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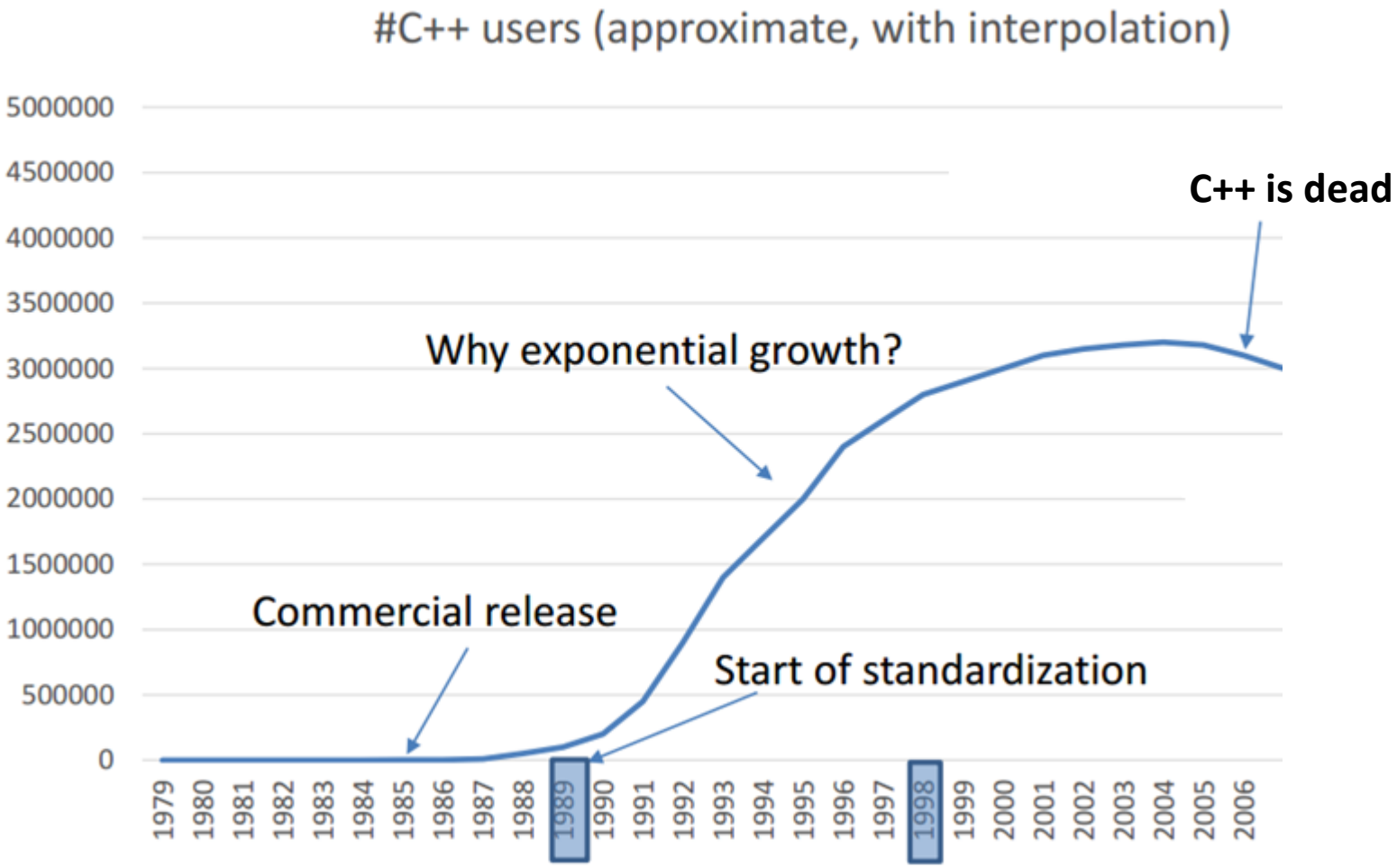
Modern C++

