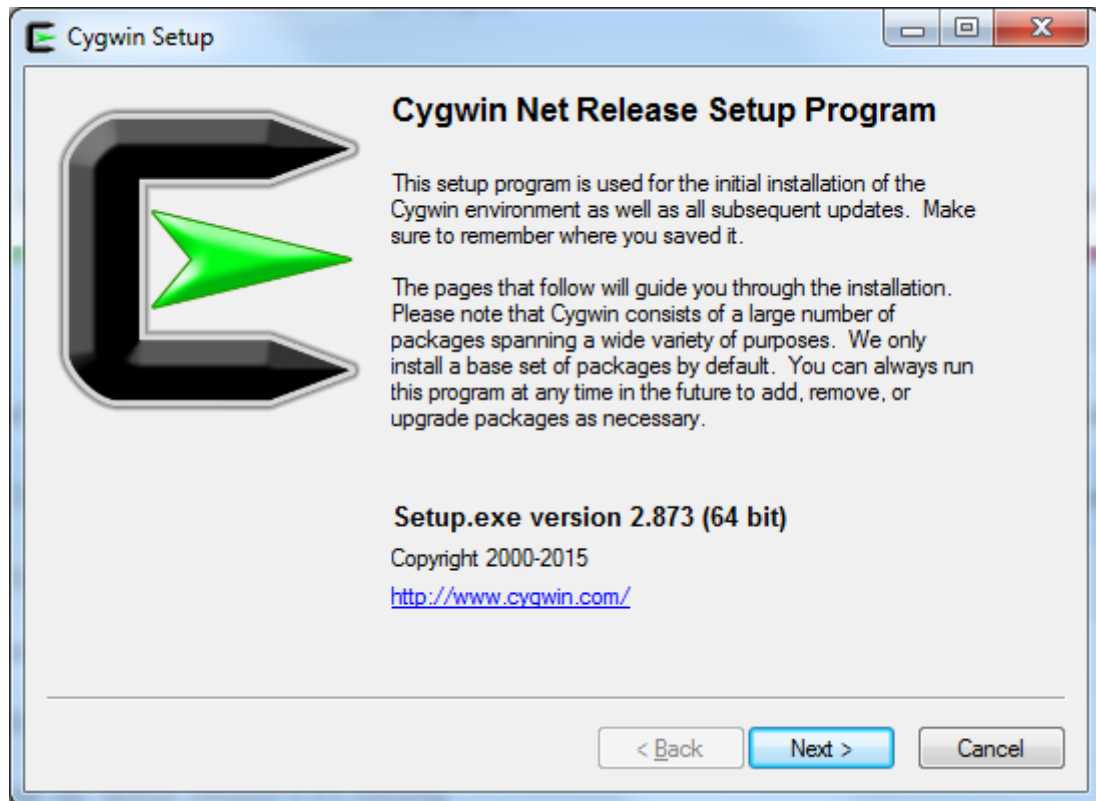




Compiling a cross-compiler on Windows

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<https://learn.adafruit.com/compiling-a-cross-compiler-on-windows>

Last updated on 2024-06-03 01:50:52 PM EDT

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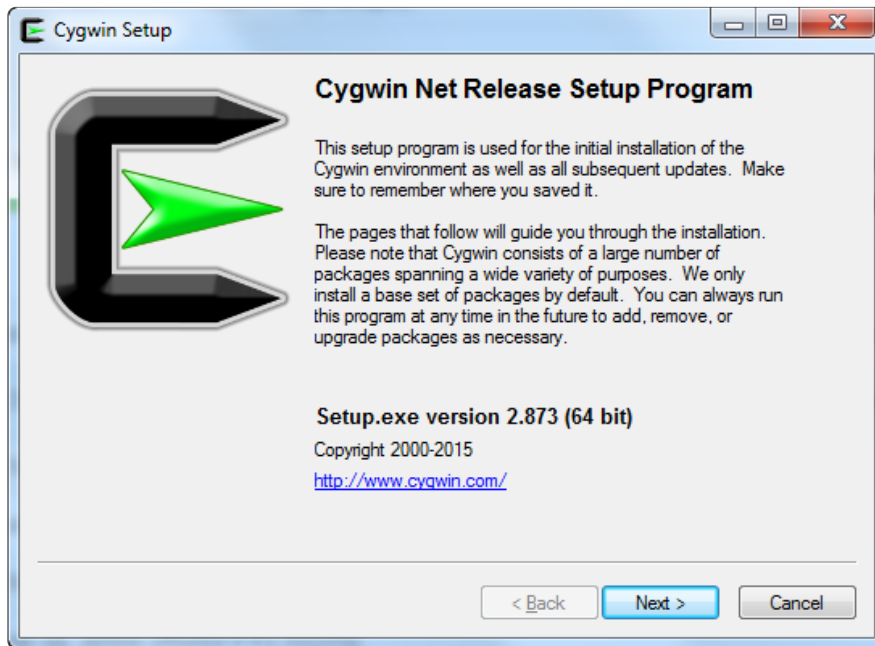
Overview

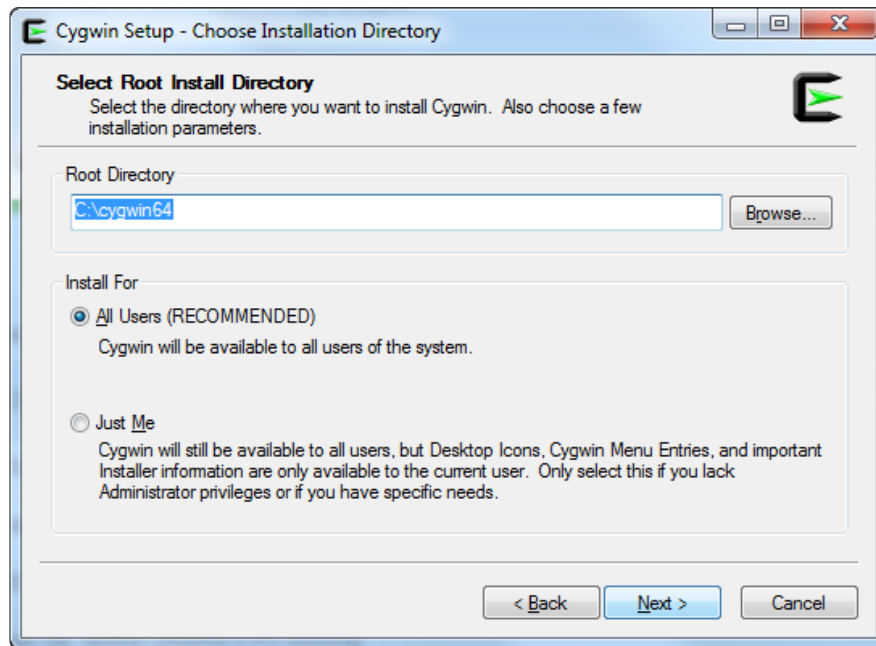
This isn't a real 'tutorial' tutorial, but since I spent a few hours building the ESP3x cross compiler on Windows, and hit just about every issue that could come up, here's my notes!

[If you just want the ESP31/32 toolchain, I have the output available for download here. \(https://adafru.it/klf\)](https://adafru.it/klf)

Use Cygwin

You might think "oh i will use msys or mingw since i know those" but you are wrong. You have to use cygwin, mingw/msys is way too out of date. There, you just saved yourself an hour of messing with mingw!





Install a ton of packages

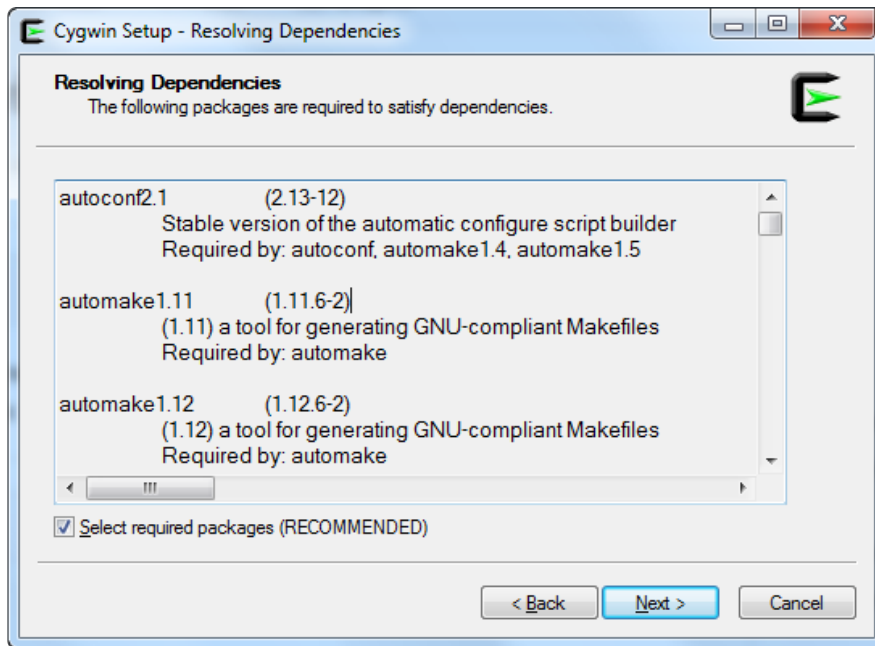
You'll need the usual developer tools, make, autoconf, bison, byacc, yacc, python, nano (if you're not into vi)

