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C++ 11 final

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- `final` constitutes a C++ 11 specifier
- Optional, can be used in context of inheritance
- Specifies that a virtual class or function can not be overwritten

Example – Final function

```
struct A
{
    virtual void foo(); // A::foo is virtual
};

struct B : A
{
    virtual void foo() final override; // B::foo is final
    void bar() final; // Error: non-virtual function cannot be final
};

struct C : B
{
    void foo(); // Error: foo cannot be overridden as it's final in B
};
```

Example – Final class

```
struct A
{
    virtual void foo();
};

struct B final : A // struct B is final
{
    virtual void foo() override;
    void bar();
};

struct C : B // Error: B is final
{
};
```

- `final`...

- ...may only be used in combination with `virtual`
- ...must be used before **pure-specifier**

```
void myAbstractFunc() final = 0;
```

- ...is usually used in **subclasses** for **derived** functions
- ...should be used in combination with `override`
- Functions / class that are declared `final` cannot be overwritten

Excuse 1 – MITK C++ 11 status

How to find out what C++11 features are supported?

- MITK C++ 11 status:

http://mitk.org/wiki/MITK_C%2B%2B_11/14_Status

- Search for

CMAKE_CXX_KNOWN_FEATURES

at <https://www.codatlas.com>

- Came up last BS ;)
- Examples:

```
extern void ipMITKSegmentationFree (mitkIpPicDescriptor* segmentation);
```

```
extern float y;
```

- Declaration without definition (not necessarily in header)
- Sharing between modules
- Definition of function or variable needs to have *external linkage* (defined outside a function / global or file scope)
- No `static` keyword

Excurs 2 – C++ extern

- Examples:

in file1.cpp:

```
int global_int = 1;
```

in file2.cpp:

```
extern int global_int;  
//in some function  
cout << "global_int = " << global_int;
```

- <http://en.cppreference.com/w/cpp/language/final>
- http://mitk.org/wiki/MITK_C%2B%2B_11/14_Status
- <https://www.codatlas.com>
- <http://stackoverflow.com/questions/10422034/when-to-use-extern-in-c>



Thank you for
your attention!

Further
information
on www.dkfz.de

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