

A survival guide to Radiance on Windows

When you have (almost) no choice :-)

Why am I doing this?

- OS Monopoly
 - PCs come with Windows pre-installed
- Corporate power (somebody else has decided for you)
- Integration with other Windows programmes (Ecotect, IES, etc.)
- Self inflicted pain

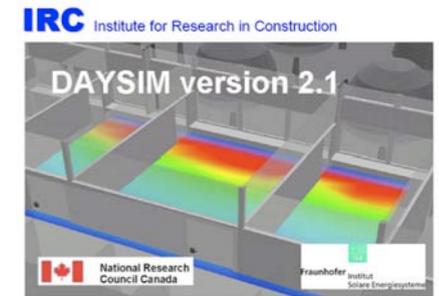
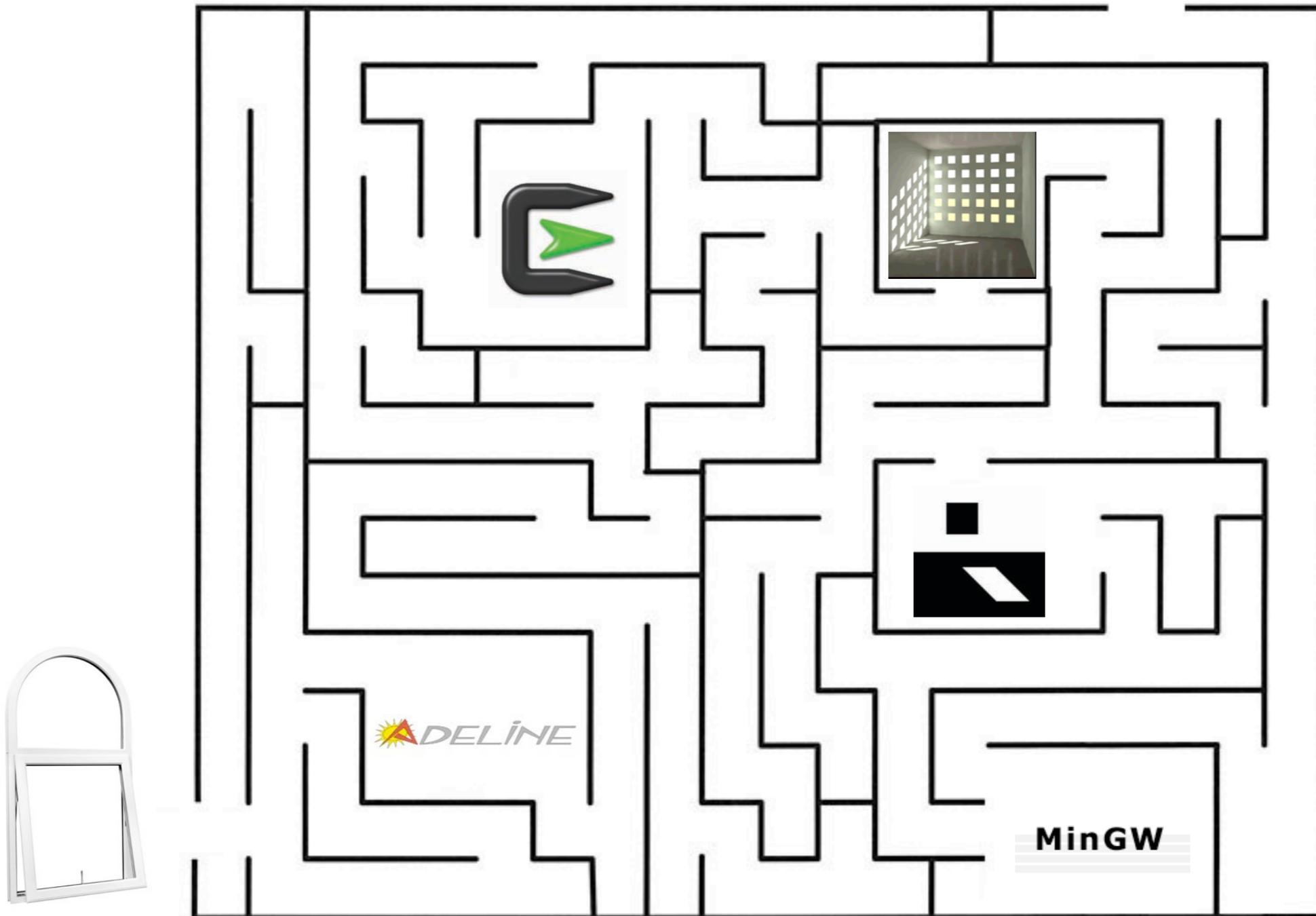
Are there no alternatives?

- Linux live distros
 - Learnix includes Radiance!
- Linux distros have become easier to install and use
- Virtualisation
 - VMware, VirtualBox, Qemu, etc.
- Running Radiance from a remote UNIX box, using Putty and Xming for example

What do I need to use Radiance?

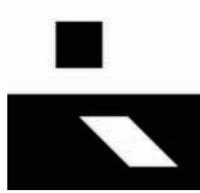
- Radiance “command line” tools
 - Binaries
 - Shell scripts
- CAD / 3D exporters
- HDR image viewers
- Radiance interactive viewers

Radiance distributions for Windows: Into the maze



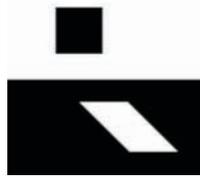
Radiance distributions for Windows: Comparison

commercial
products

 rayfront	 adeline	 desktop radiance	 cygwin binaries	 mingw binaries
development stopped in 2003	development stopped in 2002	development stopped in 2001	voluntarily supported and (almost) up-to-date	voluntarily supported and (almost) up-to-date

Radiance distributions for Windows: Comparison

commercial
products

 <p>rayfront</p>	 <p>adeline</p>	 <p>desktop radiance</p>	 <p>cygwin binaries</p>	 <p>mingw binaries</p>
<p>includes a GUI, all “windows native” binaries and compiled shell scripts and more (materials, cal files, more up-to-date versions of winview and winimage)</p>	<p>includes most “windows native” binaries and compiled shell scripts, but I would not recommend the GUI</p>	<p>includes all the “windows native” binaries and winview and winimage</p>	<p>exactly the same Radiance binaries as in the source distribution, including the X11 programmes, but requires extra installation of the Cygwin infrastructure</p>	<p>only Radiance binaries, no shell scripts (yet) and no X11 programmes, but does not require any extra installation</p>

The Radiance on Windows (free) survival kits

- Kit 1: 
 - Cygwin + Cygwin Radiance distribution
- Kit 2: 
 - MinGW Radiance distribution +
interactive viewer + HDR image viewer

The Radiance on Windows Survival Kit: Option I: Cygwin + Cygwin Radiance distribution



- 1) Download and install Cygwin
 - 2) Download and install Cygwin Radiance
 - 3) Run Cygwin
 - 4) Run Radiance
- All UNIX programmes must be run from within the Cygwin shell
 - X.org packages or Xming must be installed to run ximage, rvu, etc.

Cygwin

- Cygwin is a Linux-like environment for Windows.
- It consists of a DLL (`cygwin1.dll`), which acts as an emulation layer providing POSIX (Portable Operating System Interface) system call functionality, and a collection of tools, which provide a Linux look and feel.

I) Cygwin installation

[Cygwin Home](#)
[Cygwin/X Home](#)
[Red Hat Cygwin Product](#)
[Community](#)
• [Reporting Problems](#)
• [Mailing Lists](#)
• [Newsgroups](#)
• [GoldStars](#)
• [Mirror Sites](#)
• [Donations](#)
[Documentation](#)
• [FAQ](#)
• [User's Guide](#)
• [API Reference](#)
• [Acronyms](#)
[Contributing](#)
• [Snapshots](#)
• [Source in CVS](#)
• [Cygwin Packages](#)
[Software](#)
• [Setup Package Search](#)
• [Related Sites](#)
• [Licensing Terms](#)
[sourceware.org](#)

© GNU + Cygnus + Windows = cygwin™

What Is Cygwin?

Cygwin is a Linux-like environment for Windows. It consists of two parts:

- A DLL (cygwin1.dll) which acts as a Linux API emulation layer providing substantial Linux API functionality.
- A collection of tools which provide Linux look and feel.

The Cygwin DLL currently works with all recent, commercially released x86 32 bit and 64 bit versions of Windows, with the exception of Windows CE.

Note that the official support for Windows 95, Windows 98, and Windows Me will be discontinued with the next major version (1.7.0) of Cygwin.

What Isn't Cygwin?

- Cygwin is **not** a way to run native linux apps on Windows. You have to rebuild your application *from source* if you want it to run on Windows.
- Cygwin is **not** a way to magically make native Windows apps aware of UNIX ® functionality, like signals, ptys, etc. Again, you need to build your apps *from source* if you want to take advantage of Cygwin functionality.

[Help, contact, web page, other info...](#)

 [Install or update now!](#) (using setup.exe) or [get help on using setup.exe.](#) or [find](#) where a package or file lives in the Cygwin release.

Latest Cygwin DLL release version is [1.5.25-15](#)

Installing and Updating Cygwin

The latest net releases of the Cygwin DLL are numbered 1.n.x, where "n" is currently "5" (e.g., 1.5.25). Any Cygwin program built from December 1998 onward should work correctly with 1.n.x DLLs.

[Install Cygwin now](#)

