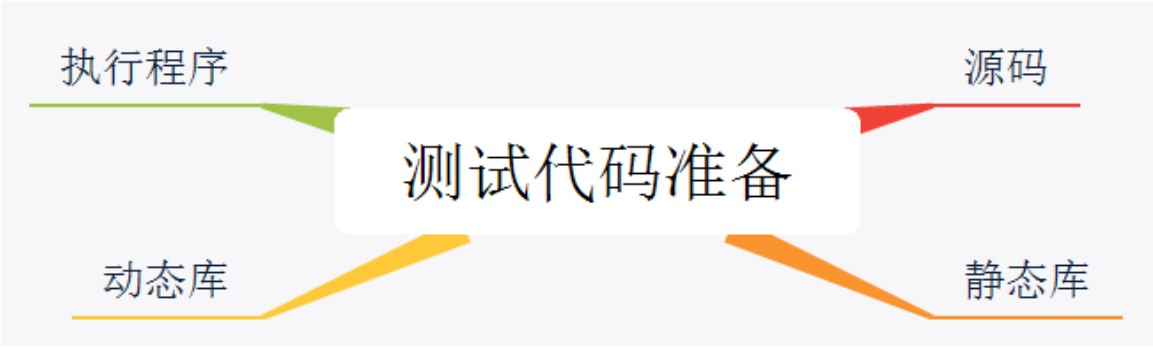
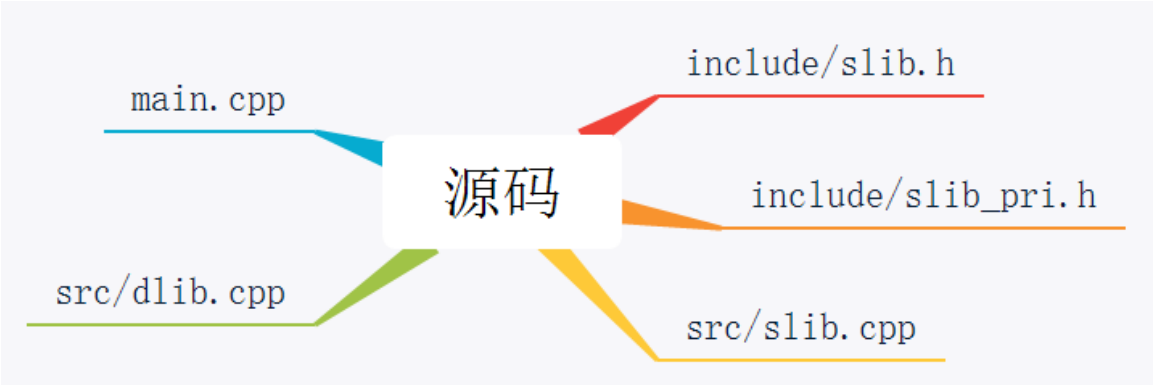
第六章 CMake install部署项目

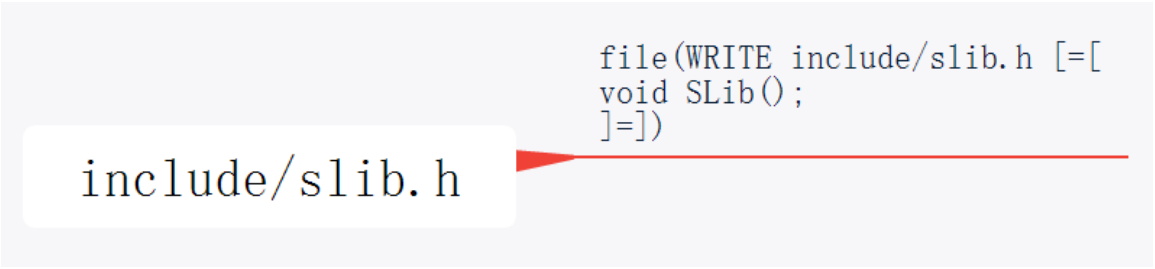
1. 测试代码准备



1.1. 源码



1.1.1. include/slib.h

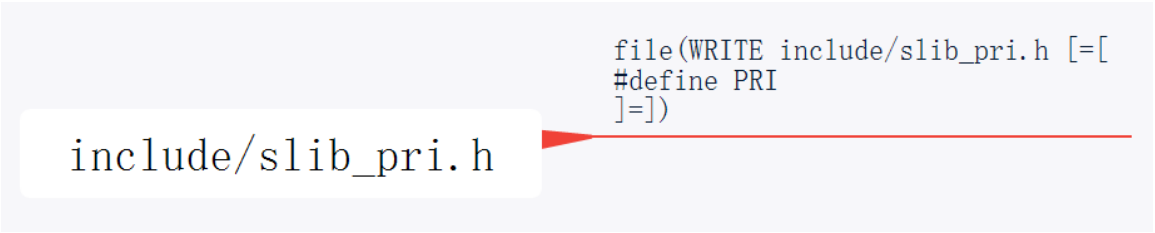


file(WRITE include/slib.h [=[

void SLib();

]=])

1.1.2. include/slib_pri.h

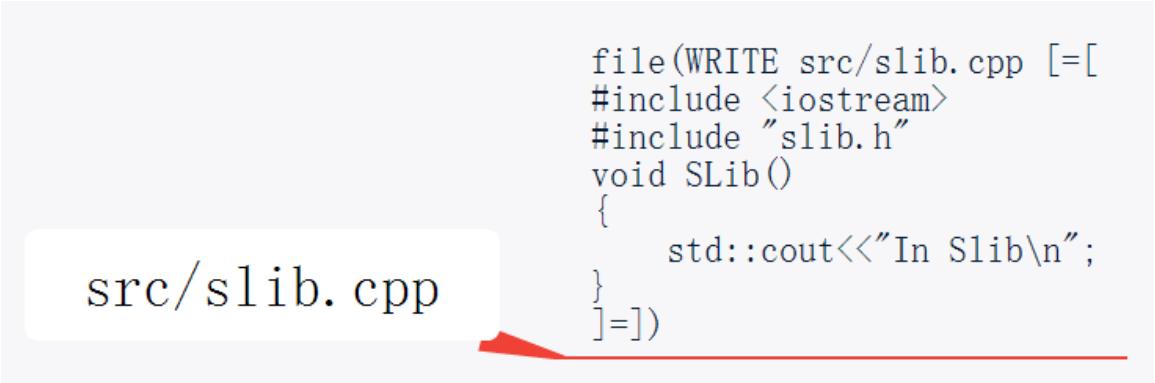


file(WRITE include/slib_pri.h [=[

#define PRI

]=])

1.1.3. src/slib.cpp



file(WRITE src/slib.cpp [=[

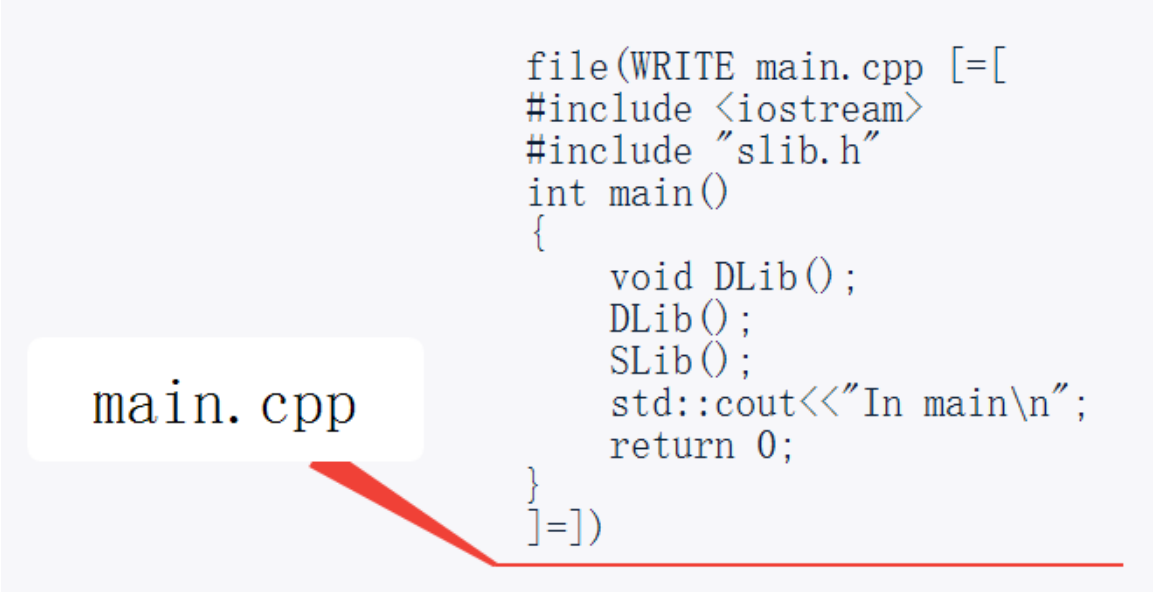
#include <iostream>

```
#include "slib.h"
void SLib()
{
   std::cout<<"In Slib\n";
}
]=])
```

