Iterating Over a Vector

This lesson will teach you how to loop through a vector.

We'll cover the following

If it is desired to access each element of a vector, then it is possible to iterate over the elements of a vector using `iter()` rather than using the indexes to access a particular element of a vector using the square bracket notation.

Iterate Using `.iter()` Built-in Method

In the previous lesson, we learned to remove an element given an index. However, **to remove a particular element**, we first need to find the index of that element and then call the `remove` function passing that index. For this we can use the `.iter().position(|&e| e == element_name).unwrap()`.

Here,

- `iter()` is the built-in function that iterates over the elements of the vector.
- `.position` is a built-in function that takes the element name to get the position of that element in the vector, i.e., `(|&e| e == element_name)` defines a variable `e` with the value equal to the name of the element that we want to find.
- `.unwrap()` is the built-in function.

> **More details of `.unwrap()`** will be covered in **Enums chapter**.

```
fn main() {
    // defines a mutable vector
    // defines a mutable vector
    let mut my_vec = vec![1, 2, 3, 4, 5];
    // define the value to be removed
    let value = 2;
    // get the index of the value in the vector
    let index = my_vec.iter().position(|&r| r == value).unwrap();
    // call the built-in remove method
    my_vec.remove(index);
    // print the updated vector
    println!("Updated Vector: {:?}", my_vec);
}
```

As you can see the value 2 is removed from the vector.

Further in this lesson, you'll learn how the iterator function helps to loop through each element in the vector index-by-index.

> **Note:** No operation can be performed on the `my_vec` after it has been used in the `for` loop traversal since the variable is borrowed immutably and cannot be borrowed as mutable.
>
> More details will be covered in the last chapter in the lesson Copy type and Moved type.

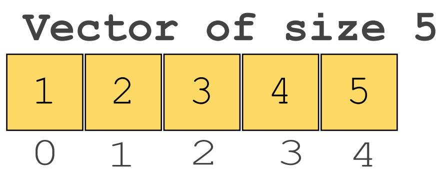
Loop Through the Values

- Define a vector variable.
- The values of the vector within the loop can be traversed using `.iter()`.

> 📝 If you don't write `.iter()` within the loop defination, a simple for loop will give you the same result.

```
fn main() {
    // define a vector of size 5
    let my_vec = vec![1, 2, 3, 4, 5];
    // using loop
    let mut index = 0;
    for i in my_vec.iter(){ // it works even if .iter() is not written
        println!("Element at index {}:{} ", index, i);
        index = index + 1;
    }
}
```

The following illustration shows how the above code works:



```
Output: Element at index 0:1
```

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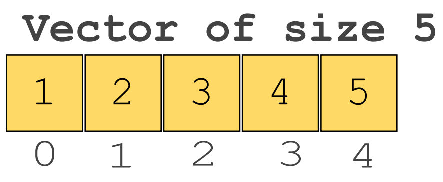

```
Output: Element at index 0:1
        Element at index 1:2
```

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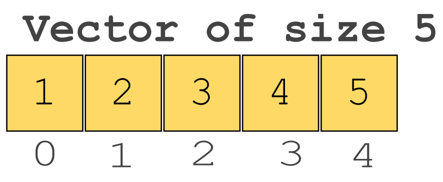

```
Output: Element at index 0:1
        Element at index 1:2
        Element at index 2:3
```

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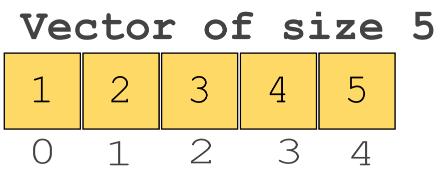

```
Output: Element at index 0:1
        Element at index 1:2
        Element at index 2:3
        Element at index 3:4
```

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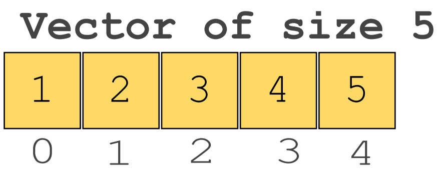

```
Output: Element at index 0:1
        Element at index 1:2
        Element at index 2:3
        Element at index 3:4
        Element at index 4:5
```

