

# CVS

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## Software Development

- Hack, hack, hack, hack, hack
  - Sorta works

Main.c

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## Software Development

- Hack, hack, hack, hack, hack
  - Sorta works
- We keep a copy, in case we get stuck later on

Main.c

Main\_old.c

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## Software Development

- Hack, hack, hack
- It works pretty well, so we keep another copy.

Main.c

Main\_old.c

Main\_not\_as\_old.c

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## Software Development

- Hack, hack, hack
- Now it works (we think), we decide to release it.

Main.c

Main\_old.c

Main\_not\_as\_old.c

Main\_rel\_1.c

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## Software Development

- We keep working to improve our software
- Hack, hack, hack, hack, hack
- New and improved version works (we think), we decide to release it.

Main\_rel\_2.c

Main.c

Main\_old.c

Main\_not\_as\_old.c

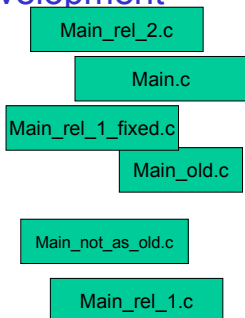
Main\_rel\_1.c

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## Software Development

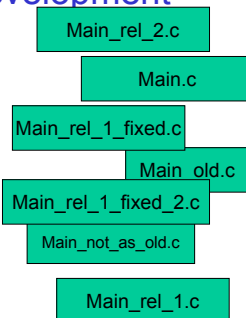
- Oh, no!!! We have a bug in release one.
  - We need to fix it (and not force the to upgrade to rel\_2).
- Hack, hack, hack, hack, hack
- Now have a fixed version.



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## Software Development

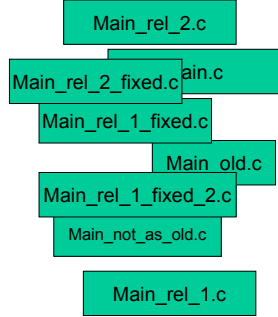
- Oh, no!!! Another bug in rel\_1.
- Hack, hack, hack, hack, hack
- Now have a fixed version.



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## Software Development

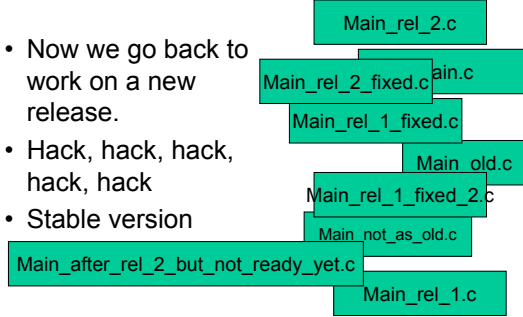
- Oh, no!!! A bug in rel\_2.
- Hack, hack, hack, hack, hack
- Now have a fixed version.



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## Software Development

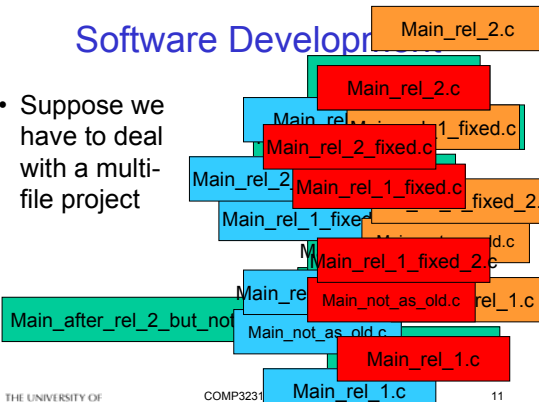
- Now we go back to work on a new release.
- Hack, hack, hack, hack, hack
- Stable version



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## Software Development

- Suppose we have to deal with a multi-file project



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## We need help!!!

- Welcome to CVS
  - Concurrent Versions System
  - Keeps track of the different versions of your files
  - Keeps track of the relationship between different version files
  - Allows more than one person to work on the files at the same time

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## CVS Development Model

Repository  
(cvsroot)

- Contains the various versions of your files
- You don't access it directly, only indirectly via cvs commands

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## CVS Development Model

Repository  
(cvsroot)

Main.c

cvs checkout main.c

Extracts a working copy of main.c for us to work on

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## CVS Development Model

Repository  
(cvsroot)

Main.c

Hack, hack, hack

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## CVS Development Model

Repository  
(cvsroot)

Main.c

cvs commit

We are at a point where we wish to save a version

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## CVS Development Model

Repository  
(cvsroot)