1.1.4. src/dlib.cpp

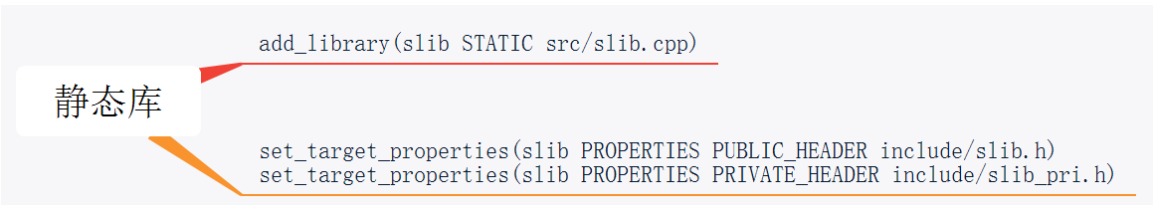

```
file(WRITE src/dlib.cpp [=[
#include <iostream>
#ifdef _WIN32
__declspec(dllexport)
#endif
void DLib()
{
   std::cout<<"In Dlib\n";
}
]=])
```

1.1.5. main.cpp




```
file(WRITE main.cpp [=[
#include <iostream>
#include "slib.h"
int main()
{
   void DLib();
   DLib();
   SLib();
   std::cout<<"In main\n";
   return 0;
}
]=])
```

1.2. 静态库

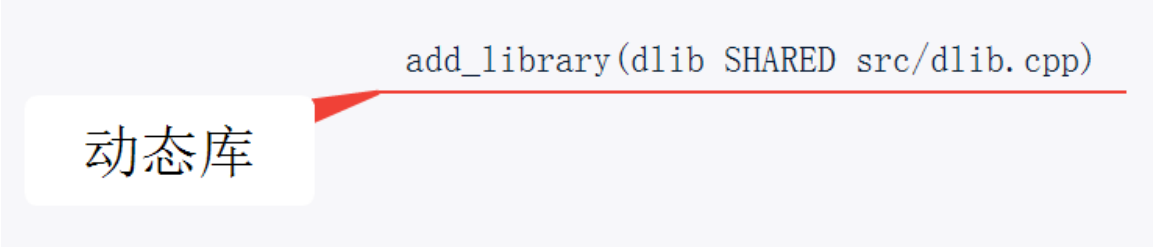


1.2.1. add_library(slib STATIC src/slib.cpp)

1.2.2. set_target_properties(slib PROPERTIES PUBLIC_HEADER include/slib.h)

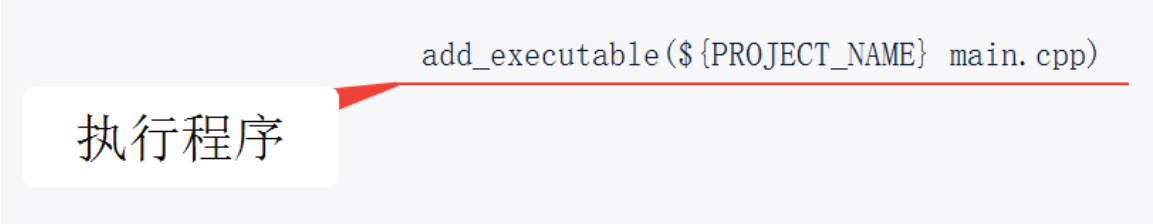
set_target_properties(slib PROPERTIES PRIVATE_HEADER include/slib_pri.h)

1.3. 动态库



1.3.1. add_library(dlib SHARED src/dlib.cpp)

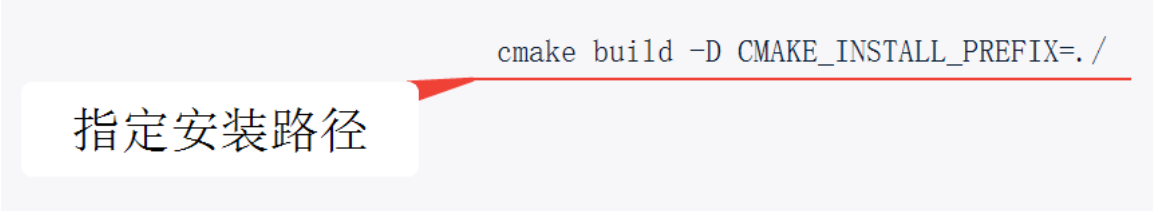
1.4. 执行程序



1.4.1. add_executable(${PROJECT_NAME} main.cpp)

2. 安装命令

2.1. 指定安装路径

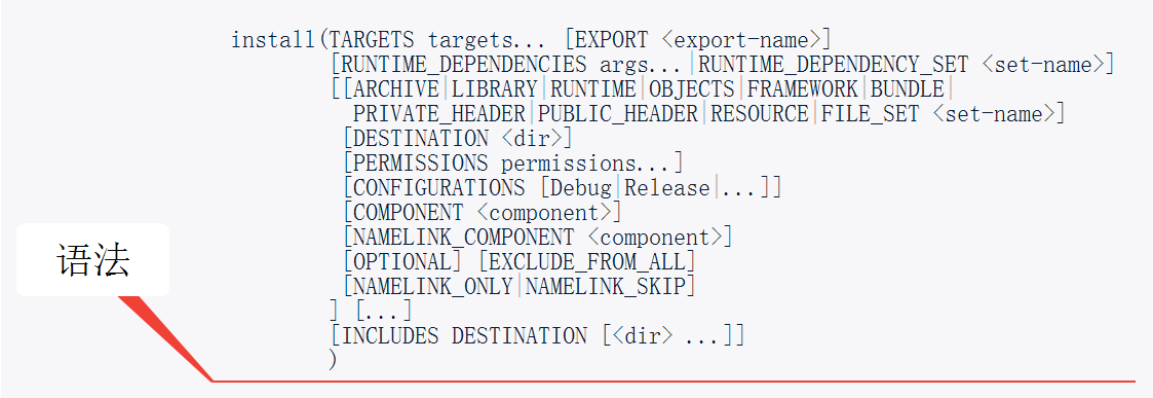


2.1.1. cmake build -D CMAKE_INSTALL_PREFIX=./

2.2. cmake --install build

3. 安装目标

3.1. 语法



3.1.1. install(TARGETS targets... [EXPORT <export-name>]

[RUNTIME_DEPENDENCIES args...|RUNTIME_DEPENDENCY_SET <set-name>]

[[ARCHIVE|LIBRARY|RUNTIME|OBJECTS|FRAMEWORK|BUNDLE|

PRIVATE_HEADER|PUBLIC_HEADER|RESOURCE|FILE_SET <set-name>]

[DESTINATION <dir>]

[PERMISSIONS permissions...]

[CONFIGURATIONS [Debug|Release|...]]

[COMPONENT <component>]

[NAMELINK_COMPONENT <component>]

[OPTIONAL] [EXCLUDE_FROM_ALL]

[NAMELINK_ONLY|NAMELINK_SKIP]

] [...]

[INCLUDES DESTINATION [<dir> ...]]

)

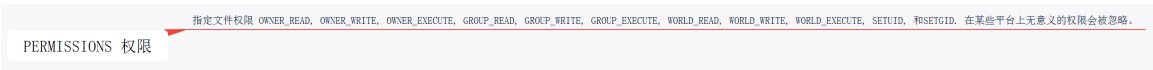
```
install(TARGETS targets... [EXPORT <export-name>]
[RUNTIME_DEPENDENCIES args...|RUNTIME_DEPENDENCY_SET <set-name>]
      [[ARCHIVE|LIBRARY|RUNTIME|OBJECTS|FRAMEWORK|BUNDLE|
    PRIVATE_HEADER|PUBLIC_HEADER|RESOURCE|FILE_SET <set-name>]
                    [DESTINATION <dir>]
                  [PERMISSIONS permissions...]
               [CONFIGURATIONS [Debug|Release|...]]
                    [COMPONENT <component>]
              [NAMELINK_COMPONENT <component>]
                [OPTIONAL] [EXCLUDE_FROM_ALL]
                [NAMELINK_ONLY|NAMELINK_SKIP]
                      ] [...]
             [INCLUDES DESTINATION [<dir> ...]]
                          )
```

3.2. DESTINATION 安装路径

3.2.1. 指定安装的目录,可以是相对路径或绝对路径

3.2.2. 相对路径则这相对于CMAKE_INSTALL_PREFIX

3.3. PERMISSIONS 权限



3.3.1. 指定文件权限 OWNER_READ, OWNER_WRITE, OWNER_EXECUTE, GROUP_READ, GROUP_WRITE, GROUP_EXECUTE, WORLD_READ, WORLD_WRITE, WORLD_EXECUTE, SETUID, 和SETGID. 在某些平台上无意义的权限会被忽略。