Here's a list of all the packages I had installed by the time I was done - you can compare with your list by running `cygcheck -c` after cygwin is installed

```
$ cygcheck -c
Cygwin Package Information
Package           Version           Status
_autorebase       001002-1         OK
_update-info-dir  00505-1          OK
alternatives      1.3.30c-10       OK
autobuild         5.3-1            OK
autoconf          13-1             OK
autoconf-archive  2015.09.25-1     OK
autoconf2.1       2.13-12          OK
autoconf2.5       2.69-3           OK
automake          9-1              OK
automake1.10      1.10.3-2         OK
automake1.11      1.11.6-2         OK
automake1.12      1.12.6-2         OK
automake1.13      1.13.4-1         OK
automake1.14      1.14.1-2         OK
automake1.15      1.15-1           OK
automake1.4       1.4p6-11         OK
automake1.5       1.5-11           OK
automake1.6       1.6.3-12         OK
automake1.7       1.7.9-11         OK
automake1.8       1.8.5-11         OK
automake1.9       1.9.6-11         OK
base-cygwin       3.8-1            OK
base-files        4.2-4            OK
bash              4.3.42-4         OK
bash-completion  1.3-1            OK
binutils          2.25-4           OK
bison             3.0.4-1          OK
```

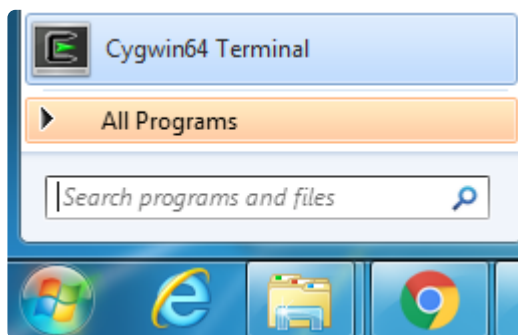
byacc	20150711-1	OK
bzip2	1.0.6-2	OK
ca-certificates	2.6-1	OK
cmake	3.3.2-1	OK
colorgcc	1.3.2-2	OK
coreutils	8.24-3	OK
cygutils	1.4.15-2	OK
cygwin	2.3.1-1	OK
cygwin-devel	2.3.1-1	OK
dash	0.5.8-3	OK
diffutils	3.3-3	OK
editrights	1.03-1	OK
expat	2.1.0-3	OK
file	5.24-1	OK
findutils	4.5.12-1	OK
gawk	4.1.3-1	OK
gcc-core	4.9.3-1	OK
gcc-g++	4.9.3-1	OK
gccmakedep	1.0.3-1	OK
getent	2.18.90-4	OK
gperf	3.0.4-2	OK
grep	2.21-2	OK
groff	1.22.3-1	OK
gzip	1.6-1	OK
hostname	3.13-1	OK
info	6.0-1	OK
ipc-utils	1.0-2	OK
less	481-1	OK
libarchive13	3.1.2-3	OK
libargp	20110921-2	OK
libatomic1	4.9.3-1	OK
libattr1	2.4.46-1	OK
libblkid1	2.25.2-2	OK
libbz2_1	1.0.6-2	OK
libcloog-isl4	0.18.0-2	OK
libcom_err2	1.42.12-2	OK
libcrypt0	1.1-1	OK
libcurl4	7.45.0-1	OK
libdb5.3	5.3.21-1	OK
libexpat-devel	2.1.0-3	OK
libexpat1	2.1.0-3	OK
libffi6	3.2.1-2	OK
libgcc1	4.9.3-1	OK
libgdbm4	1.11-1	OK
libgmp10	6.1.0-2p1	OK
libgnutls28	3.3.17-1	OK
libgomp1	4.9.3-1	OK
libgssapi_krb5_2	1.13.2-3	OK
libguile17	1.8.8-1	OK
libhogweed2	2.7-2	OK
libiconv	1.14-3	OK
libiconv2	1.14-3	OK
libidn11	1.29-1	OK
libintl-devel	0.19.5.1-2	OK
libintl8	0.19.5.1-2	OK
libisl10	0.11.1-2	OK
libk5crypto3	1.13.2-3	OK
libkrb5_3	1.13.2-3	OK
libkrb5support0	1.13.2-3	OK
libltdl7	2.4.6-2	OK
liblzma5	5.2.2-1	OK
liblzo2_2	2.08-1	OK
libmpc3	1.0.3-1	OK
libmpfr4	3.1.3-1	OK
libncurses-devel	6.0-1.20151017	OK
libncursesw10	6.0-1.20151017	OK
libnettle4	2.7-2	OK
libopenldap2_4_2	2.4.42-1	OK
libopenssl100	1.0.2e-1	OK

libp11-kit0	0.22.1-1	OK
libpcre1	8.37-2	OK
libpipeline1	1.4.0-1	OK
libpopt0	1.16-1	OK
libquadmath0	4.9.3-1	OK
libreadline7	6.3.8-1	OK
libsasl2_3	2.1.26-9	OK
libsigsegv2	2.10-2	OK
libsmartcols1	2.25.2-2	OK
libsqlite3_0	3.9.2-1	OK
libssh2_1	1.5.0-1	OK
libssp0	4.9.3-1	OK
libstdc++6	4.9.3-1	OK
libtasn1_6	4.5-1	OK
libtool	2.4.6-2	OK
libuuid-devel	2.25.2-2	OK
libuuid1	2.25.2-2	OK
libvtv0	5.2.0-1	OK
libxml2	2.9.3-1	OK
login	1.11-1	OK
lynx	2.8.7-2	OK
m4	1.4.17-2	OK
make	4.1-1	OK
makedepend	1.0.5-1	OK
man-db	2.7.4-1	OK
mintty	2.2.2-0	OK
nano	2.4.1-1	OK
ncurses	6.0-1.20151017	OK
openssl	1.0.2e-1	OK
p11-kit	0.22.1-1	OK
p11-kit-trust	0.22.1-1	OK
patch	2.7.4-1	OK
patchutils	0.3.3-1	OK
perl	5.22.1-1	OK
perl-Carp	1.38-1	OK
perl-Pod-Simple	3.32-1	OK
perl_autorebase	5.22.1-1	OK
perl_base	5.22.1-1	OK
popt	1.16-1	OK
python	2.7.10-1	OK
rebase	4.4.1-1	OK
run	1.3.4-2	OK
sed	4.2.2-3	OK
tar	1.28-1	OK
terminfo	6.0-1.20151017	OK
texinfo	6.0-1	OK
tzcode	2015g-1	OK
util-linux	2.25.2-2	OK
vim-minimal	7.4.891-1	OK
w32api-headers	4.0.4-1	OK
w32api-runtime	4.0.4-1	OK
wget	1.16.3-1	OK
which	2.20-2	OK
windows-default-manifest	6.4-1	OK
xz	5.2.2-1	OK
zlib0	1.2.8-3	OK

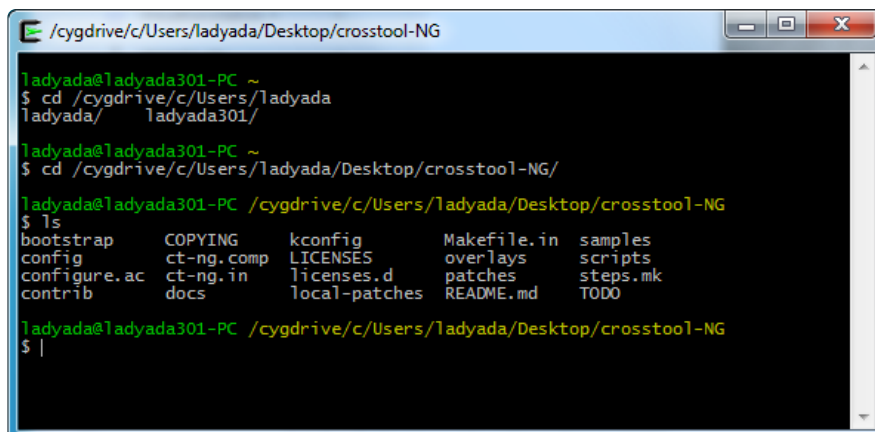


Do everything from within Cygterminal

Later all you can use Cygwin1.dll to let you call the cygwin programs from powershell, etc. For now, just stick with cygterm