1. Binary search (27.10.2017)

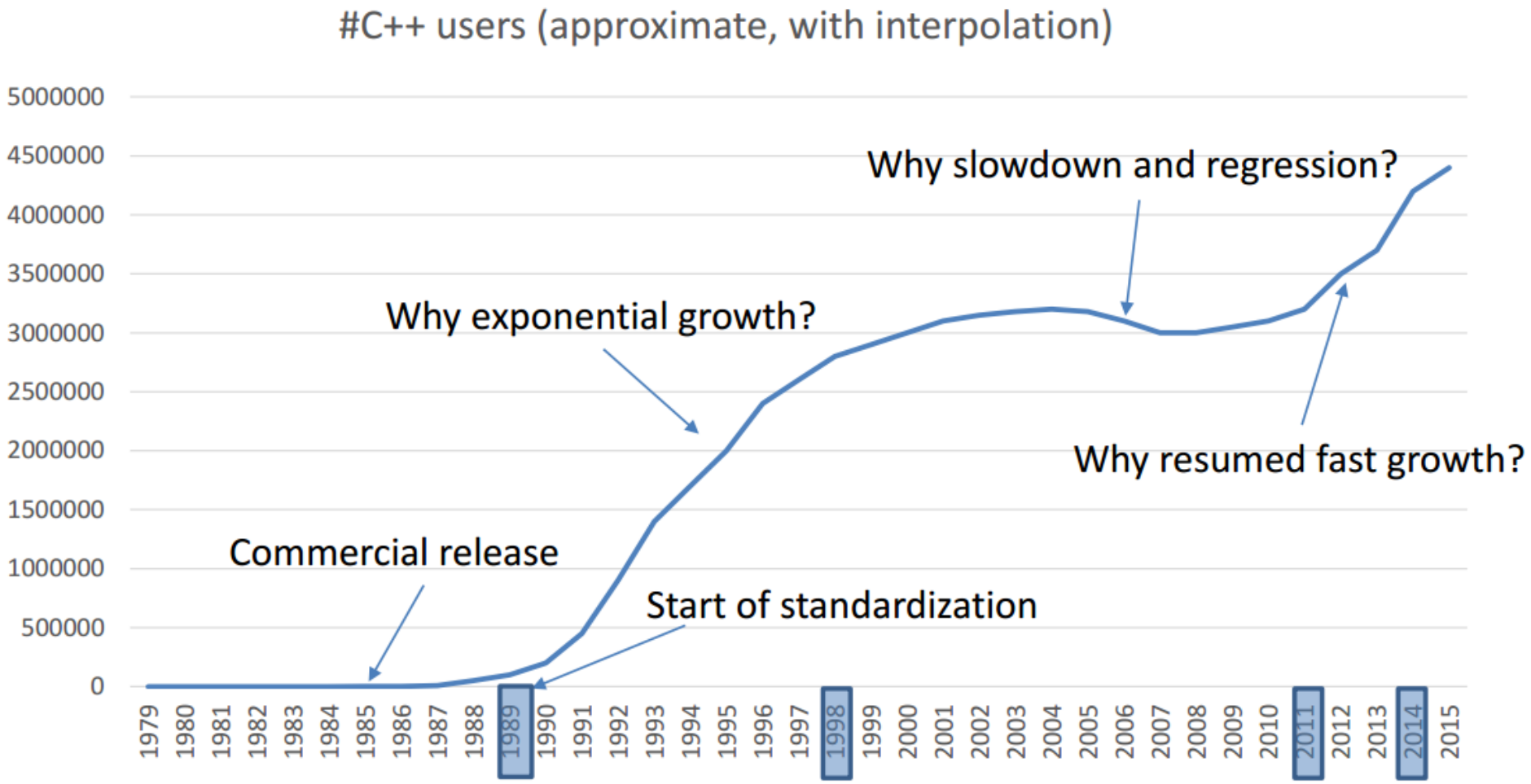
Sidnev A.A.