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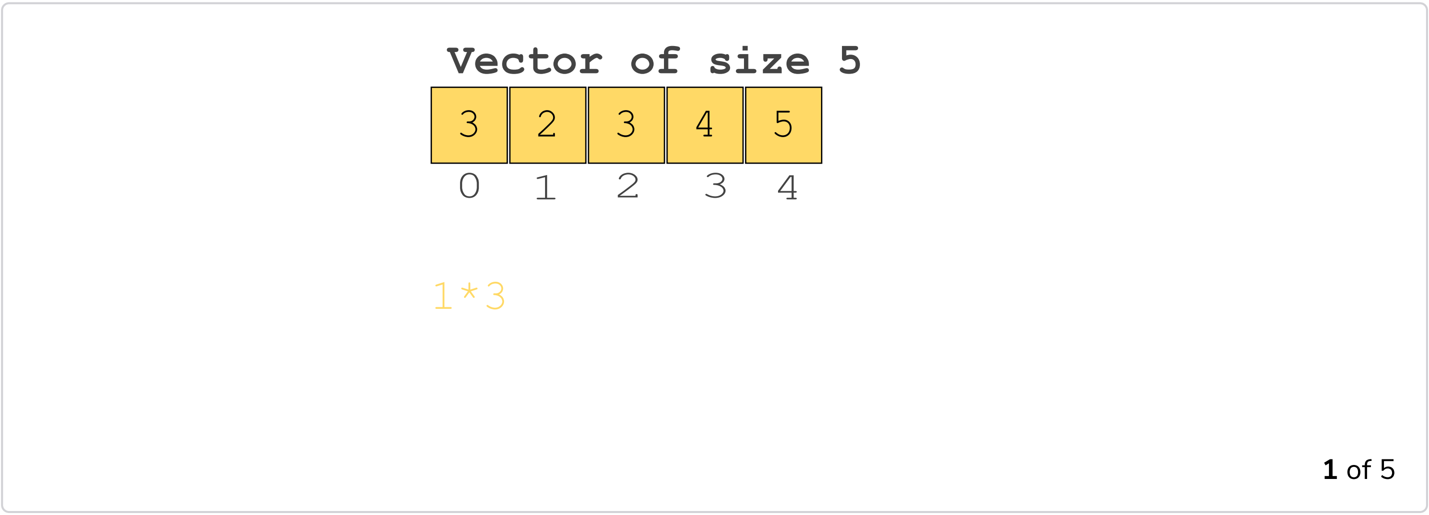
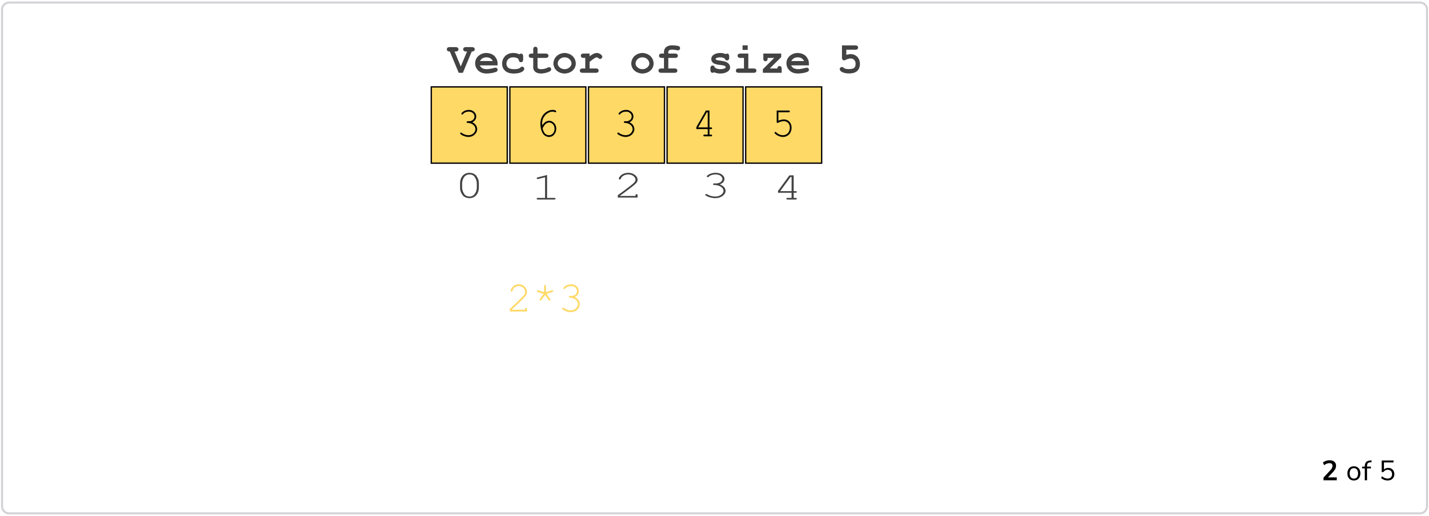
Loops and Mutate Values

