My Project

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Chapter 1

Multimedia Management System

1.1 Description

This application is a comprehensive multimedia management system that allows users to organize and interact with various types of media files including videos, photos, and films. The system implements an object-oriented approach with inheritance hierarchies and provides both a local mode for testing and a server mode for client-server interaction.

1.2 Features

- Create and manage different types of media:
  - Photos with dimensions (width, height)
  - Videos with duration
  - Films with chapters and durations
- Organize media into named collections
- Display detailed information about media and collections
- Play media files using the mpv media player
- Serialize and deserialize data for persistence
- TCP server functionality for remote client access

1.3 Prerequisites

- C++ compiler with C++11 support or later
- mpv media player (required for the playback functionality)

1.4 Installation

1.4.1 1. Installing mpv (Required)

The application depends on mpv for media playback. You must install mpv before using this application.

1.4.1.1 For Ubuntu/Debian:

```
sudo apt update
sudo apt install mpv
```

1.4.1.2 For Fedora:

```
sudo dnf install mpv
```

1.4.1.3 For macOS (using Homebrew):

```
brew install mpv
```

1.4.1.4 For Windows:

1. Download the installer from mpv.io
2. Install mpv and ensure it's added to your system PATH

1.5 Building the Application

1.5.1 Server Setup

1. Go to the repository `cpp` and type `make run` in the terminal to start the server on host port 3331.
2. You can change the port of the server, but make sure to also update it for the client.

1.5.2 Client Setup

1. Go to the repository `swing` and type `make run` in the terminal to start the client (application).

1.6 Usage

1.6.1 Server Mode

The application by default runs in server mode (with the `SERVER_v` define active in `main.cpp`).

1. The server will start on port 3331 and accept the following commands from clients:
   - `FIND_MEDIA [name]` - Display information about a specific media item
   - `FIND_GROUPE [name]` - Display information about a specific collection
   - `PLAY_MEDIA [name]` - Play a specific media item using mpv
   - `DELETE_MEDIA [name]` - Delete a specific media item
   - `DELETE_COLLECTION [name]` - Delete a specific collection
   - `DISP_ALL` - Display information about all media items and collections
2. For commands that end with `[name]`, you should:
   - Click the "CLEAR" button
   - Type the name of the media or collection you want to play or find

1.6.2 Local Testing Mode

To use the local testing mode (requires changing the SERVER_v define in main.cpp):

1. Comment out the `#define SERVER_v` line in main.cpp
2. Type make run

This mode demonstrates the basic functionality by creating sample media objects, displaying their information, serializing them to a file, deleting them, and then restoring them by deserialization.

1.7 Class Structure

- **MultiMedia**: Abstract base class for all media types
- **Video**: Class for video files with duration
- **Photo**: Class for image files with dimensions
- **Film**: Enhanced video class with chapter information
- **Collection**: Container class that holds multiple media objects
- **MediaManager**: Manages the creation and operations on media objects and collections
- **TCPServer**: Handles client connections and request processing

1.8 Serialization

The application supports saving and loading media objects and collections from files. The serialization format is text-based for easy debugging.

1.9 Example

The server mode initializes with some sample data:

- A video named "video1"
- A photo named "photo1"
- A film named "Film2"
- A collection named "HAPPY" containing the above items

1.9.1 Answers to Specific Questions:

Step 5 (Polymorphism):
The array must contain pointers (`Multimedia*` or `shared_ptr<Multimedia>`) to avoid slicing and enable polymorphism.

Step 6 (Arrays):
The modifier must copy the data from the external array to ensure encapsulation.

Step 8 (Groups):
Use pointers to avoid duplication and allow sharing between groups (unlike in Java, where references are sufficient).

Chapter 2

Hierarchical Index

2.1 Class Hierarchy

This inheritance list is sorted roughly, but not completely, alphabetically:

Chapter 3

Class Index

3.1 Class List

Here are the classes, structs, unions and interfaces with brief descriptions:

Chapter 4

File Index

4.1 File List

Here is a list of all files with brief descriptions:

Chapter 5

Class Documentation

5.1 Client Class Reference

Public Member Functions

- Client (String host, int port) throws UnknownHostException, IOException
- String send (String request)

Static Public Member Functions

- static void main (String argv[ ])

5.1.1 Constructor & Destructor Documentation

5.1.1.1 Client()

```
Client.Client (
            String host,
            int port ) throws UnknownHostException, IOException  [inline]
```

Initialise la connexion. Renvoie une exception en cas d'erreur.

5.1.2 Member Function Documentation

5.1.2.1 main()

```
static void Client.main (
            String argv[] )  [inline], [static]
```

Lit une requete depuis le Terminal, envoie cette requete au serveur, recupere sa reponse et l'affiche sur le Terminal. Noter que le programme bloque si le serveur ne repond pas.

5.1.2.2 send()

```
String Client.send (
            String request )  [inline]
```

Envoie une requete au server et retourne sa reponse. Noter que la methode bloque si le serveur ne repond pas.

The documentation for this class was generated from the following file:

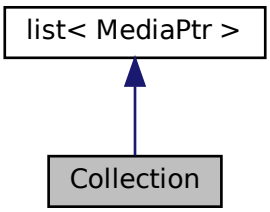
- swing/Client.java

5.2 Collection Class Reference

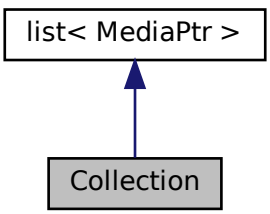
A collection of multimedia objects.

`#include <Collection.h>`

Inheritance diagram for Collection:



Collaboration diagram for Collection:



Public Member Functions

- ~Collection ()
  Destructor.
- string get_name () const
  Gets the collection name.
- string get_class_name () const
  Gets the class name.
- void write (ostream &f) const
  Serializes the collection to an output stream.
- void read (istream &f)
  Deserializes the collection from an input stream.
- void disp (ostream &out) const
  Displays the collection contents.

Friends

- class MediaManager

5.2.1 Detailed Description

A collection of multimedia objects.

This class represents a named collection of multimedia items (photos, videos, films) inheriting from std::list to provide container functionality. It supports serialization and display of the collection contents.

5.2.2 Constructor & Destructor Documentation

5.2.2.1 ~Collection()

```
Collection::~Collection ( )  [inline]
```

Destructor.

5.2.3 Member Function Documentation

5.2.3.1 disp()

```
void Collection::disp (
            ostream & out ) const
```

Displays the collection contents.

Displays the collection information and its contents.

Parameters

out	Output stream to display to

Outputs the collection name followed by information about each multimedia object in the collection.

Parameters

out	The output stream to write to

5.2.3.2 get_class_name()

```
string Collection::get_class_name ( ) const
```

Gets the class name.

Gets the class name identifier.

Returns

"Collection" string

string Always returns "Collection"

5.2.3.3 get_name()

```
string Collection::get_name ( ) const
```

Gets the collection name.

Gets the name of the collection.

Returns

Name of the collection

string The name of the collection

5.2.3.4 read()

```
void Collection::read (
            istream & f )
```

Deserializes the collection from an input stream.

Parameters

f	Input stream to read from

Reads the collection name from the input stream. Assumes the stream is properly formatted (as written by write()).

Parameters

f	The input stream to read from

5.2.3.5 write()

```
void Collection::write (
            ostream & f ) const
```

Serializes the collection to an output stream.

Parameters

f	Output stream to write to

Writes the collection data in a format that can be read back by the read() method. First writes the collection type marker, then the collection name.

Parameters

f	The output stream to write to

5.2.4 Friends And Related Function Documentation

5.2.4.1 MediaManager

```
friend class MediaManager  [friend]
```

The documentation for this class was generated from the following files:

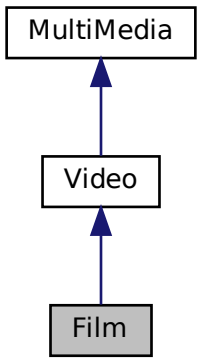
- cpp/Collection.h
- cpp/Collection.cpp

5.3 Film Class Reference

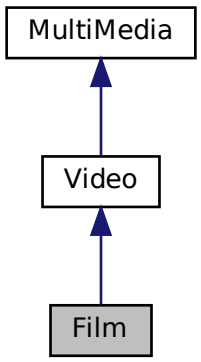
A class representing a film with chapters, derived from Video.

`#include <Film.h>`

Inheritance diagram for Film:



Collaboration diagram for Film:



Public Member Functions

- Film & operator= (const Film &from)

  Assignment operator.
- ~Film ()

Destructor.

- void set_chapters (unsigned int const *chapters, unsigned int nb_chapters)
  Sets chapter information.
- const unsigned int * get_chapters () const
  Gets chapter durations.
- unsigned int get_nb_chapters () const
  Gets number of chapters.
- void disp (ostream &out) const override
  Displays film information.
- string get_class_name () const override
  Gets class name.
- void serial_chapters (ostream &f) const
  Serializes chapter information.
- void deserial_chapters (istream &f)
  Deserializes chapter information.
- void write (ostream &f) const override
  Serializes film data.
- void read (istream &f) override
  Deserializes film data.

Friends

- class MediaManager

5.3.1 Detailed Description

A class representing a film with chapters, derived from Video.

This class extends the Video class to support films with chapters, providing methods to manage chapter information and serialization.

5.3.2 Constructor & Destructor Documentation

5.3.2.1 ~Film()

```
Film::~Film ( )
```

Destructor.

Destructor for Film class.

Releases memory allocated for chapters array.

5.3.3 Member Function Documentation

5.3.3.1 deserial_chapters()

```
void Film::deserial_chapters (
            istream & f )
```

Deserializes chapter information.

Deserializes chapter durations from input stream.

Parameters

f	Input stream
f	Input stream to read from

5.3.3.2 disp()

```
void Film::disp (
            ostream & out ) const  [override], [virtual]
```

Displays film information.

Displays film information including chapters.

Parameters

out	Output stream
out	Output stream to display to

Reimplemented from MultiMedia.

5.3.3.3 get_chapters()

```
const unsigned int * Film::get_chapters ( ) const
```

Gets chapter durations.

Gets the chapter durations array.

Returns

Pointer to chapter durations array

const pointer to chapter durations array

5.3.3.4 get_class_name()

```
string Film::get_class_name ( ) const  [override], [virtual]
```

Gets class name.

Gets the class name.

Returns

"Film"

"Film" as string

Implements MultiMedia.

5.3.3.5 get_nb_chapters()

```
unsigned int Film::get_nb_chapters ( ) const
```

Gets number of chapters.

Gets the number of chapters.

Returns

Number of chapters

5.3.3.6 operator=()

```
Film & Film::operator= (
            const Film & from )
```

Assignment operator.

Assignment operator for Film class.

Parameters

from	Film to assign from

Returns

Reference to the assigned film

Parameters

from	Film object to assign from

Returns

Reference to the assigned Film object

5.3.3.7 read()

```
void Film::read (
            istream & f )  [override], [virtual]
```

Deserializes film data.

Deserializes film data from input stream.

Parameters

f	Input stream
f	Input stream to read from

Reimplemented from MultiMedia.

5.3.3.8 serial_chapters()

```
void Film::serial_chapters (
            ostream & f ) const
```

Serializes chapter information.

Serializes chapter durations to output stream.

Parameters

f	Output stream
f	Output stream to write to

5.3.3.9 set_chapters()

```
void Film::set_chapters (
            unsigned int const * chapters,
            unsigned int nb_chapters )
```

Sets chapter information.

Sets the chapter durations for the film.

Parameters

chapters	Array of chapter durations
nb_chapters	Number of chapters
chapters	Array of chapter durations
nb_chapters	Number of chapters

Note

Manages memory allocation/deallocation for chapters array

5.3.3.10 write()

```
void Film::write (
            ostream & f ) const  [override], [virtual]
```

Serializes film data.

Serializes film data to output stream.

Parameters

f	Output stream
f	Output stream to write to

Reimplemented from MultiMedia.