3.4. CONFIGURATIONS （Debug Release）

3.4.1. 指定安装规则适用的构建配置列表（Debug， Release）

3.4.2. install(TARGETS target

CONFIGURATIONS Debug

RUNTIME DESTINATION Debug/bin)

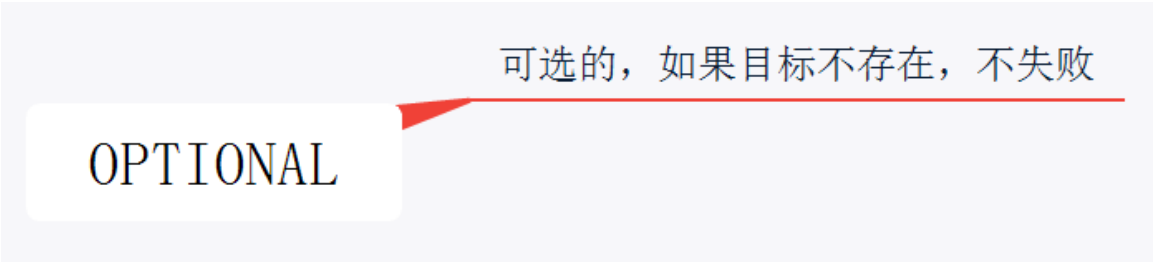
install(TARGETS target

CONFIGURATIONS Release

RUNTIME DESTINATION Release/bin)

