Cannot borrow as mutable more than once when calling &'a mut self method

help

Bytekeeper March 5, 2019, 8:18pm 1

This is my second day with Rust so please bear with me.
I'm not sure why I get a "cannot borrow" here:

```
struct A<'a> {
   b: &'a mut B,
   v: Vec<&'a B>,
}

struct B {
}


impl<'a> A<'a> {
   fn x(&'a mut self) {
       self.v.push(self.b);
   }
}

fn main() {
   let mut b = B { };
   let b = &mut b;
   let mut a = A {
       b,
       v: vec![],
   };
   a.x();
   a.x();
}
```

The error I get:

```
error[E0499]: cannot borrow `a` as mutable more than once at a time
 --> demo.rs:24:5
  |
23 |     a.x();
  |     - first mutable borrow occurs here
24 |     a.x();
  |     ^
  |     |
  |     second mutable borrow occurs here
  |     first borrow later used here
```

I'm a bit puzzled. Why would `a.x()` be a borrow at all, I thought `let mut a` would be the only borrow here.

mbrubeck March 5, 2019, 8:23pm 2

The `x` method takes `&'a mut self`, so it must borrow the `A` struct for the same lifetime as the references stored inside of the struct. This must be at least as long as the struct's own lifetime, since you can't store short-lived references in a long-lived struct:

```
fn x(&'a mut self)
```

As you've seen, taking an unique reference to a struct and storing it within that struct effectively locks that struct for its entire lifetime, preventing any other use of the struct, ever.

One way around this is to use a type like `RefCell` so that `x` can take a shared reference instead of a unique reference:

```
use std::cell::RefCell;

struct A<'a> {
   b: &'a mut B,
   v: RefCell<Vec<&'a B>>,
}
```

```
impl<'a> A<'a> {
   fn x(&'a self) {
       self.v.borrow_mut().push(self.b);
   }
}
```

1 Like

Cannot borrow `*self` as mutable more than once in a recursive function

mbrubeck March 5, 2019, 8:25pm 3

I'll add that, in general, circular references and self-referential structures are a tricky case for Rust's type system, and many Rust programming techniques are about avoiding such structures completely.

1 Like

Bytekeeper March 5, 2019, 8:52pm 4

Thank you very much! I'll try to rethink the way I structured it. But it was nevertheless important to understand the problem here (to the extent I actually understand it, that is).

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