If Expression

This lesson teaches multiple conditional constructs using if statement.

We'll cover the following

- If Expression
  - Syntax
  - Illustration
- If...else Expression
  - Syntax
  - Illustration
- if...else if...else Expression
  - Syntax
  - Illustration
- Nested if Expression
  - Syntax
  - Illustration
- Shorthand if
  - Syntax
- Quiz

There can be multiple conditional constructs using an if statement.

- If expression
- If...else expression
- If...else if...else expression
- Nested if expression
- Shorthand if expression

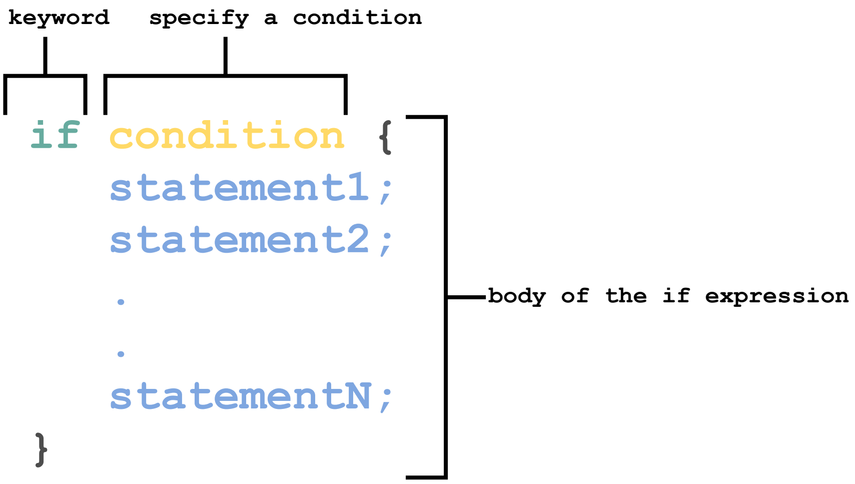
Let’s discuss each one of them in detail:-

If Expression

`If` expression takes a condition. If the condition within the `if` expression evaluates to be true, then the block of code is executed.

Syntax

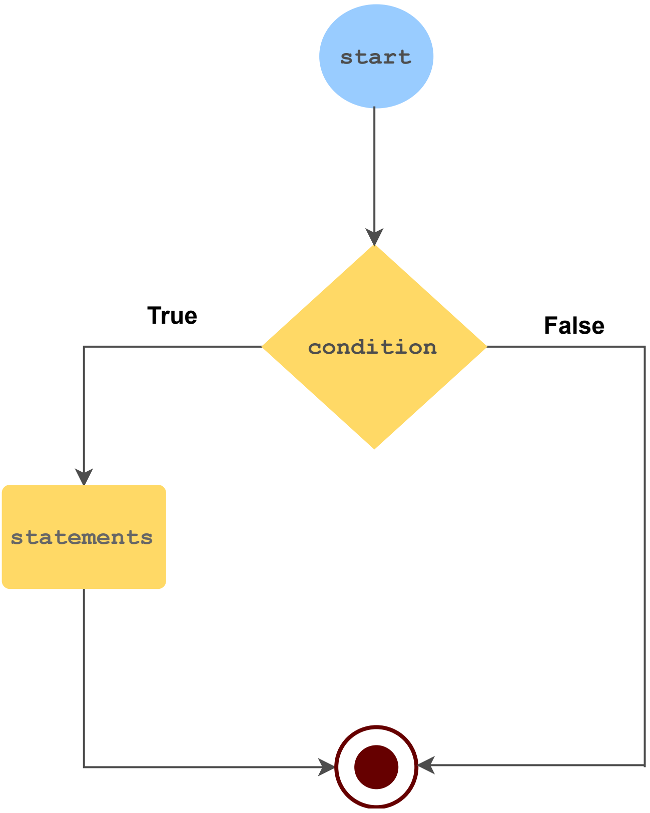
The general syntax is:



```
if condition {
    statement1;
    statement2;
    .
    .
    statementN;
}
```

Illustration

The following flow chart explains the concept of an `if` statement:



