
(define (main args)
  (basic-tests))
```