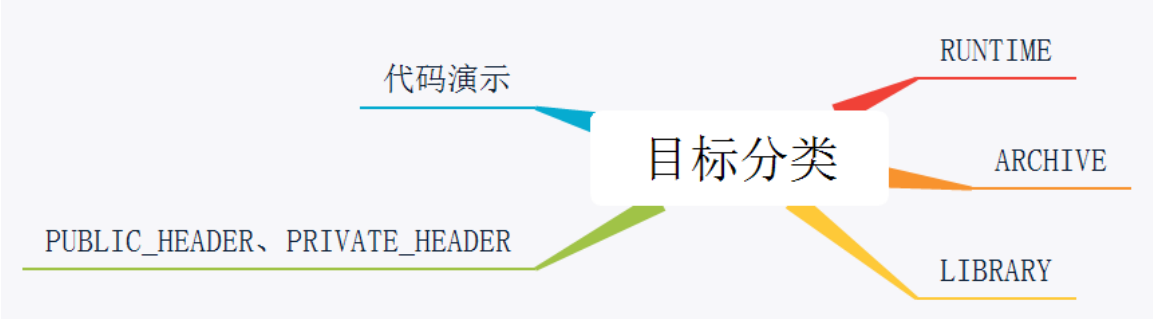
3.4.3. 需要设置在RUNTIME DESTINATION之前

3.5. OPTIONAL



3.5.1. 可选的，如果目标不存在，不失败

3.6. 目标分类



3.6.1. RUNTIME

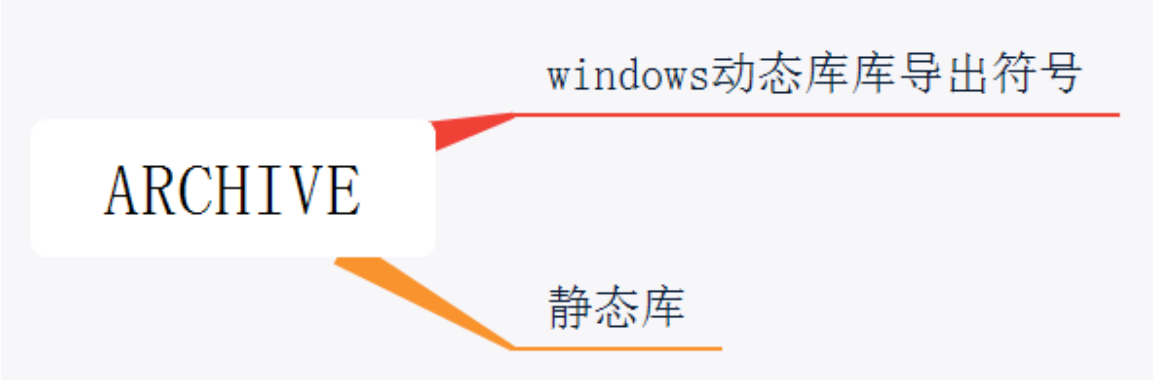
执行程序

由add_executable创建

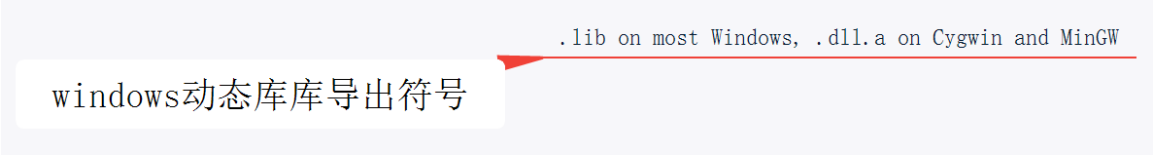
windows动态链接库dll文件

设置bin

3.6.2. ARCHIVE

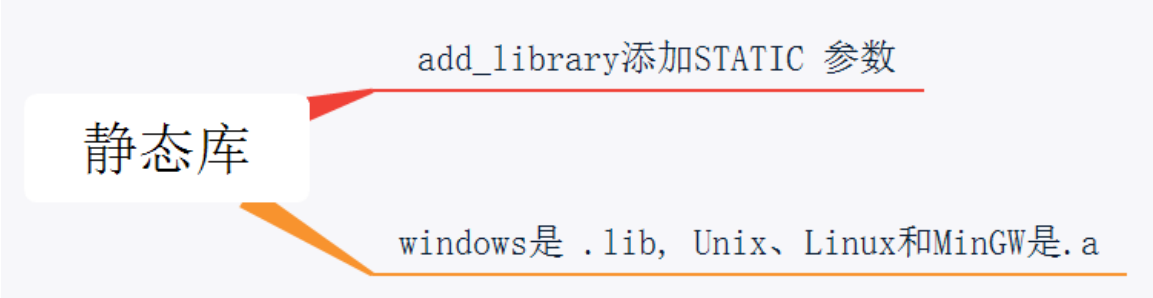


windows动态库库导出符号



.lib on most Windows, .dll.a on Cygwin and MinGW

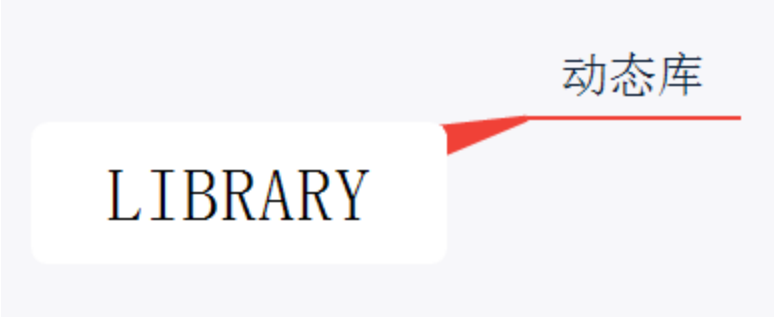
静态库



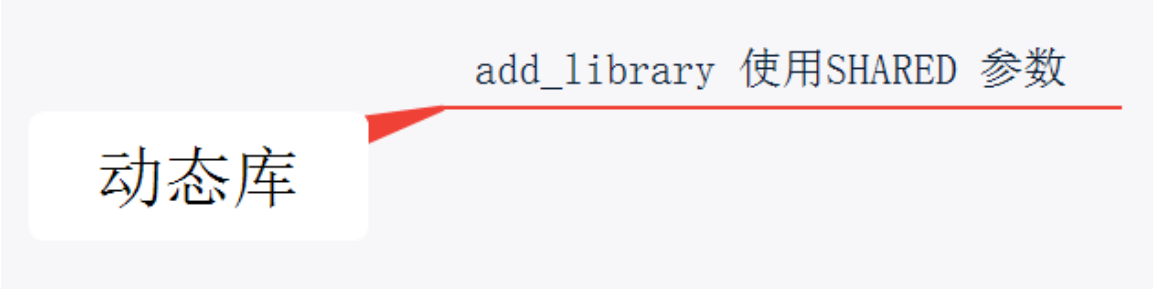
add_library添加STATIC 参数

windows是 .lib, Unix、Linux和MinGW是.a

3.6.3. LIBRARY

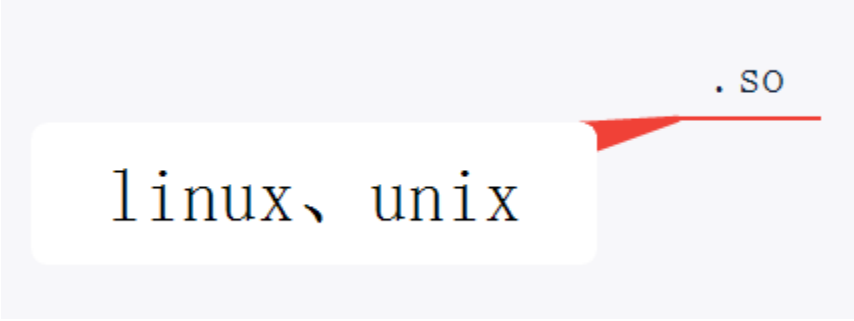


动态库



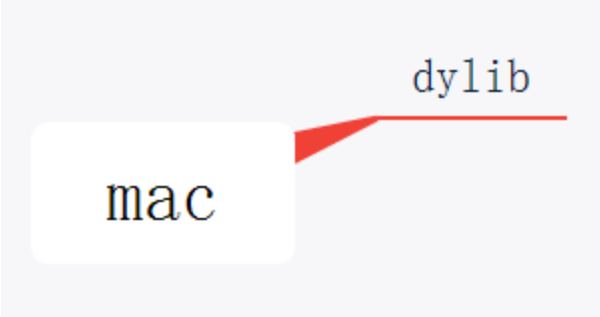
add_library 使用SHARED 参数

linux、unix



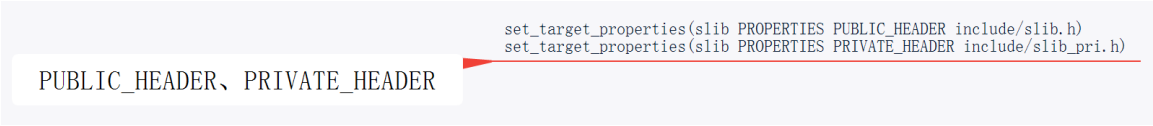
.so

mac



dylib

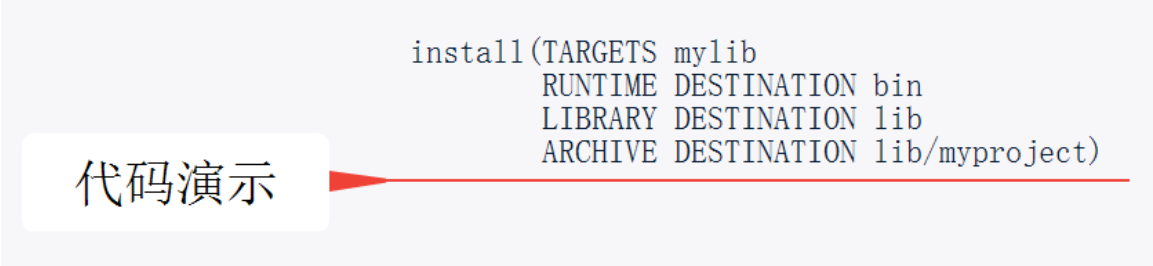
3.6.4. PUBLIC_HEADER、PRIVATE_HEADER



set_target_properties(slib PROPERTIES PUBLIC_HEADER include/slib.h)

set_target_properties(slib PROPERTIES PRIVATE_HEADER include/slib_pri.h)

3.6.5. 代码演示



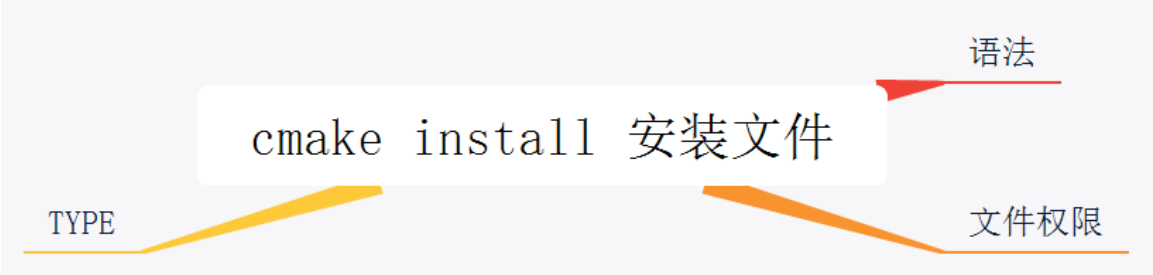
install(TARGETS mylib

RUNTIME DESTINATION bin

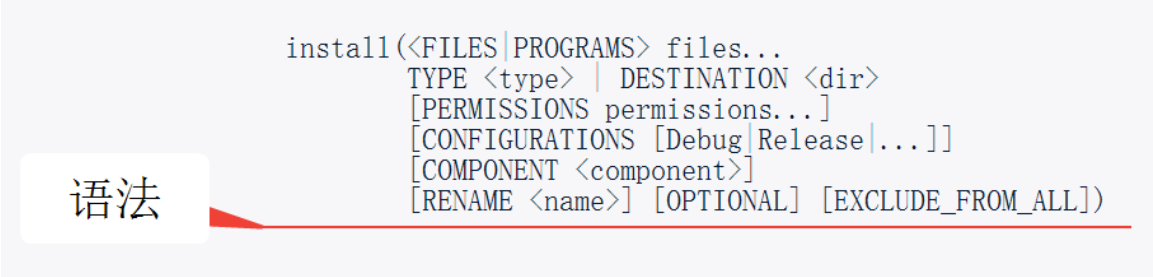
LIBRARY DESTINATION lib

ARCHIVE DESTINATION lib/myproject)

4. cmake install 安装文件



4.1. 语法



4.1.1. install(<FILES|PROGRAMS> files...

TYPE <type> | DESTINATION <dir>

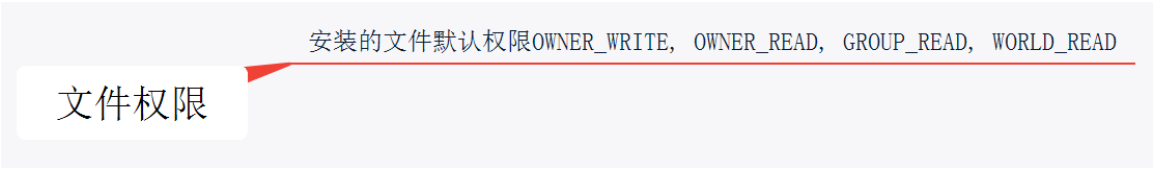
[PERMISSIONS permissions...]

[CONFIGURATIONS [Debug|Release|...]]

[COMPONENT <component>]

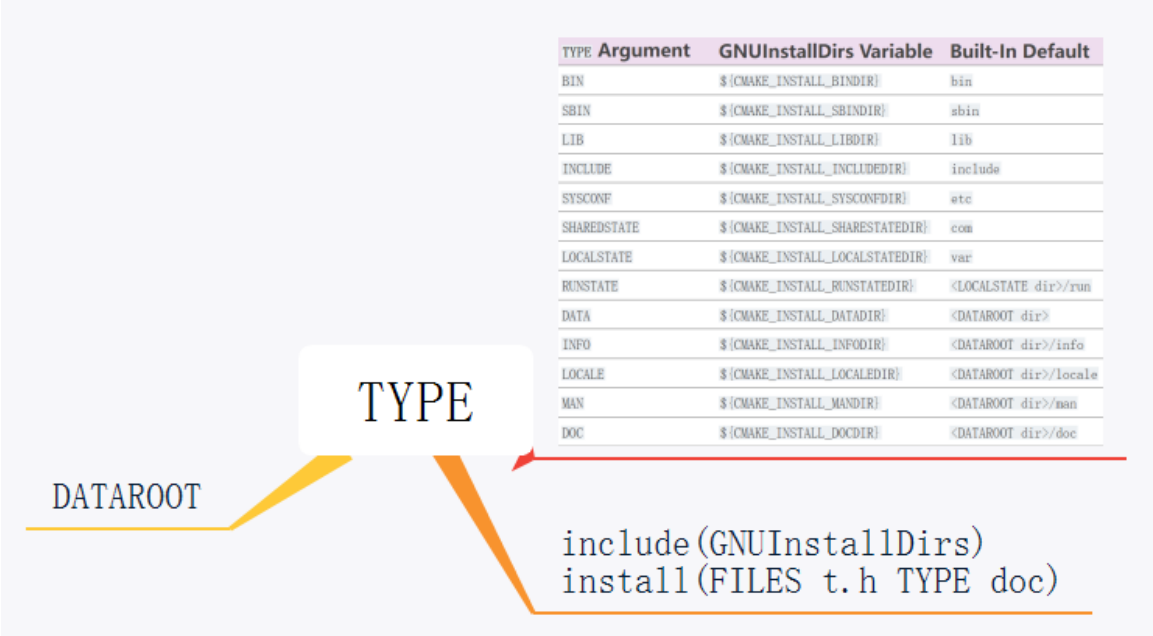
[RENAME <name>] [OPTIONAL] [EXCLUDE_FROM_ALL])

