

COMP 6471
Software Design Methodologies
Winter 2006

Assignment - 2

Component: 2- File Management System

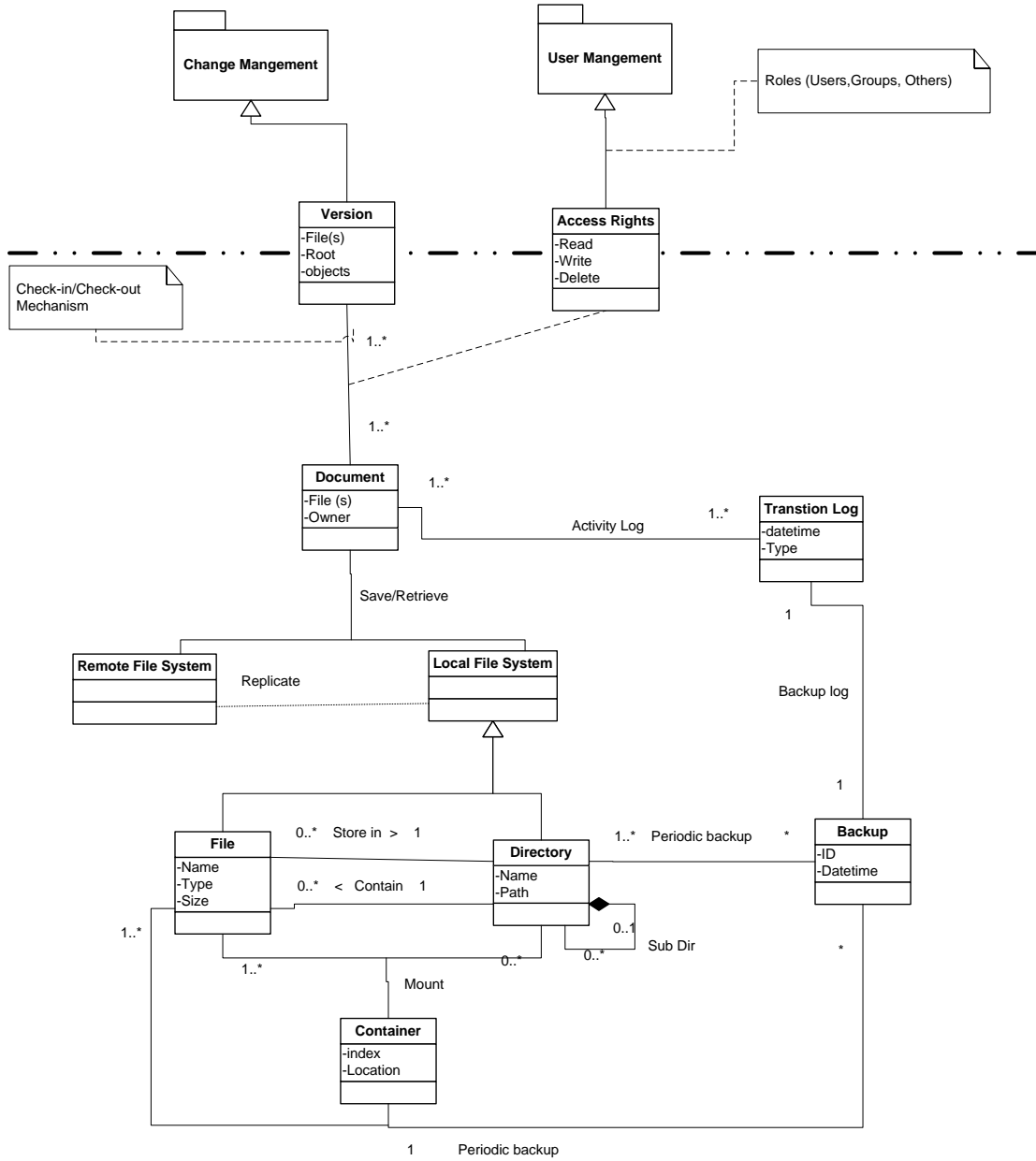
Team - 1

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CLASS DIAGRAM



Main Classes

File:

File is a collection of data or information that has a name. Almost all information stored in a computer must be in a file. There are many different types of files: data files, text files, program files, multimedia files, and so on. Different types of files store different types of information. All CU WME documents will be stored in file(s).

File class is responsible for creating, deleting, updating, opening, closing, reading and writing of file(s). It also provides functionality like renaming, undo changes, restore last backup, compression, archive etc.

File have some properties like FileName, Type, Size, Owner, Version, Creation date, Last modified datetime, and some special attribute set by owner Readonly, Hidden.

Directory:

An organizational unit, or container, used to organize folders (sub directories) and files into a hierarchical structure. Directories contain bookkeeping information about files that are, figuratively speaking, beneath them in the hierarchy. We can think of a directory as a file cabinet that contains folders (sub directory) that contain files.