5.3.4 Friends And Related Function Documentation

5.3.4.1 MediaManager

```
friend class MediaManager  [friend]
```

The documentation for this class was generated from the following files:

- cpp/Film.h
- cpp/Film.cpp

5.4 InputBuffer Struct Reference

Public Member Functions

- InputBuffer (size_t size)
- ~InputBuffer ()

Public Attributes

- char * buffer
- char * begin
- char * end
- SOCKSIZE remaining

5.4.1 Constructor & Destructor Documentation

5.4.1.1 InputBuffer()

```
InputBuffer::InputBuffer (
            size_t size )  [inline]
```

5.4.1.2 ~InputBuffer()

```
InputBuffer::~InputBuffer ( )  [inline]
```

5.4.2 Member Data Documentation

5.4.2.1 begin

```
char* InputBuffer::begin
```

5.4.2.2 buffer

```
char* InputBuffer::buffer
```

5.4.2.3 end

```
char* InputBuffer::end
```

5.4.2.4 remaining

```
SOCKSIZE InputBuffer::remaining
```

The documentation for this struct was generated from the following file:

- cpp/ccsocket.cpp

5.5 MediaManager Class Reference

Manages collections of multimedia objects and their operations.

```
#include <MediaManager.h>
```

Public Member Functions

- MediaManager ()

  Default constructor for MediaManager.
- ∼MediaManager ()

  Destructor for MediaManager.
- SharPhotoPtr create_photo (string name, string path, double width, double height)

  Creates a new Photo object.
- SharVideoPtr create_video (string name, string path, unsigned int duration)

  Creates a new Video object.
- SharFilmPtr create_Film (string name, string path, unsigned int duration, unsigned int const ∗chapters, unsigned int nb_chapters)

  Creates a new Film object.
- SharCollectPtr create_collection (string name)

  Creates a new Collection object.
- void disp_media (ostream &out, string name) const

  Displays information about a specific media object.
- void disp_collection (ostream &out, string name) const

  Displays information about a specific collection.
- void play_media (string name) const

  Plays a media object.
- void delete_media (string name)

  Deletes a media object.
- void delete_collection (string name)

  Deletes a collection.
- void disp_all (ostream &out) const

  Displays information about all media objects and collections.
- void write (ostream &f) const

  Writes the manager's data to an output stream.
- void read (istream &f)

  Reads the manager's data from an input stream.

5.5.1 Detailed Description

Manages collections of multimedia objects and their operations.

This class provides functionality to create, display, play, and delete various types of media objects (photos, videos, films) and collections.

5.5.2 Constructor & Destructor Documentation

5.5.2.1 MediaManager()

```
MediaManager::MediaManager ( )  [inline]
```

Default constructor for MediaManager.

5.5.2.2 ~MediaManager()

```
MediaManager::~MediaManager ( )  [inline]
```

Destructor for MediaManager.

5.5.3 Member Function Documentation

5.5.3.1 create_collection()

```
SharCollectPtr MediaManager::create_collection (
            string name )
```

Creates a new Collection object.

Creates a new Collection object and adds it to the groups collection.

Parameters

name	Name of the collection.

Returns

Shared pointer to the created Collection object.

5.5.3.2 create_Film()

```
SharFilmPtr MediaManager::create_Film (
            string name,
            string path,
            unsigned int duration,
            unsigned int const * chapters,
            unsigned int nb_chapters )
```

Creates a new Film object.

Creates a new Film object and adds it to the media collection.

Parameters

name	Name of the film.
path	File path of the film.
duration	Total duration of the film in seconds.
chapters	Array of chapter durations.
nb_chapters	Number of chapters in the film.

Returns

Shared pointer to the created Film object.

5.5.3.3 create_photo()

```
SharPhotoPtr MediaManager::create_photo (
            string name,
            string path,
            double width,
            double height )
```

Creates a new Photo object.

Creates a new Photo object and adds it to the media collection.

Parameters

name	Name of the photo.
path	File path of the photo.
width	Width of the photo in pixels.
height	Height of the photo in pixels.

Returns

Shared pointer to the created Photo object.

5.5.3.4 create_video()

```
SharVideoPtr MediaManager::create_video (
            string name,
            string path,
            unsigned int duration )
```

Creates a new Video object.

Creates a new Video object and adds it to the media collection.

Parameters

name	Name of the video.
path	File path of the video.
duration	Duration of the video in seconds.

Returns

Shared pointer to the created Video object.

5.5.3.5 delete_collection()

```
void MediaManager::delete_collection (
            string name )
```

Deletes a collection.

Deletes a collection from the manager.

Parameters

name	Name of the collection to delete.

5.5.3.6 delete_media()

```
void MediaManager::delete_media (
            string name )
```

Deletes a media object.

Deletes a media object from the manager.

Parameters

name	Name of the media object to delete.

Also removes the media from any collections that contain it.

Parameters

name	Name of the media object to delete.

5.5.3.7 disp_all()

```
void MediaManager::disp_all (
            ostream & out ) const
```

Displays information about all media objects and collections.

Displays information about all collections.

Parameters

out	Output stream to display the information.

5.5.3.8 disp_collection()

```
void MediaManager::disp_collection (
            ostream & out,
            string name ) const
```

Displays information about a specific collection.

Parameters

out	Output stream to display the information.
name	Name of the collection to display.

5.5.3.9 disp_media()

```
void MediaManager::disp_media (
            ostream & out,
            string name ) const
```

Displays information about a specific media object.

Parameters

out	Output stream to display the information.
name	Name of the media object to display.

5.5.3.10 play_media()

```
void MediaManager::play_media (
            string name ) const
```

Plays a media object.

Plays a media object using its associated player.

Parameters

name	Name of the media object to play.

5.5.3.11 read()

```
void MediaManager::read (
            istream & f )
```

Reads the manager's data from an input stream.

Deserializes media and collections from an input stream.

Parameters

f	Input stream to read the data from.

5.5.3.12 write()

```
void MediaManager::write (
            ostream & f ) const
```

Writes the manager's data to an output stream.

Serializes all media and collections to an output stream.

Parameters

f	Output stream to write the data to.

The documentation for this class was generated from the following files:

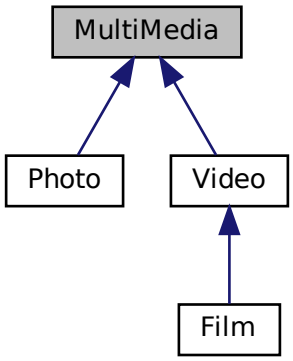
- cpp/MediaManager.h
- cpp/MediaManager.cpp

5.6 MultiMedia Class Reference

Represents a multimedia file.

```
#include <MultiMedia.h>
```

Inheritance diagram for MultiMedia:



Public Member Functions

- MultiMedia ()
  Default constructor.
- MultiMedia (string name, string path)
  Constructor with parameters.
- ~MultiMedia ()
  Destructor.
- string get_name () const
  Gets the name of the multimedia file.
- string get_path () const
  Gets the file path of the multimedia file.
- void set_name (string name)
  Sets a new name for the multimedia file.
- void set_path (string path)
  Sets a new file path for the multimedia file.
- virtual void disp (ostream &out) const
  Displays multimedia file information.
- virtual void run () const =0
  Runs the file of the multimedia file.
- virtual string get_class_name () const =0
- virtual void write (ostream &f) const
  Writes the multimedia object's data to an output stream.
- virtual void read (istream &f)
  Reads the multimedia object's data from an input stream.

5.6.1 Detailed Description

Represents a multimedia file.

This class manages a multimedia file by storing its name and file path. It provides methods to modify and display these attributes.

5.6.2 Constructor & Destructor Documentation

5.6.2.1 MultiMedia() [1/2]

```
MultiMedia::MultiMedia ( )
```

Default constructor.

Default constructor for the MultiMedia class. Initializes a MultiMedia object with empty name and path.

5.6.2.2 MultiMedia() [2/2]

```
MultiMedia::MultiMedia (
            string name,
            string path )
```

Constructor with parameters.

Parameterized constructor for the MultiMedia class.

Parameters

name	Name of the multimedia file.
path	File path of the multimedia file.
name	The name of the multimedia object.
path	The file path of the multimedia object.

5.6.2.3 ~MultiMedia()

```
MultiMedia::~MultiMedia ( )
```

Destructor.

Destructor for the MultiMedia class.

5.6.3 Member Function Documentation

5.6.3.1 disp()

```
void MultiMedia::disp (
            ostream & out ) const  [virtual]
```

Displays multimedia file information.

Displays the basic information of the multimedia object.

Parameters

out	Output stream where the information is printed.

Outputs the name and path of the multimedia object to the given output stream.

Parameters

out	The output stream where the information will be displayed.

Reimplemented in Film, Photo, and Video.

5.6.3.2 get_class_name()

```
virtual string MultiMedia::get_class_name ( ) const  [pure virtual]
```

Implemented in Film, Photo, and Video.

5.6.3.3 get_name()

```
string MultiMedia::get_name ( ) const
```

Gets the name of the multimedia file.

Gets the name of the multimedia object.

Returns

The file name as a string.

The name of the multimedia object as a string.

5.6.3.4 get_path()

```
string MultiMedia::get_path ( ) const
```

Gets the file path of the multimedia file.

Gets the path of the multimedia object.

Returns

The file path as a string.

The file path of the multimedia object as a string.

5.6.3.5 read()

```
void MultiMedia::read (
            istream & f )  [virtual]
```

Reads the multimedia object's data from an input stream.

Deserializes the name and path of the multimedia object from the given input stream.

Parameters

f	The input stream from which the data will be read.

Reimplemented in Photo, Video, and Film.

5.6.3.6 run()

```
virtual void MultiMedia::run ( ) const  [pure virtual]
```

Runs the file of the multimedia file.

Implemented in Photo, and Video.

5.6.3.7 set_name()

```
void MultiMedia::set_name (
            string name )
```

Sets a new name for the multimedia file.

Sets the name of the multimedia object.

Parameters

name	The new file name.
name	The new name to set for the multimedia object.

5.6.3.8 set_path()

```
void MultiMedia::set_path (
            string path )
```

Sets a new file path for the multimedia file.

Sets the path of the multimedia object.

Parameters

path	The new file path.
path	The new file path to set for the multimedia object.

5.6.3.9 write()

```
void MultiMedia::write (
            ostream & f ) const  [virtual]
```

Writes the multimedia object's data to an output stream.

Serializes the name and path of the multimedia object to the given output stream.

Parameters

f	The output stream where the data will be written.

Reimplemented in Film, Photo, and Video.

The documentation for this class was generated from the following files:

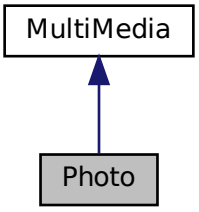
- cpp/MultiMedia.h
- cpp/MultiMedia.cpp

5.7 Photo Class Reference

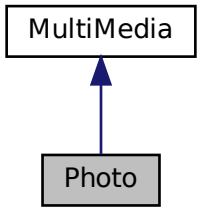
A class representing a photo file, derived from the MultiMedia base class.

```
#include <Photo.h>
```

Inheritance diagram for Photo:



Collaboration diagram for Photo:



Public Member Functions

- ~Photo ()

  Destructor for the Photo class. Outputs a message when the photo object is destroyed.
- void set_width (double width)

  Sets the width of the photo.
- double get_width () const

  Gets the width of the photo.
- void set_height (double height)

  Sets the height of the photo.
- double get_height () const

  Gets the height of the photo.
- void disp (ostream &out) const override

  Displays the details of the photo including name, path, width, and height.
- void run () const override

  Runs the photo using an external player (mpv).
- string get_class_name () const override

  Gets the class name of the object.
- void write (ostream &f) const override

  Writes the photo's attributes to an output stream.
- void read (istream &f)

  Reads the photo's attributes from an input stream.

Friends

- class MediaManager

5.7.1 Detailed Description

A class representing a photo file, derived from the MultiMedia base class.

This class provides methods to set and get the width and height of the photo, display its details, and run the photo using an external player (mpv).

5.7.2 Constructor & Destructor Documentation

5.7.2.1 ~Photo()

```
Photo::~Photo ( )  [inline]
```

Destructor for the Photo class. Outputs a message when the photo object is destroyed.

5.7.3 Member Function Documentation

5.7.3.1 disp()

```
void Photo::disp (
            ostream & out ) const  [inline], [override], [virtual]
```

Displays the details of the photo including name, path, width, and height.

This function overrides the disp() function in the MultiMedia base class.

Parameters

out	The output stream to which the details are written.

Reimplemented from MultiMedia.

