Coroutines in the C++

Why and How?

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Introduction

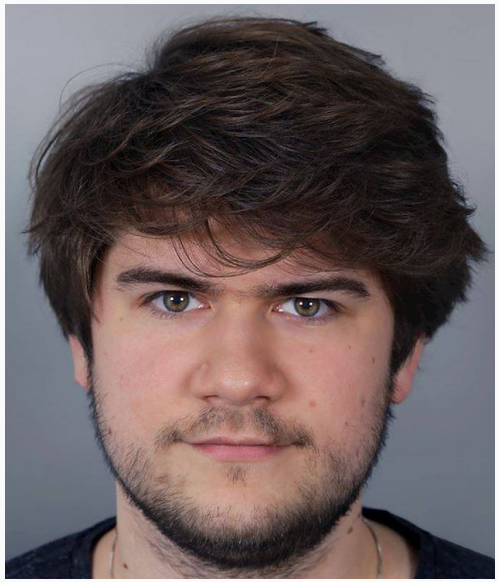
Agenda

Questions...

Ask questions any time.
Don't be afraid to interrupt me :)

Who am I?

Dawid Pilarski



- Senior Software Developer in TomTom
- Member of the ISO/JTC1/SC22/WG21
- Member of the PKN KT **(programming languages)**
- C++ blog writer

Why do we need coroutines?

What are the coroutines?

Subroutine Is a sequence of program instructions that performs a specific task, packaged as a unit.

Function Is a subroutine

Coroutine Is generalization of the function.

What are the coroutines?

Function can be:

- called
- returned from
- suspended

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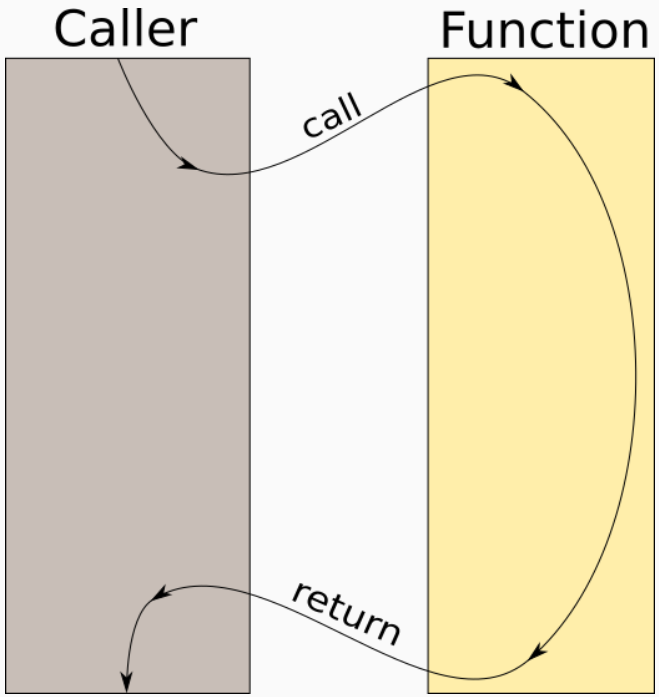
What are the coroutines?

Coroutine can be:

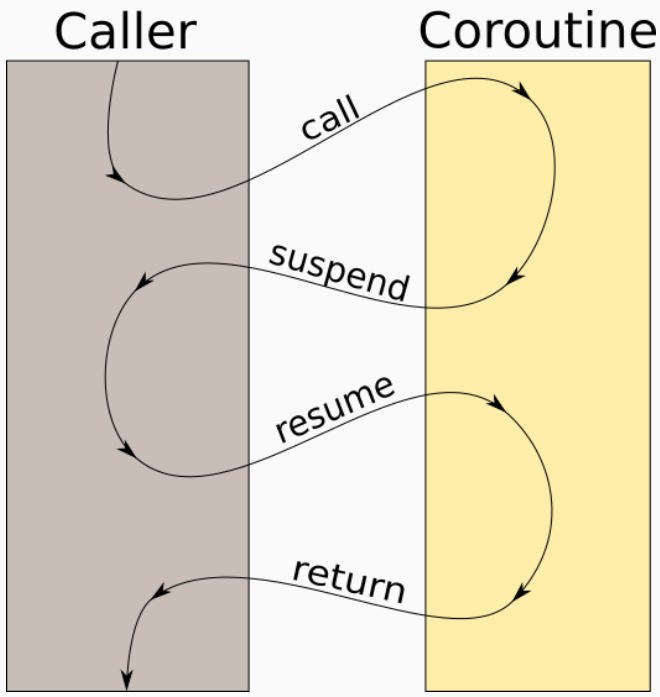
- called
- returned from
- suspended
- resumed from
- created
- destroyed