C++ users



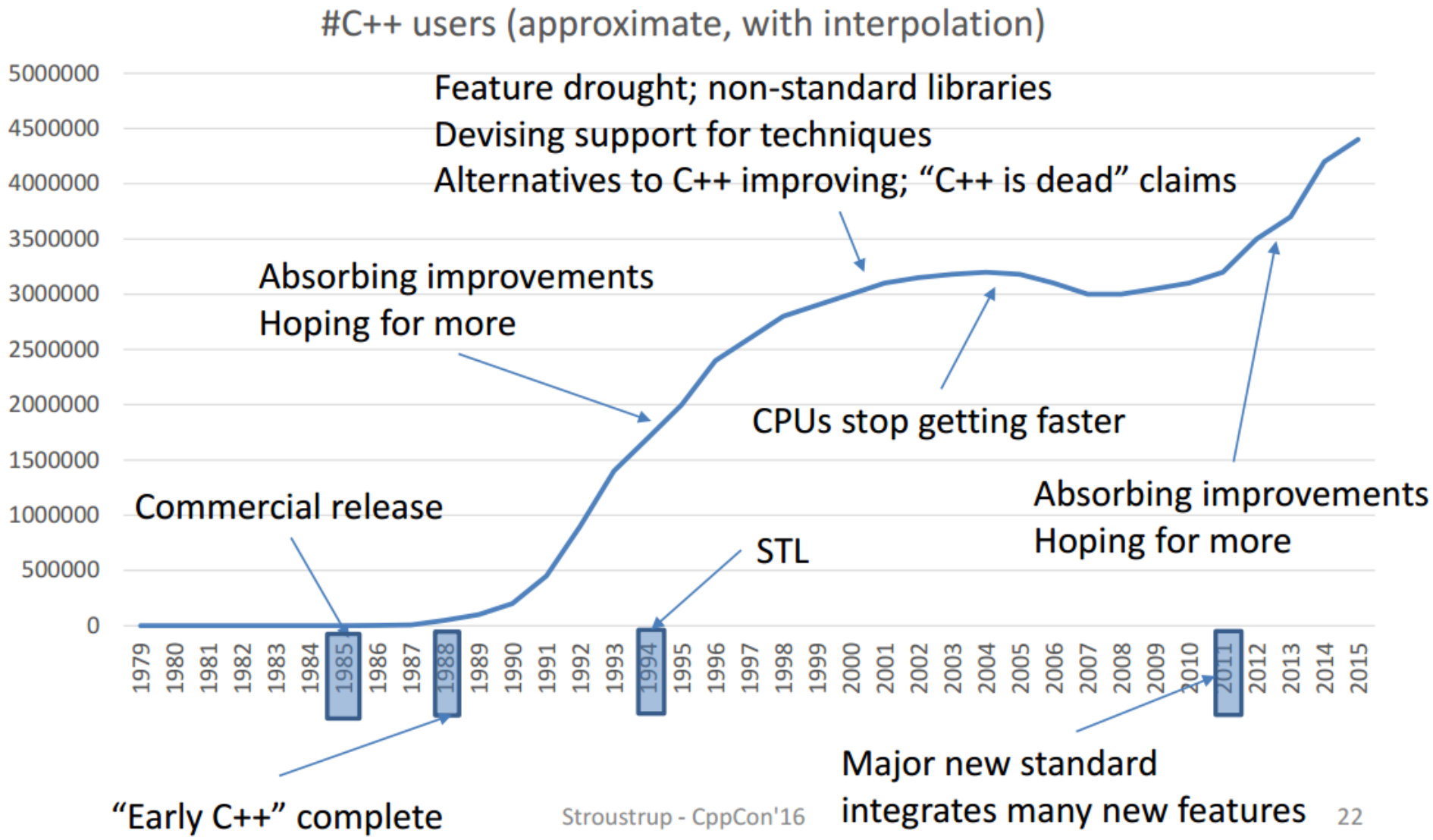
Bjarne Stroustrup. The Evolution of C++: Past, Present, and Future. CppCon2016.

C++ users



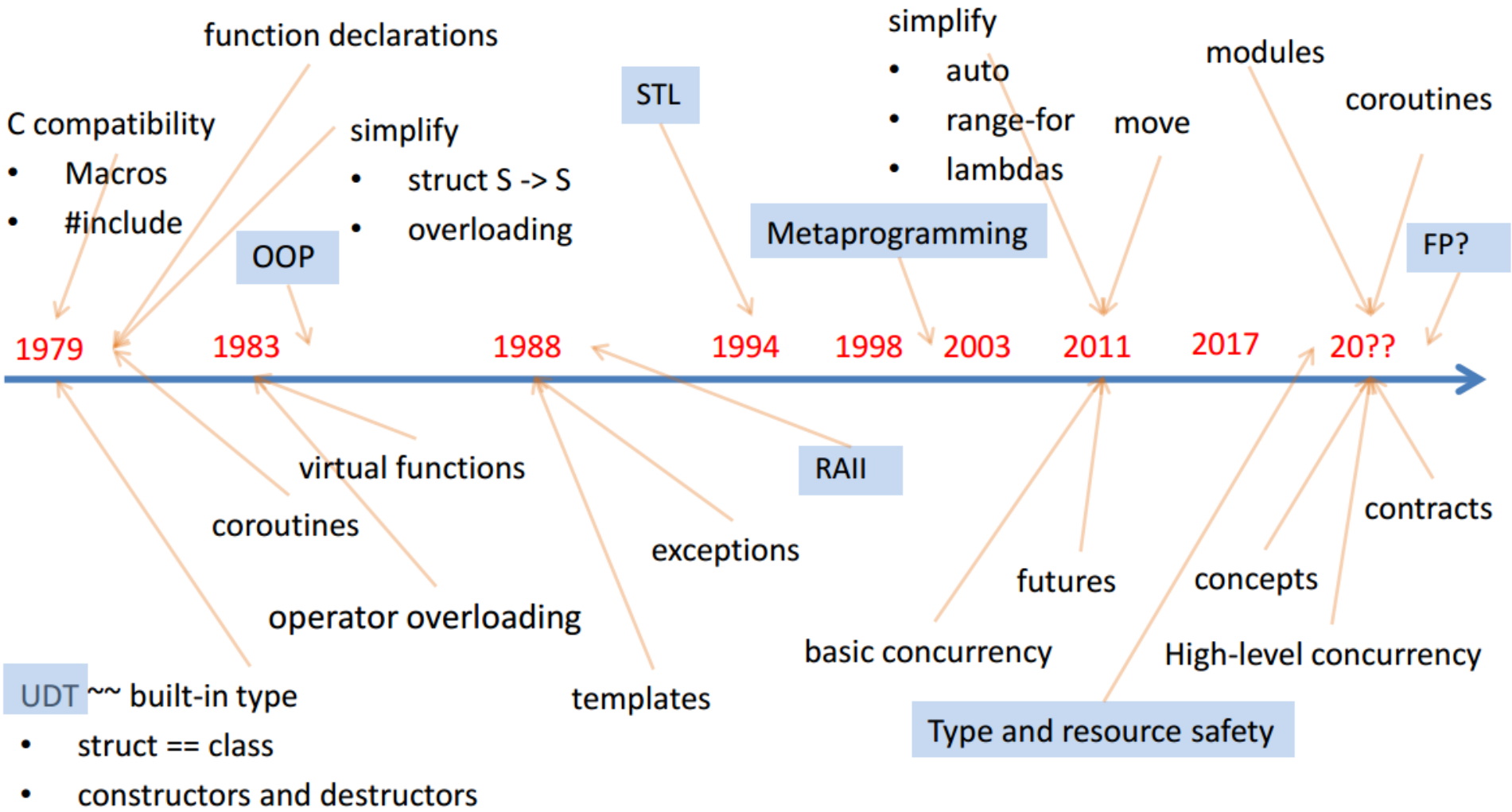
Bjarne Stroustrup. The Evolution of C++: Past, Present, and Future. CppCon2016.