5.7.3.2 get_class_name()

```
string Photo::get_class_name ( ) const  [inline], [override], [virtual]
```

Gets the class name of the object.

Returns

A string representing the class name ("Photo").

Implements MultiMedia.

5.7.3.3 get_height()

```
double Photo::get_height ( ) const  [inline]
```

Gets the height of the photo.

Returns

The height of the photo in pixels.

5.7.3.4 get_width()

```
double Photo::get_width ( ) const  [inline]
```

Gets the width of the photo.

Returns

The width of the photo in pixels.

5.7.3.5 read()

```
void Photo::read (
            istream & f )  [inline], [virtual]
```

Reads the photo's attributes from an input stream.

Parameters

f	The input stream to read from.

Reimplemented from MultiMedia.

5.7.3.6 run()

```
void Photo::run ( ) const  [inline], [override], [virtual]
```

Runs the photo using an external player (mpv).

This function overrides the run() function in the MultiMedia base class. It constructs a system command to run the mpv media player with the photo's path.

Implements MultiMedia.

5.7.3.7 set_height()

```
void Photo::set_height (
            double height )  [inline]
```

Sets the height of the photo.

Parameters

height	The height to set for the photo in pixels.

5.7.3.8 set_width()

```
void Photo::set_width (
            double width )  [inline]
```

Sets the width of the photo.

Parameters

width	The width to set for the photo in pixels.

5.7.3.9 write()

```
void Photo::write (
            ostream & f ) const  [inline], [override], [virtual]
```

Writes the photo's attributes to an output stream.

Parameters

f	The output stream to write to.

Reimplemented from MultiMedia.

5.7.4 Friends And Related Function Documentation

5.7.4.1 MediaManager

```
friend class MediaManager  [friend]
```

The documentation for this class was generated from the following file:

- cpp/Photo.h

5.8 ServerSocket Class Reference

`#include <ccsocket.h>`

Public Member Functions

- ServerSocket ()

  Creates a listening socket that waits for connection requests by TCP/IP clients.
- ~ServerSocket ()
- Socket * accept ()
- int bind (int port, int backlog=50)
- int close ()

  Closes the socket.
- bool isClosed () const

  Returns true if the socket was closed.
- SOCKET descriptor ()

  Returns the descriptor of the socket.
- int setReceiveBufferSize (int size)

  Sets the SO_RCVBUF option to the specified value.
- int setReuseAddress (bool)

  Enables/disables the SO_REUSEADDR socket option.
- int setSoTimeout (int timeout)

  Enables/disables SO_TIMEOUT with the specified timeout (in milliseconds).
- int setTcpNoDelay (bool)

  Turns on/off TCP coalescence (useful in some cases to avoid delays).

5.8.1 Detailed Description

TCP/IP IPv4 server socket. Waits for requests to come in over the network. TCP/IP sockets do not preserve record boundaries but SocketBuffer solves this problem.

5.8.2 Constructor & Destructor Documentation

5.8.2.1 ServerSocket()

`ServerSocket::ServerSocket ( )`

Creates a listening socket that waits for connection requests by TCP/IP clients.

5.8.2.2 ~ServerSocket()

`ServerSocket::~ServerSocket ( )`

5.8.3 Member Function Documentation

5.8.3.1 accept()

```
Socket * ServerSocket::accept ( )
```

Accepts a new connection request and returns a socket for exchanging data with this client. This function blocks until there is a connection request.

Returns

the new Socket or nullptr on error.

5.8.3.2 bind()

```
int ServerSocket::bind (
            int port,
            int backlog = 50 )
```

Assigns the server socket to localhost.

Returns

0 on success or a negative value on error, see Socket::Errors

5.8.3.3 close()

```
int ServerSocket::close ( )
```

Closes the socket.

5.8.3.4 descriptor()

```
SOCKET ServerSocket::descriptor ( )  [inline]
```

Returns the descriptor of the socket.

5.8.3.5 isClosed()

```
bool ServerSocket::isClosed ( ) const  [inline]
```

Returns true if the socket was closed.

5.8.3.6 setReceiveBufferSize()

```
int ServerSocket::setReceiveBufferSize (
            int size )
```

Sets the SO_RCVBUF option to the specified value.

5.8.3.7 setReuseAddress()

```
int ServerSocket::setReuseAddress (
            bool state )
```

Enables/disables the SO_REUSEADDR socket option.

5.8.3.8 setSoTimeout()

```
int ServerSocket::setSoTimeout (
            int timeout )
```

Enables/disables SO_TIMEOUT with the specified timeout (in milliseconds).

5.8.3.9 setTcpNoDelay()

```
int ServerSocket::setTcpNoDelay (
            bool state )
```

Turns on/off TCP coalescence (useful in some cases to avoid delays).

The documentation for this class was generated from the following files:

- cpp/ccsocket.h
- cpp/ccsocket.cpp

5.9 Socket Class Reference

`#include <ccsocket.h>`

Public Types

- enum Errors { Failed = -1 , InvalidSocket = -2 , UnknownHost = -3 }

Public Member Functions

- Socket (int type=SOCK_STREAM)
- Socket (int type, SOCKET sockfd)

  Creates a Socket from an existing socket file descriptor.
- ~Socket ()

  Destructor (closes the socket).
- int connect (const std::string &host, int port)
- int bind (int port)
- int bind (const std::string &host, int port)
- int close ()

  Closes the socket.
- bool isClosed () const

  Returns true if the socket has been closed.
- SOCKET descriptor ()

  Returns the descriptor of the socket.
- void shutdownInput ()

  Disables further receive operations.
- void shutdownOutput ()

  Disables further send operations.
- SOCKSIZE send (const SOCKDATA *buf, size_t len, int flags=0)
- SOCKSIZE receive (SOCKDATA *buf, size_t len, int flags=0)
- SOCKSIZE sendTo (void const *buf, size_t len, int flags, SOCKADDR const *to, socklen_t addrlen)

  Sends data to a datagram socket.
- SOCKSIZE receiveFrom (void *buf, size_t len, int flags, SOCKADDR *from, socklen_t *addrlen)

  Receives data from datagram socket.
- int setReceiveBufferSize (int size)

  Set the size of the TCP/IP input buffer.
- int setReuseAddress (bool)

  Enable/disable the SO_REUSEADDR socket option.
- int setSendBufferSize (int size)

  Set the size of the TCP/IP output buffer.
- int setSoLinger (bool, int linger)

  Enable/disable SO_LINGER with the specified linger time in seconds.
- int setSoTimeout (int timeout)

  Enable/disable SO_TIMEOUT with the specified timeout (in milliseconds).
- int setTcpNoDelay (bool)

  Enable/disable TCP_NODELAY (turns on/off TCP coalescence).
- int getReceiveBufferSize () const

  Return the size of the TCP/IP input buffer.
- bool getReuseAddress () const

Return SO_REUSEADDR state.

- int getSendBufferSize () const

  Return the size of the TCP/IP output buffer.

- bool getSoLinger (int &linger) const

  Return SO_LINGER state and the specified linger time in seconds.

- int getSoTimeout () const

  Return SO_TIMEOUT value.

- bool getTcpNoDelay () const

  Return TCP_NODELAY state.

Static Public Member Functions

- static void startup ()
- static void cleanup ()

Friends

- class ServerSocket

5.9.1 Detailed Description

TCP/IP or UDP/Datagram IPv4 socket. AF_INET connections following the IPv4 Internet protocol are supported.

Note

- ServerSocket should be used on the server side.
- SIGPIPE signals are ignored when using Linux, BSD or MACOSX.
- TCP/IP sockets do not preserve record boundaries but SocketBuffer solves this problem.

5.9.2 Member Enumeration Documentation

5.9.2.1 Errors

`enum Socket::Errors`

Socket errors.

- Socket::Failed (-1): could not connect, could not bind, etc.
- Socket::InvalidSocket (-2): invalid socket or wrong socket type
- Socket::UnknownHost (-3): could not reach host

Enumerator

Failed	
InvalidSocket	
UnknownHost	

5.9.3 Constructor & Destructor Documentation

5.9.3.1 Socket() [1/2]

```
Socket::Socket (
            int type = SOCK_STREAM )
```

Creates a new Socket. Creates a AF_INET socket using the IPv4 Internet protocol. Type can be:

- SOCK_STREAM (the default) for TCP/IP connected stream sockets
- SOCK_DGRAM for UDP/datagram sockets (available only or Unix/Linux)

5.9.3.2 Socket() [2/2]

```
Socket::Socket (
            int type,
            SOCKET sockfd )
```

Creates a Socket from an existing socket file descriptor.

5.9.3.3 ~Socket()

```
Socket::~Socket ( )
```

Destructor (closes the socket).

5.9.4 Member Function Documentation

5.9.4.1 bind() [1/2]

```
int Socket::bind (
            const std::string & host,
            int port )
```

Assigns the socket to an IP address. On Unix/Linux host can be a hostname, on Windows it can only be an IP address.

Returns

0 on success or a negative value on error, see Socket::Errors

5.9.4.2 bind() [2/2]

```
int Socket::bind (
            int port )
```

Assigns the socket to localhost.

Returns

0 on success or a negative value on error, see Socket::Errors

5.9.4.3 cleanup()

```
void Socket::cleanup ( )  [static]
```

5.9.4.4 close()

```
int Socket::close ( )
```

Closes the socket.

5.9.4.5 connect()

```
int Socket::connect (
            const std::string & host,
            int port )
```

Connects the socket to an address. Typically used for connecting TCP/IP clients to a ServerSocket. On Unix/Linux host can be a hostname, on Windows it can only be an IP address.

Returns

0 on success or a negative value on error which is one of Socket::Errors

5.9.4.6 descriptor()

```
SOCKET Socket::descriptor ( )  [inline]
```

Returns the descriptor of the socket.

5.9.4.7 getReceiveBufferSize()

```
int Socket::getReceiveBufferSize ( ) const
```

Return the size of the TCP/IP input buffer.

5.9.4.8 getReuseAddress()

```
bool Socket::getReuseAddress ( ) const
```

Return SO_REUSEADDR state.

5.9.4.9 getSendBufferSize()

```
int Socket::getSendBufferSize ( ) const
```

Return the size of the TCP/IP output buffer.

5.9.4.10 getSoLinger()

```
bool Socket::getSoLinger (
            int & linger ) const
```

Return SO_LINGER state and the specified linger time in seconds.

5.9.4.11 getSoTimeout()

```
int Socket::getSoTimeout ( ) const
```

Return SO_TIMEOUT value.

5.9.4.12 getTcpNoDelay()

```
bool Socket::getTcpNoDelay ( ) const
```

Return TCP_NODELAY state.

5.9.4.13 isClosed()

```
bool Socket::isClosed ( ) const  [inline]
```

Returns true if the socket has been closed.

5.9.4.14 receive()

```
SOCKSIZE Socket::receive (
            SOCKDATA * buf,
            size_t len,
            int flags = 0 )  [inline]
```

Receives data from a connected (TCP/IP) socket. Reads at most *len* bytes fand stores them in *buf*. By default, this function blocks the caller until thre is availbale data.

Returns

the number of bytes that were received, or 0 or shutdownOutput() was called on the other side, or Socket::Failed (-1) if an error occured.

5.9.4.15 receiveFrom()

```
SOCKSIZE Socket::receiveFrom (
            void * buf,
            size_t len,
            int flags,
            SOCKADDR * from,
            socklen_t * addrlen )  [inline]
```

Receives data from datagram socket.

5.9.4.16 send()

```
SOCKSIZE Socket::send (
            const SOCKDATA * buf,
            size_t len,
            int flags = 0 )  [inline]
```

Send sdata to a connected (TCP/IP) socket. Sends the first *len* bytes in *buf*.

Returns

the number of bytes that were sent, or 0 or shutdownInput() was called on the other side, or Socket::Failed (-1) if an error occured.

Note

TCP/IP sockets do not preserve record boundaries, see SocketBuffer.

5.9.4.17 sendTo()

```
SOCKSIZE Socket::sendTo (
            void const * buf,
            size_t len,
            int flags,
            SOCKADDR const * to,
            socklen_t addrlen )  [inline]
```

Sends data to a datagram socket.

5.9.4.18 setReceiveBufferSize()

```
int Socket::setReceiveBufferSize (
            int size )
```

Set the size of the TCP/IP input buffer.