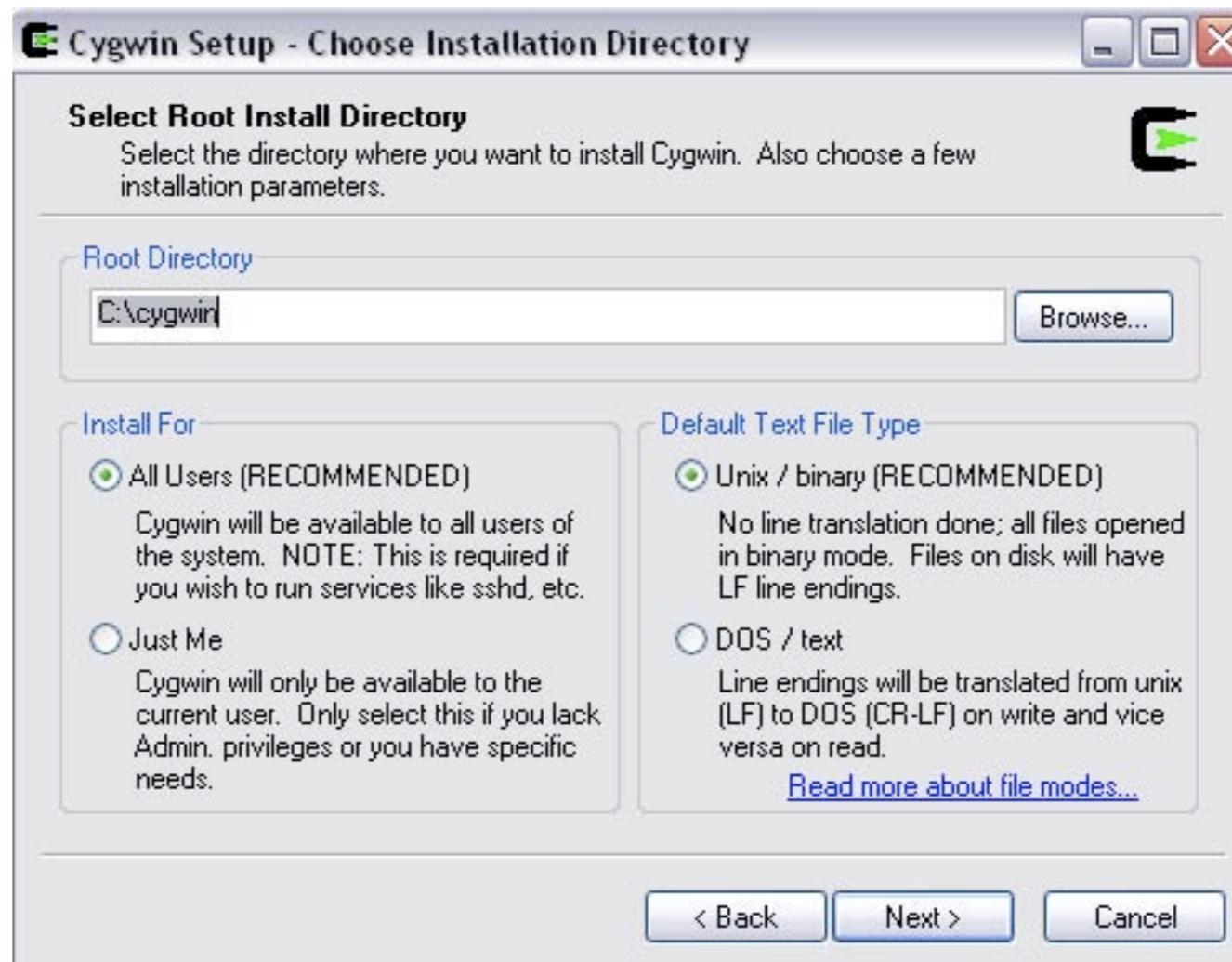
Get the setup programme

I) Cygwin installation



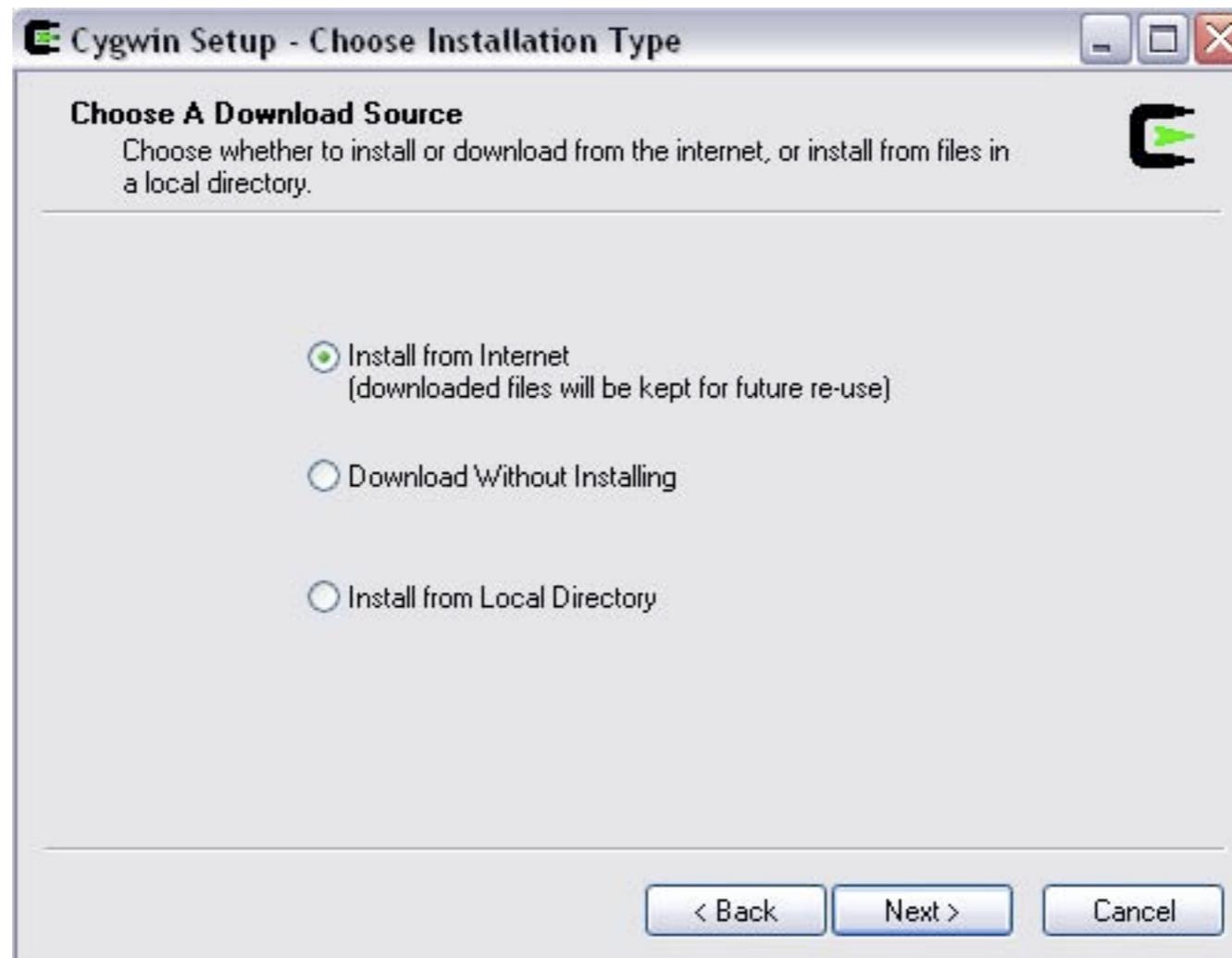
Run it

I) Cygwin installation



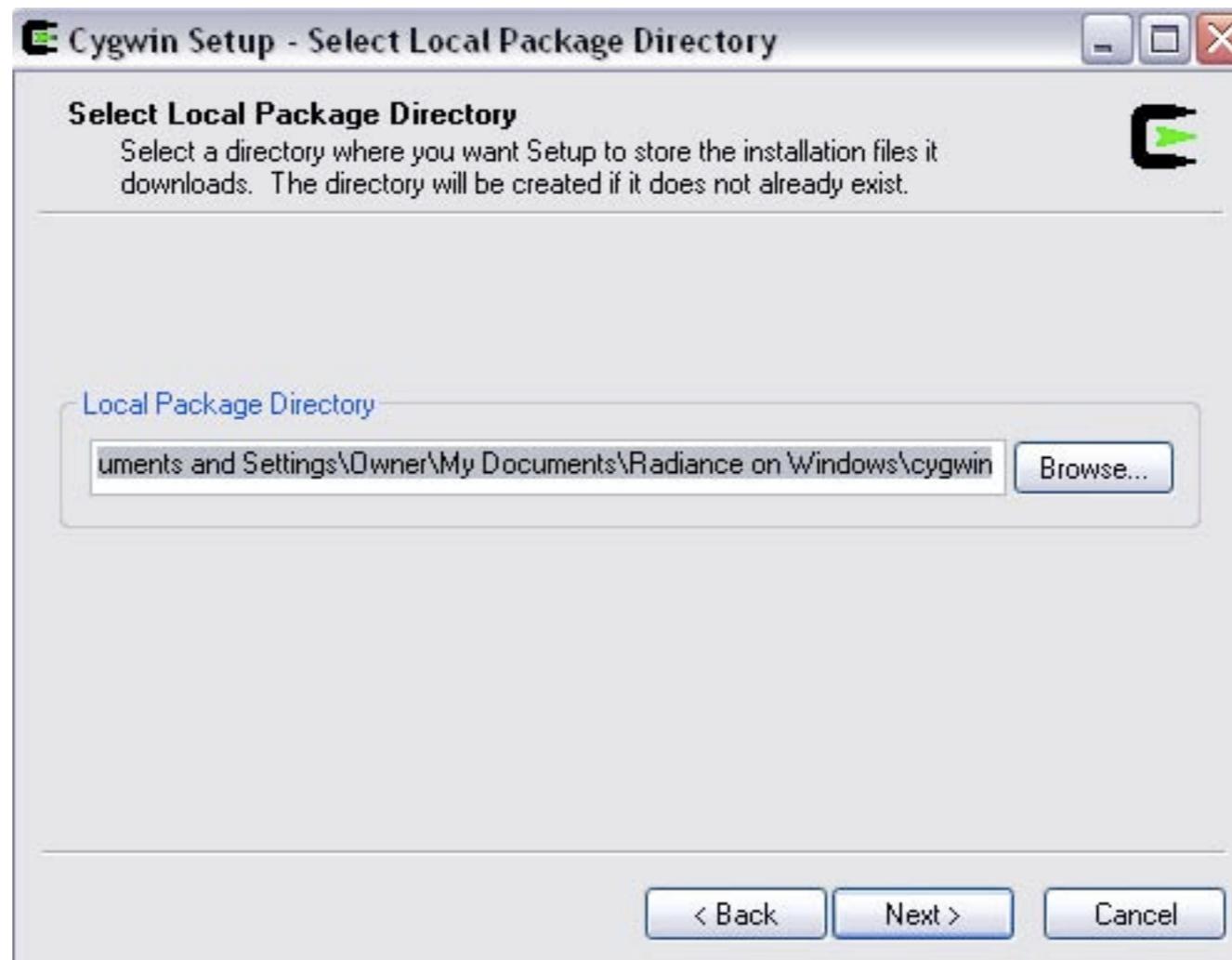
Choose installation directory

1) Cygwin installation



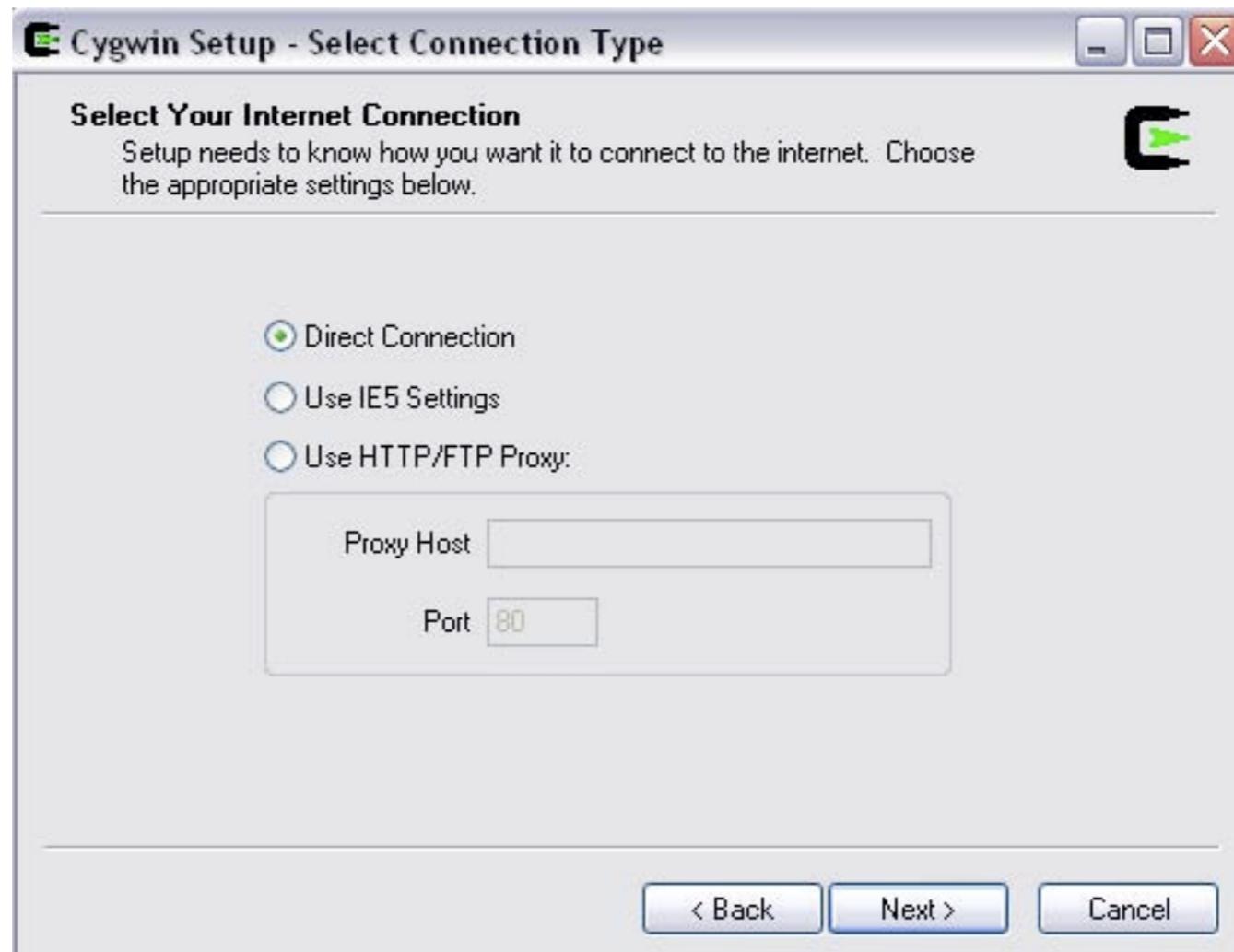
Choose whether to install from the Internet or from a local directory, or to download only

1) Cygwin installation



Select where to save downloaded packages

1) Cygwin installation



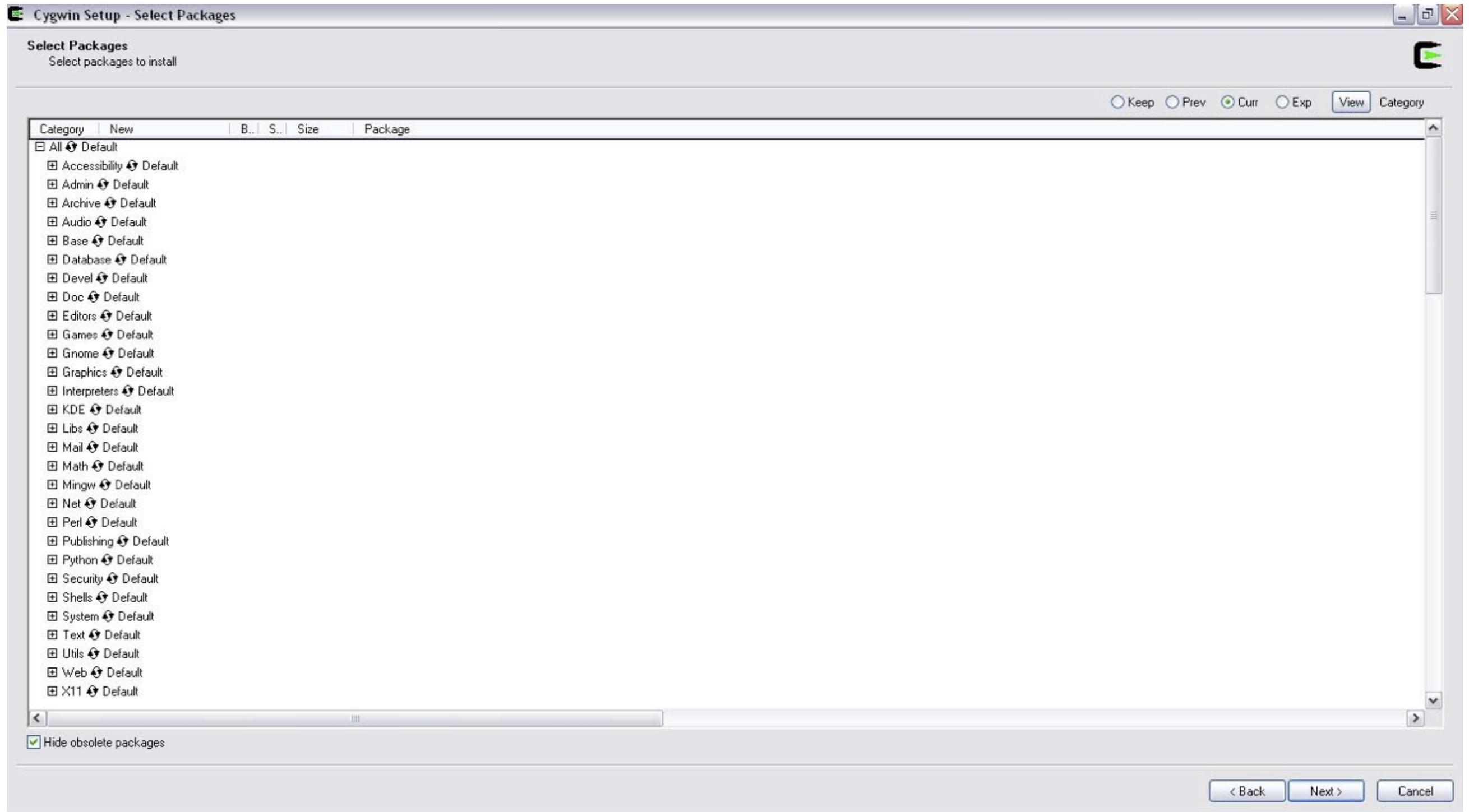
Select the type of connection and proxy settings

