



Lifeline: Static Analysis

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```
int* get_raw() {  
    auto ptr = std::make_unique<int> (42);  
    return ptr.get();  
}
```

```
int main() {  
    auto raw = get_raw();  
    std::cout << "Hello " << *raw;  
}
```

✓ ! Analyze main.cpp (arm64) 0.4 seconds

✓ ! Use of memory after it is freed

- ➔ 1. Calling 'get_raw'
- ➔ 2. Entered call from 'main'
- ➔ 3. Calling '~unique_ptr'
- ➔ 4. Entered call from 'get_raw'
- ➔ 5. Calling 'unique_ptr::reset'
- ➔ 6. Entered call from '~unique_ptr'
- ➔ 7. Assuming '__tmp' is non-null
- ➔ 8. Calling 'default_delete::operator()'
- ➔ 9. Entered call from 'unique_ptr::reset'
- ➔ 10. Memory is released
- ➔ 11. Returning; memory was released via 2nd parameter
- ➔ 12. Returning; memory was released
- ➔ 13. Returning from '~unique_ptr'
- ➔ 14. Use of memory after it is freed



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    auto ptr = std::make_unique<int> (42);  
    return ptr.get();  
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int main() {  
    auto raw = get_raw();  
    std::cout << "Hello " << *raw;  
}
```

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✓ ⓘ Use of memory after it is freed

- 1. Calling 'get_raw'
- 2. Entered call from 'main'
- 3. Calling '~unique_ptr'
- 4. Entered call from 'get_raw'
- 5. Calling 'unique_ptr::reset'
- 6. Entered call from '~unique_ptr'
- 7. Assuming '__tmp' is non-null
- 8. Calling 'default_delete::operator()'
- 9. Entered call from 'unique_ptr::reset'
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- 11. Returning; memory was released via 2nd parameter
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- 13. Returning from '~unique_ptr'
- 14. Use of memory after it is freed