I do file manipulations on the desktop, you can get there via `/cygdrive/c/Users/username/Desktop`



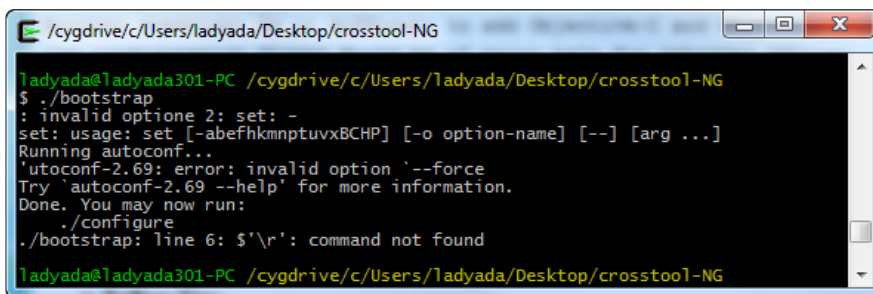
DOS/Unix line endings

If you git clone from within Windows, it will try to be 'helpful' by adding DOS line-endings to all checked out files. You'll end up with weird errors like:

```
: invalid option 2: set: -
```

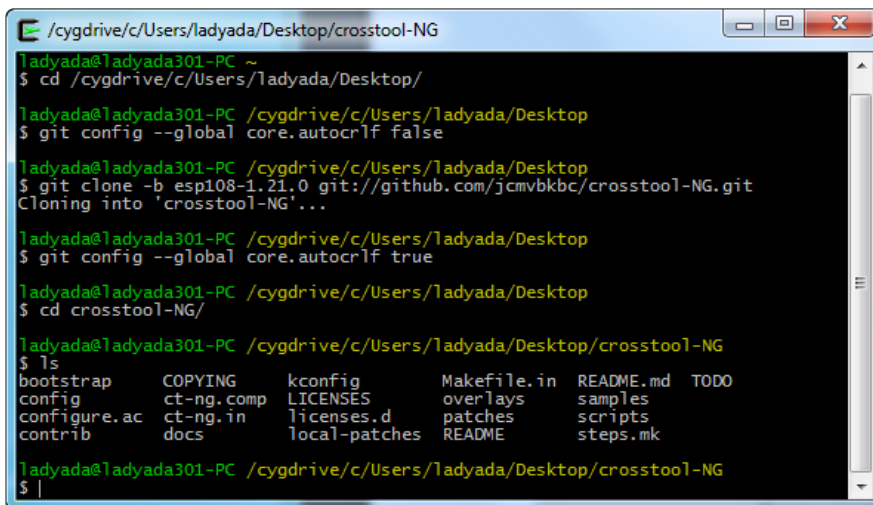
and

```
.$'\r': command not found
```



```
ladyada@ladyada301-PC /cygdrive/c/Users/ladyada/Desktop/crosstool-NG
$ ./bootstrap
: invalid option 2: set: -
set: usage: set [-abefhkmnptuvxBCHP] [-o option-name] [--] [arg ...]
Running autoconf...
'utoconf-2.69: error: invalid option '--force
Try `autoconf-2.69 --help' for more information.
Done. You may now run:
./configure
./bootstrap: line 6: $'\r': command not found
ladyada@ladyada301-PC /cygdrive/c/Users/ladyada/Desktop/crosstool-NG
```

So make sure to do your git setup and clone from within cygwin



```
ladyada@ladyada301-PC ~
$ cd /cygdrive/c/Users/ladyada/Desktop/
ladyada@ladyada301-PC /cygdrive/c/Users/ladyada/Desktop
$ git config --global core.autocrlf false
ladyada@ladyada301-PC /cygdrive/c/Users/ladyada/Desktop
$ git clone -b esp108-1.21.0 git://github.com/jcmvbkbc/crosstool-NG.git
Cloning into 'crosstool-NG'...
ladyada@ladyada301-PC /cygdrive/c/Users/ladyada/Desktop
$ git config --global core.autocrlf true
ladyada@ladyada301-PC /cygdrive/c/Users/ladyada/Desktop
$ cd crosstool-NG/
ladyada@ladyada301-PC /cygdrive/c/Users/ladyada/Desktop/crosstool-NG
$ ls
bootstrap  COPYING      kconfig      Makefile.in  README.md  TODO
config     ct-ng.comp  LICENSES     overlays     samples
configure.ac  ct-ng.in   licenses.d   patches     scripts
contrib    docs       local-patches  README      steps.mk
ladyada@ladyada301-PC /cygdrive/c/Users/ladyada/Desktop/crosstool-NG
$ |
```

You will have forgotten some packages

Now you can `./bootstrap` and `./configure --prefix='pwd'`


```

/cygdrive/c/Users/ladyada/Desktop/crosstool-NG
ladyada@ladyada301-PC /cygdrive/c/Users/ladyada/Desktop/crosstool-NG
$ ./bootstrap
Running autoconf...
Done. You may now run:
./configure

ladyada@ladyada301-PC /cygdrive/c/Users/ladyada/Desktop/crosstool-NG
$ ./configure --prefix='pwd'
checking build system type... x86_64-unknown-cygwin
checking host system type... x86_64-unknown-cygwin
checking for a BSD-compatible install... /usr/bin/install -c
checking for grep that handles long lines and -e... /usr/bin/grep
checking for egrep... /usr/bin/grep -E
checking for a sed that does not truncate output... /usr/bin/sed
checking whether sed understands -r -i -e... yes
checking whether ln -s works... yes
checking for gcc... gcc
checking whether the C compiler works... yes
checking for C compiler default output file name... a.exe
checking for suffix of executables... .exe
checking whether we are cross compiling... no
checking for suffix of object files... o
checking whether we are using the GNU C compiler... yes
checking whether gcc accepts -g... yes

```

When you run **bootstrap** & **configure** you will find that some packages are missing, like **gperf**

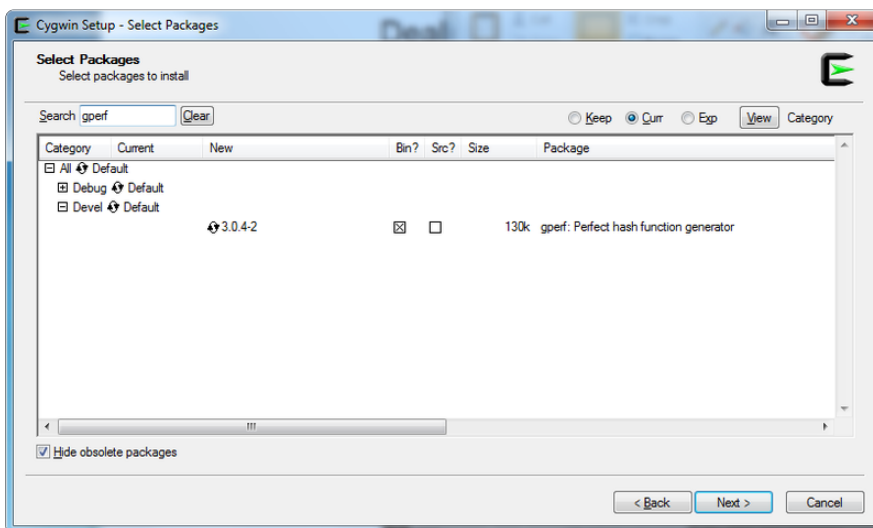
```

/cygdrive/c/Users/ladyada/Desktop/crosstool-NG
checking for gcc... gcc
checking whether the C compiler works... yes
checking for C compiler default output file name... a.exe
checking for suffix of executables... .exe
checking whether we are cross compiling... no
checking for suffix of object files... o
checking whether we are using the GNU C compiler... yes
checking whether gcc accepts -g... yes
checking for gcc option to accept ISO C89... none needed
checking how to run the C preprocessor... gcc -E
checking for ranlib... ranlib
checking for objcopy... no
checking for objcopy... objcopy
checking for absolute path to objcopy... /usr/bin/objcopy
checking for objdump... no
checking for objdump... objdump
checking for absolute path to objdump... /usr/bin/objdump
checking for greadelf... no
checking for readelf... readelf
checking for absolute path to readelf... /usr/bin/readelf
checking for gperf... no
configure: error: missing required tool: gperf

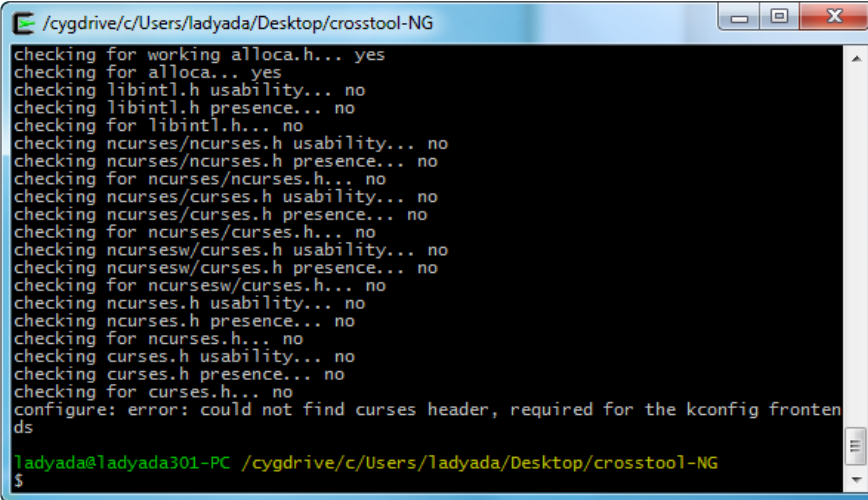
ladyada@ladyada301-PC /cygdrive/c/Users/ladyada/Desktop/crosstool-NG
$

