LESSON 5

main.rs

```rust
fn first(s: &str) -> &str {
  &s[..1]
}
```

Rust

String vs &str

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RUST PROGRAMMING

LESSON 5

Strings, Slices and Lifetimes

String vs &str, string slices, array slices, UTF-8 and lifetime annotations

String vs &str



- String is an owned, growable string on the heap. ampersand str is a borrowed view into …
- Functions should usually take ampersand str: then they accept both literals and Strings.

01

String Slices

main.rs

```rust
let s = String::from("Salaam World");
let hello = &s[0..6];          // "Salaam"
let world = &s[7..];           // "World"

fn first_word(s: &str) -> &str {
    s.split(' ').next().unwrap_or("")
}
```

- A slice borrows a range of a string with square brackets and two dots. It points into the …
- Indexes are byte positions, and Rust panics if you slice in the middle of a multi-byte …

02

UTF-8 and chars

main.rs

```
let word = "کابل";
word.len();                    // 8 bytes
word.chars().count();          // 4 characters
for c in word.chars() { print!("[{c}]"); }
let upper = "kabul".to_uppercase();
let joined = format!("{}-{}", "Kabul", 2026);
```

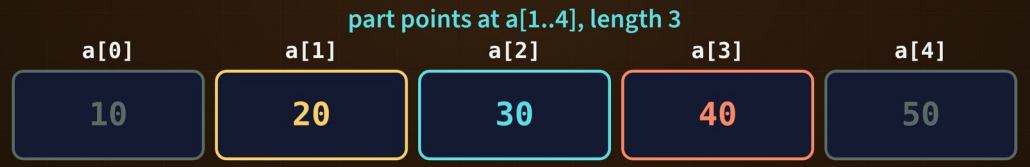
- Rust strings are always valid UTF-8. You cannot index one character with s at zero, because …
- Use chars to walk characters, and len for the byte length. Dari text works correctly.

03

Array Slices

main.rs

```
let a = [10, 20, 30, 40, 50];
let part: &[i32] = &a[1..4];
```



- Slices work for arrays and vectors too: ampersand square brackets of T. A function taking a …
- Slices know their own length, so there is no buffer overflow.

04

Lifetimes

main.rs

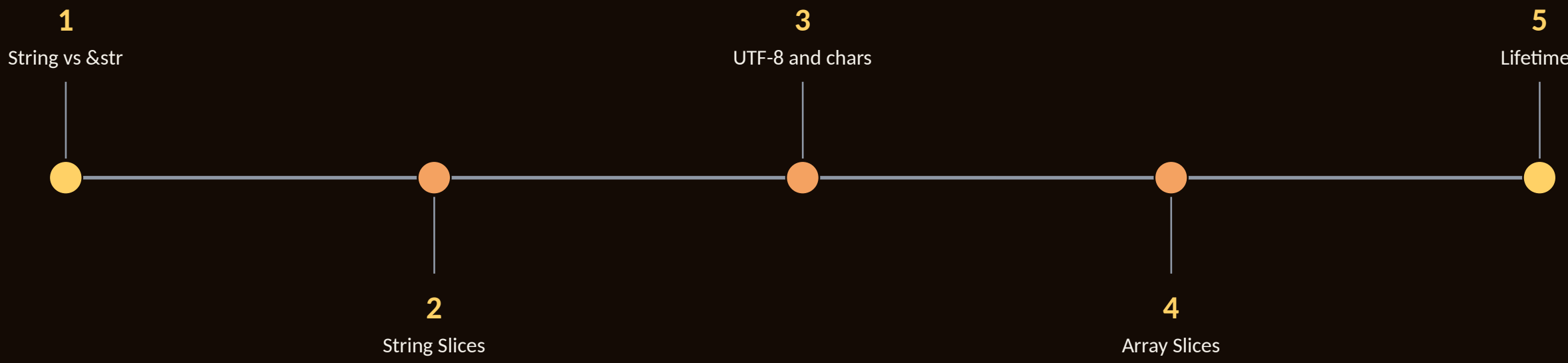
```rust
fn longest<'a>(x: &'a str, y: &'a str) -> &'a str {
    if x.len() > y.len() { x } else { y }
}

let a = String::from("Mazar-i-Sharif");
let result;
{
    let b = String::from("Herat");
    result = longest(&a, &b);
}   // error if result is used here: b does not live long enough
```

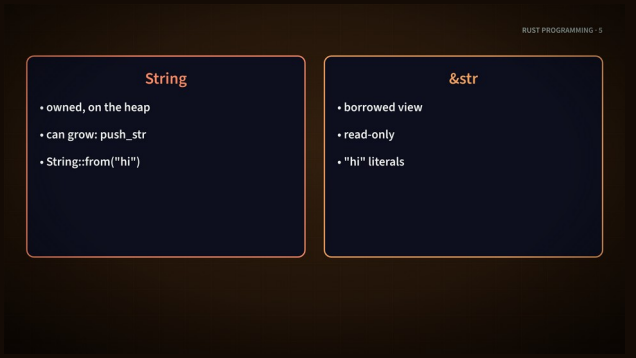
- A reference must never outlive the data it points to. Usually the compiler figures this out …
- When a function returns a reference from one of several inputs, you write a lifetime like …

05

Lesson Map


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String vs &str
2
String Slices
3
UTF-8 and chars
4
Array Slices
5
Lifetimes

Sources and Further Reading





Thank you for watching

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