Main.c

Hack, hack, hack

Main.c

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## CVS Development Model

Repository  
(cvsroot)

Main.c

cvs commit

Main.c

We are at a point where we wish to save another version

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## CVS Development Model

- We are keeping a copy of each version of main.c
- The first version forms the root of a tree (only the trunk shown here now)
- Each new main.c grows the tree trunk higher



## How can we specify a particular version of a file?

- Use dates and times
  - Awkward to use (hard to remember when something happens)
- Use CVS internal numbering
  - They end up being meaningless quickly
  - Multi-file projects end up with many version numbers that don't relate to each other
- We need something more useful

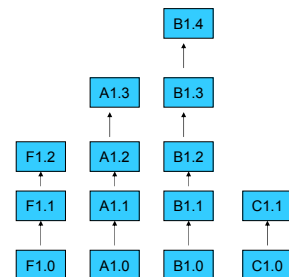


## CVS tags

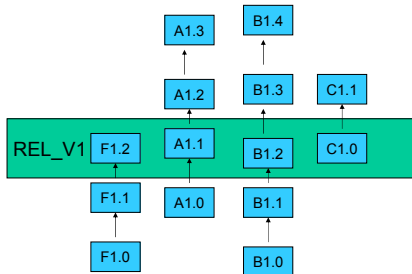
`cvs tag symbolic_name`

- Allows us to give symbolic names to particular versions of files
  - E.g. `cvs tag ass1-start`

## Multiple File and Tags

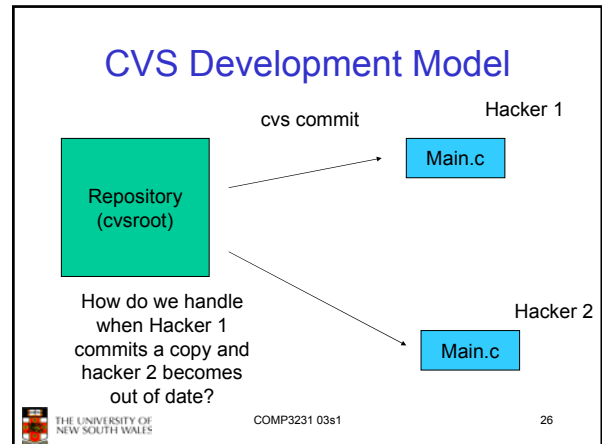
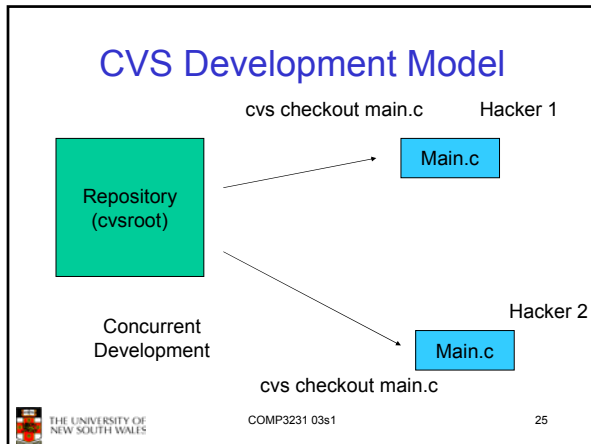


## Tagging A Coherent Version



## Tagging

- You can do the following on tags
  - Add
  - Delete
  - Move
    - Change the version a tag refers to
  - Rename
- Can tag the repository directly
  - `cvs rtag`
- See [www.cvshome.org](http://www.cvshome.org) for details



## CVS status & update

- CVS status provide the “status” of your files

```

-----
File:  exrmag.h           Status: Up-to-date
Working revision:  1.1.1.1 Fri Mar 14 03:47:33 2003
Repository revision:  1.1.1.1 /home/kavine/cv3231/cvsroot/src/kern/include/kern/exrmag.h,v
Sticky Tag:        asst1-pc03 (revision: 1.1.1.1)
Sticky Date:       (none)
Sticky Options:    (none)

```

- CVS `-q -n update`
  - Perform an “update”
    - -q “quietly”
    - -n “no action”

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## CVS update

- Brings the file (directory, or directory tree) up-to-date with a specified version
  - When no version is specified, it brings it up-to-date with the latest release
- cvs update
  - Update to latest release
- cvs update `-r os161-base main.c`
  - Update to version that was tagged os161-base