5.9.4.19 setReuseAddress()

```
int Socket::setReuseAddress (
            bool state )
```

Enable/disable the SO_REUSEADDR socket option.

5.9.4.20 setSendBufferSize()

```
int Socket::setSendBufferSize (
            int size )
```

Set the size of the TCP/IP output buffer.

5.9.4.21 setSoLinger()

```
int Socket::setSoLinger (
            bool on,
            int linger )
```

Enable/disable SO_LINGER with the specified linger time in seconds.

5.9.4.22 setSoTimeout()

```
int Socket::setSoTimeout (
            int timeout )
```

Enable/disable SO_TIMEOUT with the specified timeout (in milliseconds).

5.9.4.23 setTcpNoDelay()

```
int Socket::setTcpNoDelay (
            bool state )
```

Enable/disable TCP_NODELAY (turns on/off TCP coalescence).

5.9.4.24 shutdownInput()

```
void Socket::shutdownInput ( )
```

Disables further receive operations.

5.9.4.25 shutdownOutput()

```
void Socket::shutdownOutput ( )
```

Disables further send operations.

5.9.4.26 startup()

```
void Socket::startup ( )  [static]
```

initialisation and cleanup of sockets on Widows.

Note

startup is automaticcaly called when a Socket or a ServerSocket is created

5.9.5 Friends And Related Function Documentation

5.9.5.1 ServerSocket

```
friend class ServerSocket  [friend]
```

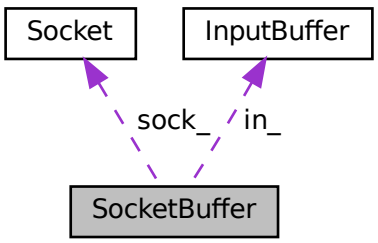
The documentation for this class was generated from the following files:

- cpp/ccsocket.h
- cpp/ccsocket.cpp

5.10 SocketBuffer Class Reference

```
#include <ccsocket.h>
```

Collaboration diagram for SocketBuffer:



Public Member Functions

- ~SocketBuffer ()
- SOCKSIZE readLine (std::string &message)
- SOCKSIZE writeLine (const std::string &message)
- SOCKSIZE read (char *buffer, size_t len)
- SOCKSIZE write (const char *str, size_t len)
- Socket * socket ()

  Returns the associated socket.

- SocketBuffer (Socket *, size_t inputSize=8192, size_t ouputSize=8192)
- SocketBuffer (Socket &, size_t inputSize=8192, size_t ouputSize=8192)

- size_t insize_ {}
- size_t outsize_ {}
- int insep_ {}
- int outsep_ {}
- Socket * sock_ {}
- struct InputBuffer * in_ {}
- void setReadSeparator (int separ)
- int readSeparator () const
- void setWriteSeparator (int separ)
- int writeSeparator () const
- bool retrieveLine (std::string &str, SOCKSIZE received)

5.10.1 Detailed Description

Preserves record boundaries when exchanging messages between connected TCP/IP sockets. Ensures that one call to readLine() corresponds to one and exactly one call to writeLine() on the other side. By default, writeLine() adds
at the end of each message and readLine() searches for
, \r or
\r so that it can retreive the entire record. Beware messages should thus not contain these charecters.

```
int main() {
    Socket sock;
    SocketBuffer sockbuf(sock);
    int status = sock.connect("localhost", 3331);
    if (status < 0) {
      cerr « "Could not connect" « endl;
      return 1;
    }
    while (cin) {
      string request, response;
      cout « "Request:  ";
      getline(cin, request);
      if (sockbuf.writeLine(request) < 0) {
         cerr « "Could not send message" « endl;
         return 2;
      }
      if (sockbuf.readLine(response) < 0) {
         cerr « "Couldn't receive message" « endl;
         return 3;
      }
    }
  return 0;
}
```

5.10.2 Constructor & Destructor Documentation

5.10.2.1 SocketBuffer() [1/2]

```
SocketBuffer::SocketBuffer (
            Socket * sock,
            size_t inputSize = 8192,
            size_t ouputSize = 8192 )
```

Constructor. *socket* must be a connected TCP/IP Socket. It should **not** be deleted as long as the SocketBuffer is used. *inputSize* and *ouputSize* are the sizes of the buffers that are used internally for exchanging data.

5.10.2.2 SocketBuffer() [2/2]

```
SocketBuffer::SocketBuffer (
            Socket & sock,
            size_t inputSize = 8192,
            size_t ouputSize = 8192 )
```

5.10.2.3 ~SocketBuffer()

```
SocketBuffer::~SocketBuffer ( )
```

5.10.3 Member Function Documentation

5.10.3.1 read()

```
SOCKSIZE SocketBuffer::read (
            char * buffer,
            size_t len )
```

Reads exactly *len* bytes from the socket, blocks otherwise.

Returns

see readLine()

5.10.3.2 readLine()

```
SOCKSIZE SocketBuffer::readLine (
            std::string & message )
```

Read a message from a connected socket. readLine() receives one (and only one) message sent by writeLine() on the other side, ie, a call to writeLine() corresponds to one and exactly one call to readLine() on the other side. The received data is stored in *message*. This method blocks until the message is fully received.

Returns

The number of bytes that were received or one of the following values:

- 0: shutdownOutput() was called on the other side
- Socket::Failed (-1): a connection error occured
- Socket::InvalidSocket (-2): the socket is invalid.

Note

the separator (eg
) is counted in the value returned by readLine().

5.10.3.3 readSeparator()

```
int SocketBuffer::readSeparator ( ) const  [inline]
```

5.10.3.4 retrieveLine()

```
bool SocketBuffer::retrieveLine (
            std::string & str,
            SOCKSIZE received )  [protected]
```

5.10.3.5 setReadSeparator()

```
void SocketBuffer::setReadSeparator (
            int separ )
```

Returns/changes the separator used by readLine(). setReadSeparator() changes the symbol used by readLine() to separate successive messages:

- if *separ* $<$ 0 (the default) readLine() searches for \n, \r or \n\r.
- if *separ* $>=$ 0, readLine() searches for this character to separate messages,

5.10.3.6 setWriteSeparator()

```
void SocketBuffer::setWriteSeparator (
            int separ )
```

Returns/changes the separator used by writeLine(). setWriteSeparator() changes the character(s) used by writeLine() to separate successive messages:

- if *separ* < 0 (the default) writeLine() inserts \n\r between successive lines.
- if *separ* >= 0, writeLine() inserts *separ* between successive lines,

5.10.3.7 socket()

```
Socket * SocketBuffer::socket ( )  [inline]
```

Returns the associated socket.

5.10.3.8 write()

```
SOCKSIZE SocketBuffer::write (
            const char * str,
            size_t len )
```

Writes *len* bytes to the socket.

Returns

see readLine()

5.10.3.9 writeLine()

```
SOCKSIZE SocketBuffer::writeLine (
            const std::string & message )
```

Send a message to a connected socket. writeLine() sends a message that will be received by a single call of readLine() on the other side,

Returns

see readLine()

Note

if *message* contains one or several occurences of the separator, readLine() will be called as many times on the other side.

5.10.3.10 writeSeparator()

```
int SocketBuffer::writeSeparator ( ) const  [inline]
```

5.10.4 Member Data Documentation

5.10.4.1 in_

```
struct InputBuffer* SocketBuffer::in_ {}  [protected]
```

5.10.4.2 insep_

```
int SocketBuffer::insep_ {}  [protected]
```

5.10.4.3 insize_

```
size_t SocketBuffer::insize_ {}  [protected]
```

5.10.4.4 outsep_

```
int SocketBuffer::outsep_ {}  [protected]
```

5.10.4.5 outsize_

```
size_t SocketBuffer::outsize_ {}  [protected]
```

5.10.4.6 sock_

```
Socket* SocketBuffer::sock_ {}  [protected]
```

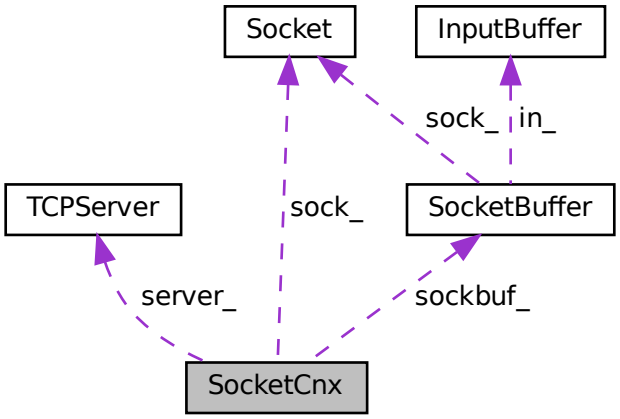
The documentation for this class was generated from the following files:

- cpp/ccsocket.h
- cpp/ccsocket.cpp

5.11 SocketCnx Class Reference

Connection with a given client. Each SocketCnx uses a different thread.

Collaboration diagram for SocketCnx:



Public Member Functions

- SocketCnx (TCPServer &, Socket *)
- ~SocketCnx ()
- void processRequests ()

Public Attributes

- TCPServer & server_
- Socket * sock_
- SocketBuffer * sockbuf_
- std::thread thread_

5.11.1 Detailed Description

Connection with a given client. Each SocketCnx uses a different thread.

5.11.2 Constructor & Destructor Documentation

5.11.2.1 SocketCnx()

```
SocketCnx::SocketCnx (
            TCPServer & server,
            Socket * socket )
```

5.11.2.2 ~SocketCnx()

```
SocketCnx::~SocketCnx ( )
```

5.11.3 Member Function Documentation

5.11.3.1 processRequests()

```
void SocketCnx::processRequests ( )
```

5.11.4 Member Data Documentation

5.11.4.1 server_

```
TCPServer& SocketCnx::server_
```

5.11.4.2 sock_

```
Socket* SocketCnx::sock_
```

5.11.4.3 sockbuf_

```
SocketBuffer* SocketCnx::sockbuf_
```

5.11.4.4 thread_

```
std::thread SocketCnx::thread_
```

The documentation for this class was generated from the following file:

- cpp/tcpserver.cpp

5.12 TCPServer Class Reference

```
#include <tcpserver.h>
```

Public Types

- using Callback = std::function< bool(std::string const &request, std::string &response) >

Public Member Functions

- TCPServer (Callback const &callback)
- virtual ~TCPServer ()
- virtual int run (int port)

Friends

- class TCPLock
- class SocketCnx

5.12.1 Detailed Description

TCP/IP IPv4 server. Supports TCP/IP AF_INET IPv4 connections with multiple clients. One thread is used per client.

5.12.2 Member Typedef Documentation

5.12.2.1 Callback

```
using TCPServer::Callback = std::function< bool(std::string const& request, std::string& response)
>
```

5.12.3 Constructor & Destructor Documentation

5.12.3.1 TCPServer()

```
TCPServer::TCPServer (
            Callback const & callback )
```

initializes the server. The callback function will be called each time the server receives a request from a client.

- *request* contains the data sent by the client
- *response* will be sent to the client as a response The connection with the client is closed if the callback returns false.

5.12.3.2 ~TCPServer()

```
TCPServer::~TCPServer ( )  [virtual]
```

5.12.4 Member Function Documentation

5.12.4.1 run()

```
int TCPServer::run (
            int port )  [virtual]
```

Starts the server. Binds an internal ServerSocket to *port* then starts an infinite loop that processes connection requests from clients.

Returns

0 on normal termination, or a negative value if the ServerSocket could not be bound (value is then one of Socket::Errors).

5.12.5 Friends And Related Function Documentation

5.12.5.1 SocketCnx

```
friend class SocketCnx  [friend]
```

5.12.5.2 TCPLock

```
friend class TCPLock  [friend]
```

The documentation for this class was generated from the following files:

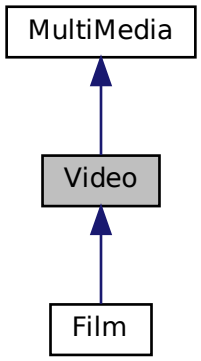
- cpp/tcpserver.h
- cpp/tcpserver.cpp

5.13 Video Class Reference

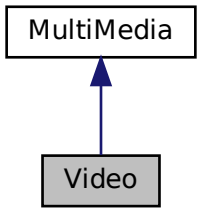
A class representing a video file, derived from the MultiMedia base class.

```
#include <Video.h>
```

Inheritance diagram for Video:



Collaboration diagram for Video:



Public Member Functions

- ~Video ()

  Destructor for the Video class.
- void set_duration (unsigned int duration)

  Sets the duration of the video.
- unsigned int get_duration () const

  Gets the duration of the video.
- void disp (ostream &out) const override

  Displays the details of the video including name, path, and duration.
- void run () const override

  Plays the video using an external player (mpv).
- string get_class_name () const override

  Gets the class name of the object.
- void write (ostream &f) const override

  Writes the video's attributes to an output stream.
- void read (istream &f)

  Reads the video's attributes from an input stream.