1) Cygwin installation



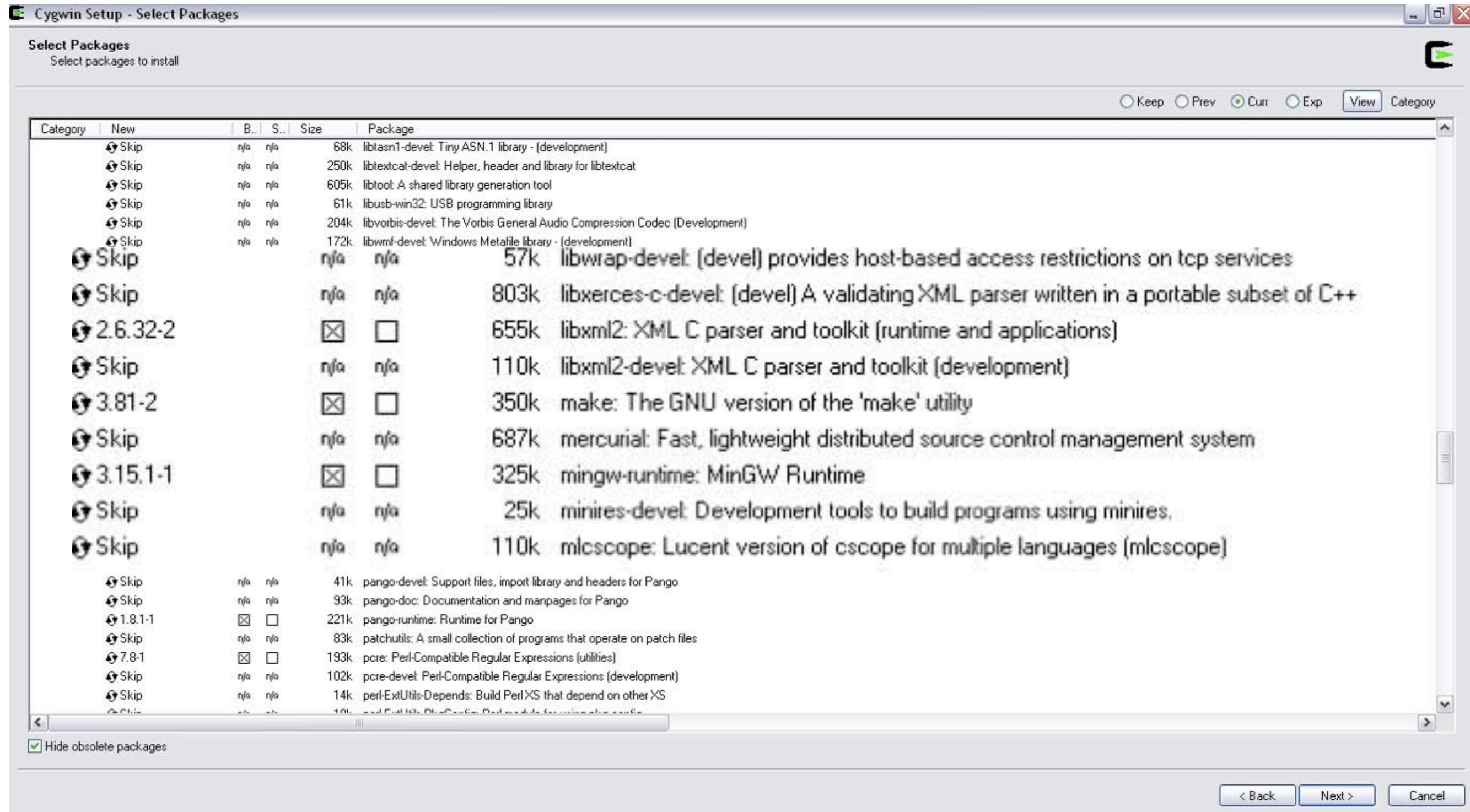
Choose download mirror

I) Cygwin installation



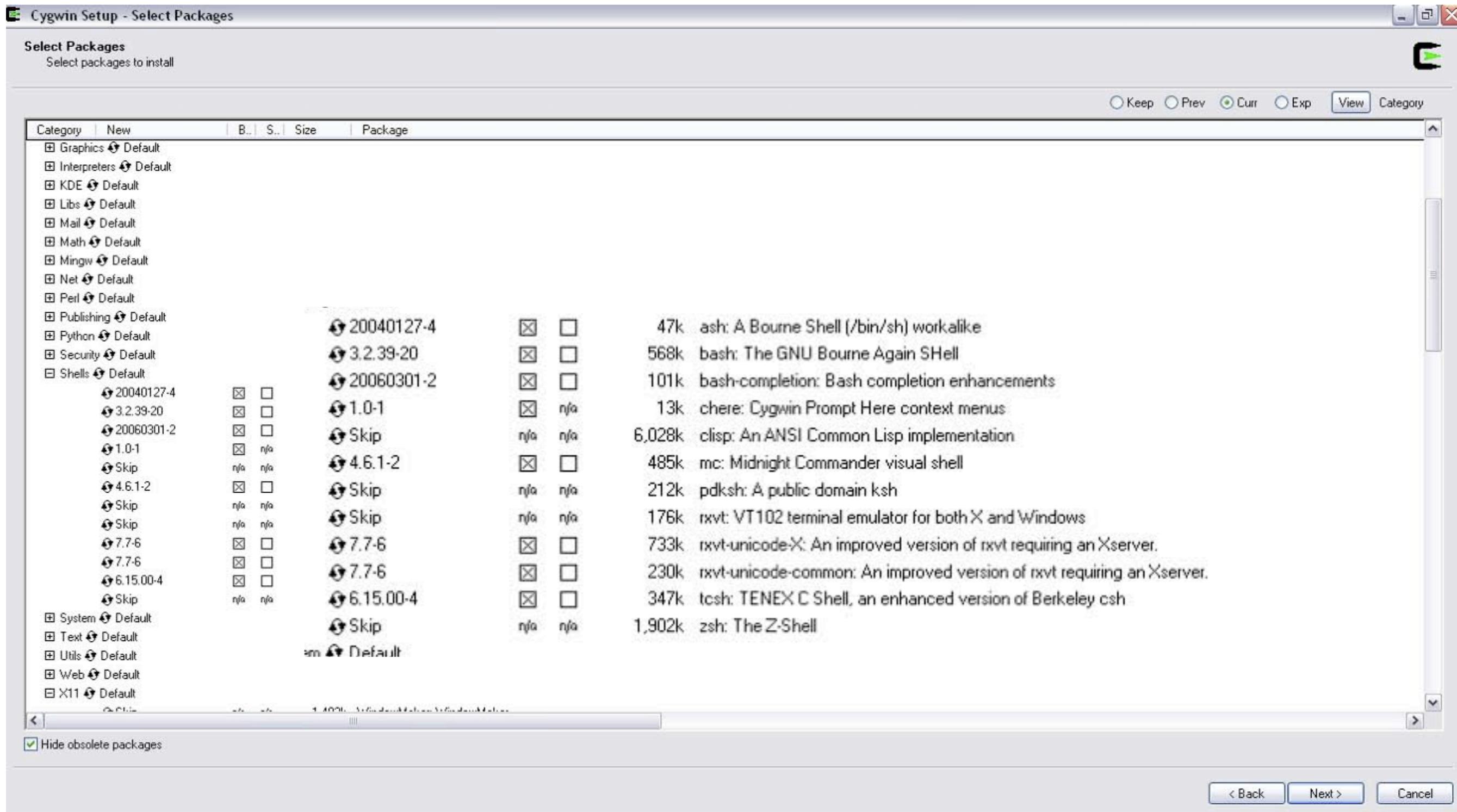
Select packages to install

I) Cygwin installation



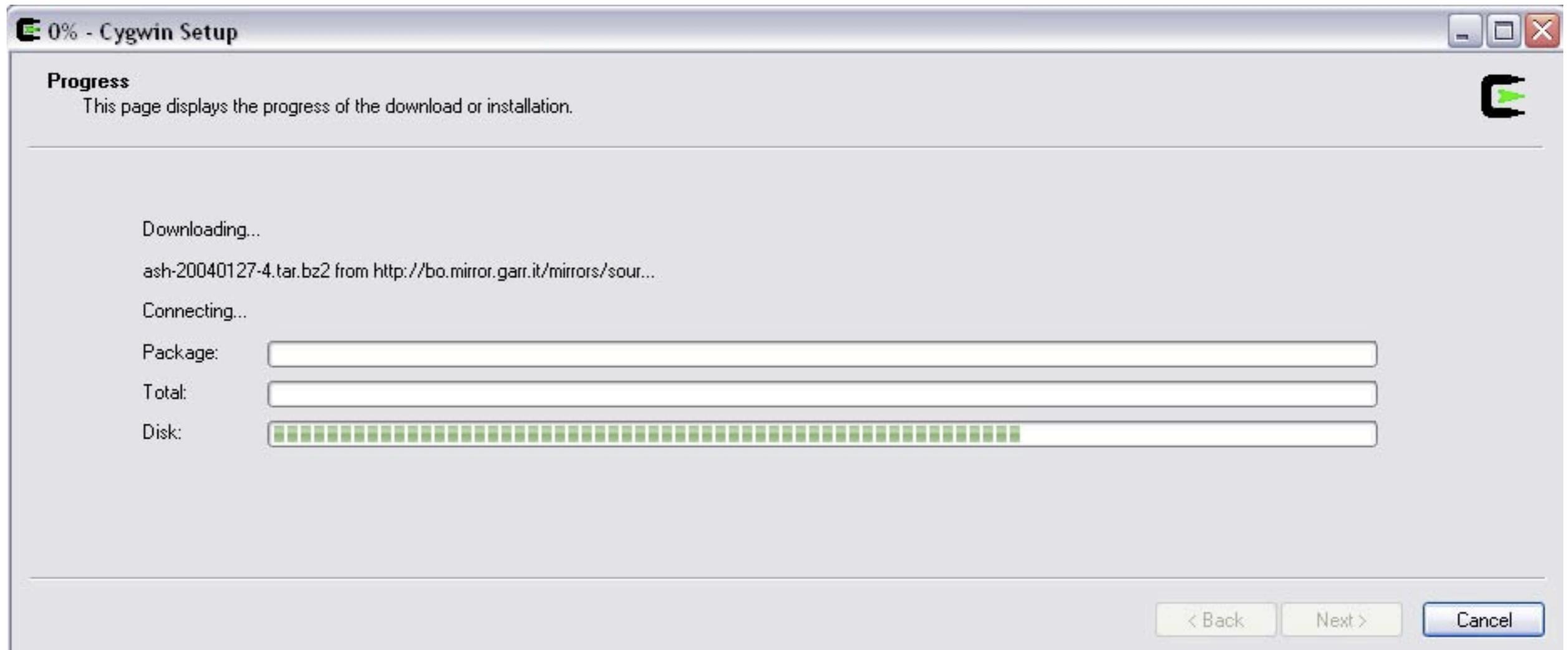
Selecting “make” can be useful

I) Cygwin installation



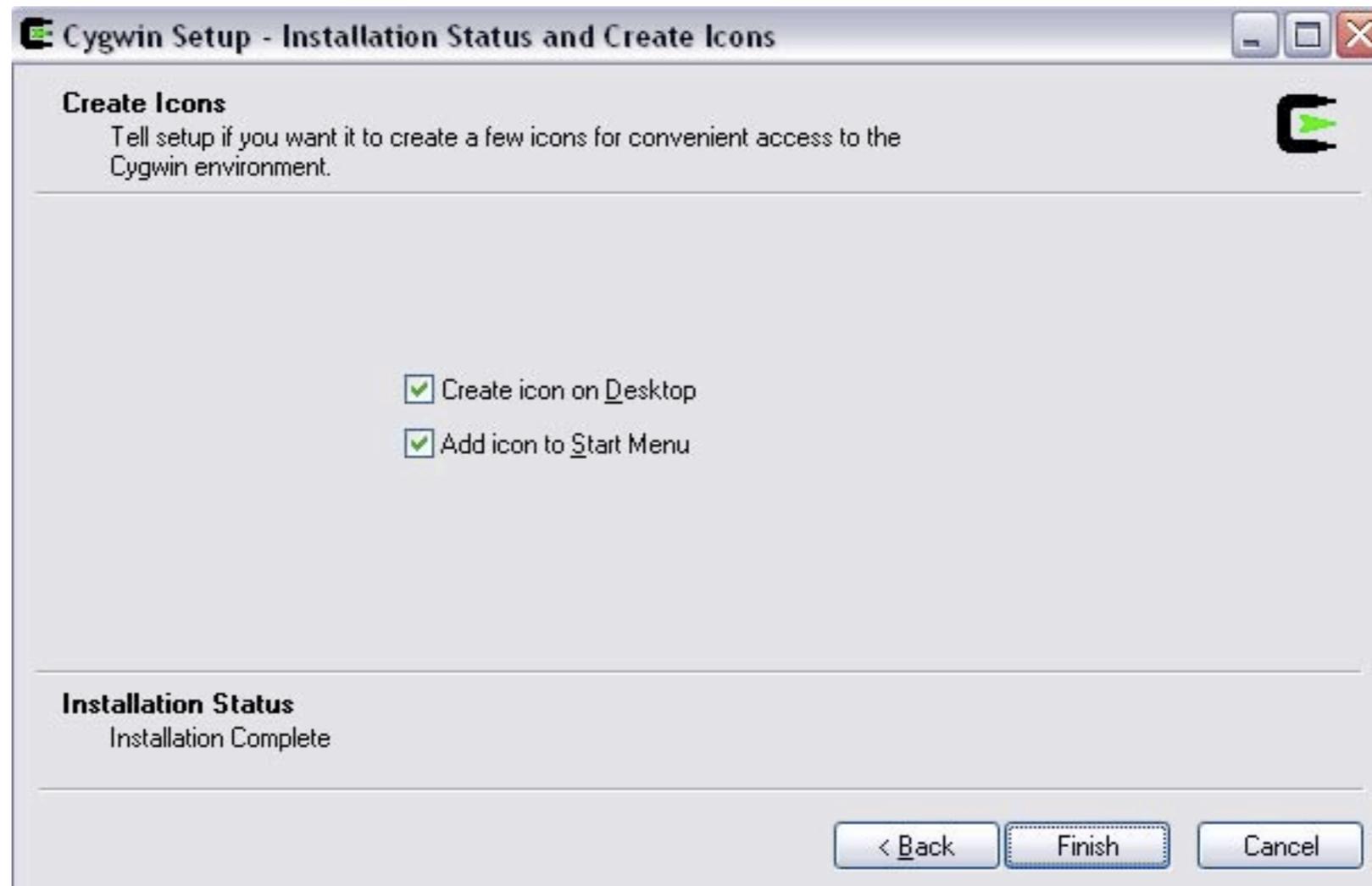
Don't forget to select the "tcsh" package

