CS446
SOFTWARE ENGINEERING

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GP

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GP OVERVIEW

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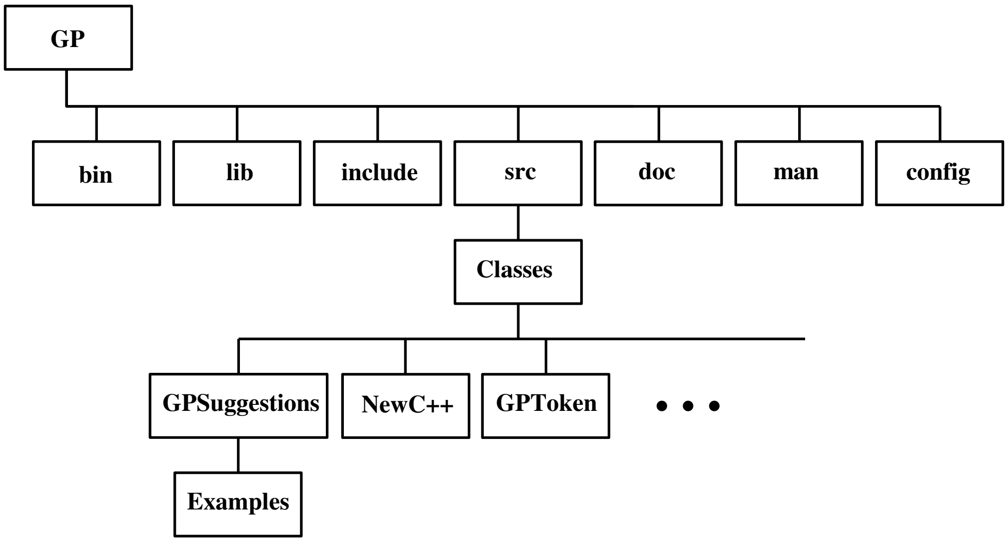
Outline

- Directory Structure
- Class Development
- Commands and make Targets
- Archiving
- Examples and Verification
- man Pages

GP Environment Overview

- Root directory is `...GP`
- Set `PATH` to include `...GP/bin`; e.g.:
  `` setenv PATH `showpath ~/CS446/GP/bin current` ``
- Extensive documentation:
  `~cs446/Formatted/Manual.ps`
- `man` pages can be read using: `gpman` *item*
- Directory structure:



Class Development

- Creating a class sector

  `gpnewsector` *sectorname*

- Results in a directory structure

  ./*sectorname*, ./*sectorname*/`Examples`, ...

- Creating a new class in ./*sectorname*

  `gpnewclass [` -*t* `]` *classname* [*baseclassname*]

- Results in files

  classname{`.h,.cc`}, `Imakefile`

- Creating a new example program in ./*sectorname*/`Examples`

  `gpnewexample [` -*t* `]` *examplename classname*

- Results in files

  examplename{`.cc,.input,.output`}, `Imakefile`

- Creating a new application is similar
- Creating a `Makefile` from an `Imakefile`

  `gmkmf`

- `make` targets

  `make`, `make verify`, `make clean`, ...

Remarks

- GP's `gpmkmf/Imakefile` extends `imake`
- `gpnew`*xxx* commands generate starter files/directories
- All starter files have common, designated style
- `.h` file format automatically creates `man` page
- File/directory structure enforced:

  sectorname/*classname*`.h`

  sectorname/*classname*`.cc`

  sectorname/`Examples/`*classname*`Example.cc`
- Example programs conform to general `#include` useage

  `#include "`*sectorname*/*classname*`.h"`
- Central library and include facility (`make install`)

  `...GP/lib`, `...GP/include`
- Individual GP environments are easy to establish

  Copy `GP` directory tree to new site

  Edit new site into `...GP/bin/LOCATIONS`

  Reset `PATH` to new `...GP/bin`

Archiving and Version Control

Unix facilities are minimal (could be much better):

- RCS
  - Versions of file stored in `diff` format

    `Foo.xx` → `RCS/Foo.xx,v`
  - Tree numbering or (optionally) labelling supported
    - ▹ `release.level.branch.sequence`
    - ▹ `name:release.level.branch.sequence`
  - Keywords logged in the file, for example
    - ▹ `$Log$` (all check-in comments)
    - ▹ `$Author$` (last person checking in)
    - ▹ `$Revision$` (latest r.l.b.s or name)
  - `rlog` reads log and status of file
  - File management
    - ▹ File checked out to one person (`co -l` command)

      `Foo.xx` is under lock-edit to that person

      `RCS/Foo.xx,v` has unchanged version
    - ▹ File checked in (`ci -u` command)

      `RCS/Foo.xx,v` has all versions including latest

      `Foo.xx` is a read-only shadow copy of latest
- SCCS (a similar Unix version-control system)

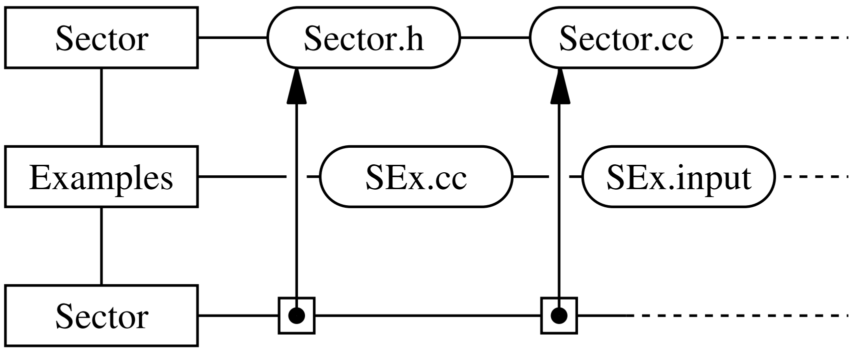
GP Provides RCS for File Collections

- Administered by `Imakefile`
  - Root directory and tree implicit in `SUBDIRS` lists
  - All files listed in `GPArchive` macros
- `make` targets
  - `make checkout`
    - ▹ Check out all files in tree to me
  - `make checkin`
    - ▹ Check in all files, leaving shadow copies (all files will have common r.l.b.s)
  - `make revision number=r.l.b.s`
    - ▹ Re-register all checked-in files with new revision number
  - `make symbolic name=n:r.l.b.s`
    - ▹ Assign symbolic name to revision number
- Management intention
  - Individual files assigned to individuals
  - Individuals manage versions through `co/cp/ci`
  - Low-level management through `make`
  - High-level management through `gp` commands
    - ▹ `gpextractsector`
    - ▹ `gpinsertsector`

Verification Examples

Each sector has `Examples` subdirectory

- Example programs with example input and output
- `make` targets to administer
  - `make`, `make verify`
- Examples use same include structure as applications
  - But some includes needed from `GP/include`
  - Sector includes needed from upper-level directory
- Resolve by *sectorname* subdirectory and symbolic links
  - `I` flag structure: *-I. -IGP/include*



man Pages

Each header file has a strict format

```
#ifndef Thing_H
#define Thing_H
// Sector/Thing \- one line
//
// Words
//
// .SH USAGE
// .EX
// Code
// .EE
//
// .SH LIBRARIES
// .SH SEE ALSO
// .SH AUTHOR(S)
// .SH COPYRIGHT
class{...};
#endif
```

Format is converted to man page

initial segment is *-man* layout

final section is parsed for formatting