Friends

- class MediaManager
- class Film

5.13.1 Detailed Description

A class representing a video file, derived from the MultiMedia base class.

This class provides methods to set and get the duration of the video, display its details, and run the video using an external player (mpv).

5.13.2 Constructor & Destructor Documentation

5.13.2.1 ~Video()

```
Video::~Video ( )  [inline]
```

Destructor for the Video class.

5.13.3 Member Function Documentation

5.13.3.1 disp()

```
void Video::disp (
            ostream & out ) const  [inline], [override], [virtual]
```

Displays the details of the video including name, path, and duration.

This function overrides the disp() function in the MultiMedia base class.

Parameters

out	The output stream to which the details are written.

Reimplemented from MultiMedia.

5.13.3.2 get_class_name()

```
string Video::get_class_name ( ) const  [inline], [override], [virtual]
```

Gets the class name of the object.

Returns

A string representing the class name ("Video").

Implements MultiMedia.

5.13.3.3 get_duration()

```
unsigned int Video::get_duration ( ) const  [inline]
```

Gets the duration of the video.

Returns

The duration of the video in seconds.

5.13.3.4 read()

```
void Video::read (
            istream & f )  [inline], [virtual]
```

Reads the video's attributes from an input stream.

Parameters

f	The input stream to read from.

Reimplemented from MultiMedia.

5.13.3.5 run()

```
void Video::run ( ) const  [inline], [override], [virtual]
```

Plays the video using an external player (mpv).

This function overrides the run() function in the MultiMedia base class. It constructs a system command to run the mpv media player with the video's path.

Implements MultiMedia.

5.13.3.6 set_duration()

```
void Video::set_duration (
            unsigned int duration )  [inline]
```

Sets the duration of the video.

Parameters

duration	The duration to set for the video in seconds.

5.13.3.7 write()

```
void Video::write (
            ostream & f ) const  [inline], [override], [virtual]
```

Writes the video's attributes to an output stream.

Parameters

f	The output stream to write to.

Reimplemented from MultiMedia.

5.13.4 Friends And Related Function Documentation

5.13.4.1 Film

```
friend class Film  [friend]
```

5.13.4.2 MediaManager

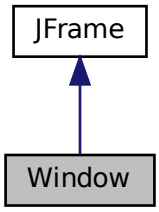
```
friend class MediaManager  [friend]
```

The documentation for this class was generated from the following file:

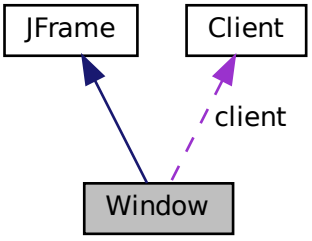
- cpp/Video.h

5.14 Window Class Reference

Inheritance diagram for Window:



Collaboration diagram for Window:



Classes

- class **Click1**
- class **Click2**
- class **Click3**
- class **Click4**
- class **Click5**
- class **Click6**
- class **Click7**
- class **Click8**
- class **Click9**

Public Member Functions

- Window ()

Static Public Member Functions

- static void main (String argv[])

5.14.1 Detailed Description

The main GUI window for the Media Player application. Provides a user interface to interact with the media server.

5.14.2 Constructor & Destructor Documentation

5.14.2.1 Window()

```
Window.Window ( )  [inline]
```

Constructs the main application window. Initializes the GUI components and sets up event handlers.

5.14.3 Member Function Documentation

5.14.3.1 main()

```
static void Window.main (
            String argv[] )  [inline], [static]
```

Main entry point for the application.

Parameters

argv	Command line arguments (not used)

The documentation for this class was generated from the following file:

- swing/Window.java

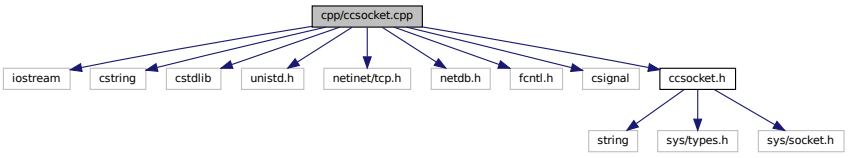
Chapter 6

File Documentation

6.1 cpp/ccsocket.cpp File Reference

```
#include <iostream>
#include <cstring>
#include <cstdlib>
#include <unistd.h>
#include <netinet/tcp.h>
#include <netdb.h>
#include <fcntl.h>
#include <csignal>
#include "ccsocket.h"
```

Include dependency graph for ccsocket.cpp:



Classes

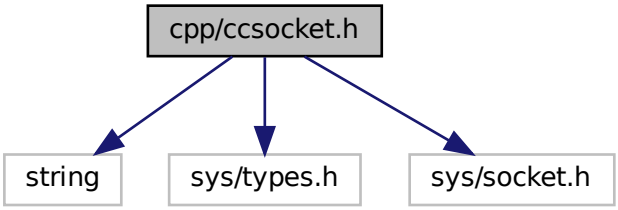
- struct InputBuffer

6.2 cpp/ccsocket.h File Reference

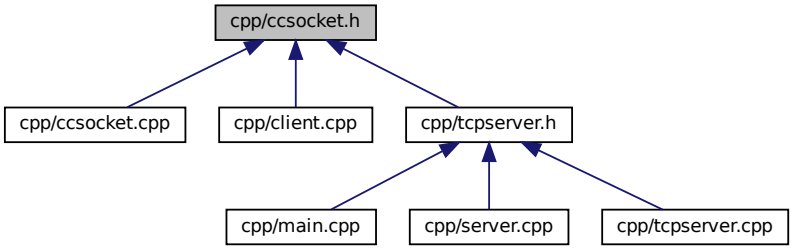
```
#include <string>
#include <sys/types.h>
```

```
#include <sys/socket.h>
```

Include dependency graph for ccsocket.h:



This graph shows which files directly or indirectly include this file:



Classes

- class Socket
- class ServerSocket
- class SocketBuffer

Macros

- #define SOCKET int
- #define SOCKADDR struct sockaddr
- #define SOCKADDR_IN struct sockaddr_in
- #define INVALID_SOCKET -1
- #define SOCKSIZE ssize_t
- #define SOCKDATA void
- #define NO_SIGPIPE_(flags) (flags)

6.2.1 Macro Definition Documentation

6.2.1.1 INVALID_SOCKET

```
#define INVALID_SOCKET -1
```

6.2.1.2 NO_SIGPIPE_

```
#define NO_SIGPIPE_(
              flags ) (flags)
```

6.2.1.3 SOCKADDR

```
#define SOCKADDR struct sockaddr
```

6.2.1.4 SOCKADDR_IN

```
#define SOCKADDR_IN struct sockaddr_in
```

6.2.1.5 SOCKDATA

```
#define SOCKDATA void
```

6.2.1.6 SOCKET

```
#define SOCKET int
```

6.2.1.7 SOCKSIZE

```
#define SOCKSIZE ssize_t
```

6.3 ccsocket.h

Go to the documentation of this file.

```
1 //
2 //  ccsocket:  C++ Classes for TCP/IP and UDP Datagram INET Sockets.
3 //  (c) Eric Lecolinet 2016/2020 - https://www.telecom-paris.fr/~elc
4 //
5 //  - Socket:  TCP/IP or UDP/Datagram IPv4 socket
6 //  - ServerSocket:  TCP/IP Socket Server
7 //  - SocketBuffer:  preserves record boundaries when exchanging data
8 //   between TCP/IP sockets.
9 //
10
11 #ifndef ccuty_ccsocket
12 #define ccuty_ccsocket 1
13
14 #include <string>
15
16 #if defined(_WIN32) || defined(_WIN64)
17 #include <winsock2.h>
18 #define SOCKSIZE int
19 #define SOCKDATA char
20
21 #else
22 #include <sys/types.h>
23 #include <sys/socket.h>
24 #define SOCKET int
25 #define SOCKADDR struct sockaddr
26 #define SOCKADDR_IN struct sockaddr_in
27 #define INVALID_SOCKET -1
28 #define SOCKSIZE ssize_t
29 #define SOCKDATA void
30 #endif
31
32 // ignore SIGPIPES when possible
33 #if defined(MSG_NOSIGNAL)
34 #  define NO_SIGPIPE_(flags) (flags | MSG_NOSIGNAL)
35 #else
36 #  define NO_SIGPIPE_(flags) (flags)
37 #endif
38
46 class Socket {
47 public:
52   enum Errors { Failed = -1, InvalidSocket = -2, UnknownHost = -3 };
53
57   static void startup();
58   static void cleanup();
60
65   Socket(int type = SOCK_STREAM);
66
68   Socket(int type, SOCKET sockfd);
69
71   ~Socket();
72
77   int connect(const std::string& host, int port);
78
81   int bind(int port);
82
86   int bind(const std::string& host, int port);
87
89   int close();
90
92   bool isClosed()const { return sockfd_ == INVALID_SOCKET; }
93
95   SOCKET descriptor() { return sockfd_; }
96
98   void shutdownInput();
99
101   void shutdownOutput();
102
108   SOCKSIZE send(const SOCKDATA* buf, size_t len, int flags = 0) {
109     return ::send(sockfd_, buf, len, NO_SIGPIPE_(flags));
110   }
111
117   SOCKSIZE receive(SOCKDATA* buf, size_t len, int flags = 0) {
118     return ::recv(sockfd_, buf, len, flags);
119   }
120
121 #if !defined(_WIN32) && !defined(_WIN64)
122
124   SOCKSIZE sendTo(void const* buf, size_t len, int flags,
125                   SOCKADDR const* to, socklen_t addrlen) {
126     return ::sendto(sockfd_, buf, len, NO_SIGPIPE_(flags), to, addrlen);
127   }
128
```