I) Cygwin installation



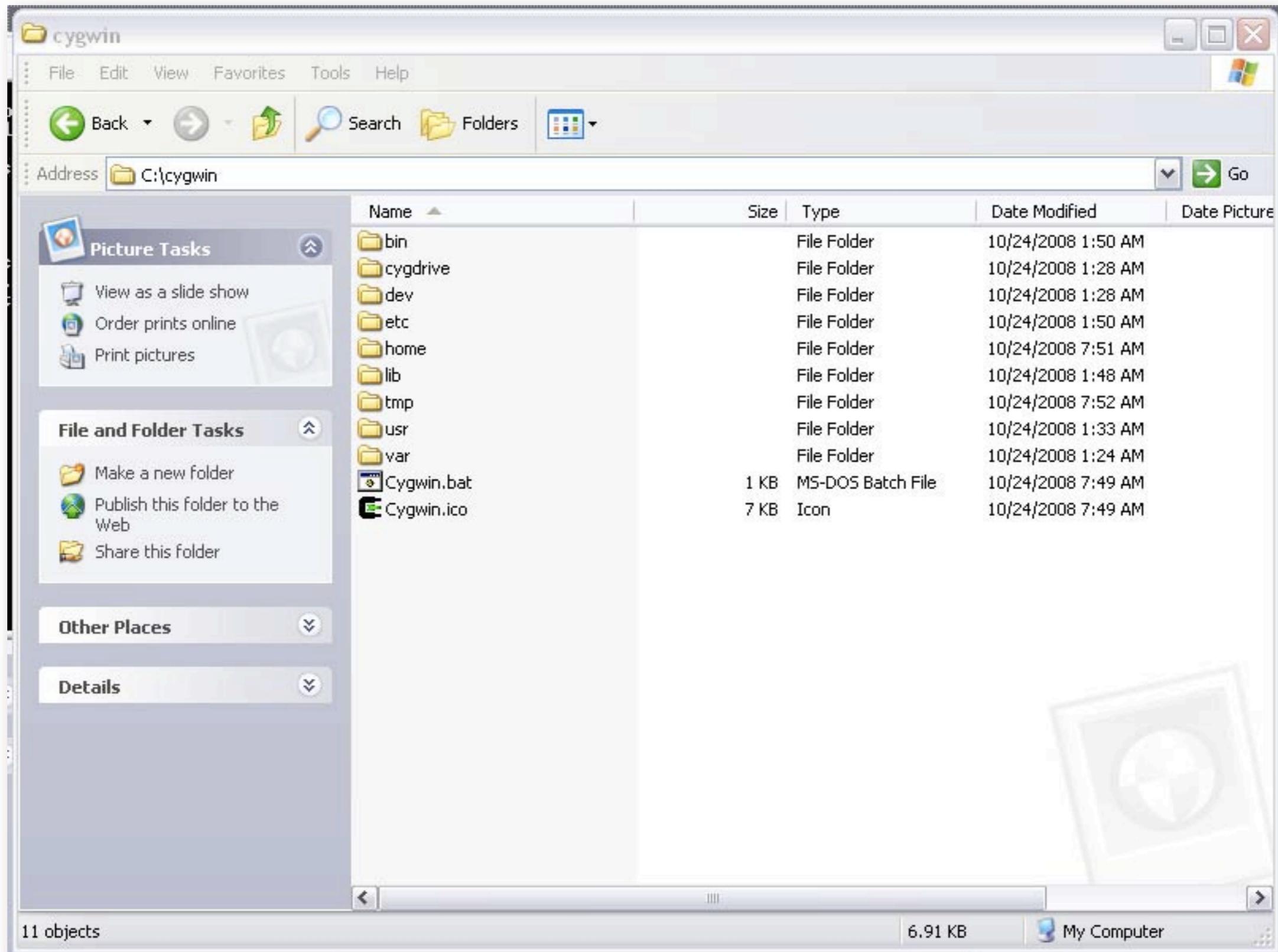
Wait a bit ...

1) Cygwin installation

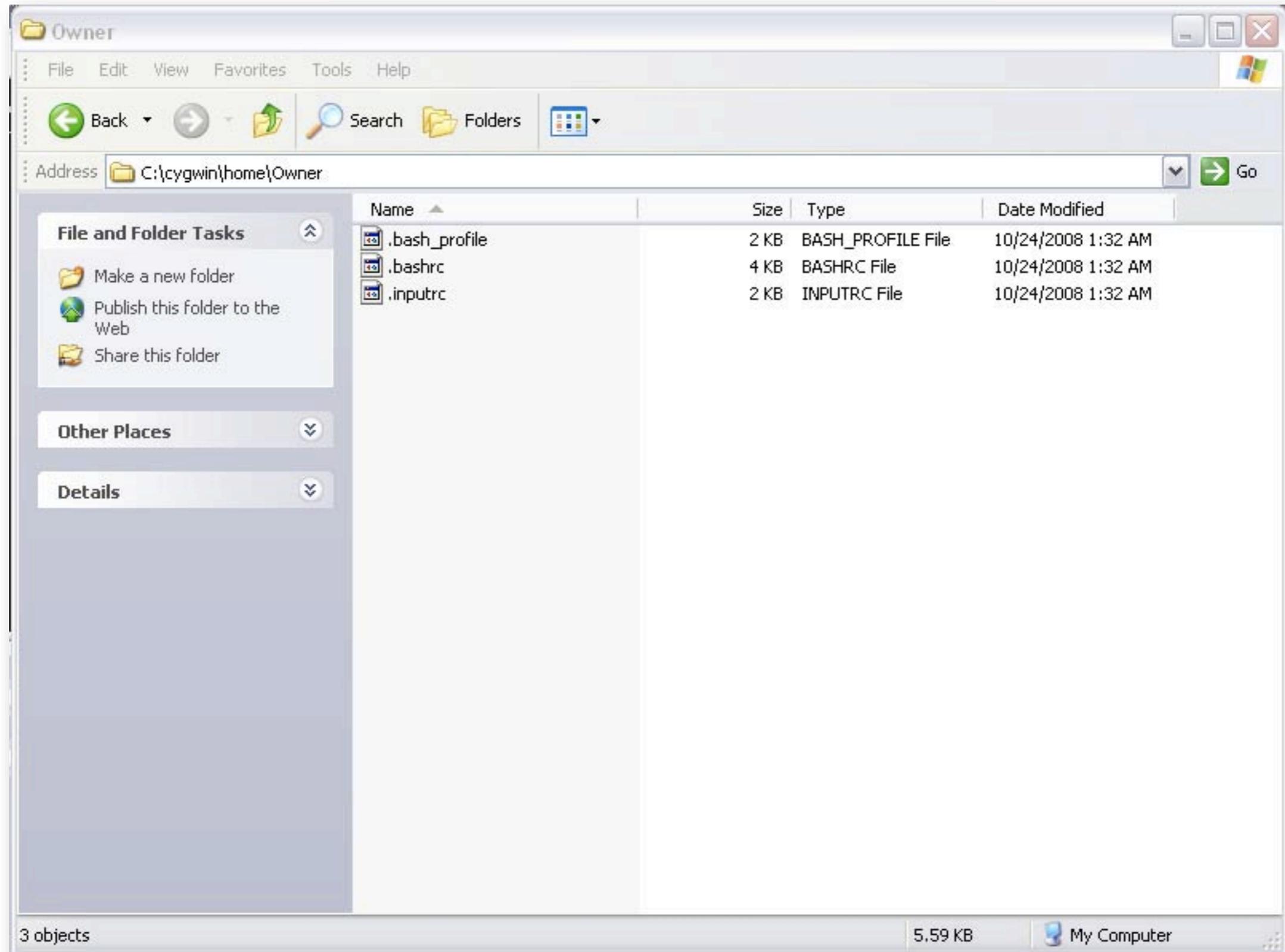


... until the final click

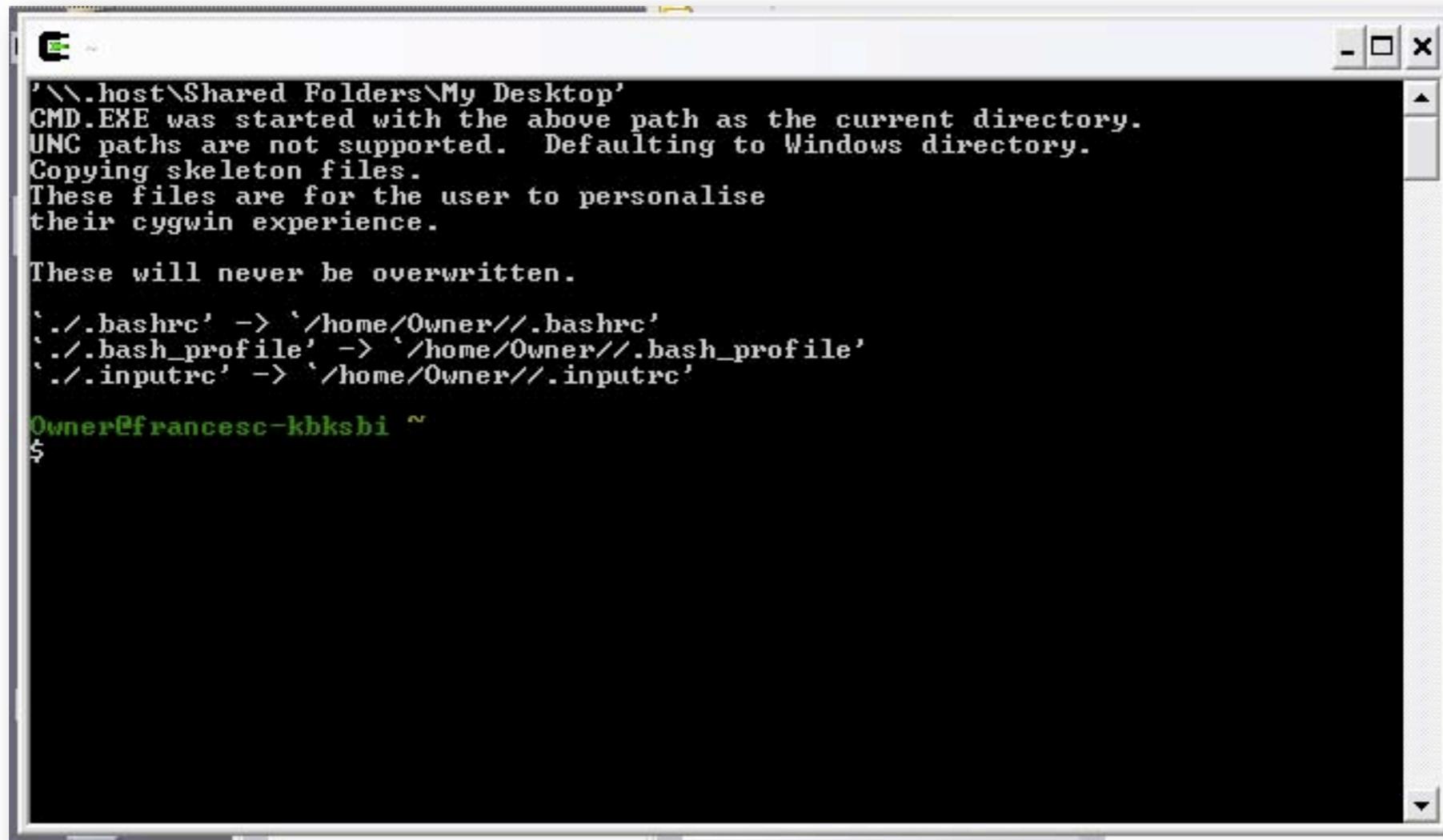
I) Cygwin installation



I) Cygwin installation



1) Cygwin installation



```
'\\.\host\Shared Folders\My Desktop'  
CMD.EXE was started with the above path as the current directory.  
UNC paths are not supported.  Defaulting to Windows directory.  
Copying skeleton files.  
These files are for the user to personalise  
their cygwin experience.  
  
These will never be overwritten.  
  
'./bashrc' -> '/home/Owner//.bashrc'  
'./bash_profile' -> '/home/Owner//.bash_profile'  
'./inputrc' -> '/home/Owner//.inputrc'  
  
Owner@francesc-kbksi ~  
$
```

2) Radiance installation

The screenshot shows a Firefox browser window displaying the website <http://www.bozzograo.net/radiance/modules.php?op=modload&name=Downloads&file=index&req=viewsd>. The page title is "Radiance tools -- Downloads". The main content area lists three Cygwin Radiance packages:

- Cygwin Radiance 3R6P1** (marked with a star)
Description: Radiance 3R6P1 official release.
Version: | File size: 6.27 MB
Added on: 04-Jan-2005 | Downloads: 736
[Home page](#) | [Details](#)
- Cygwin Radiance 3R7P1** (marked with a star)
Description: Radiance official (patched) release.
Version: 3R7P1 | File size: 9.32 MB
Added on: 04-Aug-2005 | Downloads: 884
[Home page](#) | [Details](#)
- Cygwin Radiance pmap 3.13**
Description: Latest pmap Radiance release.
Version: 3.13 | File size: 4.75 MB
Added on: 04-Jan-2005 | Downloads: 457
[Home page](#) | [Details](#)

Below these packages, there is a section for "eulum2ies" with the description: "This is a Linux binary of Carsten Bauer's conversion programme from Eulumdat to IES files."

The website also features a "Main Menu" with links to Home, b/rad, Galleries, Downloads, FAQ, News, Search, Stats, and Web Links. A sidebar on the left indicates "Online" statistics: "There are 3 unregistered users and 0 registered users on-line. You can log-in or register for a user account here."

Download the Cygwin Radiance package from <http://www.bozzograo.net/radiance>

2) Radiance installation

1. Launch the Cygwin console (double-click on the Cygwin desktop icon)

2. Change to root directory (don't type the dollar sign):

```
$ cd /
```

3. Create the "opt" directory:

```
$ mkdir /opt
```

4. Create the "radiance" directory inside /opt:

```
$ cd /opt
```

```
$ mkdir radiance
```

5. Copy the radiance_cygwin_3R9.tar.gz inside C:\cygwin\opt\radiance

6. Extract the archive:

```
$ cd radiance
```

```
$ tar zxvf radiance_cygwin_3R9.tar.gz
```

7. Append bash_profile file to the one in the home directory:

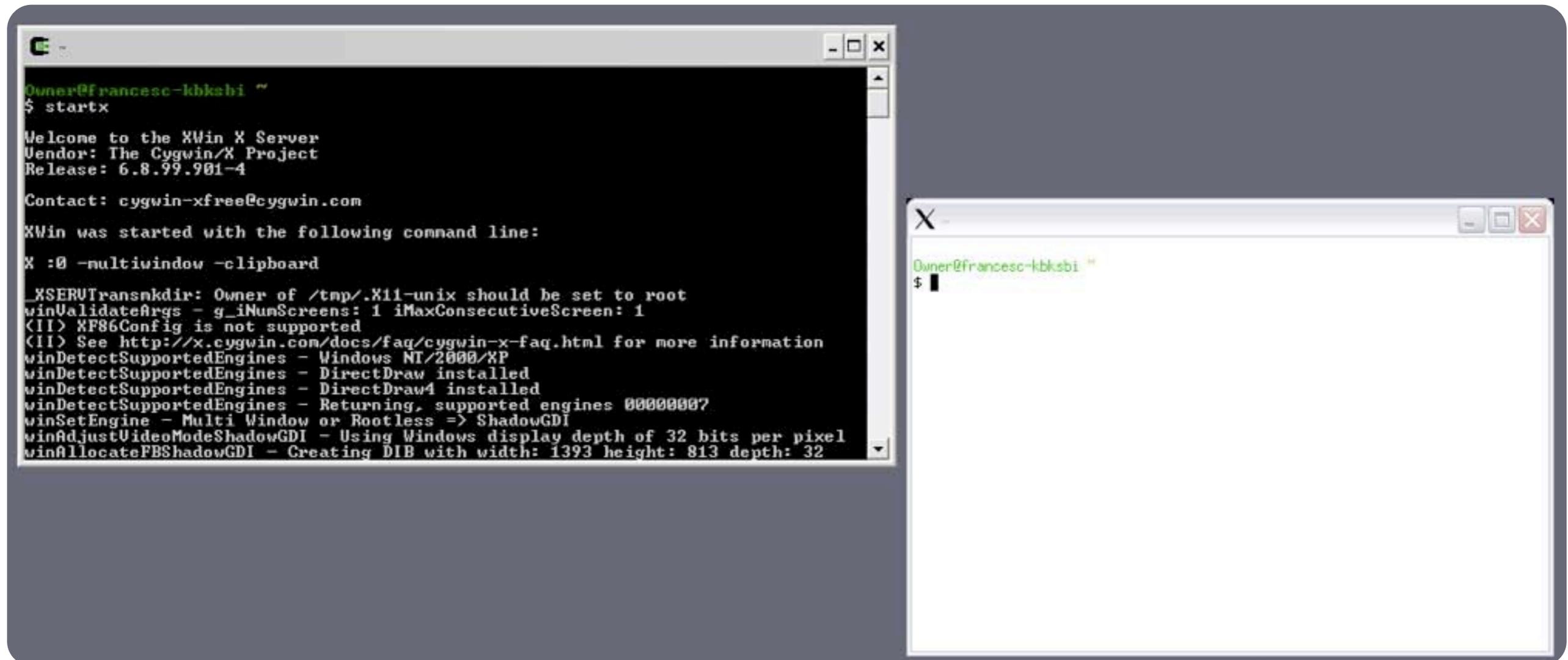
```
$ cat bash_profile >> ~/.bash_profile
```