4.2. 文件权限



4.2.1. 安装的文件默认权限OWNER_WRITE, OWNER_READ, GROUP_READ, WORLD_READ

4.3. TYPE



TYPE Argument	GNUInstallDirs Variable	Built-In Default
BIN	${CMAKE_INSTALL_BINDIR}	bin
SBIN	${CMAKE_INSTALL_SBINDIR}	sbin
LIB	${CMAKE_INSTALL_LIBDIR}	lib
INCLUDE	${CMAKE_INSTALL_INCLUDEDIR}	include
SYSCONF	${CMAKE_INSTALL_SYSCONFDIR}	etc
SHAREDSTATE	${CMAKE_INSTALL_SHARESTATEDIR}	com
LOCALSTATE	${CMAKE_INSTALL_LOCALSTATEDIR}	var
RUNSTATE	${CMAKE_INSTALL_RUNSTATEDIR}	<LOCALSTATE dir>/run
DATA	${CMAKE_INSTALL_DATADIR}	<DATAROOT dir>
INFO	${CMAKE_INSTALL_INFODIR}	<DATAROOT dir>/info
LOCALE	${CMAKE_INSTALL_LOCALEDIR}	<DATAROOT dir>/locale
MAN	${CMAKE_INSTALL_MANDIR}	<DATAROOT dir>/man
DOC	${CMAKE_INSTALL_DOCDIR}	<DATAROOT dir>/doc

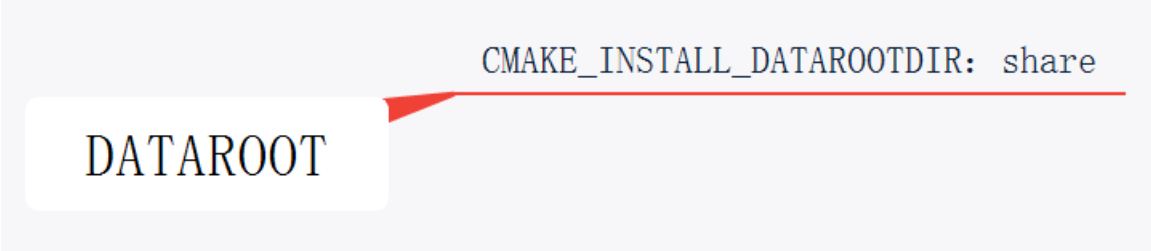
4.3.1.

TYPE Argument	GNUInstallDirs Variable	Built-In Default
BIN	${CMAKE_INSTALL_BINDIR}	bin
SBIN	${CMAKE_INSTALL_SBINDIR}	sbin
LIB	${CMAKE_INSTALL_LIBDIR}	lib
INCLUDE	${CMAKE_INSTALL_INCLUDEDIR}	include
SYSCONF	${CMAKE_INSTALL_SYSCONFDIR}	etc
SHAREDSTATE	${CMAKE_INSTALL_SHARESTATEDIR}	com
LOCALSTATE	${CMAKE_INSTALL_LOCALSTATEDIR}	var
RUNSTATE	${CMAKE_INSTALL_RUNSTATEDIR}	<LOCALSTATE dir>/run
DATA	${CMAKE_INSTALL_DATADIR}	<DATAROOT dir>
INFO	${CMAKE_INSTALL_INFODIR}	<DATAROOT dir>/info
LOCALE	${CMAKE_INSTALL_LOCALEDIR}	<DATAROOT dir>/locale
MAN	${CMAKE_INSTALL_MANDIR}	<DATAROOT dir>/man
DOC	${CMAKE_INSTALL_DOCDIR}	<DATAROOT dir>/doc

4.3.2. include(GNUInstallDirs)

install(FILES t.h TYPE doc)

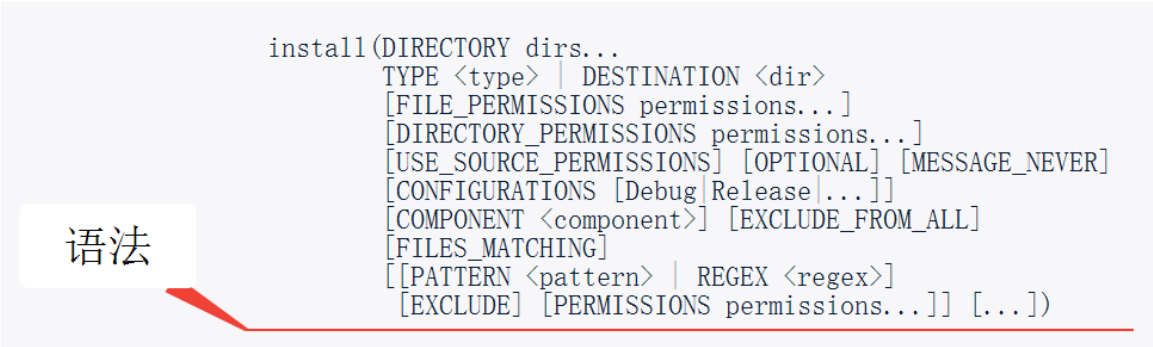
4.3.3. DATAROOT



CMAKE_INSTALL_DATAROOTDIR：share

5. cmake install目录

5.1. 语法



5.1.1. install(DIRECTORY dirs...

TYPE <type> | DESTINATION <dir>

[FILE_PERMISSIONS permissions...]

[DIRECTORY_PERMISSIONS permissions...]

[USE_SOURCE_PERMISSIONS] [OPTIONAL] [MESSAGE_NEVER]

[CONFIGURATIONS [Debug|Release|...]]

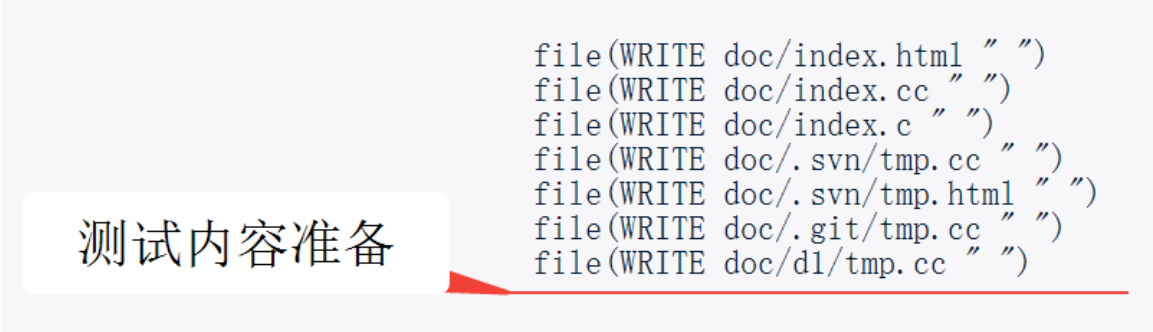
[COMPONENT <component>] [EXCLUDE_FROM_ALL]

[FILES_MATCHING]

[[PATTERN <pattern> | REGEX <regex>]

[EXCLUDE] [PERMISSIONS permissions...]] [...])

5.2. 测试内容准备



5.2.1. file(WRITE doc/index.html " ")

file(WRITE doc/index.cc " ")

file(WRITE doc/index.c " ")

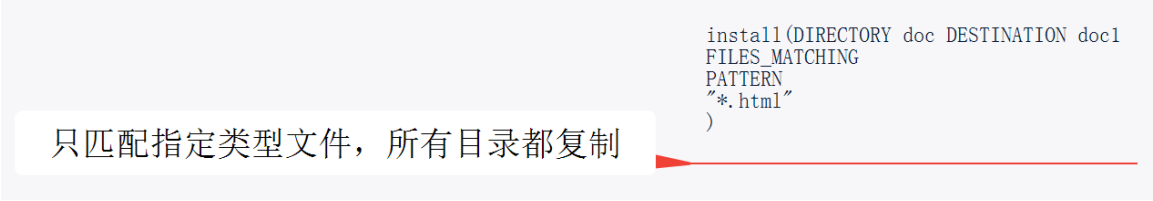
file(WRITE doc/.svn/tmp.cc " ")

file(WRITE doc/.svn/tmp.html " ")

file(WRITE doc/.git/tmp.cc " ")

file(WRITE doc/d1/tmp.cc " ")

5.3. 只匹配指定类型文件，所有目录都复制



5.3.1. install(DIRECTORY doc DESTINATION doc1

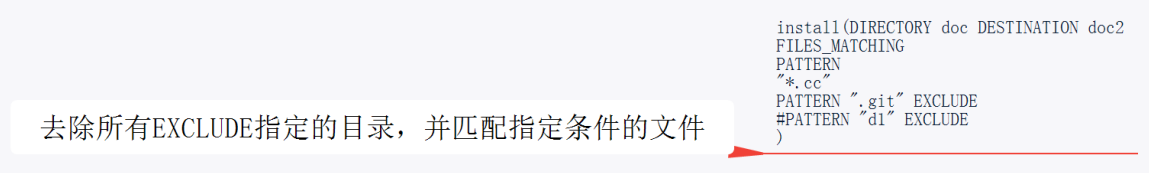
FILES_MATCHING

PATTERN

"*.html"

