

Why is "&&" being used in closure arguments?

Asked 4 years, 7 months ago Active 2 years, 5 months ago Viewed 2k times



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I have two questions regarding this example:

```
let a = [1, 2, 3];
assert eq!(a.iter().find(|\&\&x| x=2), Some(\&2));
assert_eq!(a.iter().find(|&&x| x== 5), None);
```

1. Why is &&x used in the closure arguments rather than just x? I understand that & is passing a reference to an object, but what does using it twice mean?

I don't understand what the documentation says:

Because find() takes a reference, and many iterators iterate over references, this leads to a possibly confusing situation where the argument is a double reference. You can see this effect in the examples below, with &&x.

2. Why is Some(&2) used rather than Some(2)?



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asked May 7 '17 at 5:03



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a is of type [i32; 3]; an array of three i32 s. [i32; 3] does not implement an iter method, but it does dereference into &[i32]. &[i32] implements an iter method which produces an iterator. This iterator implements Iterator
<Item=&i32> .

It uses &i32 rather than i32 because the iterator has to work on arrays of any type, and not all types can be safely copied. So rather than restrict itself to copyable types, it iterates over the elements by reference rather than by value.

find is a method defined for all Iterator s. It lets you look at each element and return the one that matches the predicate. Problem: if the iterator produces non-copyable values, then passing the value into the predicate would make it impossible to return it from find . The value cannot be re-generated, since iterators are not (in general) rewindable or restartable. Thus, find has to pass the element to the predicate by-reference rather than by-value.

So, if you have an iterator that implements Iterator</term=T>, then Iterator::find requires a predicate that takes a &T and returns a bool. [i32]::iter produces an iterator that implements Iterator</ri>
Iterator
It element in question.

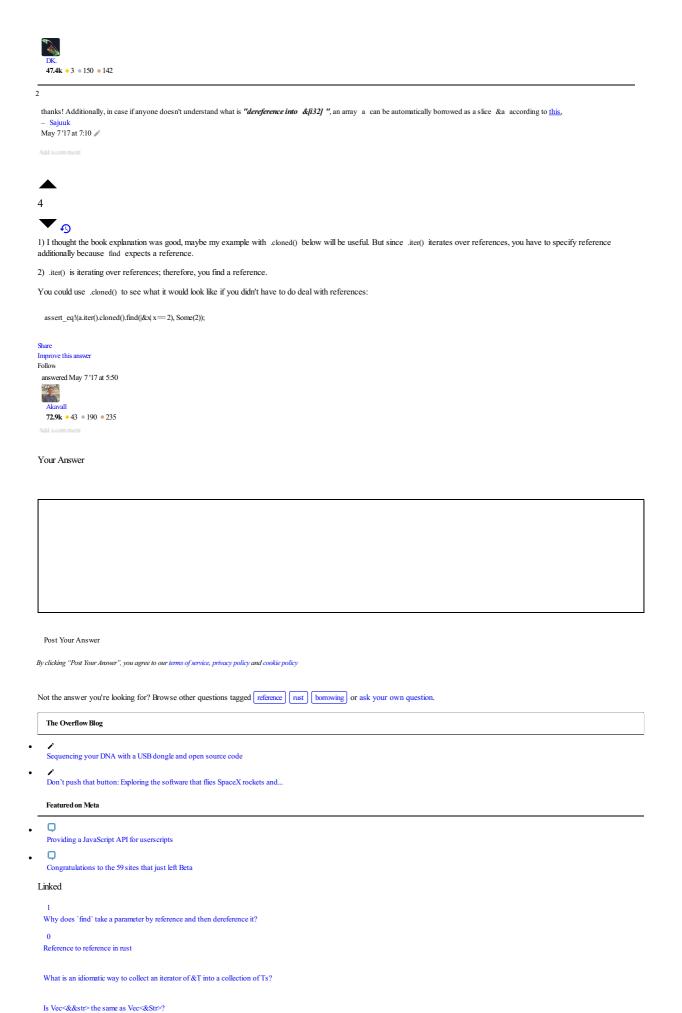
So if you were to write a.iter().find(x|...), the type of x would be &&i32. This cannot be directly compared to the literal i32 value 2. There are several ways of fixing this. One is to explicitly dereference x: a.iter().find(x)**x=2). The other is to use pattern matching to destructure the double reference: a.iter().find()(&x/x)=2). These two approaches are, in this case, doing exactly the same thing. [1]

As for why Some(&2) is used: because a.iter() is an iterator over &i32, not an iterator of i32. If you look at the documentation for Iterator::find, you'll see that for Iterator Item=T>, it returns an Option <T>. Hence, in this case, it returns an Option <&i32>, so that's what you need to compare it against.

[1]: The differences only matter when you're talking about non- Copy types. For example, |&&x|.. wouldn't work on a &&String , because you'd have to be able to move the Your privactioning out from behind the reference, and that's not allowed. However, |x|**x.. would work, because that is just reaching inside the reference without moving anything. By clicking "Accept all cookies", you agree Stack Exchange can store cookies on your device and disclose information in accordance with our Cookie Policy.

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answered May 7 '17 at 6:05



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