C++ users (cont.)



Bjarne Stroustrup. The Evolution of C++: Past, Present, and Future. CppCon2016.

C++ evolution



Bjarne Stroustrup. The Evolution of C++: Past, Present, and Future. CppCon2016.

Compilers

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- GCC 5 (6.1, 7)
- Clang 3.4 (3.9)
- MSVC 19 (Visual Studio 2015)

Compiler support

References

- Bjarne Stroustrup. The C++ Programming Language (4th Edition). 2013.
- Scott Meyers. Effective Modern C++, 2014.
  - The book on effective use of the features new in “modern” C++ (i.e., C++11 and C++14). A complement to Scott’s existing books, 42 all-new guidelines address smart pointers, move semantics, lambda expressions, the concurrency API, moving from C++98 to modern C++, and much more.
- Бьёрн Страуструп. Язык программирования C++ (3-е издание).
- CppCon. https://cppcon.org/
- Reference. http://en.cppreference.com

Binary search

Task: Find position for element in sorted array

Examples:

```
[1]          , 0   ->   0
[1, 2, 3], 2   ->   1
[1, 2, 4], 3   ->   2
[1, 2, 4], 5   ->   3
```

std::binary_search

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```
template<class ForwardIt, class T>
bool binary_search(ForwardIt first,
                   ForwardIt last,
                   const T& value);
```

```
template<class ForwardIt, class T, class Compare>
bool binary_search(ForwardIt first,
                   ForwardIt last,
                   const T& value,
                   Compare comp);
```

Binary search

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Task: Find position for element in sorted array

```
int find(const vector<int>& v, const int& target) {
  return lower_bound(v.begin(), v.end(), val) - v.begin();
}
```

lower/upper bound

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```
std::vector<int> data =
 { 1, 1, 2, 3, 3, 3, 3, 4, 4, 4, 5, 5, 6 };
// 0  1  2  3  4  5  6  7  8  9  10 11 12
// ???
auto lower = std::lower_bound(data.begin(),
                              data.end(), 4);


// ???
auto upper = std::upper_bound(data.begin(),
                              data.end(), 4);
```

lower/upper bound

```
std::vector<int> data =
 { 1, 1, 2, 3, 3, 3, 3, 4, 4, 4, 5, 5, 6 };
// 0  1  2  3  4  5  6  7  8  9  10 11 12
//                        ^
auto lower = std::lower_bound(data.begin(),
                              data.end(), 4);

// 0  1  2  3  4  5  6  7  8  9  10 11 12
//                              ^
auto upper = std::upper_bound(data.begin(),
                              data.end(), 4);
```

Homework: Leetcode

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69. Sqrt(x)

441. Arranging Coins

Leetcode

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Sqrt(x)

Submission Details

Runtime: **6 ms**

Status: Accepted

Submitted: **9 months ago**

Accepted Solutions Runtime Distribution