)

5.4. 去除所有EXCLUDE指定的目录，并匹配指定条件的文件



5.4.1. install(DIRECTORY doc DESTINATION doc2

FILES_MATCHING

PATTERN

"*.cc"

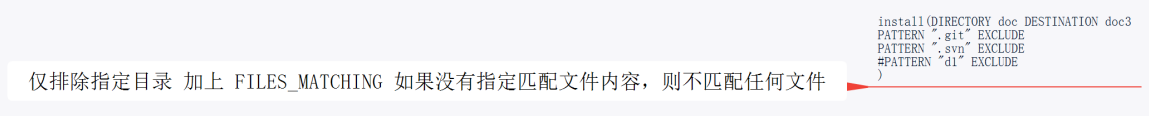
PATTERN ".git" EXCLUDE

#PATTERN "d1" EXCLUDE

)

5.5. 仅排除指定目录 加上 FILES_MATCHING

如果没有指定匹配文件内容，则不匹配任何文件



5.5.1. install(DIRECTORY doc DESTINATION doc3

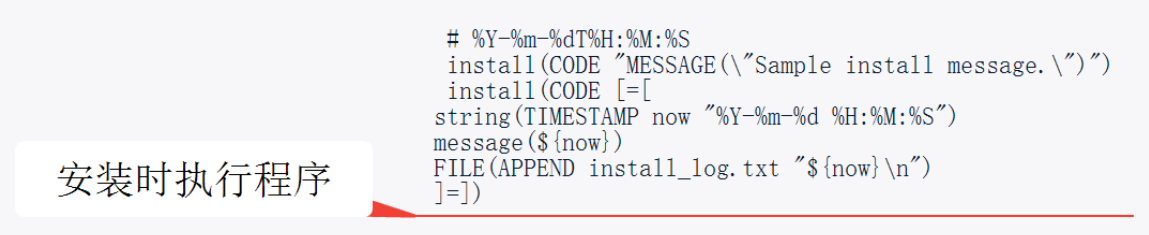
PATTERN ".git" EXCLUDE

PATTERN ".svn" EXCLUDE

#PATTERN "d1" EXCLUDE

)

6. 安装时执行程序



6.1. # %Y-%m-%dT%H:%M:%S

install(CODE "MESSAGE(\"Sample install message.\")")

install(CODE [=[

string(TIMESTAMP now "%Y-%m-%d %H:%M:%S")

message(${now})

FILE(APPEND install_log.txt "${now}\n")

]=])

7. 安装指定的模块

7.1. cmake .. -DCMAKE_INSTALL_PREFIX=./

7.2. cmake -DCOMPONENT=Runtime -P cmake_install.cmake

7.3. install(TARGETS ${PROJECT_NAME} dlib slib

RUNTIME DESTINATION bin2 COMPONENT Runtime #test_install

LIBRARY DESTINATION lib2 COMPONENT Runtime # libdlib.so

ARCHIVE DESTINATION lib2/myproject COMPONENT Development

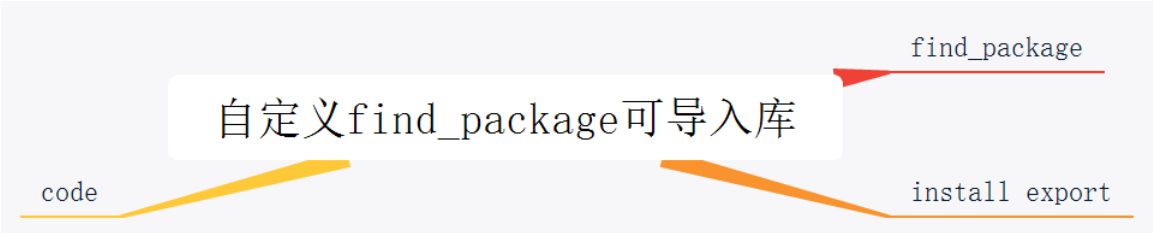
PUBLIC_HEADER DESTINATION pub_include COMPONENT Development

PRIVATE_HEADER DESTINATION pri_include

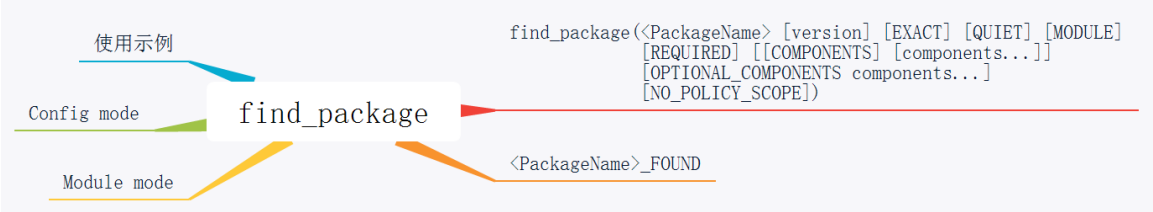
) #libslib.a

7.4. cmake -DBUILD_TYPE=Debug -P cmake_install.cmake

8. 自定义find_package可导入库



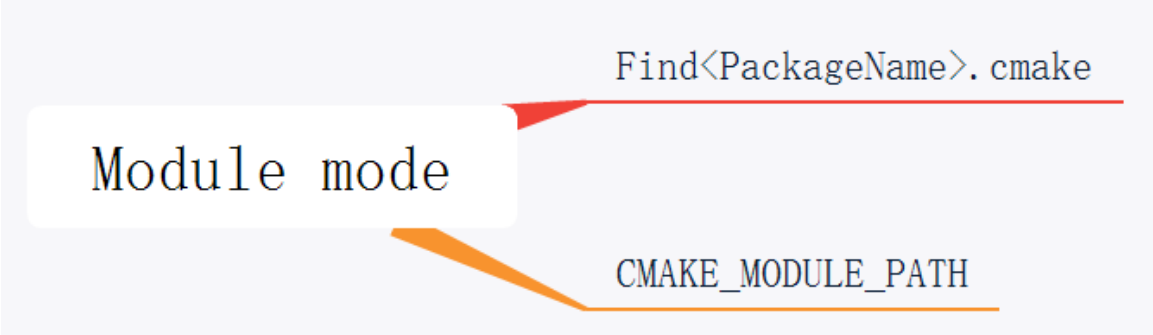
8.1. find_package



8.1.1. find_package(<PackageName> [version] [EXACT] [QUIET] [MODULE] [REQUIRED] [[COMPONENTS] [components...]] [OPTIONAL_COMPONENTS components...] [NO_POLICY_SCOPE])