8. Close the Cygwin console.

9. Re-launch the Cygwin console.

3) Run Cygwin

- XII
 - either use the provided X.org (type startx from Cygwin command line) ...



```
Owner@francesc-kbksbi ~
$ startx

Welcome to the XWin X Server
Vendor: The Cygwin/X Project
Release: 6.8.99.901-4

Contact: cygwin-xfree@cygwin.com

XWin was started with the following command line:
X :0 -multiwindow -clipboard

_XSERVTransmkdir: Owner of /tmp/.X11-unix should be set to root
winValidateArgs - g_iNumScreens: 1 iMaxConsecutiveScreen: 1
<II> XF86Config is not supported
<II> See http://x.cygwin.com/docs/faq/cygwin-x-faq.html for more information
winDetectSupportedEngines - Windows NT/2000/XP
winDetectSupportedEngines - DirectDraw installed
winDetectSupportedEngines - DirectDraw4 installed
winDetectSupportedEngines - Returning, supported engines 00000007
winSetEngine - Multi Window or Rootless => ShadowGDI
winAdjustVideoModeShadowGDI - Using Windows display depth of 32 bits per pixel
winAllocateFBShadowGDI - Creating DIB with width: 1393 height: 813 depth: 32
```

3) Run Cygwin

- ... or use Xming

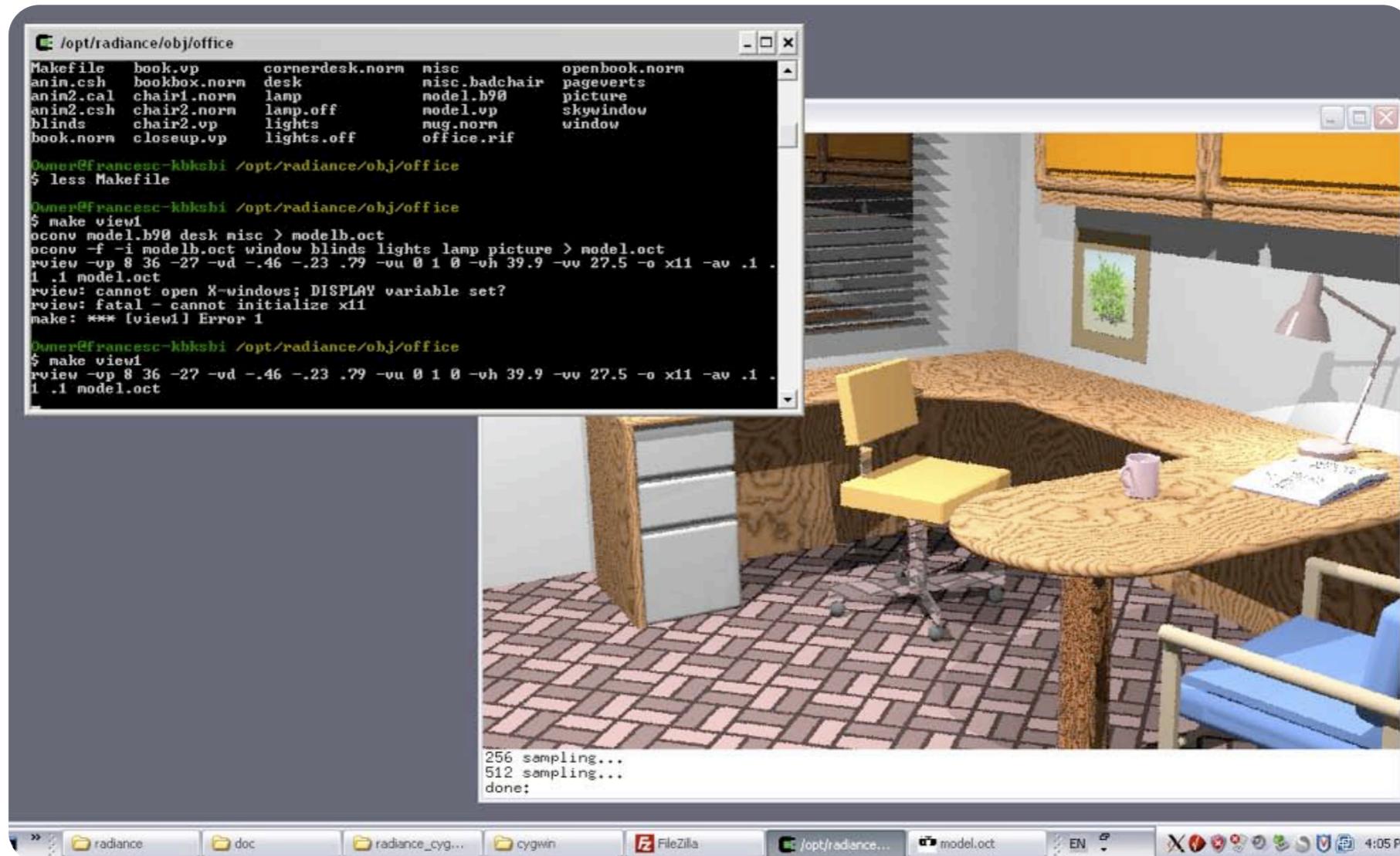
<http://www.straightrunning.com/XmingNotes/>

first run the Xming server 

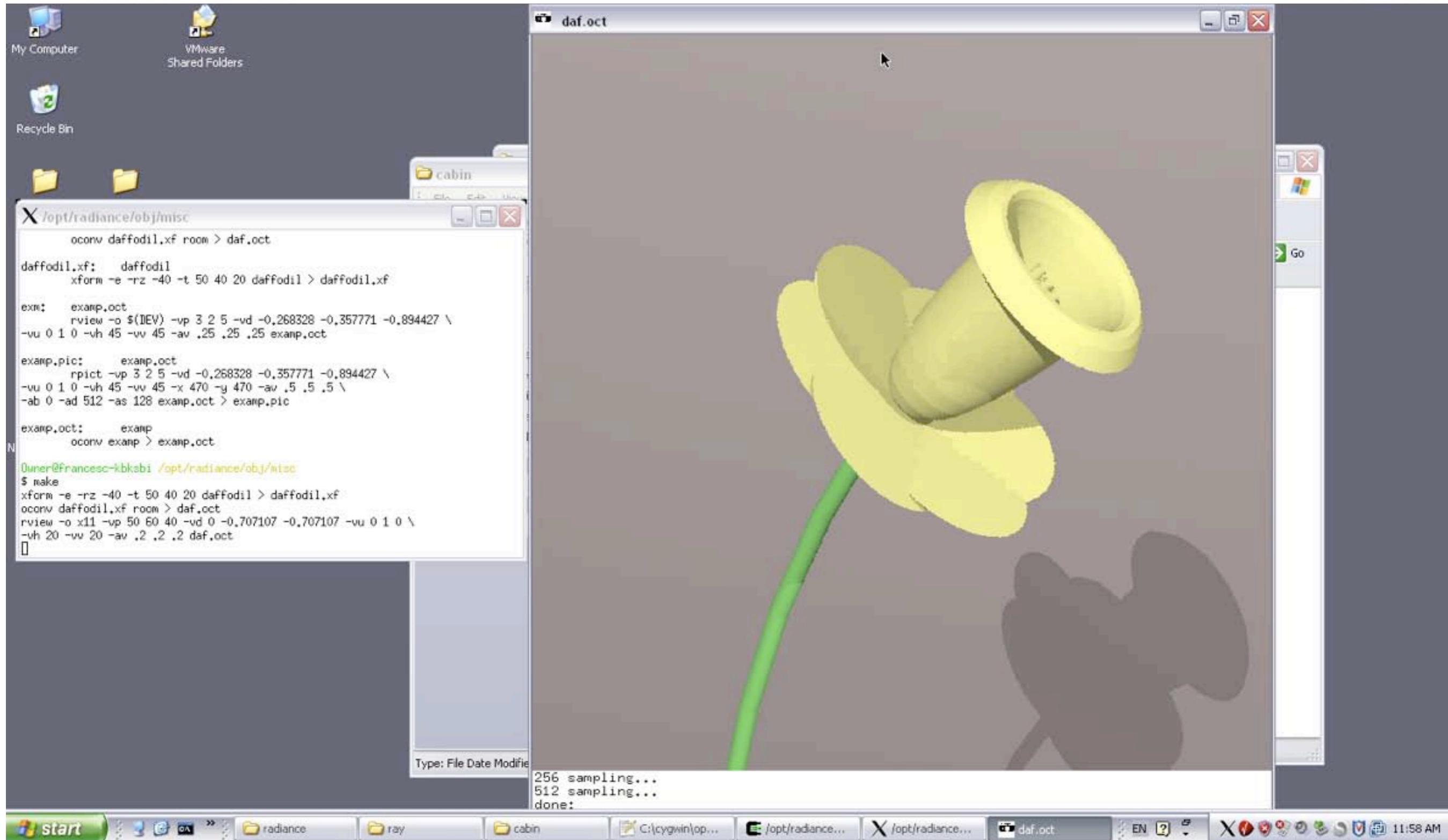
then export the DISPLAY variable

```
$ export DISPLAY=:0
```

then run the Radiance X I I applications



4) Run Radiance



Cygwin shell and performance

- By default no Cygwin program can allocate more than 384 MB of memory (program+data). To use more real or virtual memory, add an entry in the either the HKEY_LOCAL_MACHINE (to change the limit for all users) or HKEY_CURRENT_USER (for just the current user) section of the registry:
 - Add the DWORD value heap_chunk_in_mb and set it to the desired memory limit in decimal Mb, or
 - using the regtool program included in the Cygwin package, like in this example that sets memory limit to 1024 MB:

```
regtool -i set /HKLM/Software/Cygnus\ Solutions/Cygwin/  
heap_chunk_in_mb 1024
```

```
regtool -v list /HKLM/Software/Cygnus\ Solutions/Cygwin
```

- Cygwin supports both Win32- and POSIX-style paths, using either forward or back slashes as the directory delimiter. This means that no changes to Makefiles and shell scripts are required.
- UNC pathnames (starting with two slashes) are supported.

Cygwin shell and performance

- The Windows filesystem is accessible from the `/cygdrive` mount point.
- `fork` calls are slower than `spawn` calls.
- Executable program filenames end with `.exe` but the `.exe` need not be included in the command, so that traditional UNIX names can be used. For programs that end in `.bat` and `.com`, you cannot omit the extension.
- UNIX and Win32 use different end-of-line terminators in text files. Consequently, carriage-return newlines have to be translated on the fly by Cygwin into a single newline when reading in text mode. This seems to slow down command line pipelines. This solution addresses the compatibility requirement at the expense of violating the POSIX standard that states that text and binary mode will be identical. Consequently, processes that attempt to `lseek` through text files can no longer rely on the number of bytes read as an accurate indicator of position in the file. For this reason, the `CYGWIN` environment variable can be set to override this behavior.
- Refer to the user guide for more information:

`C:\cygwin\usr\share\doc\cygwin-doc-1.4\cygwin-ug-net.pdf`

Cygwin Radiance To Do

- Package Radiance so that it can be installed directly from the Cygwin installation programme `setup.exe`

The Radiance on Windows Survival Kit:

Option 2:

MinGW

MinGW Radiance + interactive viewer + HDR viewer

- Download and install MinGW
- Interactive viewer
 - nrv (<http://www.aisarquitectura.com/nrv/>)
 - winrview (Desktop Radiance <http://radsite.lbl.gov/deskrad/>)
- HDR image viewer
 - winimage (Desktop Radiance <http://radsite.lbl.gov/deskrad/>)
 - raddisplay (http://deluminaelab.com/en/raddisplay_details.html)
 - QTpfsGUI (<http://qtpfsgui.sourceforge.net/>)

MinGW

- MinGW: A collection of freely available and freely distributable Windows specific header files and import libraries, additional to the GNU Compiler Collection (GCC) and its associated tools (GNU binutils). MinGW provides a complete Open Source programming tool set which is suitable for the development of native Windows programmes that do not depend on any 3rd-party C runtime DLLs.
- MSYS: A Minimal SYStem providing a POSIX compatible Bourne shell environment, with a small collection of UNIX command line tools. Primarily developed as a means to execute the configure scripts and Makefiles used to build Open Source software, but also useful as a general purpose command line interface to replace Windows cmd.exe.

I) Download MinGW Radiance

The screenshot shows the 'Radiance tools' website. The header includes the site name 'Radiance tools ...' and a tagline 'b/rad and other free Radiance related stuff ...'. A navigation menu on the left lists 'Home', 'b/rad', 'Galleries', 'Downloads', 'FAQ', 'News', 'Search', 'Stats', and 'Web Links'. The main content area is titled 'Radiance tools -- Downloads' and features a search bar and a list of download categories. The 'Category: Radiance Binaries' section shows a folder icon for 'Old Radiance Binaries (8)'. Below this, there are two download entries for MinGW Radiance installers for Windows, each with a description, version, file size, and download count.

Radiance tools ... b/rad
and other free
Radiance related
stuff ...

Welcome to Radiance tools, ! Oct 26, 2008 - 11:43 PM

Main Menu

- Home
- b/rad
- Galleries
- Downloads
- FAQ
- News
- Search
- Stats
- Web Links

Online

There are 7 unregistered users and 0 registered users on-line.

You can log-in or register for a user account here.

