Evolution of Programming Abstraction Mechanisms: C++ Data Abstraction

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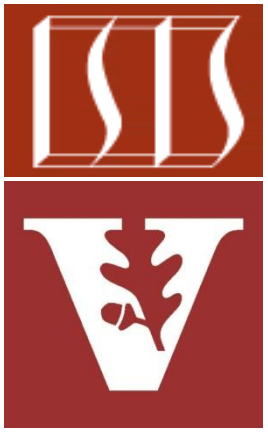

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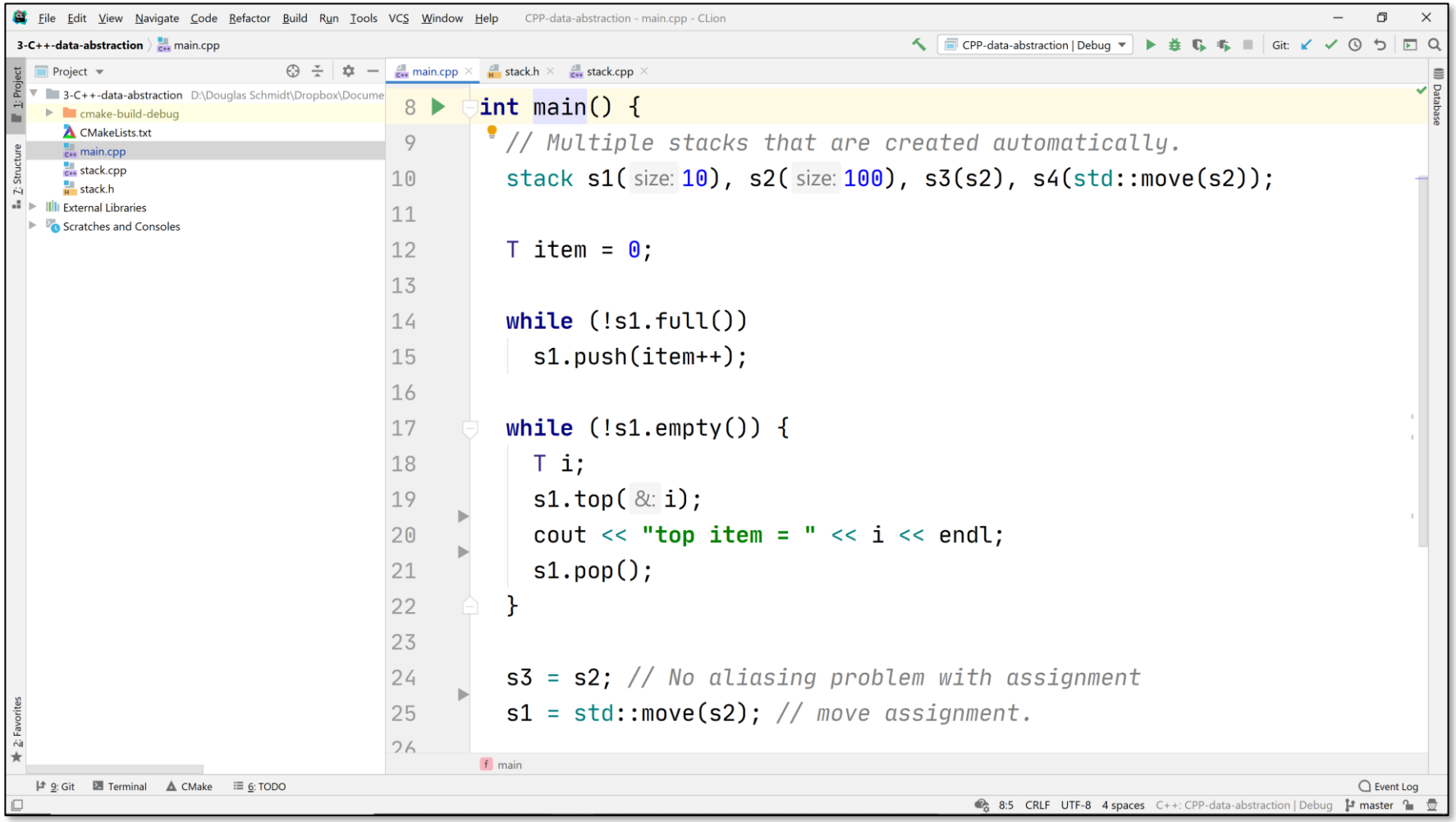
C++ Data Abstraction
Stack Implementations

Data Abstraction Implementation in C++

- Use a C++ class to achieve encapsulation & create more than one stack



See CPlusPlus/tree/master/overview/capabilities/3-C++-data-abstraction

Pros of Data Abstraction in C++

- Information Hiding & data abstraction, e.g.,

```
stack s1 (200);
s1.top_ = 10 // Error flagged by compiler!
```

- The ability to declare multiple stack objects

```
stack s1 (10), s2 (20), s3 (30);
```

- Automatic initialization & termination

```
{
  stack s1 (1000); // constructor called automatically.
  // ...
  // Destructor called automatically
}
```

Cons of Data Abstraction in C++

- Error handling is obtrusive
  - Use exception handling to solve this (but be careful)!
- The example is limited to a single type of stack element (int in this case)
  - We can use C++ "parameterized types" to remove this limitation
- Function call overhead
  - We can use C++ inline functions to remove this overhead

End of C++ Data Abstraction Stack Implementations