8.1.2. <PackageName>_FOUND

8.1.3. Module mode

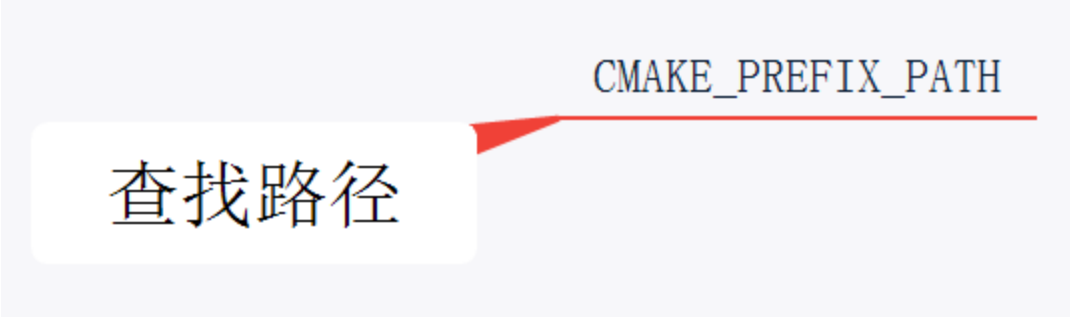


Find<PackageName>.cmake

CMAKE_MODULE_PATH

8.1.4. Config mode

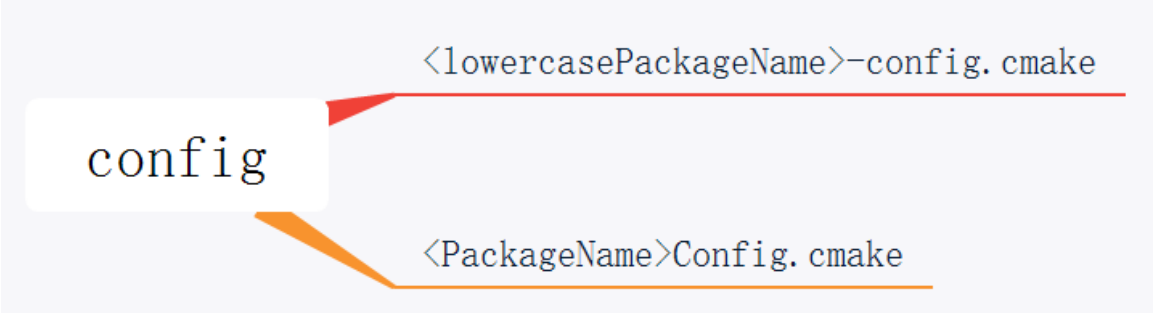
查找路径



CMAKE_PREFIX_PATH

读取文件

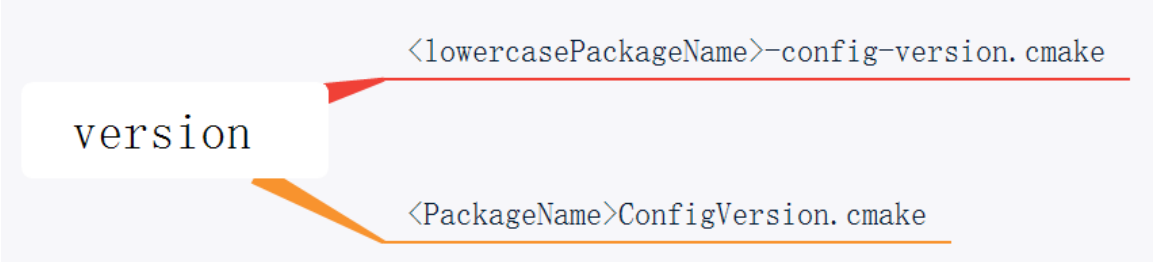
config



<lowercasePackageName>-config.cmake

<PackageName>Config.cmake

version

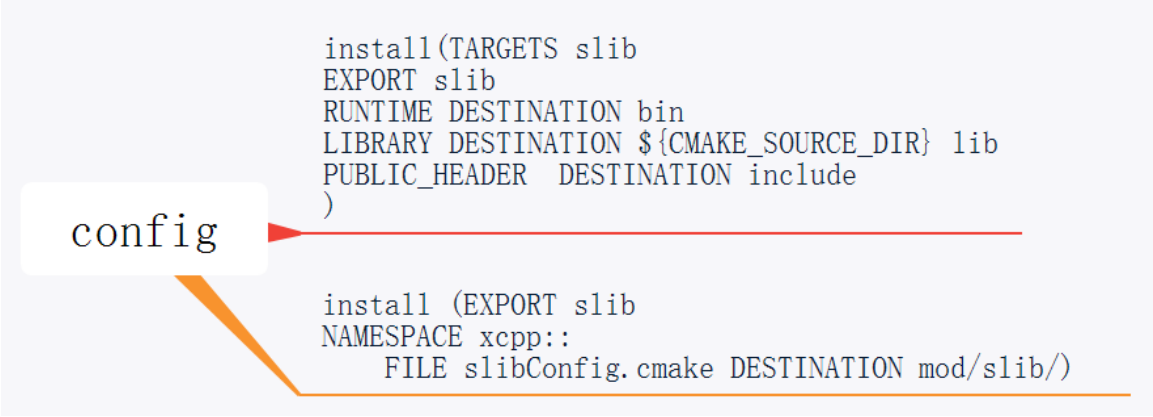


<lowercasePackageName>-config-version.cmake

<PackageName>ConfigVersion.cmake

生成Config mode文件

config



install(TARGETS slib

EXPORT slib

RUNTIME DESTINATION bin

LIBRARY DESTINATION ${CMAKE_SOURCE_DIR} lib

PUBLIC_HEADER DESTINATION include

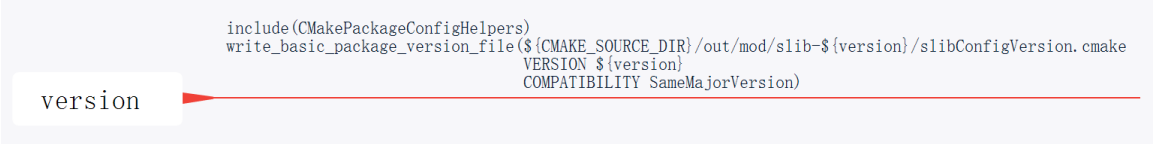
)

install (EXPORT slib

NAMESPACE xcpp::

FILE slibConfig.cmake DESTINATION mod/slib/)

version



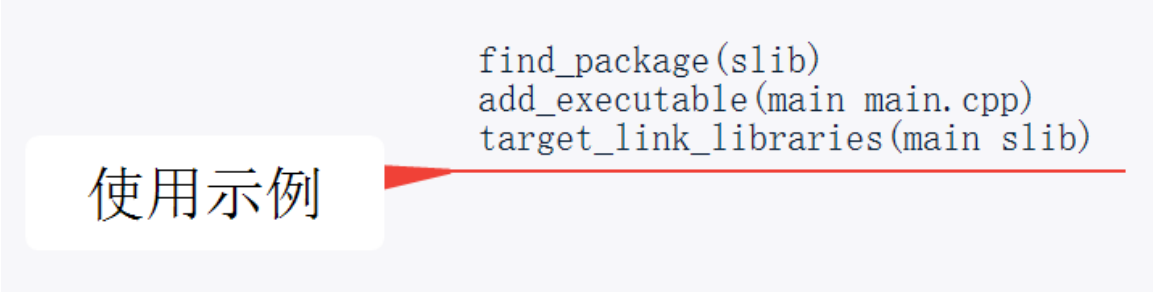
include(CMakePackageConfigHelpers)

write_basic_package_version_file(${CMAKE_SOURCE_DIR}/out/mod/slib-${version}/slibConfigVersion.cmake

VERSION ${version}

COMPATIBILITY SameMajorVersion)

8.1.5. 使用示例

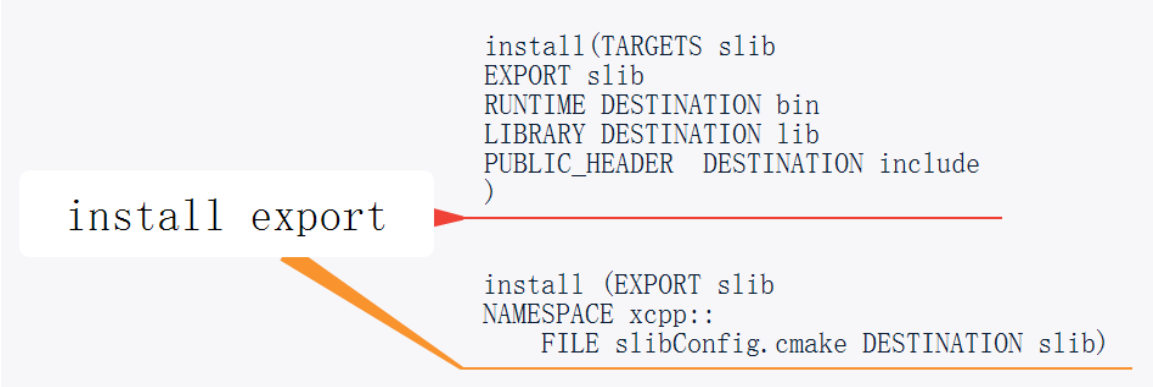


find_package(slib)

add_executable(main main.cpp)

target_link_libraries(main slib)

8.2. install export



8.2.1. install(TARGETS slib

EXPORT slib

RUNTIME DESTINATION bin

LIBRARY DESTINATION lib

PUBLIC_HEADER DESTINATION include

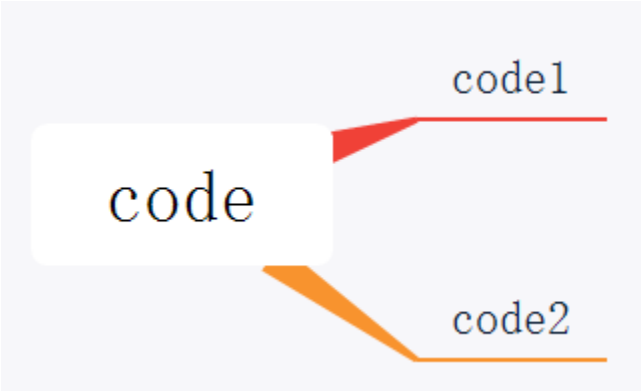
)

8.2.2. install (EXPORT slib

NAMESPACE xcpp::

FILE slibConfig.cmake DESTINATION slib)