```

Restart the cygwin installer and grab the missing packages



You might also be missing some headers that are inside packages. For example `curses.h`

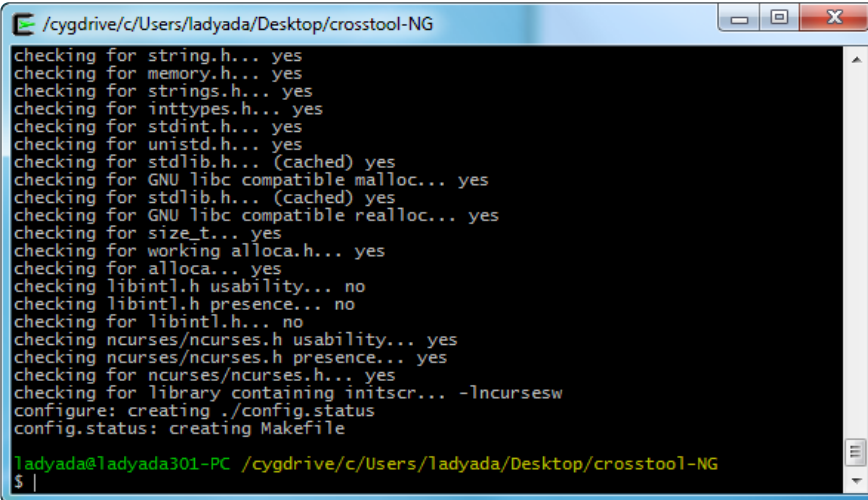


```
/cygdrive/c/Users/ladyada/Desktop/crosstool-NG
checking for working alloca.h... yes
checking for alloca... yes
checking libintl.h usability... no
checking libintl.h presence... no
checking for libintl.h... no
checking ncurses/ncurses.h usability... no
checking ncurses/ncurses.h presence... no
checking for ncurses/ncurses.h... no
checking ncurses/curses.h usability... no
checking ncurses/curses.h presence... no
checking for ncurses/curses.h... no
checking ncursesw/curses.h usability... no
checking ncursesw/curses.h presence... no
checking for ncursesw/curses.h... no
checking ncurses.h usability... no
checking ncurses.h presence... no
checking for ncurses.h... no
checking curses.h usability... no
checking curses.h presence... no
checking for curses.h... no
configure: error: could not find curses header, required for the kconfig frontends

ladyada@ladyada301-PC /cygdrive/c/Users/ladyada/Desktop/crosstool-NG
$
```

I just installed `libncurses`, `libncursesw10` and `libncurses-devel` (not sure which ended up having the header)

Eventually autoconfig will finish



```
/cygdrive/c/Users/ladyada/Desktop/crosstool-NG
checking for string.h... yes
checking for memory.h... yes
checking for strings.h... yes
checking for inttypes.h... yes
checking for stdint.h... yes
checking for unistd.h... yes
checking for stdlib.h... (cached) yes
checking for GNU libc compatible malloc... yes
checking for stdlib.h... (cached) yes
checking for GNU libc compatible realloc... yes
checking for size_t... yes
checking for working alloca.h... yes
checking for alloca... yes
checking libintl.h usability... no
checking libintl.h presence... no
checking for libintl.h... no
checking ncurses/ncurses.h usability... yes
checking ncurses/ncurses.h presence... yes
checking for ncurses/ncurses.h... yes
checking for library containing initscr... -lncursesw
configure: creating ./config.status
config.status: creating Makefile

ladyada@ladyada301-PC /cygdrive/c/Users/ladyada/Desktop/crosstool-NG
$ |
```

Apply patches

Copy and paste this patch into a new file with

```
cat > cygwin.patch
```

paste in

Control-D

```

--- ./kconfig/Makefile 2015-01-16 12:58:59.002108400 +0000
@@ -35,20 +35,21 @@
conf_OBJ = $(patsubst %.c,%o,$(conf_SRC))
conf_DEP = $(patsubst %.o,%dep,$(conf_OBJ))
$(conf_OBJ) $(conf_DEP): CFLAGS += $(INTL_CFLAGS)
+conf: LDFLAGS += -lintl

# What's needed to build 'mconf'
mconf_SRC = mconf.c
mconf_OBJ = $(patsubst %.c,%o,$(mconf_SRC))
mconf_DEP = $(patsubst %.c,%dep,$(mconf_SRC))
$(mconf_OBJ) $(mconf_DEP): CFLAGS += $(NCURSES_CFLAGS) $(INTL_CFLAGS)
-mconf: LDFLAGS += $(NCURSES_LDFLAGS)
+mconf: LDFLAGS += -lintl $(NCURSES_LDFLAGS)

# What's needed to build 'nconf'
nconf_SRC = nconf.c nconf.gui.c
nconf_OBJ = $(patsubst %.c,%o,$(nconf_SRC))
nconf_DEP = $(patsubst %.c,%dep,$(nconf_SRC))
-$(nconf_OBJ) $(nconf_DEP): CFLAGS += $(INTL_CFLAGS) -I/usr/include/ncurses
-nconf: LDFLAGS += -lmenu -lpanel -lncurses
+$(nconf_OBJ) $(nconf_DEP): CFLAGS += -I/usr/include/ncurses/ $(INTL_CFLAGS)
+nconf: LDFLAGS += -lintl -lmenu -lpanel -lncurses

# Under Cygwin, we need to auto-import some libs (which ones, exactly?)
# for mconf and nconf to lin properly.
--- ./kconfig/nconf.c 2015-01-16 12:58:59.048908500 +0000
@@ -1518,7 +1518,7 @@
}

notimeout(stdscr, FALSE);
- ESCDELAY = 1;
+ set_escdelay(1);

/* set btns menu */
curses_menu = new_menu(curses_menu_items);

```

```

/cygdrive/c/Users/ladyada/Desktop/crosstool-NG
ladyada@ladyada301-PC /cygdrive/c/Users/ladyada/Desktop/crosstool-NG
$ cat > cygwin.patch
--- ./kconfig/Makefile 2015-01-16 12:58:59.002108400 +0000
@@ -35,20 +35,21 @@
conf_OBJ = $(patsubst %.c,%o,$(conf_SRC))
conf_DEP = $(patsubst %.o,%dep,$(conf_OBJ))
$(conf_OBJ) $(conf_DEP): CFLAGS += $(INTL_CFLAGS)
+conf: LDFLAGS += -lintl

# What's needed to build 'mconf'
mconf_SRC = mconf.c
mconf_OBJ = $(patsubst %.c,%o,$(mconf_SRC))
mconf_DEP = $(patsubst %.c,%dep,$(mconf_SRC))
$(mconf_OBJ) $(mconf_DEP): CFLAGS += $(NCURSES_CFLAGS) $(INTL_CFLAGS)
-mconf: LDFLAGS += $(NCURSES_LDFLAGS)
+mconf: LDFLAGS += -lintl $(NCURSES_LDFLAGS)

# What's needed to build 'nconf'
nconf_SRC = nconf.c nconf.gui.c
nconf_OBJ = $(patsubst %.c,%o,$(nconf_SRC))
nconf_DEP = $(patsubst %.c,%dep,$(nconf_SRC))
-$(nconf_OBJ) $(nconf_DEP): CFLAGS += $(INTL_CFLAGS) -I/usr/include/ncurses
-nconf: LDFLAGS += -lmenu -lpanel -lncurses
+$(nconf_OBJ) $(nconf_DEP): CFLAGS += -I/usr/include/ncurses/ $(INTL_CFLAGS)
+nconf: LDFLAGS += -lintl -lmenu -lpanel -lncurses

# Under Cygwin, we need to auto-import some libs (which ones, exactly?)
# for mconf and nconf to lin properly.
--- ./kconfig/nconf.c 2015-01-16 12:58:59.048908500 +0000
@@ -1518,7 +1518,7 @@
}

notimeout(stdscr, FALSE);
- ESCDELAY = 1;
+ set_escdelay(1);

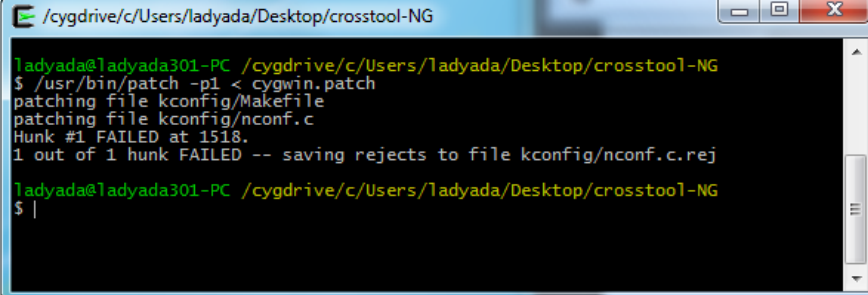
/* set btns menu */
curses_menu = new_menu(curses_menu_items);
ladyada@ladyada301-PC /cygdrive/c/Users/ladyada/Desktop/crosstool-NG
$