We can also describe directories and file structures in terms of an inverted tree. The files and directories at any level are contained in the directory above them. To access a file, you may need to specify the names of all the directories above it. You do this by specifying a path. The topmost directory in any file is called the root directory. A directory that is below another directory is called a subdirectory. A directory above a subdirectory is called the parent directory.

Directory class can perform action on file(s) and directory(s) it contains like copy, delete, backup etc. and it has some attributes like name, location(path), no of file(s) and sub directory(s) it contain, size and Access rights like read, write, update, delete will be implemented to all files and subdirectories.

Container:

Container is the place where files or data store physically. In terms of computer we can say hard drive or tap drive. Provides some mechanism that reads data from or writes data to physical media by Random access and sequential access. Concurrent access to multiple file(s). Mange file allocation table where it maintains information like file name and its physical address and indexes of files if one file is stored in pieces at different physical locations.

Basic functions of container class are allocate space to file, keep track of empty space available for allocation, manage fragmentation, Read, write and delete data (file/directory) from storage media.

Basic attributes are capacity to save amount of data, available space, consumed space. Speed in term of time takes in saving (writing) or retrieving (reading) of data.

Main Associations:

Directory contains File(s): This association is between directory and file class shows that one directory can contain zero or many files. And files are stored in directory. File could be store in one or more directories or multiple directories can contain copies of same file. Files are located in directories and directory could have many subdirectories or level and each level has its own files. Therefore same operation can be performed at single file or all files in the same directory or all files which are located in all sub directories. e.g if copy or delete operation perform on one directory then all files in same level and sub level directories will be copied or deleted.

Directory and File are mounted in Container: This association is between directory and file and container classes. As both the file and directories are physically stored in container and container manage physical space. While directory contain file(s) and folders (sub directories) in a hierarchal structure. Physical storage should take care of this hierarchy save and retrieved in same way.

Directory composite aggregation with itself: directory could have subdirectories which have the same properties root directory has. If root directory destroyed then all subdirectories will destroy too. One directory could have many sub directories and each sub directory could have many sub directories. In this way FMS will maintain hierarchical structure.

Other Classes:

Document: document is the collation of file and objects. Concurrent users are working on it, Making changes and creating new version of documents. Main attributes are related file(s) and objects and their hierarchical relation and owner.

Transaction log: every action performs on documents in file system will be recorded in form of log like document created updated or deleted. Other activates like all type of backups are created on time.

Backup: Backup class takes care of periodic backup of each files and directory at some other media. and backup of complete storage media too. In case of

accidental deletion or hardware failure it should be restored. Basic attributes are ID, type and Datetime.

Local & Remote File System: File system will be responsible for all operation perform on files and directories. To provide distributed access and control on system we need to keep consistency between local and remote file system this class will also take care of replication.

Version: this class is inherited by change management system it is related to version information of document and its depended file(s) and relation.

Access Rights: this class is associated class between document and version it is inherited by user management system to provide access right information related to user and document. Basic attributes are read, write and delete.

Other Associations:

File, Directory and container create periodic backup: this association is between file, directory and backup class and also between container and backup class. Periodic backup is required for files and directories after specific interval of time or changes. And backup of container (storage media) is also required as in case of hardware failure we could restore entire media (HDD).

Document Save/Retrieve on File system: all documents and their files will be managed by file system (local or remote). All operation on file will be performed by file system. And documents could be save and retrieve from file system.

Document maintain Activity log at Transaction Log: This association is between document class and transaction log class. All action performed on documents will be recorded in transaction log. Document class will maintain its activity log at transaction log class.

Backup log at Transaction Log: it is the association between backup class and transaction log class. If the backup is taken on time and if it couldn't be created then backup class will generate error log.

Association between version and document: each document has many versions and every version has its own file and objects. A group of user is working on it with different access rights. Also provide check-in/check-out mechanism to avoid overwriting.

Association between Local and remote file system: to maintain consistency between local and remote file system through replication.

Component Consistency

File management system (FMS) is responsible organized file into hierarchical directories and implement access control. User having rights can perform specific action on files. Also set up backup mechanism.

Different components can request File Management System to provide storage to save their data. And also provide security in term of access rights. Data should be storied in organized way that could be retrieved anytime.

The main interaction of File management system is with change management system (CMS) and user management system (UMS). CMS is responsible for creating new version of document and request FMS to save document and all related file(s) of specific version and CMS can request for update and retrieve entire document.

File management will provide security to access file. User management system will provide all necessary information about user or group and their roles that can access these file(s) or directories and can perform actions like read, write, delete or update.

Access rights are defined at UMS but implemented by FMS. CMS grants roles to users or group to access document. Version is created by CMS and stored by FMS.