Radiance tools -- Downloads

Downloads

[Main download area | New | Popular | Top-rated]

Category: Radiance Binaries

Downloads also available in Radiance Binaries sub-categories:

Old Radiance Binaries (8)

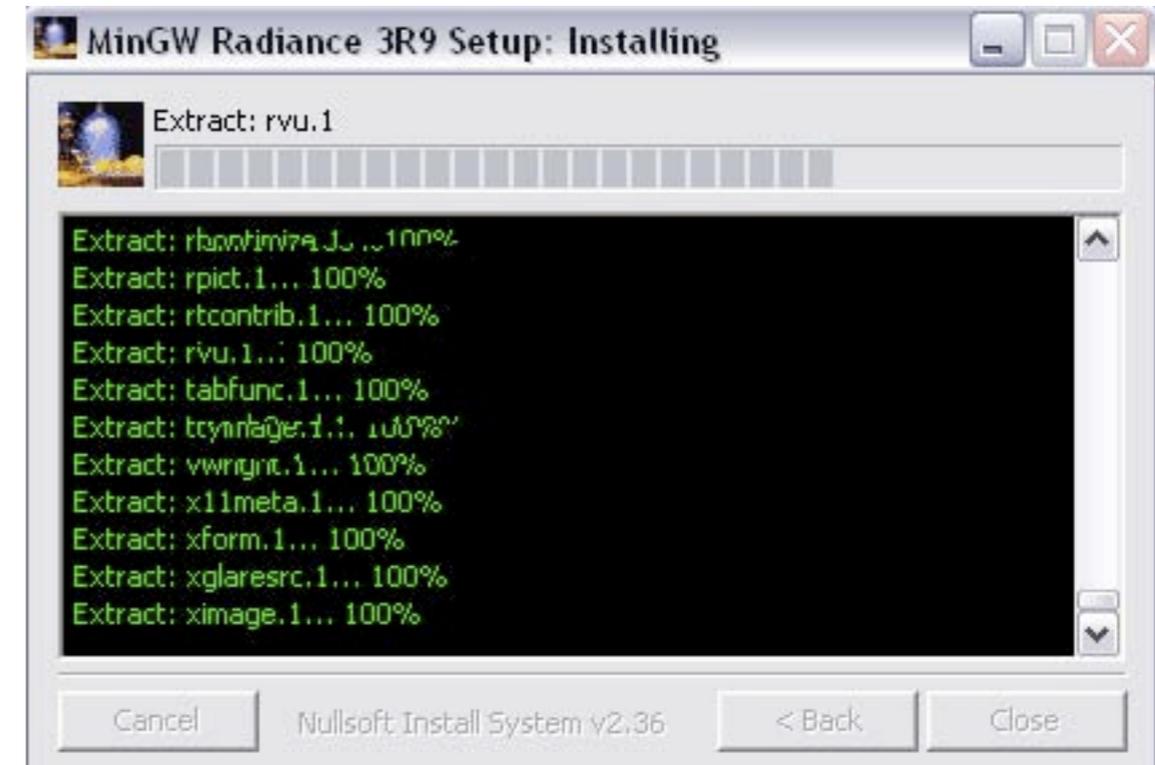
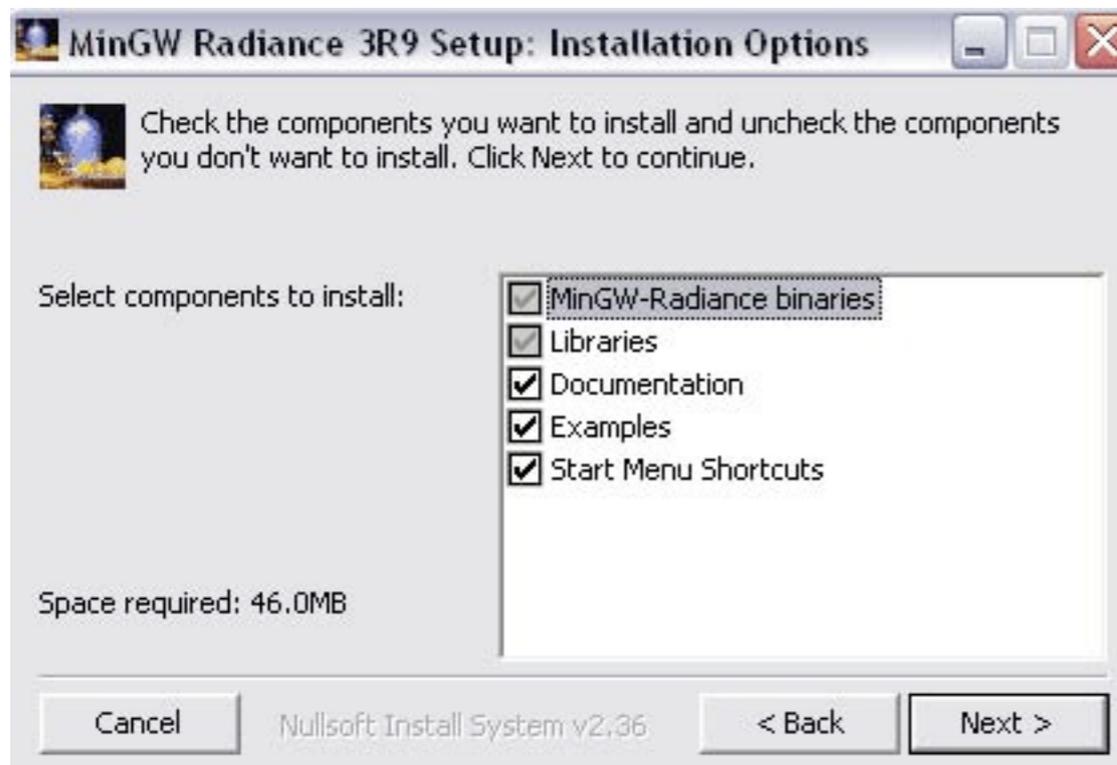
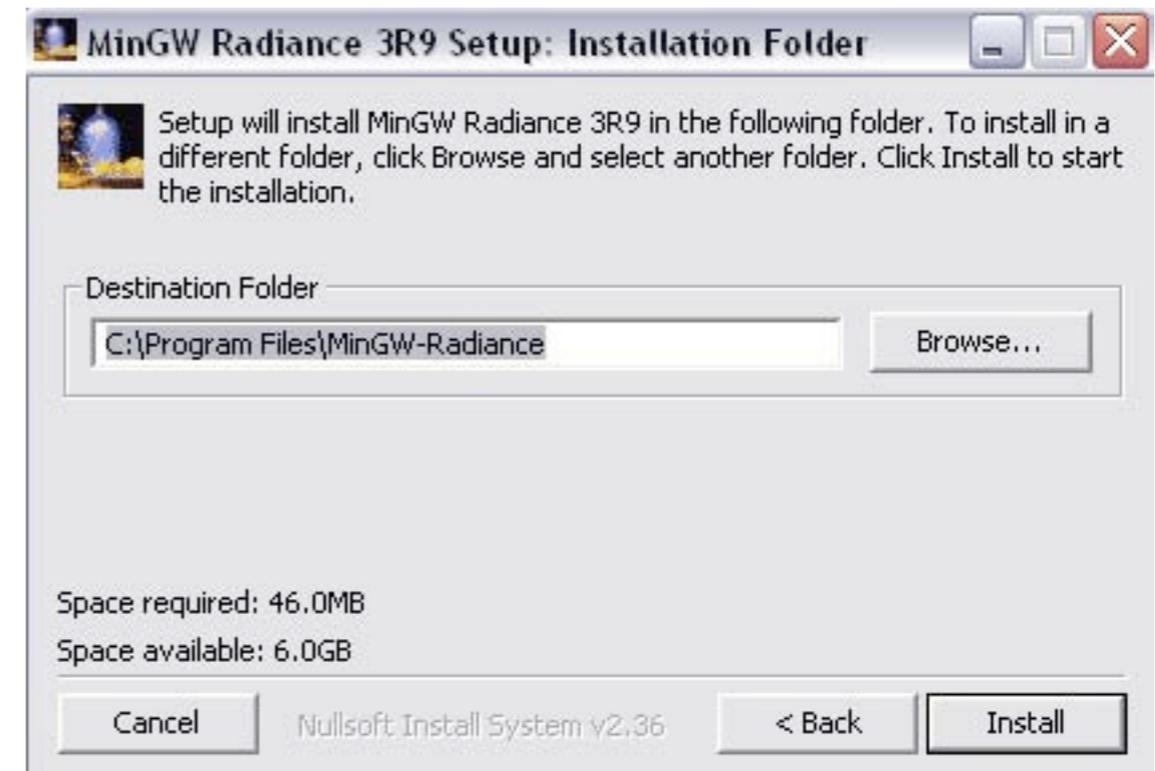
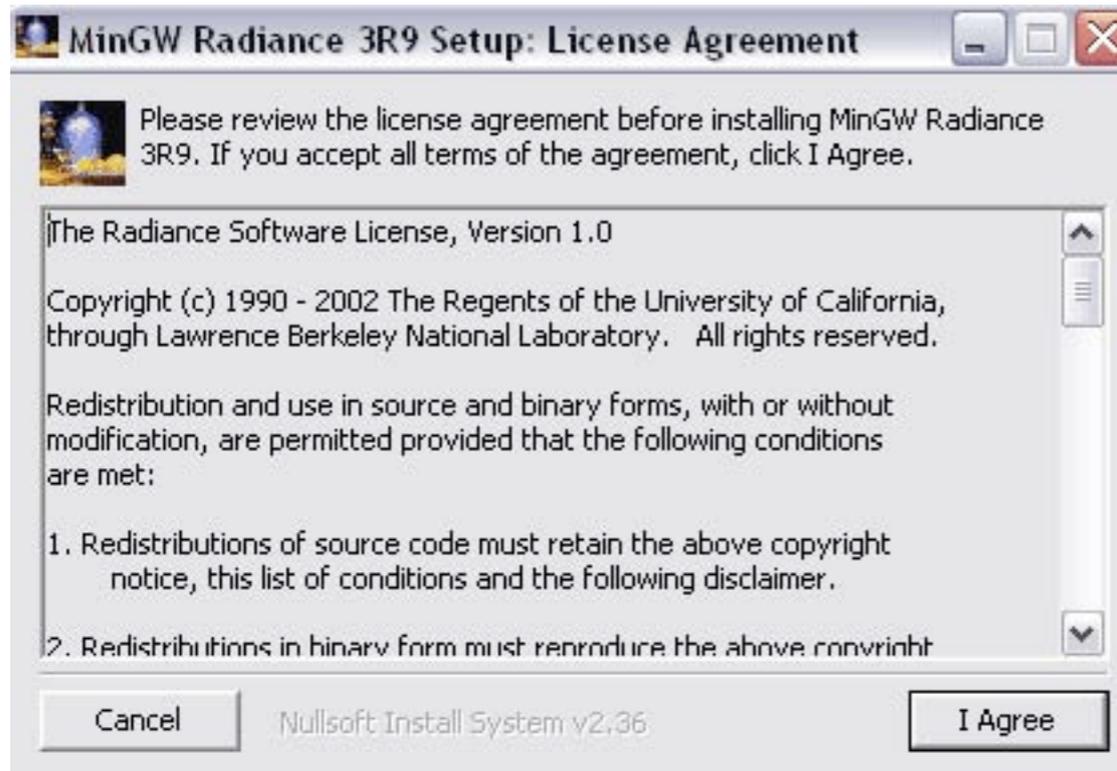
Sort downloads by: Title (+ | -) Date (+ | -) Rating (+ | -) Popularity (+ | -)
Resources currently sorted by: Title (A to Z)

MinGW Radiance 3R9 installer for Windows
Description: This is a windows installer of the 3R9 Radiance release. It does not include any interactive and visual programs. C-shell scripts are also excluded (no falsecolor, no objview, etc.)
Version: 3R9 | File size: 13.70 MB
Added on: 31-Aug-2008 | Downloads: 153
[Home page](#) | [Details](#)

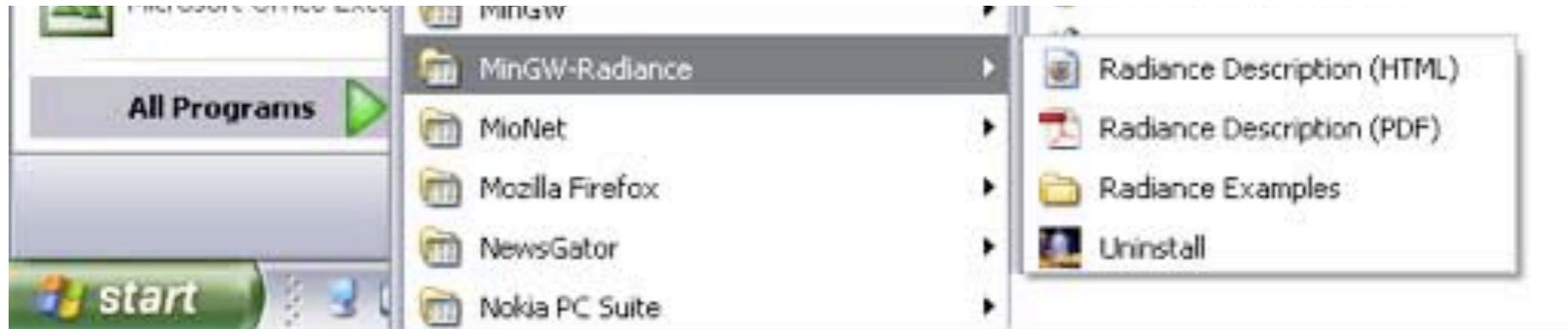
MinGW Radiance Installer for Windows (HEAD snapshot 2008-04-17) ★
Description: This setup programme installs a more up-to-date version of the Radiance binaries compiled with the MinGW gcc compiler for the Windows operating system. The binary package does not include any X window based programme (so no rvu, no ximage, no xglaresrc, etc.), but includes the new programme rsensor and some other useful programmes not included in the main Radiance distribution, like gendaylit, evalglare and eulum2ies.
Version: 2008-04-17 | File size: 13.99 MB
Added on: 18-Apr-2008 | Downloads: 512
[Home page](#) | [Details](#)

Radiance binaries for Sharp Zaurus (Arm processor)