```

Run `patch` to apply

```
/usr/bin/patch -p1 < cygwin.patch
```

Note it may fail, in which case you may need to handpatch (see later)

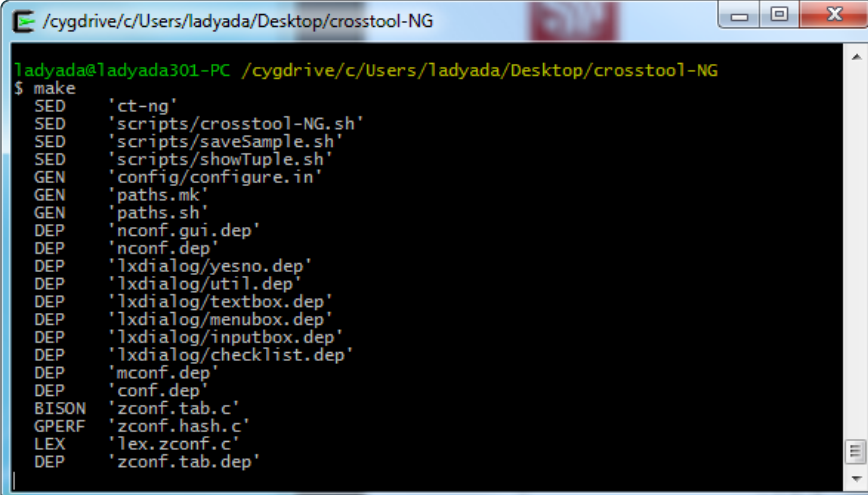


```
ladyada@ladyada301-PC /cygdrive/c/Users/ladyada/Desktop/crosstool-NG
$ /usr/bin/patch -p1 < cygwin.patch
patching file kconfig/Makefile
patching file kconfig/nconf.c
Hunk #1 FAILED at 1518.
1 out of 1 hunk FAILED -- saving rejects to file kconfig/nconf.c.rej

ladyada@ladyada301-PC /cygdrive/c/Users/ladyada/Desktop/crosstool-NG
$ |
```

Try to Make

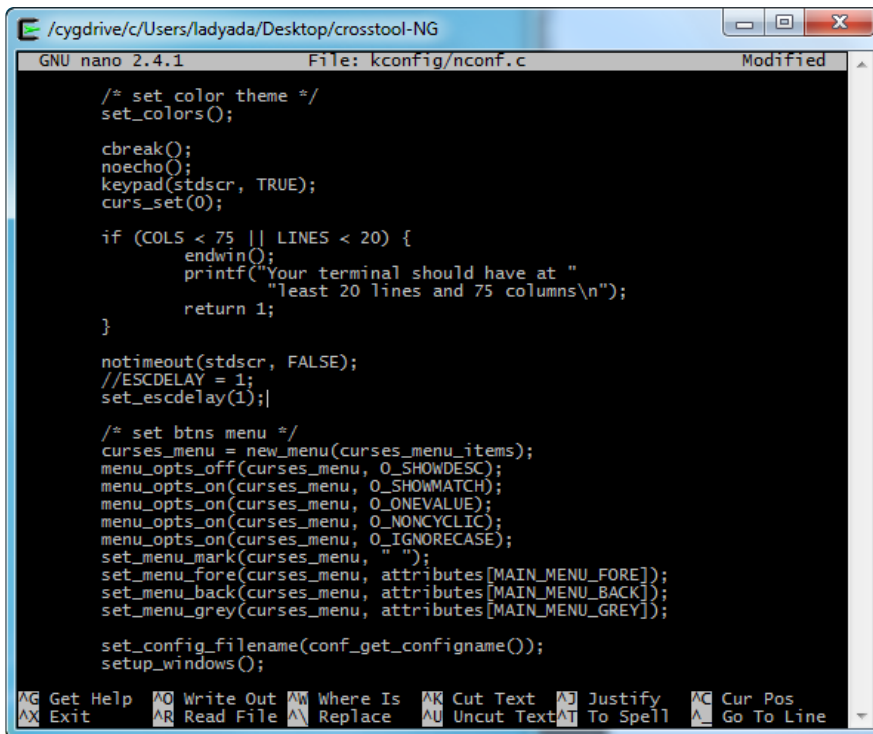
run `make`



```
ladyada@ladyada301-PC /cygdrive/c/Users/ladyada/Desktop/crosstool-NG
$ make
SED      'ct-ng'
SED      'scripts/crosstool-NG.sh'
SED      'scripts/saveSample.sh'
SED      'scripts/showTuple.sh'
GEN      'config/configure.in'
GEN      'paths.mk'
GEN      'paths.sh'
DEP      'nconf.gui.dep'
DEP      'nconf.dep'
DEP      'lxdialog/yesno.dep'
DEP      'lxdialog/util.dep'
DEP      'lxdialog/textbox.dep'
DEP      'lxdialog/menubox.dep'
DEP      'lxdialog/inputbox.dep'
DEP      'lxdialog/checklist.dep'
DEP      'mconf.dep'
DEP      'conf.dep'
BISON    'zconf.tab.c'
GPERF    'zconf.hash.c'
LEX      'lex.zconf.c'
DEP      'zconf.tab.dep'
```

If you get an error about `ESCDELAY = 1;` edit `kconfig/nconf.c` (i just used nano)

and comment out that line and replace with `set_escdelay(1);`



```
GNU nano 2.4.1 File: kconfig/nconf.c Modified
/* set color theme */
set_colors();

cbreak();
noecho();
keypad(stdscr, TRUE);
curs_set(0);

if (COLS < 75 || LINES < 20) {
    endwin();
    printf("Your terminal should have at "
        "least 20 lines and 75 columns\n");
    return 1;
}

notimeout(stdscr, FALSE);
//ESCDELAY = 1;
set_escdelay(1);

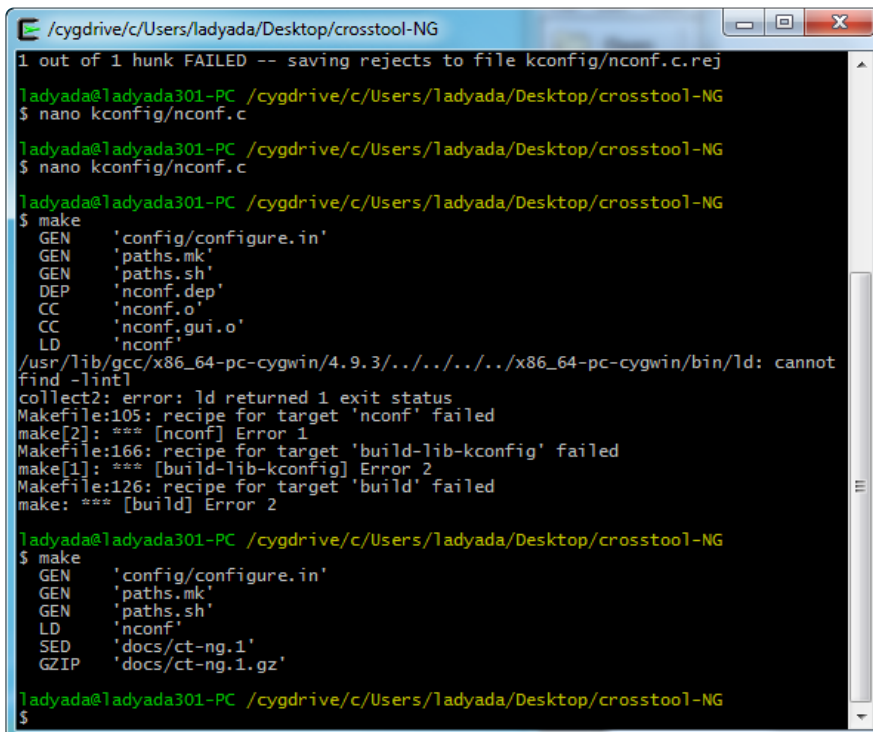
/* set btns menu */
curses_menu = new_menu(curses_menu_items);
menu_opts_off(curses_menu, O_SHOWDESC);
menu_opts_on(curses_menu, O_SHOWMATCH);
menu_opts_on(curses_menu, O_ONEVALUE);
menu_opts_on(curses_menu, O_NONCYCLIC);
menu_opts_on(curses_menu, O_IGNORECASE);
set_menu_mark(curses_menu, " ");
set_menu_fore(curses_menu, attributes[MAIN_MENU_FORE]);
set_menu_back(curses_menu, attributes[MAIN_MENU_BACK]);
set_menu_grey(curses_menu, attributes[MAIN_MENU_GREY]);

set_config_filename(conf_get_configname());
setup_windows();

^G Get Help ^O Write Out ^W Where Is ^K Cut Text ^J Justify ^C Cur Pos
^X Exit ^R Read File ^M Replace ^U Uncut Text ^T To Spell ^_ Go To Line
```