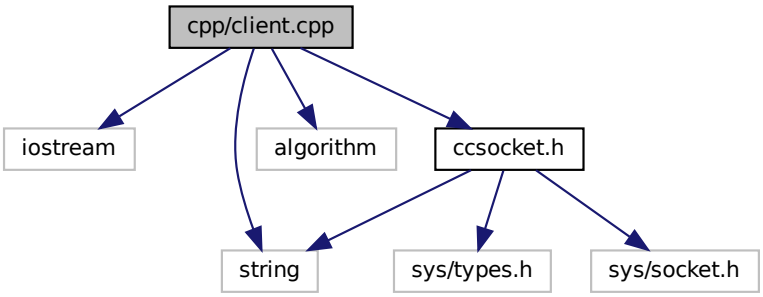
```
130   SOCKSIZE receiveFrom(void* buf, size_t len, int flags,
131                        SOCKADDR* from, socklen_t* addrlen) {
132     return ::recvfrom(sockfd_, buf, len, flags, from, addrlen);
133   }
134
136   int setReceiveBufferSize(int size);
137
139   int setReuseAddress(bool);
140
142   int setSendBufferSize(int size);
143
145   int setSoLinger(bool, int linger);
146
148   int setSoTimeout(int timeout);
149
151   int setTcpNoDelay(bool);
152
154   int getReceiveBufferSize() const;
155
157   bool getReuseAddress() const;
158
160   int getSendBufferSize() const;
161
163   bool getSoLinger(int& linger) const;
164
166   int getSoTimeout() const;
167
169   bool getTcpNoDelay() const;
170
171 #endif
172
173 private:
174   friend class ServerSocket;
175
176   // Initializes a local INET4 address, returns 0 on success, -1 otherwise.
177   int setLocalAddress(SOCKADDR_IN& addr, int port);
178   // Initializes a remote INET4 address, returns 0 on success, -1 otherwise.
179   int setAddress(SOCKADDR_IN& addr, const std::string& host, int port);
180
181   SOCKET sockfd_{};
182   Socket(const Socket&) = delete;
183   Socket& operator=(const Socket&) = delete;
184   Socket& operator=(Socket&&) = delete;
185 };
186
187
188
192 class ServerSocket {
193 public:
195   ServerSocket();
196
197   ~ServerSocket();
198
202   Socket* accept();
203
206   int bind(int port, int backlog = 50);
207
209   int close();
210
212   bool isClosed()const { return sockfd_ == INVALID_SOCKET; }
213
215   SOCKET descriptor() { return sockfd_; }
216
217 #if !defined(_WIN32) && !defined(_WIN64)
218
220   int setReceiveBufferSize(int size);
221
223   int setReuseAddress(bool);
224
226   int  setSoTimeout(int timeout);
227
229   int setTcpNoDelay(bool);
230
231 #endif
232
233 private:
234   Socket* createSocket(SOCKET);
235   SOCKET sockfd_{};  // listening socket.
236   ServerSocket(const ServerSocket&) = delete;
237   ServerSocket& operator=(const ServerSocket&) = delete;
238   ServerSocket& operator=(ServerSocket&&) = delete;
239 };
240
241
276 class SocketBuffer {
277 public:
283   SocketBuffer(Socket*, size_t inputSize = 8192, size_t ouputSize = 8192);
```

```
284   SocketBuffer(Socket&, size_t inputSize = 8192, size_t ouputSize = 8192);
286
287   ~SocketBuffer();
288
300   SOCKSIZE readLine(std::string& message);
301
309   SOCKSIZE writeLine(const std::string& message);
310
313   SOCKSIZE read(char* buffer, size_t len);
314
317   SOCKSIZE write(const char* str, size_t len);
318
320   Socket* socket() { return sock_; }
321
327   void setReadSeparator(int separ);
328   int readSeparator()const { return insep_; }
329   // @}
330
336   void setWriteSeparator(int separ);
337   int writeSeparator()const { return outsep_; }
338   // @}
339
340 private:
341   SocketBuffer(const SocketBuffer&) = delete;
342   SocketBuffer& operator=(const SocketBuffer&) = delete;
343   SocketBuffer& operator=(SocketBuffer&&) = delete;
344
345 protected:
346   bool retrieveLine(std::string& str, SOCKSIZE received);
347   size_t insize_{}, outsize_{};
348   int insep_{}, outsep_{};
349   Socket* sock_{};
350   struct InputBuffer* in_{};
351 };
352
353 #endif
```

6.4 cpp/client.cpp File Reference

```
#include <iostream>
#include <string>
#include <algorithm>
#include "ccsocket.h"
```

Include dependency graph for client.cpp:



Functions

- int main ()

6.4.1 Function Documentation

6.4.1.1 main()

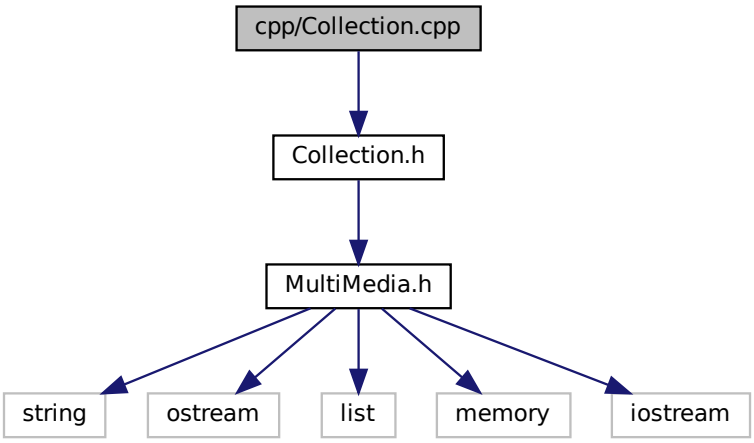
```
int main ( )
```

Lit une requete depuis le Terminal, envoie cette requete au serveur, recupere sa reponse et l'affiche sur le Terminal. Noter que le programme bloque si le serveur ne repond pas.

6.5 cpp/Collection.cpp File Reference

```
#include "Collection.h"
```

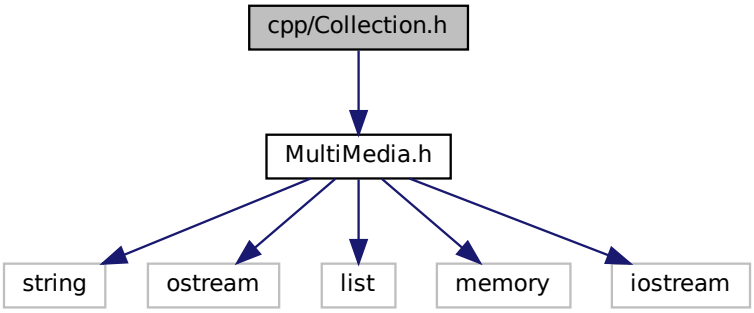
Include dependency graph for Collection.cpp:



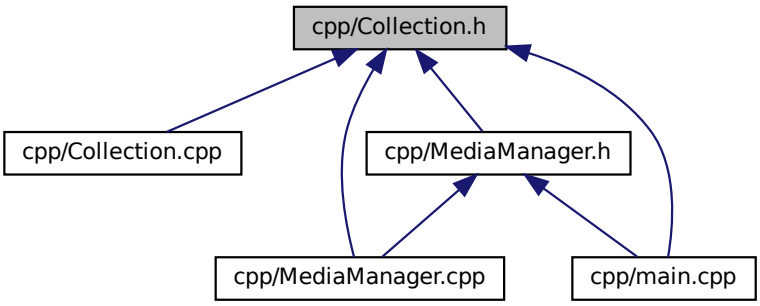
6.6 cpp/Collection.h File Reference

```
#include "MultiMedia.h"
```

Include dependency graph for Collection.h:



This graph shows which files directly or indirectly include this file:



Classes

- class Collection

  A collection of multimedia objects.

Typedefs

- typedef std::shared_ptr< MultiMedia > MediaPtr

  Shared pointer to a MultiMedia object.

6.6.1 Typedef Documentation

6.6.1.1 MediaPtr

MediaPtr

Shared pointer to a MultiMedia object.

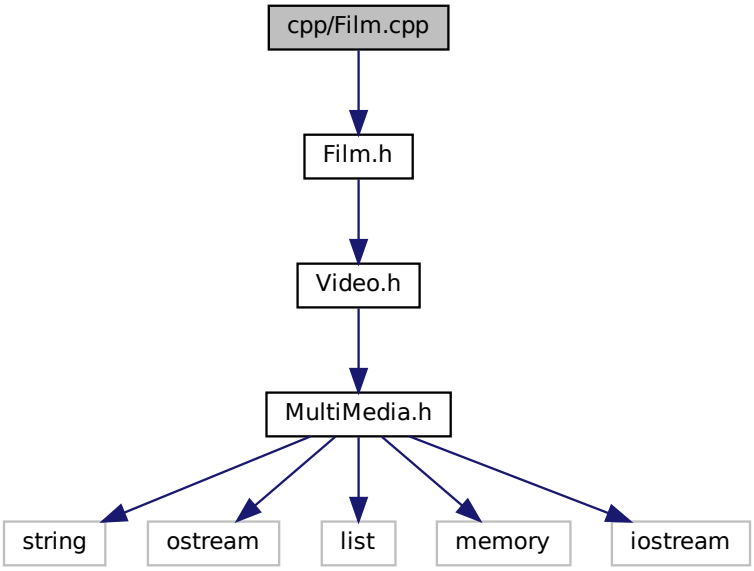
6.7 Collection.h

Go to the documentation of this file.

```
1 #ifndef COLLECTION_H
2 #define COLLECTION_H
3 #include "MultiMedia.h"
4
9 typedef std::shared_ptr<MultiMedia> MediaPtr;
10
19 class Collection :  public list<MediaPtr>
20 {
21     friend class MediaManager;
22 private:
23     string name {};
24
29     Collection(string name);
30
34     Collection(){};
35
36 public:
40     ~Collection(){};
41
46     string get_name() const;
47
52     string get_class_name() const;
53
58     void write(ostream& f) const;
59
64     void read(istream& f);
65
70     void disp(ostream& out) const;
71 };
72
73 #endif
```

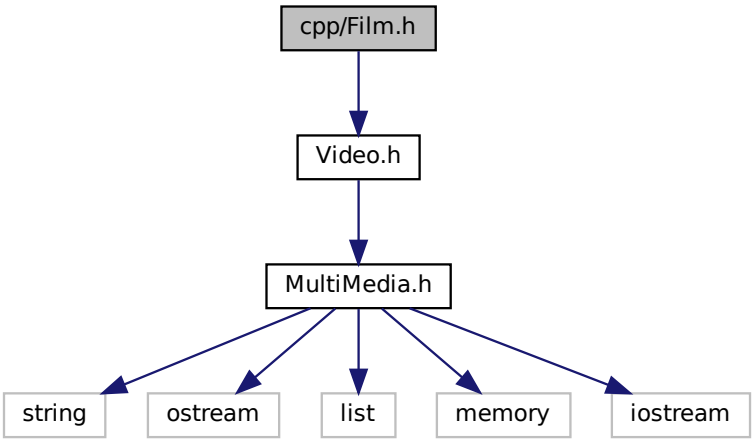
6.8 cpp/Film.cpp File Reference

`#include "Film.h"`
Include dependency graph for Film.cpp:

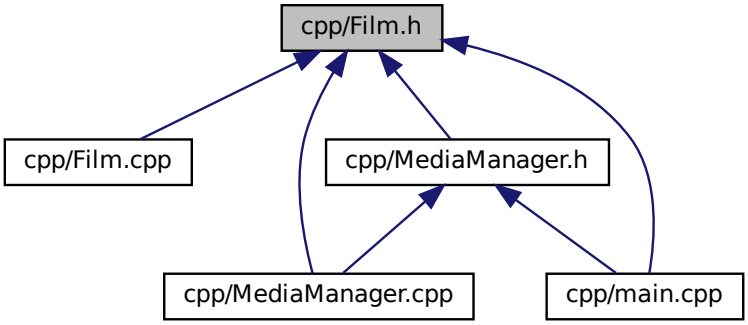


6.9 cpp/Film.h File Reference

`#include "Video.h"`
Include dependency graph for Film.h:



This graph shows which files directly or indirectly include this file:



Classes

- class Film

  A class representing a film with chapters, derived from Video.

6.10 Film.h

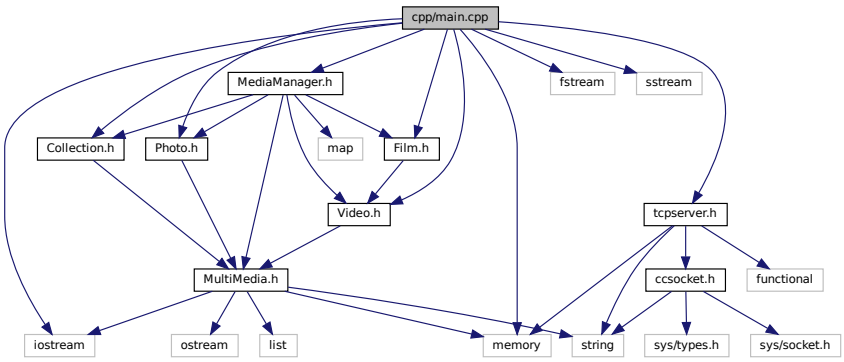
Go to the documentation of this file.

```
1 #ifndef FILM_H
2 #define FILM_H
3 #include "Video.h"
4
12 class Film :  public Video
13 {
14     friend class MediaManager;
15 private:
16     unsigned int* chapters {};
17     unsigned int nb_chapters {};
18
22     Film(){};
23
33     Film(string name, string path, unsigned int duration,
34         unsigned int const* chapters, unsigned int nb_chapters);
35
40     Film(const Film& from);
41
42 public:
48     Film& operator=(const Film& from);
49
53     ~Film();
54
60     void set_chapters(unsigned int const* chapters, unsigned int nb_chapters);
61
66     const unsigned int* get_chapters() const;
67
72     unsigned int get_nb_chapters() const;
73
78     void disp(ostream& out) const override;
79
84     string get_class_name() const override;
85
90     void serial_chapters(ostream& f) const;
91
96     void deserial_chapters(istream& f);
97
102     void write(ostream& f) const override;
103
108     void read(istream& f) override;
109 };
110
111 #endif
```

6.11 cpp/main.cpp File Reference

```
#include <iostream>
#include <memory>
#include "Video.h"
#include "Photo.h"
#include "Film.h"
#include "Collection.h"
#include "MediaManager.h"
#include <fstream>
#include <sstream>
#include "tcpserver.h"
```

Include dependency graph for main.cpp:



Macros

- #define SERVER_v

Functions

- int main (int argc, char ∗argv[ ])

  Main function for server mode of the multimedia application.