Coroutine flowchart

Function's flow:



Coroutine flow:

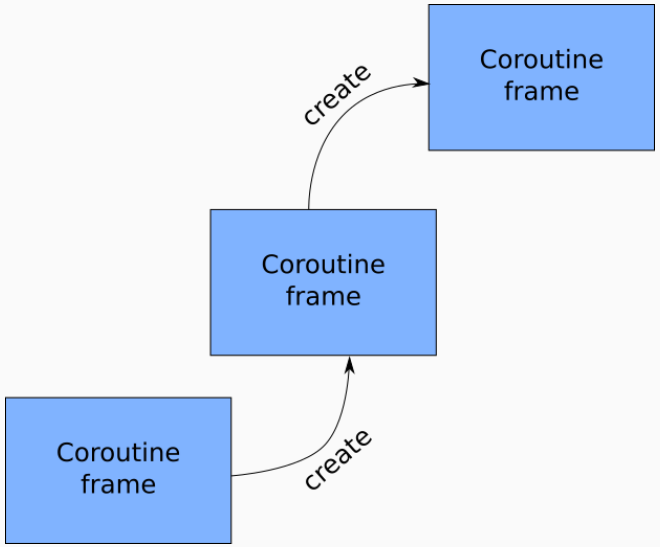


Coroutines use cases

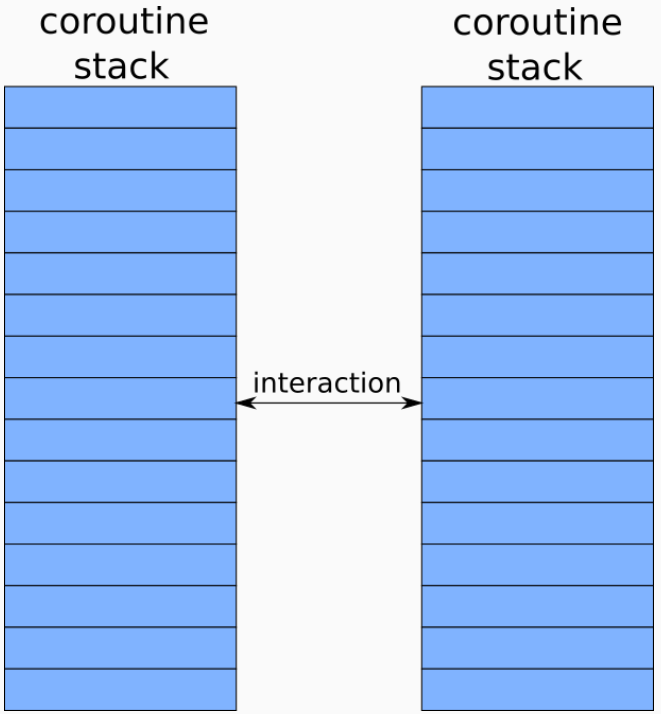
Why do we need language support for the coroutines

C++ coroutines vs library coroutines

Language based



Library based



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- Multiple allocations

How to implement your own coroutine types?

What's the issue?

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You need to remember to implement on average 9 functions.

Coroutine declaration

```
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   generator<int> fibonacci (int from_value);
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- Whether the function is a coroutine depends on it's definition.
- If function is a coroutine it's return type must support coroutines.

Promise_type

Type supports coroutines if it has promise_type.

promise_type can be:

- member of the class
- specialization of the coroutine_traits<returned_type>

Keywords

co_await

Thank you for attention

Recommended further readings

Questions?

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