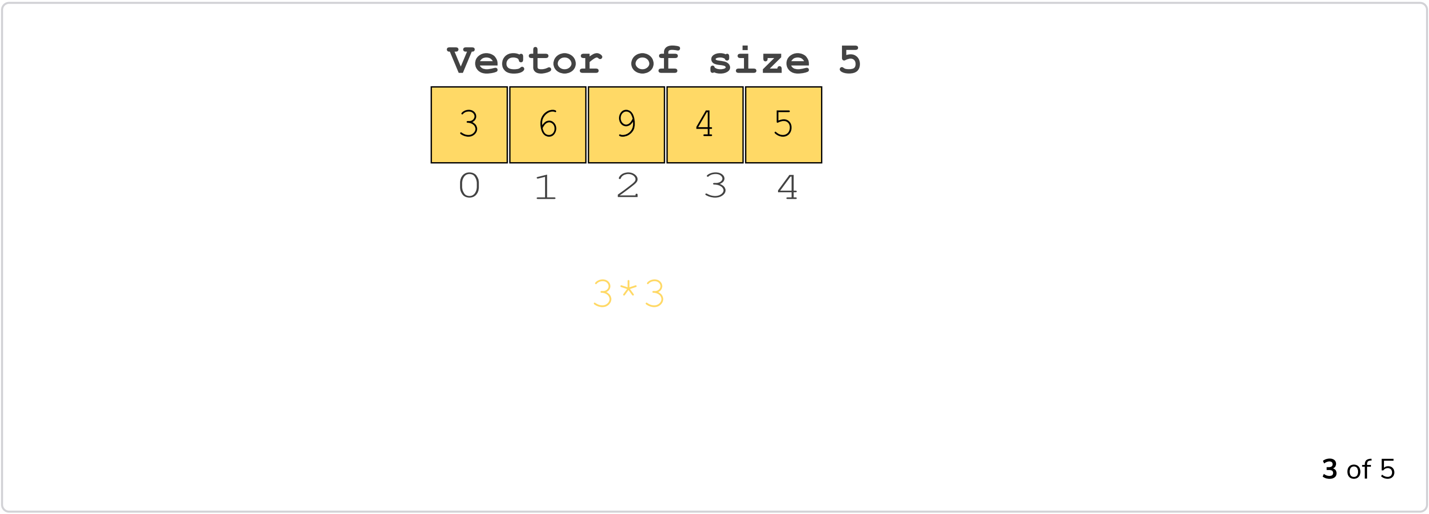
- Define a mutable vector variable
- The values of the vector within the loop can be changed using `.iter_mut()`.

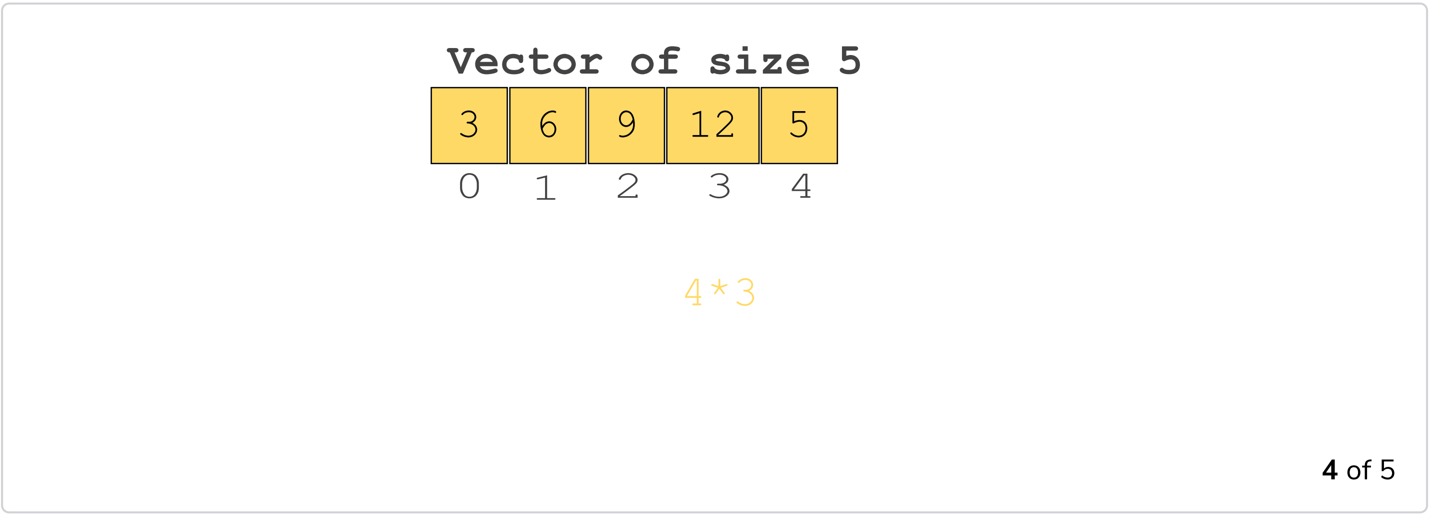
```
fn main() {
   // define a vector of size 5
   let mut my_vec = vec![1, 2, 3, 4, 5];
   println!("Initial Vector : {:?}", my_vec);
   for x in my_vec.iter_mut(){
       *x *= 3;
   }
   // print the updated vector
   println!("Updated Vector : {:?}", my_vec);
}
```