Variables

- const int PORT = 3331

6.11.1 Macro Definition Documentation

6.11.1.1 SERVER_v

```
#define SERVER_v
```

6.11.2 Function Documentation

6.11.2.1 main()

```
int main (
            int argc,
            char * argv[] )
```

Main function for server mode of the multimedia application.

Creates a MediaManager with sample data and starts a TCP server to handle client requests.

Parameters

argc	Number of command-line arguments.
argv	Array of command-line arguments.

Returns

int Returns 0 on success, 1 on server startup failure.

6.11.3 Variable Documentation

6.11.3.1 PORT

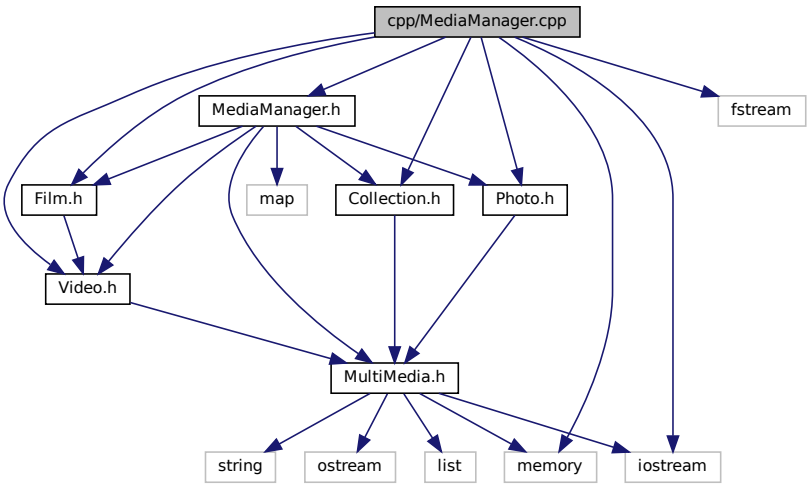
```
const int PORT = 3331
```

6.12 cpp/MediaManager.cpp File Reference

```
#include "MediaManager.h"
#include <fstream>
#include <iostream>
#include <memory>
#include "Video.h"
#include "Photo.h"
#include "Film.h"
```

```
#include "Collection.h"
```

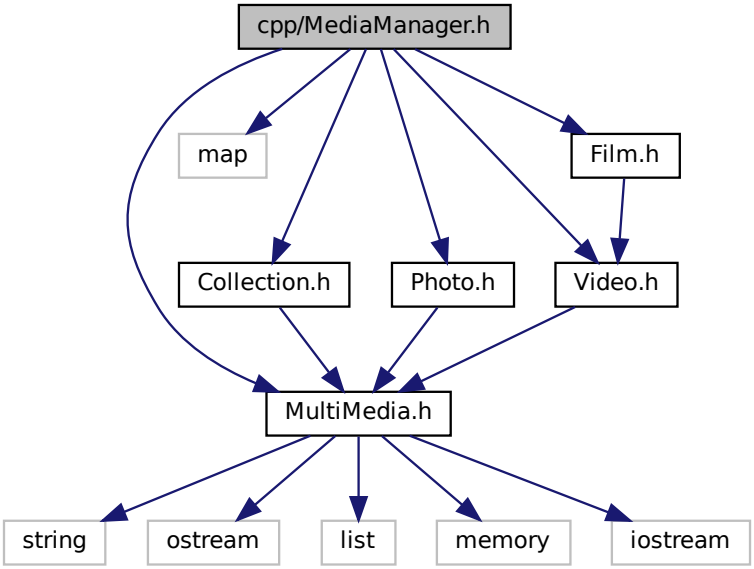
Include dependency graph for MediaManager.cpp:



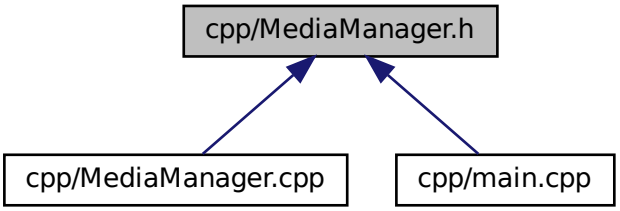
6.13 cpp/MediaManager.h File Reference

```
#include "MultiMedia.h"
#include <map>
#include "Collection.h"
#include "Photo.h"
#include "Video.h"
#include "Film.h"
```

Include dependency graph for MediaManager.h:



This graph shows which files directly or indirectly include this file:



Classes

- class MediaManager

  Manages collections of multimedia objects and their operations.

Typedefs

- typedef std::shared_ptr< MultiMedia > MediaPtr
- typedef std::shared_ptr< Collection > CollectPtr

  Shared pointer to a Collection object.

- typedef std::shared_ptr< Photo > SharPhotoPtr

  Shared pointer to a Photo object.
- typedef std::shared_ptr< Video > SharVideoPtr

  Shared pointer to a Video object.
- typedef std::shared_ptr< Film > SharFilmPtr

  Shared pointer to a Film object.
- typedef std::shared_ptr< Collection > SharCollectPtr

  Shared pointer to a Collection object.
- typedef std::map< string, CollectPtr > Dict_collection

  Map of collection names to Collection shared pointers.
- typedef std::map< string, MediaPtr > Dict_Media

  Map of media names to MultiMedia shared pointers.

6.13.1 Typedef Documentation

6.13.1.1 CollectPtr

```
CollectPtr
```

Shared pointer to a Collection object.

6.13.1.2 Dict_collection

```
Dict_collection
```

Map of collection names to Collection shared pointers.

6.13.1.3 Dict_Media

```
Dict_Media
```

Map of media names to MultiMedia shared pointers.

6.13.1.4 MediaPtr

```
typedef std::shared_ptr<MultiMedia> MediaPtr
```

6.13.1.5 SharCollectPtr

SharCollectPtr

Shared pointer to a Collection object.

6.13.1.6 SharFilmPtr

SharFilmPtr

Shared pointer to a Film object.

6.13.1.7 SharPhotoPtr

SharPhotoPtr

Shared pointer to a Photo object.

6.13.1.8 SharVideoPtr

SharVideoPtr

Shared pointer to a Video object.

6.14 MediaManager.h

Go to the documentation of this file.

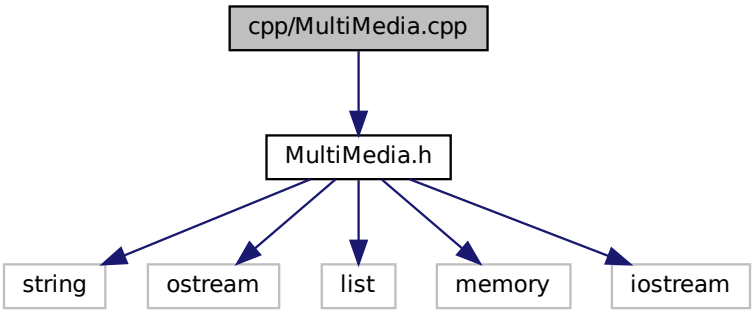
```
1 #ifndef MEDIA_MANAGER_H
2 #define MEDIA_MANAGER_H
3 #include "MultiMedia.h"
4 #include <map>
5 #include "Collection.h"
6 #include "Photo.h"
7 #include "Video.h"
8 #include "Film.h"
9
14 typedef std::shared_ptr<MultiMedia> MediaPtr;
15
20 typedef std::shared_ptr<Collection> CollectPtr;
21
26 typedef std::shared_ptr<Photo> SharPhotoPtr;
27
32 typedef std::shared_ptr<Video> SharVideoPtr;
33
38 typedef std::shared_ptr<Film> SharFilmPtr;
39
44 typedef std::shared_ptr<Collection> SharCollectPtr;
45
50 typedef std::map<string, CollectPtr> Dict_collection;
51
56 typedef std::map<string, MediaPtr> Dict_Media;
57
65 class MediaManager
```

```
66 {
67 private:
68     Dict_collection groups {};
69     Dict_Media  medias {};
70 
71 public:
75     MediaManager(){};
76 
80     ~MediaManager(){};
81 
91     SharPhotoPtr create_photo(string name, string path, double width, double height);
92 
101     SharVideoPtr create_video(string name, string path, unsigned int duration);
102 
113     SharFilmPtr create_Film(string name, string path, unsigned int duration,
114         unsigned int const* chapters, unsigned int nb_chapters);
115 
122     SharCollectPtr create_collection(string name);
123 
130     void disp_media(ostream& out, string name) const;
131 
138     void disp_collection(ostream& out, string name) const;
139 
145     void play_media(string name) const;
146 
152     void delete_media(string name);
153 
159     void delete_collection(string name);
160 
166     void disp_all(ostream& out) const;
167 
173     void write(ostream& f) const;
174 
180     void read(istream& f);
181 };
182 
183 #endif
```

6.15 cpp/MultiMedia.cpp File Reference

```
#include "MultiMedia.h"
```

Include dependency graph for MultiMedia.cpp:

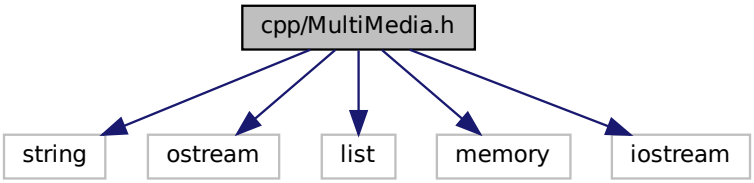


6.16 cpp/MultiMedia.h File Reference

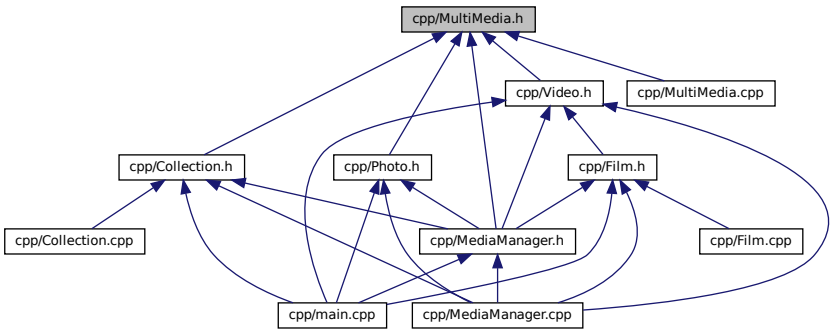
```
#include <string>
#include <ostream>
#include <list>
```

```
#include <memory>
#include <iostream>
```

Include dependency graph for MultiMedia.h:



This graph shows which files directly or indirectly include this file:



Classes

- class MultiMedia

  Represents a multimedia file.

6.17 MultiMedia.h

Go to the documentation of this file.

