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Overview

Logger C++ library provides logging functions: printing in terminal and(or) printing in file. File **Logger.h** contains declaration of class **Logger** which provides logging functions. **Logger** class provide thread safe method to print info file or terminal. The user can create multiple **Logger** class objects and the library will provide thread-safe output to the terminal and thread-safe writing to the file (all data will be written to the file in sequence). The **Logger** class also provides color output to the terminal. When writing the log to a text file, the **Logger** class controls the size of the file as well as the total size of the files in the directory and deletes old files if the directory size is exceeded.

Versions

Table 1 - Library versions.

Version	Release date	What's new
1.0.0	13.02.2023	First version.
1.1.0	24.03.2023	<ul style="list-style-type: none">- Added new print option DISABLE.- Example updated.- Documentation updated.

Version	Release date	What's new
1.2.0	08.05.2023	- Added macro to print file name.
1.2.1	20.06.2023	- Required CMake version updated to 3.13.
1.2.2	06.07.2023	- Documentation updated. - Example updated. - License added. - Repository made public.
1.2.3	11.08.2023	- Code clean up. - Updated example. Fixed the same name for log folder as name of executable file.

Logger class description

Logger class declaration

Logger.h file contains **Logger** class declaration. Class declaration:

```

namespace cr
{
    namespace utils
    {
        /**
         * @brief Logger main class.
         */
        class Logger
        {
        public:
            /**
             * @brief Method to get string of current version of library.
             * @return String of current library version.
             */
            static std::string getVersion();
            /**
             * @brief Class constructor.
             */
            Logger();
            /**
             * @brief Class destructor.
             */
            ~Logger();
            /**
             * @brief Method for setting params for loggers
             * @param folder Log folder
             * @param filePrefix Start log file filename
             * @param maxFoldersSizeMb Max file size (Mb)

```

```

    * @param maxFileSizeMb Max folder size (Mb)
    * @return true if params are set.
    */
    static bool setSaveLogParams(std::string folder,
                                std::string filePrefix,
                                int maxFolderSizeMb,
                                int maxFileSizeMb);

    /**
    * @brief Methods to prints message through the operator "<<".
    * @param color Print color
    * @param flags Options for print
    * @return object that will output a message to the stream when destroyed.
    */
    ColourPrint print(PrintColor color, PrintFlag flags = PrintFlag::CONSOLE);
};
}
}

```

Default constructor

Default **Logger** class constructor doesn't do anything. It doesn't allocate memory. Constructor declaration:

```
Logger();
```

getVersion method

getVersion() method return string of current version of **Logger** class. Method declaration:

```
static std::string getVersion();
```

Method can be used without **Logger** class instance. Example:

```
std::cout << "Logger class version: " << cr::utils::Logger::getVersion() << std::endl;
```

Console output:

```
Logger class version: 1.2.3
```

setSaveLogParams method

setSaveLogParams(...) static method intended to set global parameter for writing logs into text files. This method is static. The method sets parameters for all objects of the **Logger** class. If a method is called in more than one place in the program, the last parameters will be applied to all objects of the **Logger** class. If the method is not called, all objects of the **Logger** class will only be able to output information to the console. The method used without **Logger** class instance. Method declaration:

```
static bool setSaveLogParams(std::string folder, std::string filePrefix, int
maxFolderSizeMb, int maxFileSizeMb);
```

Parameter	Description
folder	Path to folder. Example: /home/pi/Log
filePrefix	File prefix. The library creates files with names: PREFIX_DATE_TIME.txt. Example: LOG_2023.03.24_15.55.59.txt.
maxFolderSizeMb	Maximum folder size. the library controls size of all files in folder. If overall size of files in folder > maxFolderSizeMb the library deletes oldest files in folder so the overall size of files < maxFolderSizeMb.
maxFileSizeMb	Maximum file size, MB. Library creates files and controls their size. If size of file > maxFileSizeMb the library creates new file.

Returns: TRUE if parameters are set or FALSE if not.

Example:

```
string folder = "LoggerExample";
string filePrefix = "LOG";
int maxFolderSizeMb = 3;
int maxFileSizeMb = 1;
Logger::setSaveLogParams(folder, filePrefix, maxFolderSizeMb, maxFileSizeMb);
```

print method

print(...) method intended to print data in console and(or) file. The method provides the same interface as **std::cout** method and supports all **std::cout** formats. The method allows the user to define the colour of the output to the console and the direction of the output (console, file or file and console). When the library prints in file it adds additional information about date and time (e.g.: **2023-03-24 15:56:52.127716**

Something to print) and moved to new line after printing a string. Method declaration:

```
ColourPrint print(PrintColor color, PrintFlag flags = PrintFlag::CONSOLE);
```

Parameter	Description
color	Print color. Colors defined in PrintColor enum (logger.h file).
flags	Print flag to define print direction: console, file, console and file or disabled. Print flags defines in PrintFlag enum (Logger.h file).

Returns: TRUE if parameters are set or FALSE if not.