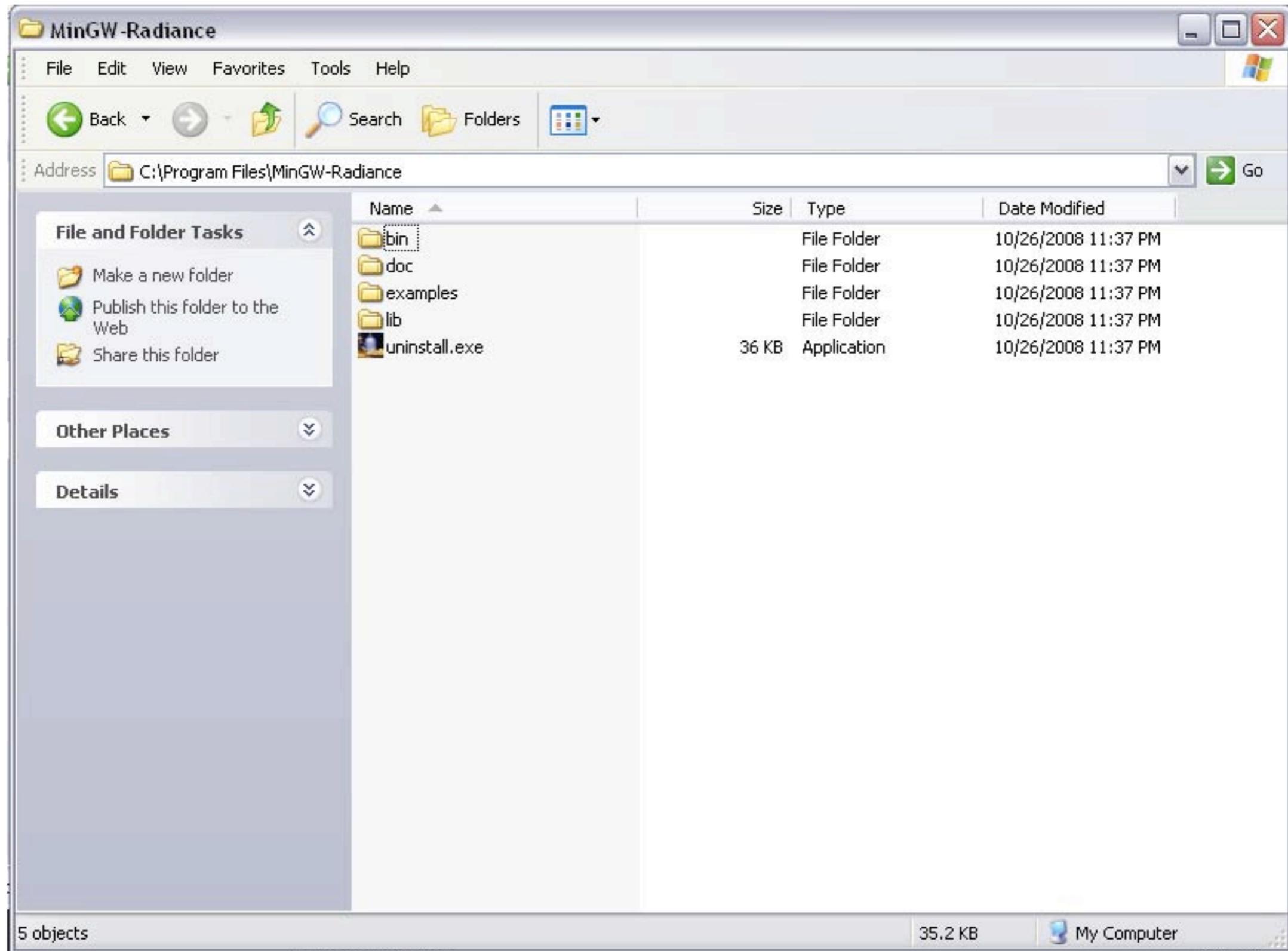
2) Install MinGW Radiance



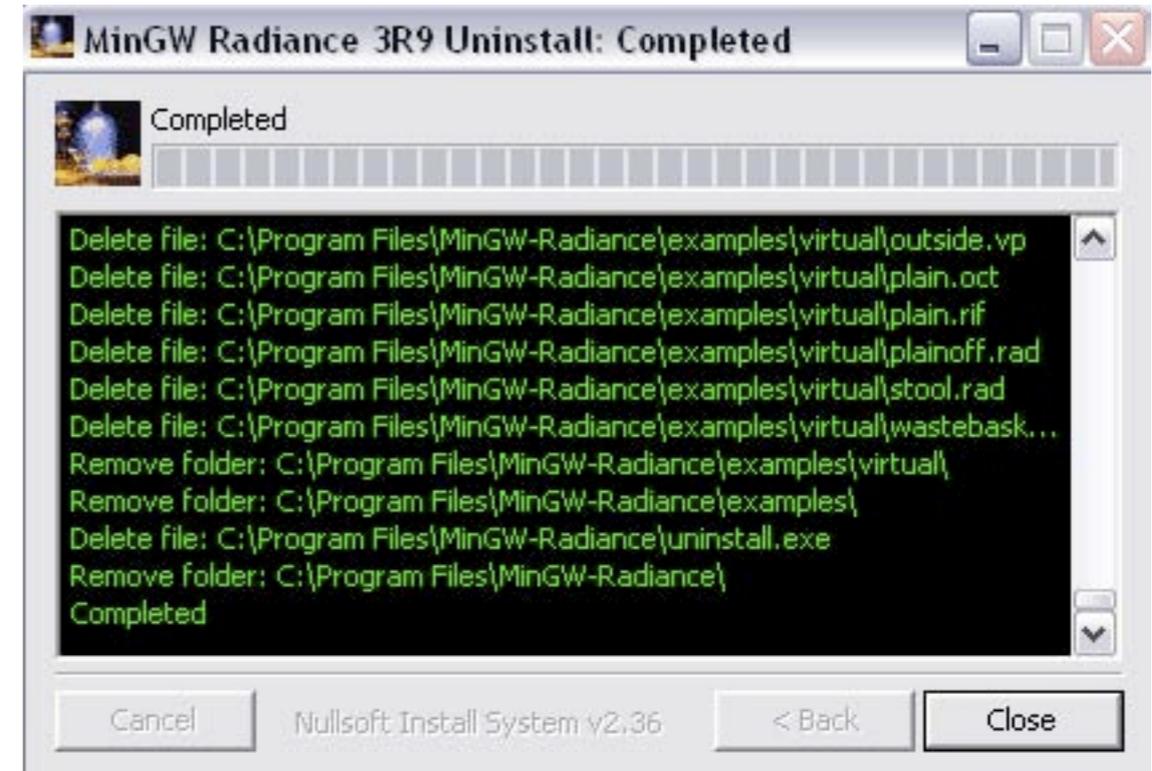
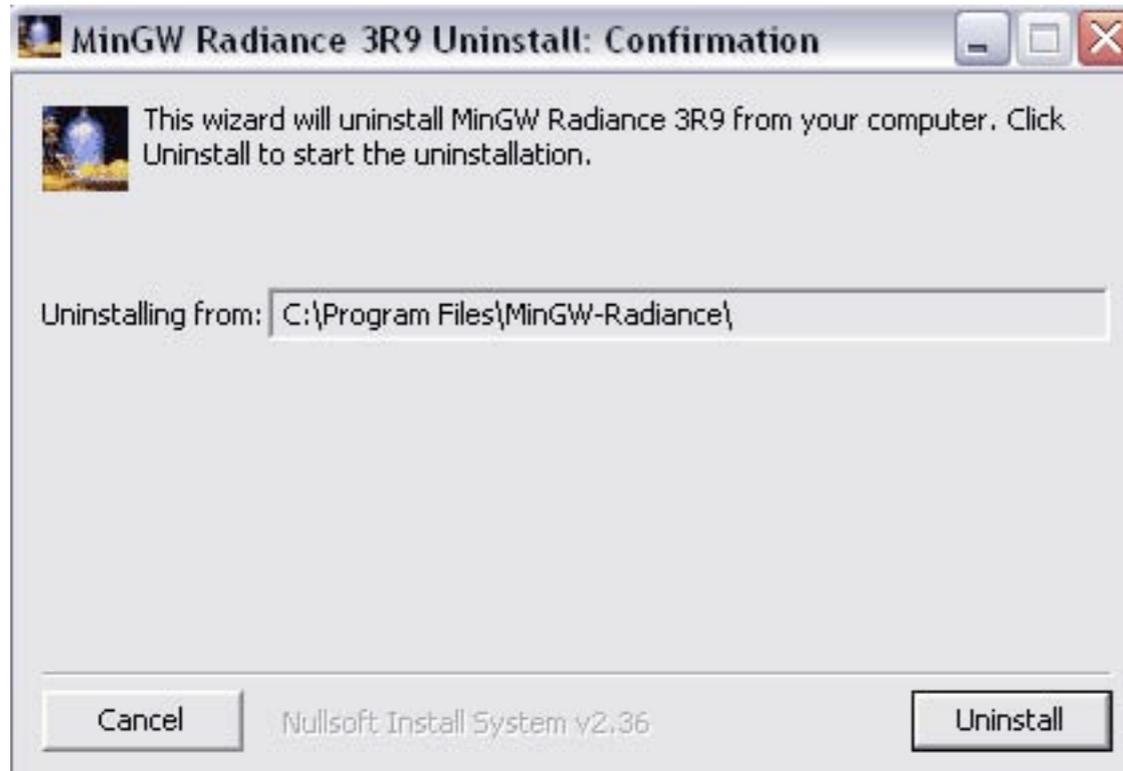
2) Install MinGW Radiance



2) Install MinGW Radiance



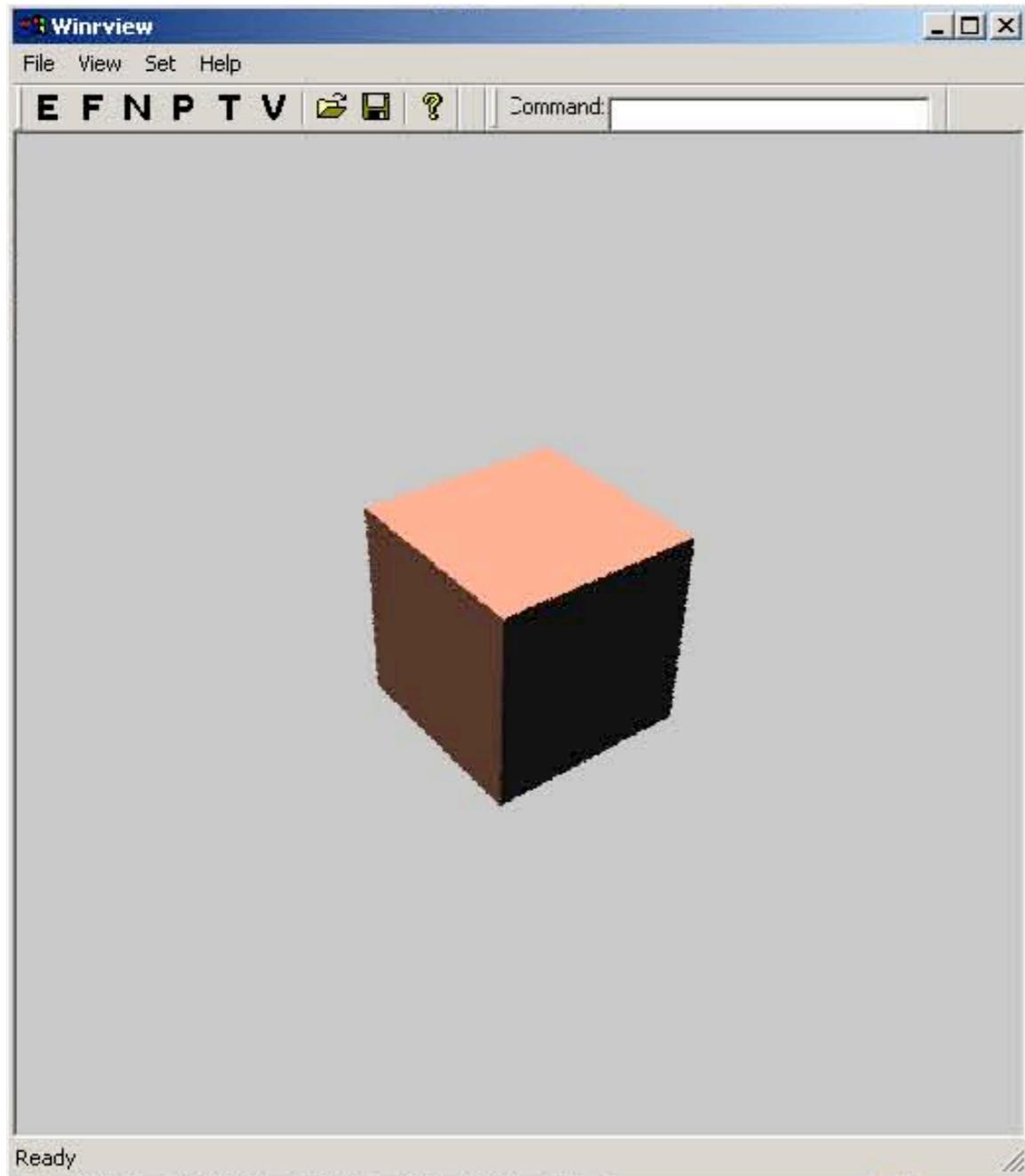
Uninstall MinGW Radiance



Some Windows command lines oddities

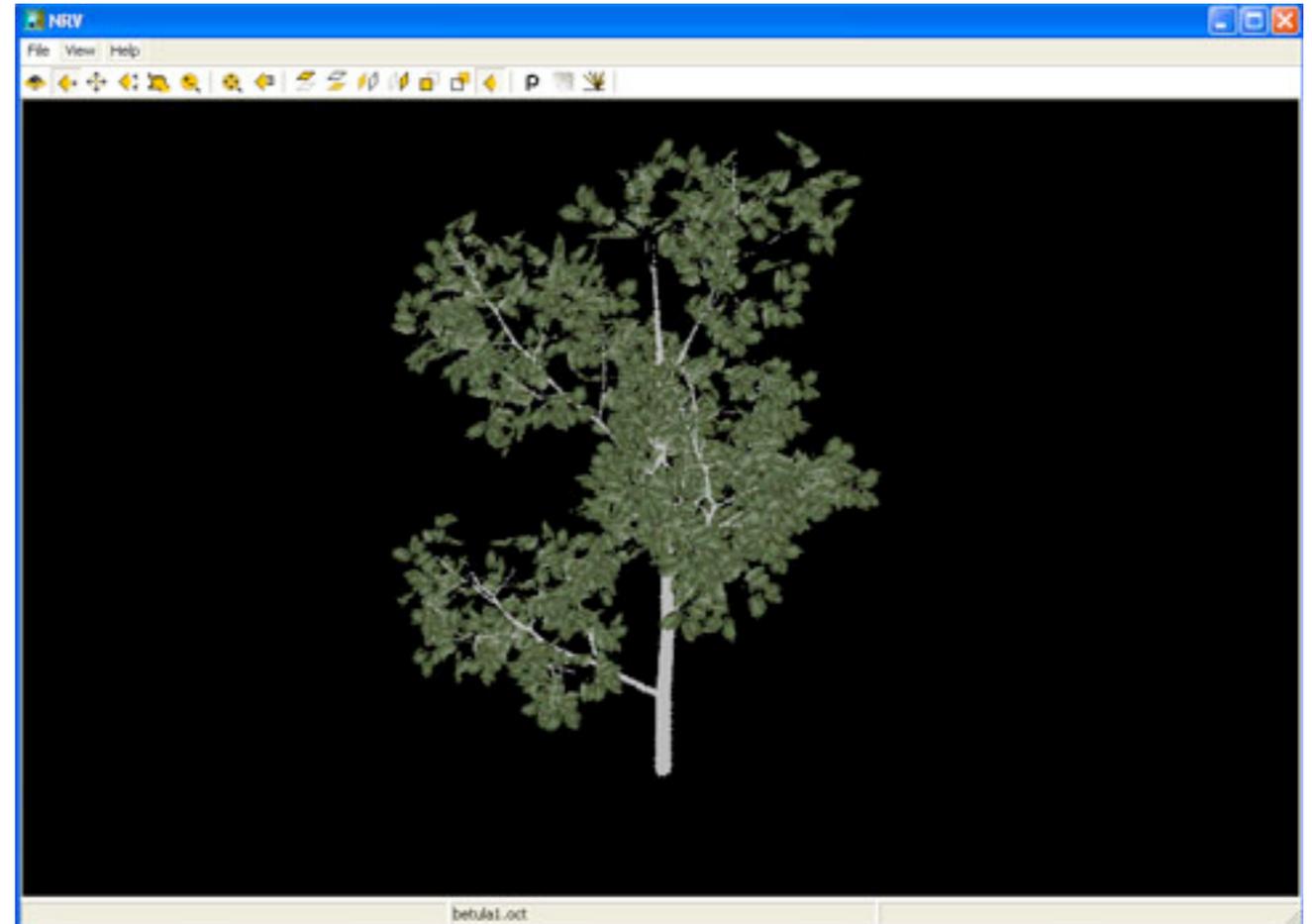
- The command line has a very limited number of characters that can be input (8191 for Windows Xp, 2047 for Microsoft Windows 2000 or Windows NT 4.0). This unfortunately includes the PATH environmental variable, and has many implications on running long pipelines with Radiance commands
- `rca1c -e '$1=$1'` translates to `rca1c -e "$1=$1"`
- Piping *stdout* of a programme to *stdin* of another seems to be slower than saving *stdout* to a file and then sending this file to the next programme