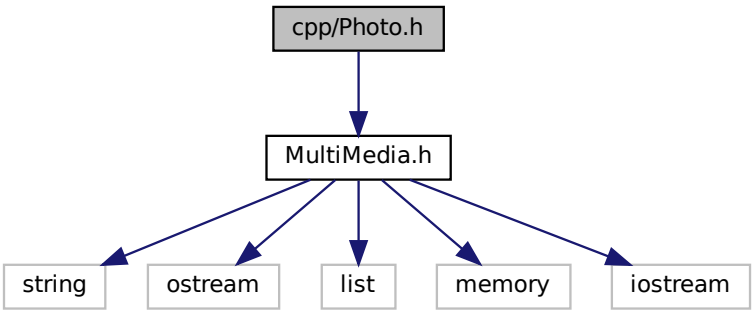
```
1 #ifndef MULTI_MEDIA_H
2 #define MULTI_MEDIA_H
3
4 #include <string>
5 #include <ostream>
6 #include <list>
7 #include <memory>
8 #include <iostream>
9 using namespace std;
10
18 class MultiMedia
19 {
20 private:
21     string name{};
22     string path{};
23
```

```
24 public:
28     MultiMedia();
29
35     MultiMedia(string name, string path);
36
40     ~MultiMedia();
41
46     string get_name() const;
47
52     string get_path() const;
53
58     void set_name(string name);
59
64     void set_path(string path);
65
70     virtual void disp(ostream &out) const;
71
75     virtual void run() const = 0;
76     virtual string get_class_name() const = 0;
77
78     virtual void write(ostream & f) const ;
79     virtual void read(istream & f);
80 };
81
82 #endif // MULTI_MEDIA_
```

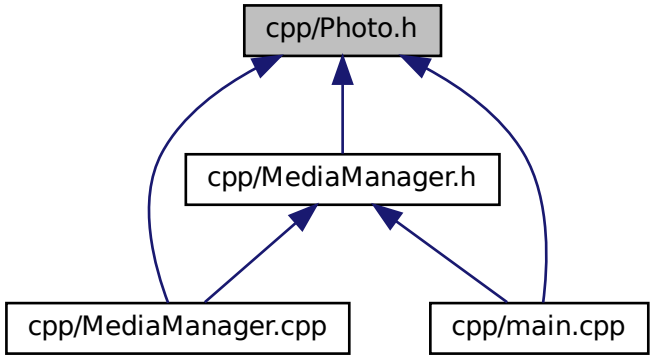
6.18 cpp/Photo.h File Reference

`#include "MultiMedia.h"`

Include dependency graph for Photo.h:



This graph shows which files directly or indirectly include this file:



Classes

- class Photo

  A class representing a photo file, derived from the MultiMedia base class.

6.19 Photo.h

Go to the documentation of this file.

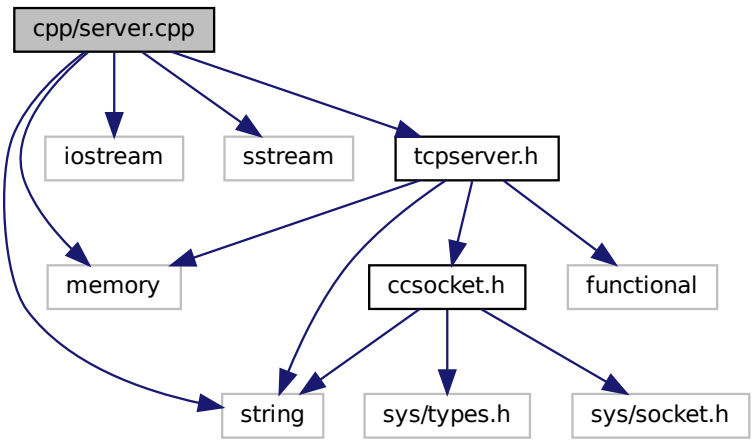
```
1 #ifndef PHOTO_H
2 #define PHOTO_H
3 #include "MultiMedia.h"
4
12 class Photo :  public MultiMedia
13 {
14     friend class MediaManager;
15 private:
16     double width {};
17     double height {};
18
23     Photo(){}
24
33     Photo(string name, string path, double width, double height) :
34     MultiMedia(name, path), width{width}, height{height} {}
35
36
37 public:
42     ~Photo(){
43         cout« " A Photo classe has been destroyed U Monster"«endl;
44     };
45
51     void set_width(double width) {
52         this->width = width;
53     }
54
60     double get_width()const {
61         return this->width;
62     }
63
69     void set_height(double height) {
70         this->height = height;
71     }
72
78     double get_height()const {
79         return this->height;
80     }
```

```
81
89      void disp(ostream & out)const override {
90          MultiMedia::disp(out);
91          out « "\nwidth :  " « this->get_width() «
92              "\nheight :  " « this->get_height() « endl;
93      }
94
101      void run()const override {
102          string command = "mpv --keep-open";
103          command = command + " " + this->get_path() + " &";
104          system(command.data());
105      }
106
112      string get_class_name()const override{
113          return "Photo";
114      }
115
121      void write(ostream & f)const override{
122          f « "Photo"«'\n';
123          MultiMedia::write(f);
124          f « width « '\n' « height « endl ;
125      }
126
132      void read(istream & f){
133          MultiMedia::read(f);
134          f » width » height;
135      }
136  };
137
138  #endif
```

6.20 cpp/server.cpp File Reference

```
#include <memory>
#include <string>
#include <iostream>
#include <sstream>
#include "tcpserver.h"
```

Include dependency graph for server.cpp:



Functions

- int main (int argc, char ∗argv[ ])

Variables

- const int PORT = 3331

6.20.1 Function Documentation

6.20.1.1 main()

```
int main (
            int argc,
            char * argv[] )
```

6.20.2 Variable Documentation

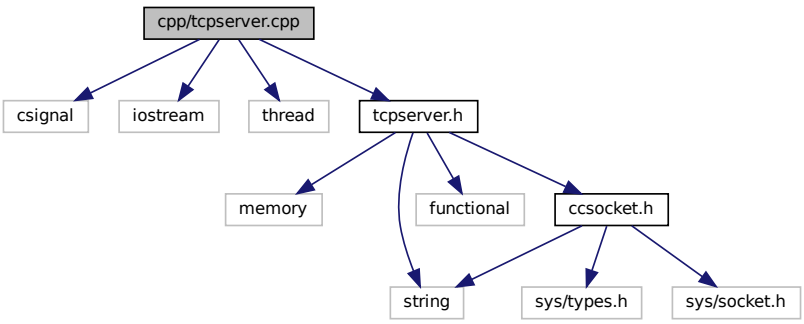
6.20.2.1 PORT

```
const int PORT = 3331
```

6.21 cpp/tcpserver.cpp File Reference

```
#include <csignal>
#include <iostream>
#include <thread>
#include "tcpserver.h"
```

Include dependency graph for tcpserver.cpp:



Classes

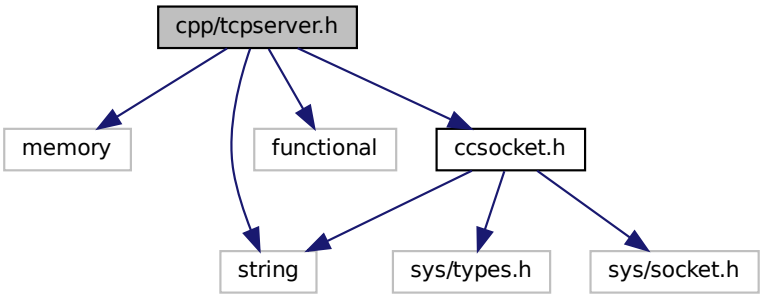
- class SocketCnx

  Connection with a given client. Each SocketCnx uses a different thread.

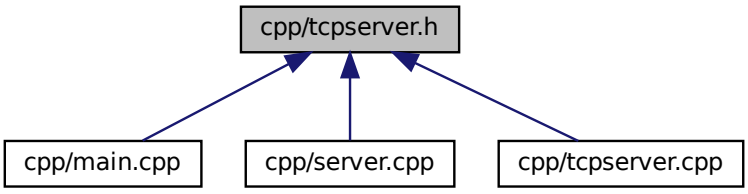
6.22 cpp/tcpserver.h File Reference

```
#include <memory>
#include <string>
#include <functional>
#include "ccsocket.h"
```

Include dependency graph for tcpserver.h:



This graph shows which files directly or indirectly include this file:



Classes

- class TCPServer

6.23 tcpserver.h

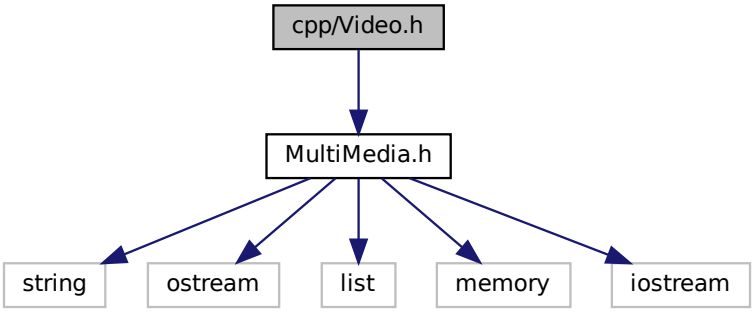
Go to the documentation of this file.

```
1 //
2 //  tcpserver:  TCP/IP INET Server.
3 //  (c) Eric Lecolinet - Telecom ParisTech - 2016.
4 //  http://www.telecom-paristech.fr/~elc
5 //
6
7 #ifndef __tcpserver__
8 #define __tcpserver__
9 #include <memory>
10 #include <string>
11 #include <functional>
12 #include "ccsocket.h"
13
14 class TCPConnection;
15 class TCPLock;
16
19 class TCPServer {
20 public:
21
22   using Callback =
23   std::function< bool(std::string const& request, std::string& response) >;
24
30   TCPServer(Callback const& callback);
31
32   virtual ~TCPServer();
33
39   virtual int run(int port);
40
41 private:
42   friend class TCPLock;
43   friend class SocketCnx;
44
45   TCPServer(TCPServer const&) = delete;
46   TCPServer& operator=(TCPServer const&) = delete;
47   void error(std::string const& msg);
48
49   ServerSocket servsock_;
50   Callback callback_{};
51 };
52
53 #endif
```

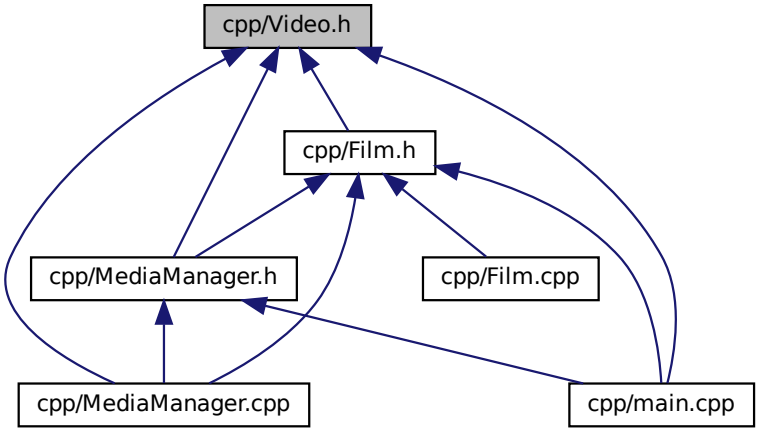
6.24 cpp/Video.h File Reference

`#include "MultiMedia.h"`

Include dependency graph for Video.h:



This graph shows which files directly or indirectly include this file:



Classes

- class Video

  A class representing a video file, derived from the MultiMedia base class.

6.25 Video.h

Go to the documentation of this file.

```
1 #ifndef VIDEO_H
2 #define VIDEO_H
3 #include "MultiMedia.h"
4
12 class Video :  public MultiMedia
13 {
14     friend class MediaManager;
15     friend class Film;
16 private:
17     unsigned int duration {};
18
23     Video(){}
24
32     Video(string name, string path, unsigned int duration) :
33     MultiMedia(name, path), duration{duration} {}
34
35 public:
39     ~Video(){
40         cout « " A Video classe has been destroyed U Monster" «endl;
41     };
42
48     void set_duration(unsigned int duration){
49         this->duration = duration ;
50     }
51
57     unsigned int get_duration()const {
58         return this->duration ;
59     }
60
68     void disp(ostream & out)const override {
69         MultiMedia::disp(out);
70         out « "\nduration :  " « this->get_duration() « endl;
71     }
72
79     void run()const override {
```

```
80          string command = "mpv --keep-open";
81          command = command + " "  + this->get_path() + " &";
82          system(command.data());
83      }
84
90      string get_class_name()const override{
91          return "Video";
92      }
93
99      void write(ostream & f)const override{
100          f « "Video" «'\n';
101          MultiMedia::write(f);
102          f «  duration « '\n' ;
103      }
104
110      void read(istream & f){
111          MultiMedia::read(f);
112          f » duration ;
113      }
114 };
115
116 #endif
```

6.26 README.md File Reference

6.27 swing/Client.java File Reference

Classes

- class Client

6.28 swing/Window.java File Reference

Classes

- class Window
- class **Window.Click1**
- class **Window.Click2**
- class **Window.Click3**
- class **Window.Click4**
- class **Window.Click5**
- class **Window.Click6**
- class **Window.Click7**
- class **Window.Click8**
- class **Window.Click9**

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