Try make again

If you haven't installed `libintl-devel` it'll complain, just install via cygwin & try again



```
1 out of 1 hunk FAILED -- saving rejects to file kconfig/nconf.c.rej
ladyada@ladyada301-PC /cygdrive/c/Users/ladyada/Desktop/crosstool-NG
$ nano kconfig/nconf.c
ladyada@ladyada301-PC /cygdrive/c/Users/ladyada/Desktop/crosstool-NG
$ nano kconfig/nconf.c
ladyada@ladyada301-PC /cygdrive/c/Users/ladyada/Desktop/crosstool-NG
$ make
GEN 'config/configure.in'
GEN 'paths.mk'
GEN 'paths.sh'
DEP 'nconf.dep'
CC 'nconf.o'
CC 'nconf.gui.o'
LD 'nconf'
/usr/lib/gcc/x86_64-pc-cygwin/4.9.3/../../../../x86_64-pc-cygwin/bin/ld: cannot
find -lintl
collect2: error: ld returned 1 exit status
Makefile:105: recipe for target 'nconf' failed
make[2]: *** [nconf] Error 1
Makefile:166: recipe for target 'build-lib-kconfig' failed
make[1]: *** [build-lib-kconfig] Error 2
Makefile:126: recipe for target 'build' failed
make: *** [build] Error 2
ladyada@ladyada301-PC /cygdrive/c/Users/ladyada/Desktop/crosstool-NG
$ make
GEN 'config/configure.in'
GEN 'paths.mk'
GEN 'paths.sh'
LD 'nconf'
SED 'docs/ct-ng.1'
GZIP 'docs/ct-ng.1.gz'
ladyada@ladyada301-PC /cygdrive/c/Users/ladyada/Desktop/crosstool-NG
$
```

Then run `make install`

```

/cygdrive/c/Users/ladyada/Desktop/crosstool-NG
make: *** [build] Error 2

ladyada@ladyada301-PC /cygdrive/c/Users/ladyada/Desktop/crosstool-NG
$ make
GEN      'config/configure.in'
GEN      'paths.mk'
GEN      'paths.sh'
LD       'nconf'
SED      'docs/ct-ng.1'
GZIP     'docs/ct-ng.1.gz'

ladyada@ladyada301-PC /cygdrive/c/Users/ladyada/Desktop/crosstool-NG
$ make install
GEN      'config/configure.in'
GEN      'paths.mk'
GEN      'paths.sh'
MKDIR    '/cygdrive/c/Users/ladyada/Desktop/crosstool-NG/bin/'
INST     'ct-ng'
MKDIR    '/cygdrive/c/Users/ladyada/Desktop/crosstool-NG/lib/ct-ng.1.21.0/'
INSTDIR  'config/'
INSTDIR  'contrib/'
INSTDIR  'patches/'
INSTDIR  'scripts/'
INST     'steps.mk'
INST     'paths'
INSTDIR  'samples/'
INST     'kconfig/'
MKDIR    '/cygdrive/c/Users/ladyada/Desktop/crosstool-NG/share/doc/crosstool-ng
/crosstool-NG.1.21.0/'
INST     'docs/*.txt'
MKDIR    '/cygdrive/c/Users/ladyada/Desktop/crosstool-NG/share/man/man1/'
INST     'ct-ng.1.gz'

For auto-completion, do not forget to install 'ct-ng.comp' into
your bash completion directory (usually /etc/bash_completion.d)

ladyada@ladyada301-PC /cygdrive/c/Users/ladyada/Desktop/crosstool-NG
$ |

```

You're Done!

haha j/k you've only installed to program that does the actual build

Check the actual crosstools instruction for which arch you are targing. For ours we're using xtensa-esp108-elf so we run

`./ct-ng xtensa-esp108-elf`

```

/cygdrive/c/Users/ladyada/Desktop/crosstool-NG
MKDIR  '/cygdrive/c/Users/ladyada/Desktop/crosstool-NG/share/man/man1/'
INST   'ct-ng.1.gz'

For auto-completion, do not forget to install 'ct-ng.comp' into
your bash completion directory (usually /etc/bash_completion.d)

ladyada@ladyada301-PC /cygdrive/c/Users/ladyada/Desktop/crosstool-NG
$ ./ct-ng xtensa-esp108-elf
MKDIR config.gen
IN     config.gen/arch.in
IN     config.gen/kernel.in
IN     config.gen/cc.in
IN     config.gen/binutils.in
IN     config.gen/libc.in
IN     config.gen/debug.in
CONF  config/config.in
#
# configuration saved
#
*****

Initially reported by: Max Filippov <jcmvbkbc@gmail.com>
URL:
*****

WARNING! This sample may enable experimental features.
Please be sure to review the configuration prior
to building and using your toolchain!
Now, you have been warned!
*****

Now configured for "xtensa-esp108-elf"
ladyada@ladyada301-PC /cygdrive/c/Users/ladyada/Desktop/crosstool-NG
$

```

Setting up Case-Sensitive in windows

I forgot to get a screenshot but basically you'll get an error like:

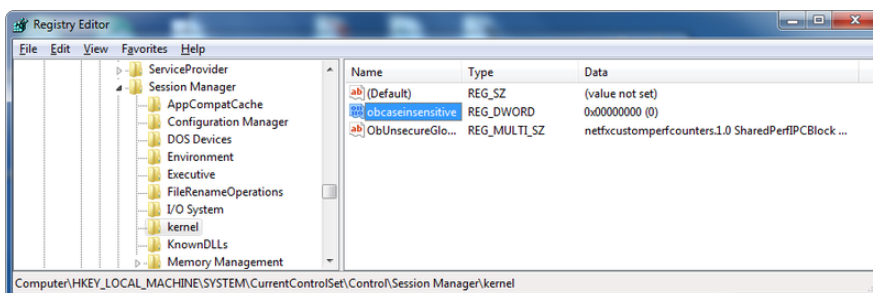
```

$ ./ct-ng build
[INFO ] Performing some trivial sanity checks
[ERROR] Your file system in '/devdir/.build' is *not* case-
sensitive!
[00:02] / make: *** [build] Error 1

```

In which case you'll need to set up case-sensitive filesystem in Windows. Open up **regedit** and look for the key

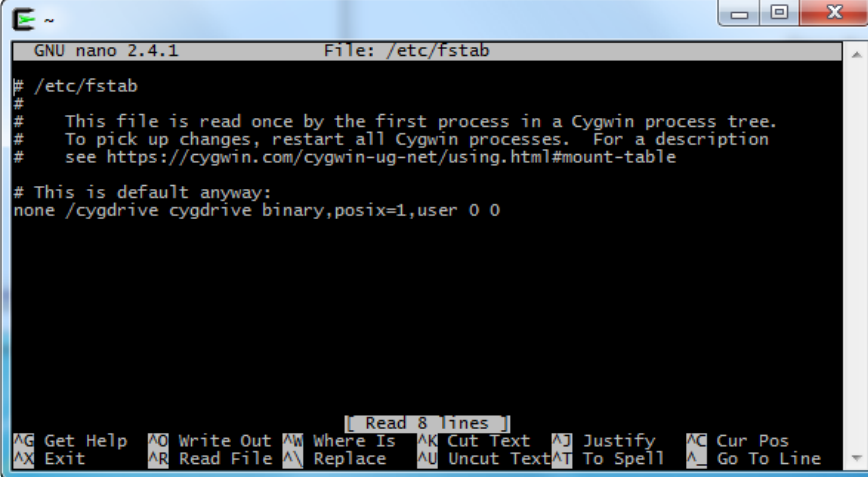
HKEY_LOCAL_MACHINE \ SYSTEM \ CurrentControlSet \ Control \ Session Manager \ kernel