Interactive viewer



winrview - Desktop Radiance

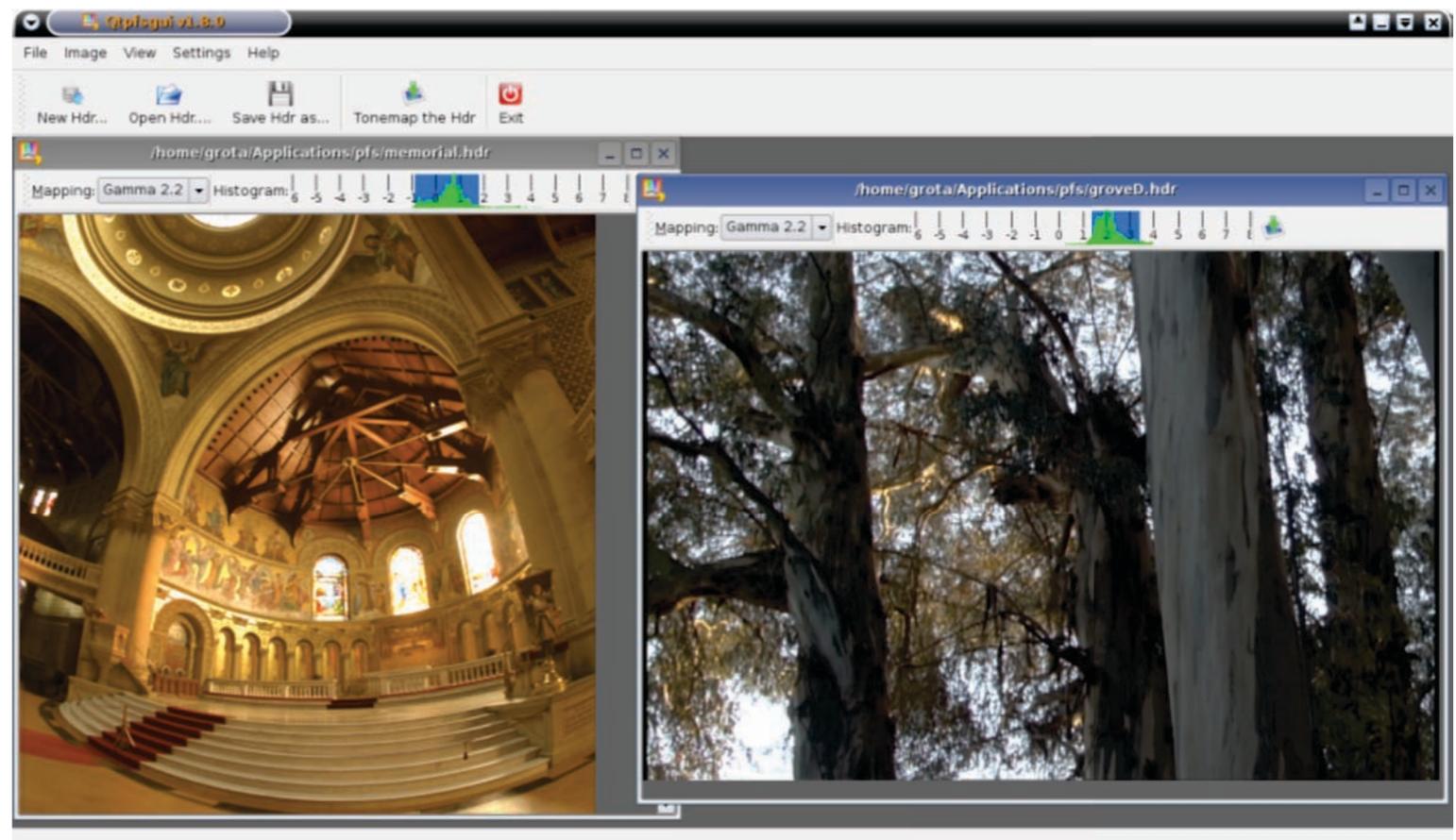
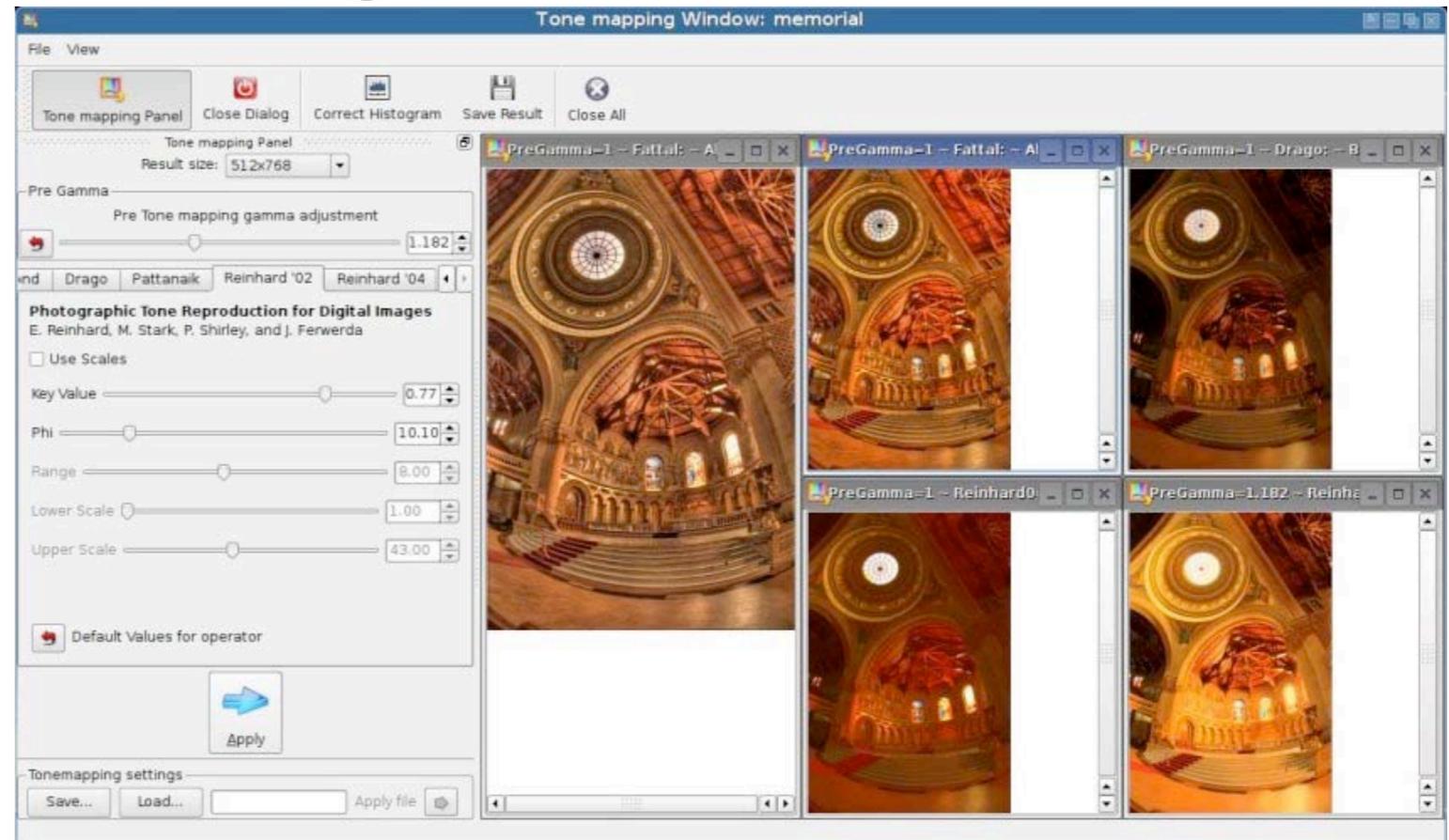
<http://radsite.tbl.gov/deskrad/>



nrv

<http://www.aisarquitectura.com/nrv/>

HDR image viewer



QTpfsGUI

<http://qtpfsgui.sourceforge.net/>

MinGW Radiance To Do

- Provide scripts (perhaps as compiled binaries)
- Re-write them in Python?
- Compile X11 programmes
 - ideally with Windows native widgets (major GUI rewrite required), or ...
 - ... using Xming or Interix infrastructure (X11 server required), or ...
- writing totally new applications ...

Radiance scripts example: radfalcolor

Radiance False Color

Picture filename

Input picture: Browse...

Background picture: Browse...

Output picture: Browse...

Display type: False color picture Contour lines Contour bands

Show pixel extrema values:

Maximum value:

Number of divisions: 10

Multiplier:

Logarithmic decades:

Legend label:

Legend width:

Legend height:

Falsecolor type: New Old

OK Cancel

```
Francesco-Anselmo-Laptop:radtools francescoanselmo$ python radfalsecolor.py --help
Usage: radfalsecolor.py [options]
```

Options:

```
-h, --help          show this help message and exit
-i INPUT, --input=INPUT
                    input picture filename for reading data
-p PICTURE, --picture=PICTURE
                    background picture filename to use for contour bands
                    or contour lines
-o OUTPUT, --output=OUTPUT
                    output picture filename; if omitted, the program will
                    add a _fc suffix to the input filename
--contour-bands    display contour bands
--contour-lines    display contour lines
-e, --show-extrema display pixel extrema
-s SCALE, --scale=SCALE
                    maximum value for scale; set to "a" to account for all
                    values in the picture
-l LABEL, --label=LABEL
                    text for label
--legend-width=LEGEND_WIDTH
                    legend width (number of points)
--legend-height=LEGEND_HEIGHT
                    legend height (number of points)
-n DIVISIONS, --number-divisions=DIVISIONS
                    number of divisions
--log=LOG_DECADES  number decades below the maximum value for logarithmic
                    scale
-m MULTIPLIER, --multiplier=MULTIPLIER
                    multiplier (standard multiplier is 179 lm/W)
-r RED, --red=RED   mapping expression of values to colors for red channel
-g GREEN, --green=GREEN
                    mapping expression of values to colors for green
                    channel
-b BLUE, --blue=BLUE
                    mapping expression of values to colors for blue
                    channel
--spec             use old false color mapping
```

Volunteers?

Ideas for further Radiance development

1. Translate Radiance shell scripts to Python, to make them portable across different OS platforms:
 - I. **addfclegend** (Add a falsecolor legend to a RADIANCE picture - from RADZILLA)
 - II. **compamb** (Compute best ambient value for a scene and append to rad input file)
 - III. **dayfact** (Interactive script to calculate daylight factors)
 - IV. **debugcal** (Script to debug cal files for Radiance)
 - V. **falsecolor** (Create false color image with legend)
 - VI. **fieldcomb** (Combine alternate lines in full frames for field rendering)
 - VII. **genambpos** (Mark ambient locations)
 - VIII. **glare** (Interactive program for calculating glare values)
 - IX. **glaze** (Complex glazing model - goes with glaze1.cal and glaze2.cal)
 - X. **objline** (Create four standard views of scene and present as line drawings)
 - XI. **objpict** (Make a nice multi-view picture of an object)
 - XII. **objview** (Make a nice view of an object)
 - XIII. **optics2rad** (Convert Optics 5 output to correct Radiance input)
 - XIV. **pbilat** (Bilateral Filter)
 - XV. **pdelta** (Compute 1976 CIE Lab deltaE* between two Radiance pictures)
 - XVI. **pdfblur** (Generate views for depth-of-field blurring on picture)
 - XVII. **pgblur** (Apply Gaussian blur without resizing image)
 - XVIII. **phisto** (Compute foveal histogram for picture set)
 - XIX. **pmbur** (Generate views for motion blurring on picture)
 - XX. **pmdbur** (Generate views for motion and depth blurring on picture)
 - XXI. **raddepend** (Find scene dependencies in this directory)
 - XXII. **ran2tiff** (Convert Radiance animation frames to TIFF output)
 - XXIII. **ra_pfm** (Convert to/from Poskanzer Float Map image format using pvalue)
 - XXIV. **rlux** (Compute illuminance from ray origin and direction)
 - XXV. **vinfo** (Edit information header in Radiance file)
 - XXVI. **xyzimage** (Display one or more CIE XYZ pictures using ximage)
2. Advanced image viewer, with support for comments and "pcomb sliders"
3. Multiplatform rvu, with OpenGL support
4. Python library for lighting and daylighting

Radiance Knowledge Base

1. Installation and Set-up
 - I. Standard (UNIX) distribution 
 - II. Radzilla
 - III. Windows alternatives
 - IV. Other packages
2. Tutorials
 - I. Basic 
 - II. Advanced
 - III. Electric Lighting
 - IV. Daylighting
3. Input
 - I. CAD links and conversion tools 
 - II. Photometry & Sky models
 - III. Materials
 - IV. Generator programs
 - V. Scene processing (xform, replmarks, oconv, etc.)
4. Computation
 - I. Rendering (batch & interactive) 
 - II. Illumination calculations
 - III. Executive programs (rad, rayfront, etc.)
 - IV. Limitations of the Radiance calculation methods
5. Output
 - I. Image processing 
 - II. Image viewing
 - III. Image format conversion
 - IV. Graphing & plotting
6. Radiance based software
7. Ideas for further development
8. Other on-line Radiance resources

[3ds](#) [3ds2mgf](#) [autocad](#) [blender](#) [cad](#) [converters](#) [cygwin](#) [daylighting](#) [deb](#) [debian](#)
[desktop_radiance](#) [exporters](#) [gensky](#) [installation](#) [linux](#) [macosx](#) [mingw](#) [radout](#) [rpm](#) [source](#)
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Thank you!