The following illustration shows how the above code works:









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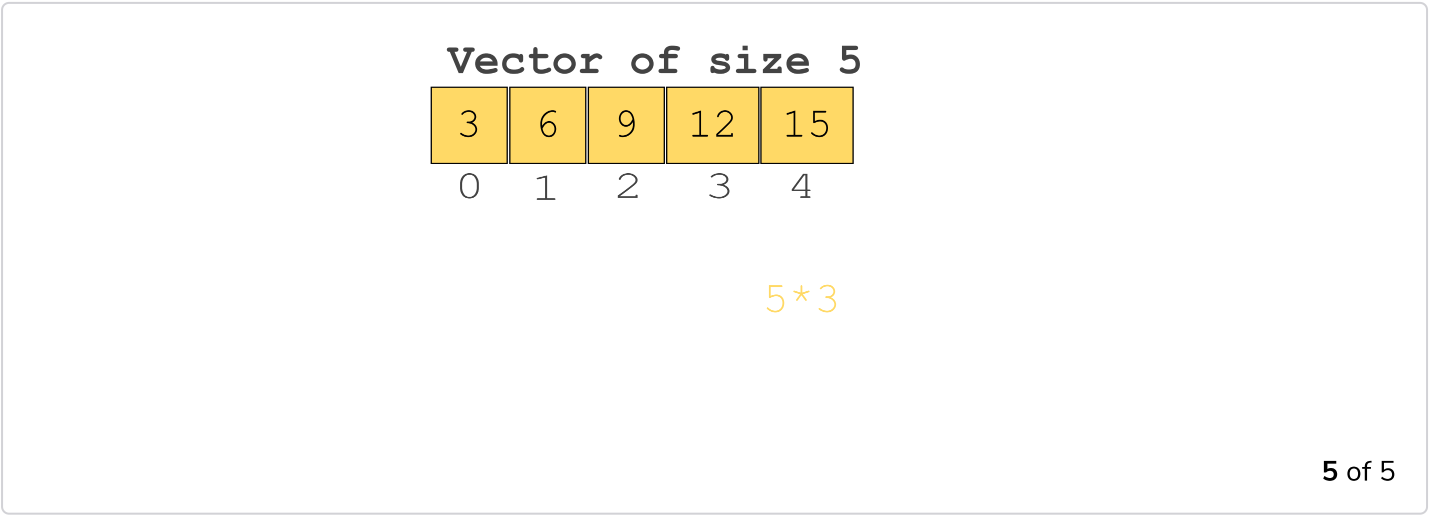

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Quiz

Test your understanding of looping through a vector in Rust.

Quick Quiz on Iterating over a Vector!

Q

What is the output of the following code?

```
fn main() {
   let mut my_vec = vec![1, 2, 3, 4, 5];
   for x in my_vec.iter_mut(){
       *x += 4;
   }
   my_vec.push(23);
   println!("Vector : {:?}",my_vec);
```

```
    println!("Vector : {:?}",my_vec);
    println!("Length of the vector : {}",my_vec.len());
}
```

Retake Quiz

Now that you have learned to iterate over a vector, let’s go to the next lesson “Slicing a Vector”.