Creation of Threads

This lesson gives an introduction on how to create threads in C++ using callable units such as functions and lambda functions.

WE'LL COVER THE FOLLOWING

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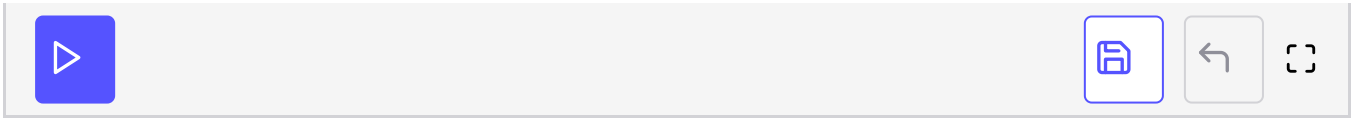
To launch a thread in C++, we have to include the `<thread>` header.

- A thread `std::thread` represents an executable unit. This executable unit, which the thread immediately starts, gets its work package as a callable unit.
- A callable unit is an entity that behaves like a function. Of course, it can be a function, but also a function object or a lambda function.

Example

```
// createThread.cpp

#include <iostream>
#include <thread>

void helloFunction(){
  std::cout << "Hello from a function." << std::endl;
}

class HelloFunctionObject{
  public:
    void operator()() const {
      std::cout << "Hello from a function object." << std::endl;
    }
};

int main(){

  std::cout << std::endl;
```

```
  std::thread t1(helloFunction);

  HelloFunctionObject helloFunctionObject;
  std::thread t2(helloFunctionObject);

  std::thread t3([]{std::cout << "Hello from a lambda." << std::endl;});

  t1.join();
  t2.join();
  t3.join();

  std::cout << std::endl;

};
```



Explanation

All three threads (`t1`, `t2`, and `t3`) write their messages to the console. The work package of thread `t2` is a function object (lines 10 - 15), and the work package of thread `t3` is a lambda function (line 26). In lines 28 - 30 the main thread is waiting until its children are done.

Output

The three threads are executed in an arbitrary order; even the three output operations can interleave. The creator of the child - the main thread in our case - is responsible for the lifetime of the child.

In the next lesson, we'll learn how to use the join and detach functions to properly end thread execution in C++.