PrintColor enum

PrintColor enum declared in **Logger.h** file and defines . Enum declaration:

```
enum class PrintColor
{
    NORMAL,
    RED,
    GREEN,
    YELLOW,
    BLUE,
    MAGENTA,
    CYAN,
    WHITE
};
```

PrintFlag enum

PrintFlag enum defines output options: print to console, print to file, print to file and console or disable printing. Enum declaration:

```
enum class PrintFlag
{
    CONSOLE = 1,
    FILE = 2,
    CONSOLE_AND_FILE = CONSOLE | FILE,
    DISABLE
};
```

Example

Sample application creates three thread. Each thread print information to file, console or both.

```
#include <iostream>
#include <thread>
#include "Logger.h"

// Link namespaces.
using namespace std;
using namespace cr::utils;

// Print thread function.
void printThreadFunction(PrintColor colour, PrintFlag flag)
{
    // Init local logger.
    Logger log;

    // Thread function.
    int counter = 0;
```

```

while (true)
{
    // Print something in console.
    log.print(colour, flag) << "Print thread output " << counter++ << endl;
}
}

// Entry point.
int main(void)
{
    cout << "===== " << endl;
    cout << "Logger v" << Logger::getVersion() << " example" << endl;
    cout << "===== " << endl;
    cout << endl;

    // Init logger.
    Logger log;

    // Set Logger global parameters to write log in files.
    string folder = "Logs";
    string filePrefix = "LOG";
    int maxFolderSizeMb = 3;
    int maxFileSizeMb = 1;
    Logger::setSaveLogParams(folder, filePrefix, maxFolderSizeMb, maxFileSizeMb);

    // Run print threads.
    thread printThread1(&printThreadFunction, PrintColor::GREEN,
                        PrintFlag::CONSOLE_AND_FILE);
    thread printThread2(&printThreadFunction, PrintColor::BLUE,
                        PrintFlag::CONSOLE);

    // Main print loop.
    int counter = 0;
    while (true)
    {
        // Print something in console and file.
        log.print(PrintColor::RED, PrintFlag::CONSOLE_AND_FILE) <<
            "Main thread output " << counter++ << endl;

        // Print something in console only.
        log.print(PrintColor::CYAN, PrintFlag::CONSOLE) <<
            "[" << __LOGFILENAME__ << "]"[" << __LINE__ << "]" <<
            "Main thread output " << counter++ << endl;
    }

    return 1;
}

```

Build and connect to your project

Typical commands to build **Logger** library:

```
git clone https://github.com/ConstantRobotics-Ltd/Logger.git
cd Logger
mkdir build
cd build
cmake ..
make
```

If you want connect Logger library to your CMake project as source code you can make follow. For example, if your repository has structure:

```
CMakeLists.txt
src
    CMakeList.txt
    yourLib.h
    yourLib.cpp
```

You can add repository **Logger** as submodule by command:

```
cd <your repository folder>
git submodule add https://github.com/ConstantRobotics-Ltd/Logger.git 3rdparty/Logger
```

In you repository folder will be created folder **3rdparty/Logger** which contains files of **Logger** repository. New structure of your repository:

```
CMakeLists.txt
src
    CMakeList.txt
    yourLib.h
    yourLib.cpp
3rdparty
    Logger
```

Create CMakeLists.txt file in **3rdparty** folder. CMakeLists.txt should contain:

```
cmake_minimum_required(VERSION 3.13)

#####
## 3RD-PARTY
## dependencies for the project
#####
project(3rdparty LANGUAGES CXX)

#####
## SETTINGS
## basic 3rd-party settings before use
#####
```

```

# To inherit the top-level architecture when the project is used as a submodule.
SET(PARENT ${PARENT}_YOUR_PROJECT_3RDPARTY)
# Disable self-overwriting of parameters inside included subdirectories.
SET(${PARENT}_SUBMODULE_CACHE_OVERWRITE OFF CACHE BOOL "" FORCE)

#####
## CONFIGURATION
## 3rd-party submodules configuration
#####
SET(${PARENT}_SUBMODULE_LOGGER ON CACHE BOOL "" FORCE)
if (${PARENT}_SUBMODULE_LOGGER)
    SET(${PARENT}_LOGGER ON CACHE BOOL "" FORCE)
    SET(${PARENT}_LOGGER_EXAMPLE OFF CACHE BOOL "" FORCE)
endif()

#####
## INCLUDING SUBDIRECTORIES
## Adding subdirectories according to the 3rd-party configuration
#####
if (${PARENT}_SUBMODULE_LOGGER)
    add_subdirectory(Logger)
endif()

```

File **3rdparty/CMakeLists.txt** adds folder **Logger** to your project and excludes example (Logger class example) from compiling. Your repository new structure will be:

```

CMakeLists.txt
src
  CMakeList.txt
  yourLib.h
  yourLib.cpp
3rdparty
  CMakeLists.txt
  Logger

```

Next you need include folder 3rdparty in main **CMakeLists.txt** file of your repository. Add string at the end of your main **CMakeLists.txt**:

```
add_subdirectory(3rdparty)
```

Next you have to include Logger library in your **src/CMakeLists.txt** file:

```
target_link_libraries(${PROJECT_NAME} Logger)
```

Done!