8.3. code



8.3.1. code1

code1

```
cmake_minimum_required(VERSION 3.22)

project(slib2)
if(NOT version)
set(version 1.1)
endif()
file(WRITE include/slib.h [=[
void SLib();
]=])


file(WRITE include/slib_pri.h [=[
void SLib2();
]=])



file(WRITE slib.cpp.in [=[
#include <iostream>
void SLib()
{
    std::cout<<"test slib ${version} \n";
}
]=])

configure_file("slib.cpp.in" "${CMAKE_SOURCE_DIR}/slib.cpp" )



file(WRITE slib2.cpp [=[
#include <iostream>
void SLib()
{
    std::cout<<"test slib 1.1 \n";
}
]=])


add_library(slib SHARED slib.cpp)
set_target_properties(slib PROPERTIES VERSION ${version})


target_include_directories(slib PUBLIC /home/xcj/test_mode/out/include )
set_target_properties(slib PROPERTIES PUBLIC_HEADER include/slib.h)
set_target_properties(slib PROPERTIES PRIVATE_HEADER include/slib_pri.h)

install(TARGETS slib
EXPORT slib
RUNTIME DESTINATION bin
LIBRARY DESTINATION ${CMAKE_SOURCE_DIR}/out/mod/slib-${version}/lib
PUBLIC_HEADER  DESTINATION include
PRIVATE_HEADER DESTINATION include/in
)
include(CMakePackageConfigHelpers)
write_basic_package_version_file(${CMAKE_SOURCE_DIR}/out/mod/slib-${version}/slibConfigVersion.cmake
                                 VERSION ${version}
                                COMPATIBILITY SameMajorVersion)


#write_basic_package_version_file(${CMAKE_SOURCE_DIR}/out/mod1/slibConfigVersion.cmake
#                                 VERSION 1.1
#                                 COMPATIBILITY SameMajorVersion)
install (EXPORT slib
NAMESPACE xcpp::
    FILE slibConfig.cmake DESTINATION mod/slib-${version}/)
#install(EXPORT slib_mod NAMESPACE mp_
#install(EXPORT slib_mod
#        DESTINATION mod)



#export(PACKAGE slib_mod)
message("path is ${CMAKE_SOURCE_DIR}/out/mod/")
#set(CMAKE_MODULE_PATH "${CMAKE_SOURCE_DIR}/out/mod/")


set(CMAKE_PREFIX_PATH "${CMAKE_SOURCE_DIR}/out/mod/")
#find_package(slib ${version})

message("slib_DIR = ${slib_DIR}")
message("slib_FOUND = ${slib_FOUND}")
message("slib_INCLUDES = ${slib_INCLUDES}")
message("slib_INCLUDE_DIR = ${slib_INCLUDE_DIR}")
message("slib_LIBRARY = ${slib_LIBRARY}")
message("slib_LIBRARIES = ${slib_LIBRARIES}")

message("slib_CONSIDERED_CONFIGS = ${slib_CONSIDERED_CONFIGS}")
message("slib_CONSIDERED_VERSIONS = ${slib_CONSIDERED_VERSIONS}")
message("slib_CONFIG = ${slib_CONFIG}")

#FIND_PACKAGE(curl)
#message("CURL_DIR = ${curl_DIR}")
```

cmake_minimum_required(VERSION 3.22)

project(slib2)

```
if(NOT version)
set(version 1.1)
endif()
file(WRITE include/slib.h [=[
void SLib();
]=])


file(WRITE include/slib_pri.h [=[
void SLib2();
]=])



file(WRITE slib.cpp.in [=[
#include <iostream>
void SLib()
{
   std::cout<<"test slib ${version} \n";
}
]=])

configure_file("slib.cpp.in" "${CMAKE_SOURCE_DIR}/slib.cpp" )



file(WRITE slib2.cpp [=[
#include <iostream>
void SLib()
{
   std::cout<<"test slib 1.1 \n";
```

```
}
]=])


add_library(slib SHARED slib.cpp)
set_target_properties(slib PROPERTIES VERSION ${version})


target_include_directories(slib PUBLIC /home/xcj/test_mode/out/include )
set_target_properties(slib PROPERTIES PUBLIC_HEADER include/slib.h)
set_target_properties(slib PROPERTIES PRIVATE_HEADER include/slib_pri.h)

install(TARGETS slib
EXPORT slib
RUNTIME DESTINATION bin
LIBRARY DESTINATION ${CMAKE_SOURCE_DIR}/out/mod/slib-${version}/lib
PUBLIC_HEADER  DESTINATION include
PRIVATE_HEADER DESTINATION include/in
)
include(CMakePackageConfigHelpers)
write_basic_package_version_file(${CMAKE_SOURCE_DIR}/out/mod/slib-
${version}/slibConfigVersion.cmake
                        VERSION ${version}
                        COMPATIBILITY SameMajorVersion)


#write_basic_package_version_file(${CMAKE_SOURCE_DIR}/out/mod1/slibConf
igVersion.cmake
#                        VERSION 1.1
#                        COMPATIBILITY SameMajorVersion)
install (EXPORT slib
```

```
  NAMESPACE xcpp::
    FILE slibConfig.cmake DESTINATION mod/slib-${version}/)
  #install(EXPORT slib_mod NAMESPACE mp_
  #install(EXPORT slib_mod
  #       DESTINATION mod)



  #export(PACKAGE slib_mod)
  message("path is ${CMAKE_SOURCE_DIR}/out/mod/")
  #set(CMAKE_MODULE_PATH "${CMAKE_SOURCE_DIR}/out/mod/")



  set(CMAKE_PREFIX_PATH "${CMAKE_SOURCE_DIR}/out/mod/")
  #find_package(slib ${version})

  message("slib_DIR = ${slib_DIR}")
  message("slib_FOUND = ${slib_FOUND}")
  message("slib_INCLUDES = ${slib_INCLUDES}")
  message("slib_INCLUDE_DIR = ${slib_INCLUDE_DIR}")
  message("slib_LIBRARY = ${slib_LIBRARY}")
  message("slib_LIBRARIES = ${slib_LIBRARIES}")

  message("slib_CONSIDERED_CONFIGS = ${slib_CONSIDERED_CONFIGS}")
  message("slib_CONSIDERED_VERSIONS = ${slib_CONSIDERED_VERSIONS}")
  message("slib_CONFIG = ${slib_CONFIG}")

  #FIND_PACKAGE(curl)
  #message("CURL_DIR = ${curl_DIR}")
```

8.3.2. code2

code2

```
cmake_minimum_required(VERSION 3.22)

project(findpkg)

file(WRITE main.cpp [=[
#include <iostream>
int main()
{
    std::cout<<"test main\n";
    void SLib();
    SLib();
    return 0;
}
]=])

set(CMAKE_PREFIX_PATH "/home/xcj/test_mode/out/mod/;/home/xcj/test_mode/out/mod1/")
find_package(slib 1.2)
add_executable(main main.cpp)
target_link_libraries(main xcpp::slib)

get_target_property(pa xcpp::slib INCLUDE_DIRECTORIES)
include(CMakePrintHelpers)
cmake_print_properties(TARGETS xcpp::slib PROPERTIES
INCLUDE_DIRECTORIES
INTERFACE_INCLUDE_DIRECTORIES
)


message("xcpp::slib INCLUDE_DIRECTORIES = ${pa}")
message("slib_DIR = ${slib_DIR}")
message("slib_FOUND = ${slib_FOUND}")
message("slib_INCLUDES = ${slib_INCLUDES}")
message("slib_INCLUDE_DIR = ${slib_INCLUDE_DIR}")
message("slib_LIBRARY = ${slib_LIBRARY}")
message("slib_LIBRARIES = ${slib_LIBRARIES}")

message("slib_CONSIDERED_CONFIGS = ${slib_CONSIDERED_CONFIGS}")
message("slib_CONSIDERED_VERSIONS = ${slib_CONSIDERED_VERSIONS}")
message("slib_CONFIG = ${slib_CONFIG}")
```

cmake_minimum_required(VERSION 3.22)

project(findpkg)

file(WRITE main.cpp [=[

#include <iostream>

int main()

{

std::cout<<"test main\n";

void SLib();

SLib();

return 0;

```
}
]=])

set(CMAKE_PREFIX_PATH
"/home/xcj/test_mode/out/mod/;/home/xcj/test_mode/out/mod1/")
find_package(slib 1.2)
add_executable(main main.cpp)
target_link_libraries(main xcpp::slib)

get_target_property(pa xcpp::slib INCLUDE_DIRECTORIES)
include(CMakePrintHelpers)
cmake_print_properties(TARGETS xcpp::slib PROPERTIES
INCLUDE_DIRECTORIES
INTERFACE_INCLUDE_DIRECTORIES
)


message("xcpp::slib INCLUDE_DIRECTORIES = ${pa}")
message("slib_DIR = ${slib_DIR}")
message("slib_FOUND = ${slib_FOUND}")
message("slib_INCLUDES = ${slib_INCLUDES}")
message("slib_INCLUDE_DIR = ${slib_INCLUDE_DIR}")
message("slib_LIBRARY = ${slib_LIBRARY}")
message("slib_LIBRARIES = ${slib_LIBRARIES}")

message("slib_CONSIDERED_CONFIGS = ${slib_CONSIDERED_CONFIGS}")
message("slib_CONSIDERED_VERSIONS = ${slib_CONSIDERED_VERSIONS}")
message("slib_CONFIG = ${slib_CONFIG}")
```