第二十一讲：异步编程 (Asynchronous Programming)

第 4 节：Self-Referential Structs & Pin

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Self-Referential Structs

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async fn pin_example() -> i32 {
    let array = [1, 2, 3];
    let element = &array[2];
    async_write_file("foo.txt", element.to_string()).await;
    *element
}
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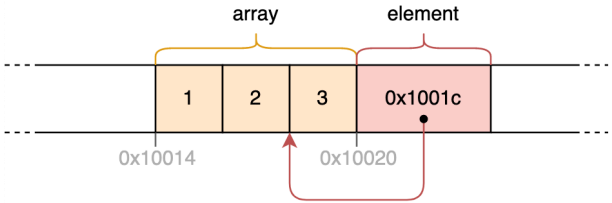
The struct for the "waiting on write" state

```
struct WaitingOnWriteState {
    array: [1, 2, 3],
    element: 0x1001c, // address of the last array element
}
```

The Problem with Self-Referential Structs

Memory layout of self-referential struct



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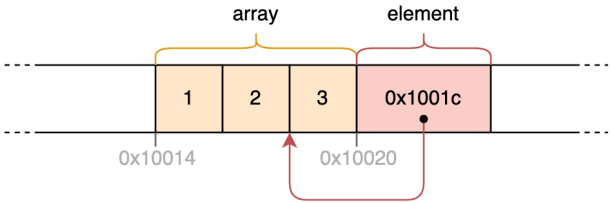
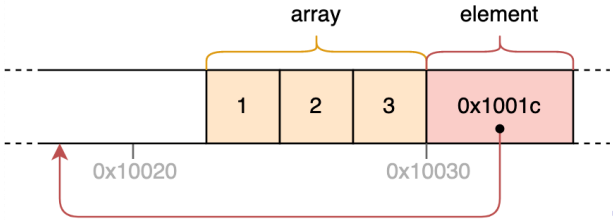


After moving this struct to a different memory address



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  - It puts the burden of dealing with move operations on possibly self-referential structs on the programmer

Defination of Pin

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  - Reference type. In order to break apart a large future into its smaller components, and put an entire resulting future into some immovable location, we need a reference type for methods like ‘poll‘

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```
trait Future {
    type Item;
    type Error;

    fn poll(self: Pin<Self>, cx: &mut task::Context) -> Poll<Self::Item,
}
```

Pinning to the heap

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