Right-click and select **Modify...** to change the value to 0

Quit **regedit**

Next, in **cygterminal**, edit **/etc/fstab** and change the **/cygwin** line to include **posix=1** rather than 0



The screenshot shows the GNU nano 2.4.1 text editor in a window titled "File: /etc/fstab". The editor's content is as follows:

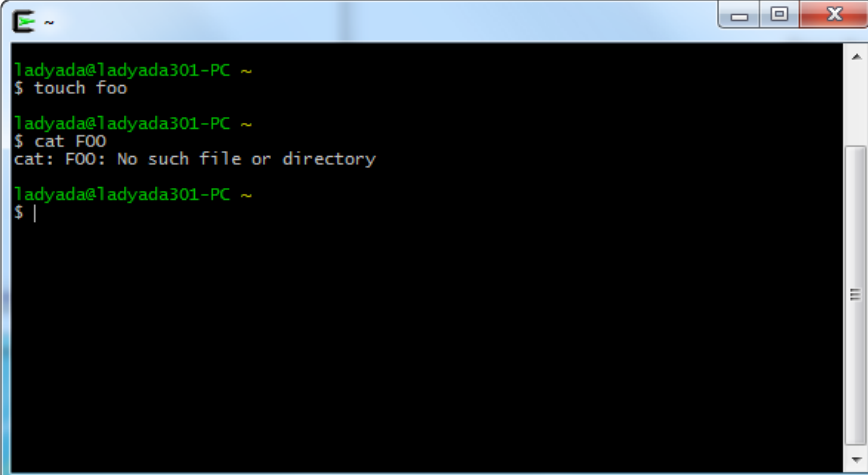
```
# /etc/fstab
# This file is read once by the first process in a Cygwin process tree.
# To pick up changes, restart all Cygwin processes. For a description
# see https://cygwin.com/cygwin-ug-net/using.html#mount-table
# This is default anyway:
none /cygdrive cygdrive binary,posix=1,user 0 0
```

The bottom status bar of the editor shows various keyboard shortcuts: **Get Help**, **Write Out**, **Where Is**, **Cut Text**, **Justify**, **Cur Pos**, **Exit**, **Read File**, **Replace**, **Uncut Text**, **To Spell**, and **Go To Line**. A small box above the status bar indicates "Read 8 lines".

Reboot the computer. Open up a new **cygterminal** and run this quick test:

- **touch foo**
- **cat FOO**

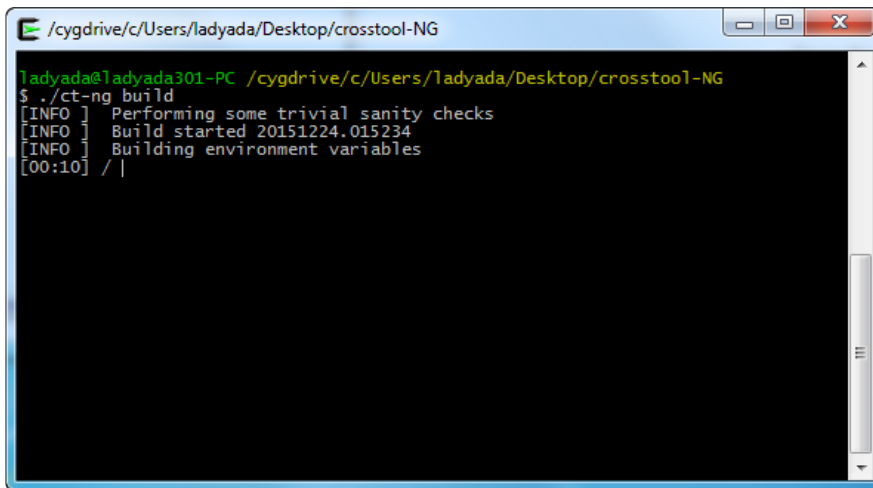
You should get an error, because **FOO** is no longer the same file as **foo**



The screenshot shows a **cygterminal** window with the following commands and output:

```
ladyada@ladyada301-PC ~
$ touch foo
ladyada@ladyada301-PC ~
$ cat FOO
cat: FOO: No such file or directory
ladyada@ladyada301-PC ~
$ |
```

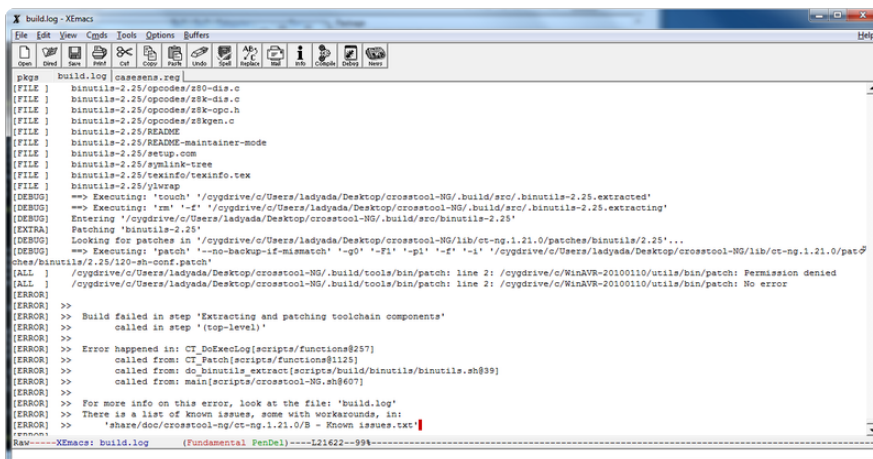
Go back and restart your **ct-ng** build



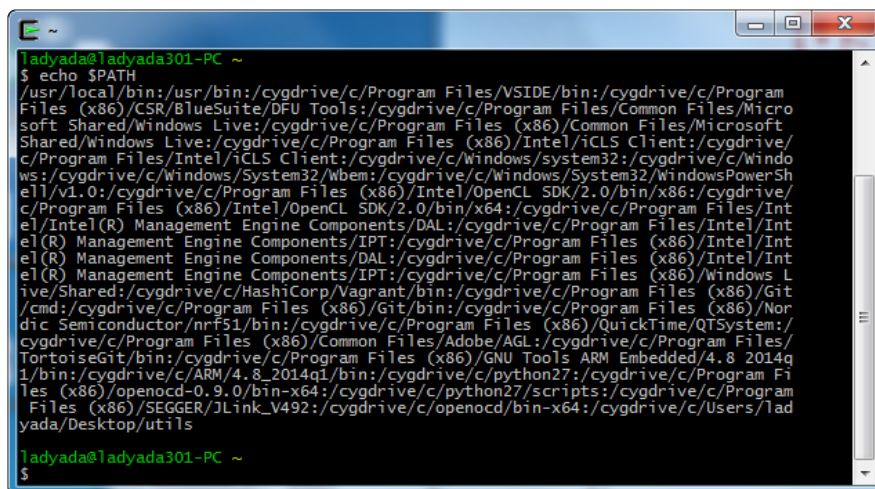
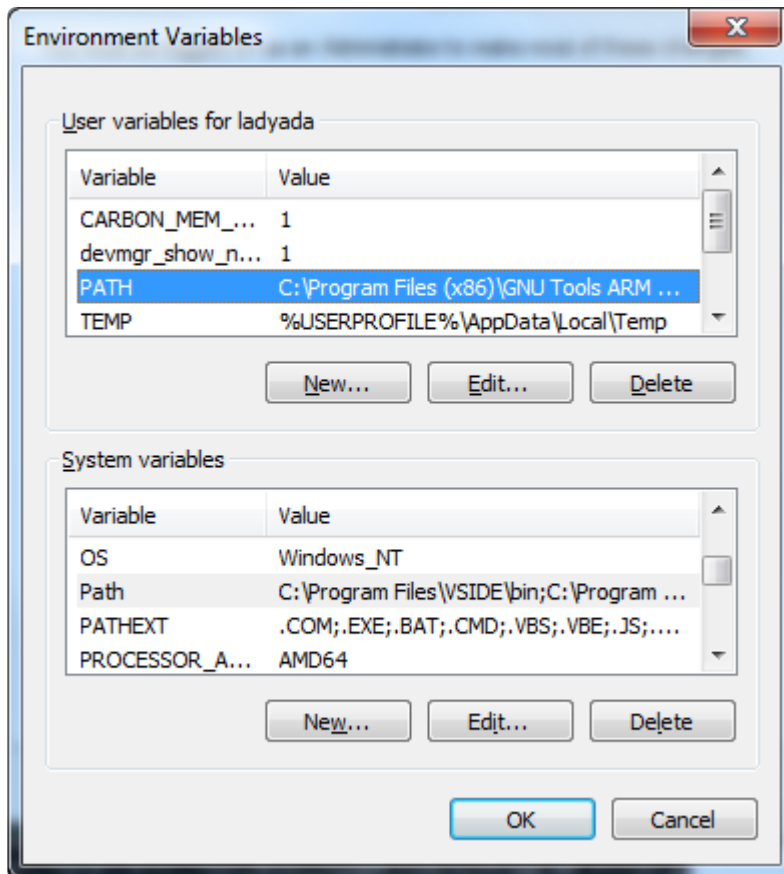
Fix errors along the way

The build process will easily take an hour. It may fail in the middle in which case you will see errors in the **build.log** file

For example I had a patch error, and in the log saw..



