COMP6991 23T1

Slices & Lifetimes

Ownership & Borrowing

…recapped

Type	Requirements	Access
T	Exactly one owner	Read & Write
&T	Only shared borrows can coexist	Read only
&mut T	No other borrows can coexist	Read & Write

Slices 🍕

Example time!

```
> Example: slice.rs
```

Slices

Type	Layout	Access
`[T; N]`	Contiguous, exact length	Owned (or Copy)
`Vec<T>`	Contiguous, dynamic length	Owned
`&[T]`	Shared borrow of a contiguous subsequence	Read only borrow
`&mut [T]`	Exclusive borrow of a contiguous subsequence (cannot extend nor shrink)	Read write borrow

Slices

Type	Layout	Access
String	Contiguous, dynamic length	Owned
&str	Shared borrow of a contiguous subsequence	Read only borrow
&mut str	Exclusive borrow of a contiguous subsequence (cannot extend nor shrink)	Read write borrow

Lifetimes

Example time!

> Example: dangling.rs

Annotating lifetimes

Example time!

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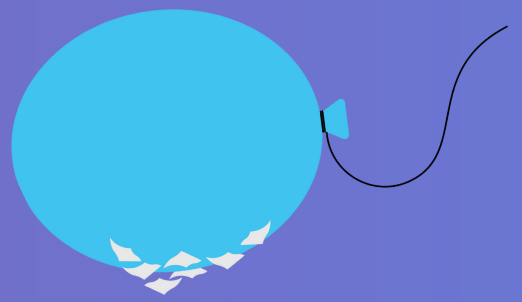
> Example: longest.rs
```

Annotations on structs & enums

Example time!

`> Example: struct_lifetime.rs`



'static lifetime

> What type is a string literal? e.g. "foo"

> What is the lifetime of that literal?

> What about borrowing a global variable?

Eliding lifetimes

Example time!

```
> Example: elision.rs
```

Smart pointers

... if we have time

Type	Location	Borrowing	Limitations
T	Stack	Owned	Must have a fixed size known at compile-time
Box<T>	Heap	Owned	Peformance, memory usage
Rc<T>	Heap	Shared without lifetimes!	Read-only, performance, memory usage, reference cycles
RefCell<T>	Stack	Owned, allowing dynamic borrowck	Incorrect borrowing causes panic at runtime