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## cvs update output

- *U file*
  - The file was brought up to date with respect to the repository.
- *P file*
  - Like ‘U’, but the CVS server sends a patch instead of an entire file.
- *A file*
  - The file has been added to your private copy of the sources
- *R file*
  - The file has been removed from your private copy of the sources
- *M file*
  - The file is modified in your working directory.
- *C file*
  - A conflict was detected while trying to merge your changes to *file* with changes from the source repository.
- *? file*
  - *file* is in your working directory, but does not correspond to anything in the source repository, and is not in the list of files for CVS to ignore

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## Example: cvs -q -n update

```

% cvs -q -n update
A kern/asst1/bar.c
A kern/asst1/bar.h
A kern/asst1/bar_driver.c
R kern/asst1/catlock.c
R kern/asst1/catsem.c
R kern/asst1/stoplight.c
A kern/asst1/test.h
M kern/conf/conf.kern
M kern/include/synch.h
M kern/include/test.h
M kern/include/version.h
M kern/main/menu.c
M kern/thread/synch.c
M kern/thread/thread.c
M lib/hostcompat/time.c
M lib/libc/exit.c
%

```

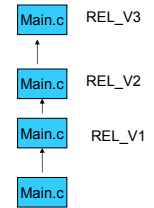
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## Example: Reverting to a different version of a file

```
% rm main.c
% cvs update -r tag_you_want main.c
%
```

## How do we handle the “go back and bugfix an old release” problem?

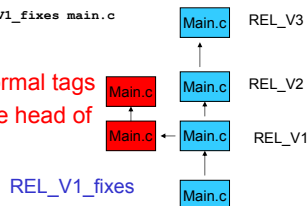
- We would like to go to the version released and make changes
- We can't insert in the middle of the trunk, and the head of the trunk is being using for REL\_V3



## How do we handle the “go back and bugfix an old release” problem?

- We can use a *branch*
- Note *branch tags*
  - are different to normal tags
  - always refer to the head of the branch

```
% cvs rtag -r REL_V1 -b REL_V1_fixes main.c
```



## Checking out branches

- cvs checkout main.c
  - Checks out →
- cvs checkout -r REL\_V1\_fixes
  - Checks out →
- To continue development, you must check out a branch tag or the main trunk



## Adding and removing files


- cvs add file.c
- cvs remove file.c
  - Note: Like always, you must *commit* to make the changes visible

## View tags and commit logs

- cvs log

```
$ cvs log synch.c

RCS file: /home/kevine/cs3231/cvsroot/src/kern/thread/synch.c,v
Working file: synch.c
head: 1.1
branch: 1.1.1
locks: strict
access list:
symbolic names:
  ass1-v3-start: 1.1.1.1.12.1
  ass1-v3-test: 1.1.1.1.0.12
  ass1-v3-rel2: 1.1.1.1.2.2
  ass1-v3-rel1: 1.1.1.1.2.2
  ass1-v3-pre2: 1.1.1.1.2.2
  ass1-v3-pre1: 1.1.1.1.2.2.0.4
  ass1-v2-pre1: 1.1.1.1.0.10
  ass1_v1-start: 1.1.1.1.8.1
  ass1_v1: 1.1.1.1.0.8
  ass1: 1.1.1.1
  ass1: 1.1.1.1
  ass1-test-base: 1.1.1.1.6.1.0.2
  ass1-test-pre: 1.1.1.1.6.1
  ass1-test1: 1.1.1.1.0.6
  ass1-rel3: 1.1.1.1.2.2
  ass1-rel2: 1.1.1.1.2.2.0.2
```




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```
keyword substitution: kv
total revisions: 8; selected revisions: 8
description:
-----
revision 1.1
date: 2003/03/14 03:47:33; author: kevine; state: Exp;
branches: 1.1.1;
Initial revision
-----
revision 1.1.1.1
date: 2003/03/14 03:47:33; author: kevine; state: Exp; lines: +0 -0
branches: 1.1.1.1.2; 1.1.1.1.4; 1.1.1.1.6; 1.1.1.1.8; 1.1.1.1.12;
Initial import of os161
-----
revision 1.1.1.1.12.1
date: 2003/03/27 01:46:22; author: kevine; state: Exp; lines: +87 -27
test start
-----
revision 1.1.1.1.8.1
date: 2003/03/19 08:34:15; author: kevine; state: Exp; lines: +87 -27
Start of assignment 1
-----
revision 1.1.1.1.6.1
date: 2003/03/17 23:30:03; author: kevine; state: Exp; lines: +87 -27
patched to bring up to date
```



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