You can see that instead of using cygwin's **patch** it picked up the **WinAVR** version. Edit your PATH environment variable to remove any extraneous paths. There's two PATH envvars, one for user and one for system so check both



Since the path to patch was picked up in the autoconf step, its not enough to just **ct-ng clean**, i started from the **bootstrap** step instead of hand-editing the config/makefile (its all much faster the second time!)

Really build

```

/cygdrive/c/Users/ladyada/Desktop/crosstool-NG
*****
WARNING! This sample may enable experimental features.
Please be sure to review the configuration prior
to building and using your toolchain!
Now, you have been warned!
*****

Now configured for "xtensa-esp108-elf"

ladyada@ladyada301-PC /cygdrive/c/Users/ladyada/Desktop/crosstool-NG
$ ./ct-ng build
[INFO ] Performing some trivial sanity checks
[INFO ] Build started 20151225.003807
[INFO ] Building environment variables
[INFO ] =====
[INFO ] Retrieving needed toolchain components' tarballs
[INFO ] Retrieving needed toolchain components' tarballs: done in 76.18s (at 01
:32)
[INFO ] =====
[INFO ] Extracting and patching toolchain components
[01:38] / |

```

```

/cygdrive/c/Users/ladyada/Desktop/crosstool-NG
[INFO ] Building environment variables
[INFO ] =====
[INFO ] Retrieving needed toolchain components' tarballs
[INFO ] Retrieving needed toolchain components' tarballs: done in 76.18s (at 01
:32)
[INFO ] =====
[INFO ] Extracting and patching toolchain components
[INFO ] Extracting and patching toolchain components: done in 260.96s (at 05:53
)
[INFO ] =====
[INFO ] Installing GMP for host
[INFO ] Installing GMP for host: done in 302.80s (at 10:56)
[INFO ] =====
[INFO ] Installing MPFR for host
[INFO ] Installing MPFR for host: done in 120.52s (at 12:57)
[INFO ] =====
[INFO ] Installing ISL for host
[INFO ] Installing ISL for host: done in 124.58s (at 15:01)
[INFO ] =====
[INFO ] Installing MPC for host
[INFO ] Installing MPC for host: done in 61.48s (at 16:03)
[INFO ] =====
[INFO ] Installing binutils for host
[16:09] - |

```

```

/cygdrive/c/Users/ladyada/Desktop/crosstool-NG
[INFO ] Extracting and patching toolchain components
[INFO ] Extracting and patching toolchain components: done in 260.96s (at 05:53
)
[INFO ] =====
[INFO ] Installing GMP for host
[INFO ] Installing GMP for host: done in 302.80s (at 10:56)
[INFO ] =====
[INFO ] Installing MPFR for host
[INFO ] Installing MPFR for host: done in 120.52s (at 12:57)
[INFO ] =====
[INFO ] Installing ISL for host
[INFO ] Installing ISL for host: done in 124.58s (at 15:01)
[INFO ] =====
[INFO ] Installing MPC for host
[INFO ] Installing MPC for host: done in 61.48s (at 16:03)
[INFO ] =====
[INFO ] Installing binutils for host
[INFO ] Installing binutils for host: done in 423.61s (at 23:07)
[INFO ] =====
[INFO ] Installing C library headers & start files
[INFO ] Installing C library headers & start files: done in 0.68s (at 23:07)
[INFO ] =====
[INFO ] Installing pass-2 core C compiler
[33:46] | |

```

```
INFO] Installing MPFR for host
INFO] Installing MPFR for host: done in 120.52s (at 12:57)
INFO] Installing ISL for host
INFO] Installing ISL for host: done in 124.58s (at 15:01)
INFO] Installing MPC for host
INFO] Installing MPC for host: done in 61.48s (at 16:03)
INFO] Installing binutils for host
INFO] Installing binutils for host: done in 423.61s (at 23:07)
INFO] Installing C library headers & start files
INFO] Installing C library headers & start files: done in 0.68s (at 23:07)
INFO] Installing pass-2 core C compiler
INFO] Installing pass-2 core C compiler: done in 929.81s (at 38:37)
INFO] Installing C library
INFO] Installing C library: done in 225.91s (at 42:23)
INFO] Installing final compiler
[42:51]
```

One more thing...

Just when you thought you were done, if you didn't install `libexpat-devel` you could get a `libexpat` complaint

```
build.log - XEmacs
File Edit View Cmds Tools Options Buffers Help
[ALL ] checking for library containing dlgetmodinfo... no
[ALL ] checking for iconv... no, consider installing GNU libiconv
[ALL ] checking for library containing waddstr... -lncurses
[ALL ] checking for library containing tgetent... none required
[ALL ] checking size of unsigned long long... 8
[ALL ] checking size of unsigned long... 8
[ALL ] checking size of unsigned _int128... 16
[ALL ] checking for library containing dlopen... (cached) none required
[ALL ] checking whether to use expat... yes
[ALL ] checking for ld used by GCC... /usr/lib/gcc/x86_64-pc-cygwin/4.9.3/...
[ALL ] checking if the linker (/usr/lib/gcc/x86_64-pc-cygwin/4.9.3/...
[ALL ] checking for shared library run path origin... done
[ALL ] checking for libexpat... no
[ERROR] configure: error: expat is missing or unusable
[ALL ] Makefile:8314: recipe for target 'configure-gdb' failed
[ERROR] make[2]: *** [configure-gdb] Error 1
[ALL ] make[2]: Leaving directory '/cygdrive/c/Users/ladyada/Desktop/crosstool-NG/.build/xtensa-esp108-elf/build/build-gdb-cross'
[ALL ] Makefile:840: recipe for target 'all' failed
[ERROR] make[1]: *** [all] Error 2
[ALL ] make[1]: Leaving directory '/cygdrive/c/Users/ladyada/Desktop/crosstool-NG/.build/xtensa-esp108-elf/build/build-gdb-cross'
[ERROR]
[ERROR] >>
[ERROR] >> Build failed in step 'Installing cross-gdb'
[ERROR] >> called in step '(top-level)'
```

Go back to the cygwin installed and add `libexpat` & `libexpat-devel`

```
cygdrive/c/Users/ladyada/Desktop/crosstool-NG
[INFO] Saving state to restart at step 'cc_for_host'...
[INFO] =====
[INFO] Installing final compiler
[INFO] Installing final compiler: done in 1008.22s (at 48:34)
[INFO] Saving state to restart at step 'libelf_for_target'...
[INFO] Saving state to restart at step 'binutils_for_target'...
[INFO] Saving state to restart at step 'debug'...
[INFO] =====
[INFO] Installing cross-gdb
[INFO] Installing cross-gdb: done in 630.44s (at 60:02)
[INFO] Saving state to restart at step 'test_suite'...
[INFO] Saving state to restart at step 'finish'...
[INFO] =====
[INFO] Cleaning-up the toolchain's directory
[INFO] Stripping all toolchain executables
[INFO] Cleaning-up the toolchain's directory: done in 13.73s (at 60:57)
[INFO] Build completed at 20151225.205523
[INFO] (elapsed: 60:55.34)
[INFO] Finishing installation (may take a few seconds)...
[60:57]
ladyada@ladyada301-PC /cygdrive/c/Users/ladyada/Desktop/crosstool-NG
$
```

Whew. You can find your toolchain in **builds/platformname**

Running outside of Cygwin

You don't have to run the compiler from within Cygwin terminal, but you'll need to copy & paste **cygwin1.dll** into your **builds/platform/bin** folder if so! You can find the file in **C:\cygwin64\bin**