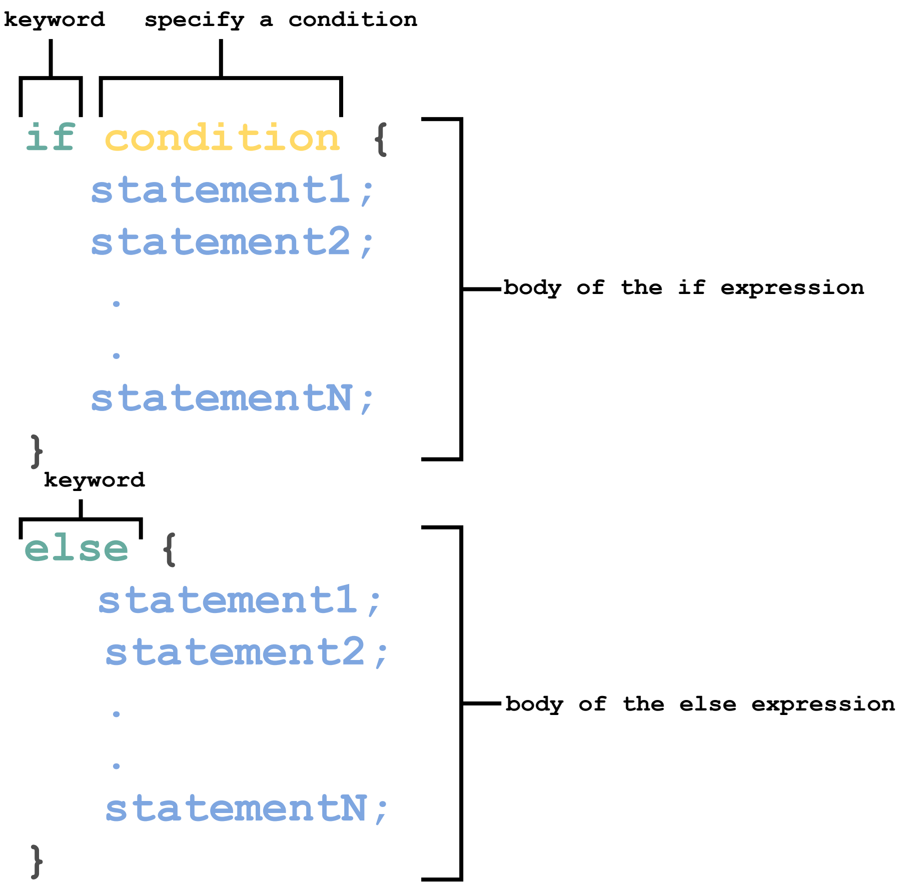
```
fn main() {
      //define a variable
      let learn_language = "Rust";
      // if construct
      if learn_language == "Rust" {
         println!("You are learning Rust language!");
      }
}
```

If...else Expression

In an `if..else` construct, if the condition within the `if` expression evaluates to be false, then the statement within the `else` block is executed.

Syntax

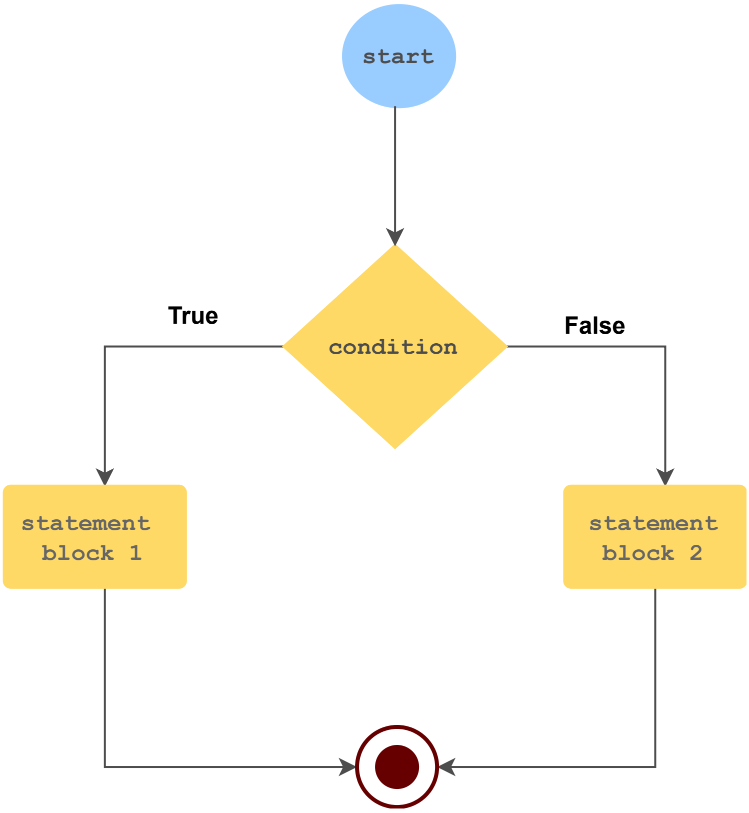
The general syntax is:



```
if condition {
    statement1;
    statement2;
    .
    .
    statementN;
}
else {
    statement1;
    statement2;
    .
    .
    statementN;
}
```

Illustration

The following flow chart explains the concept of an `if..else` statement:



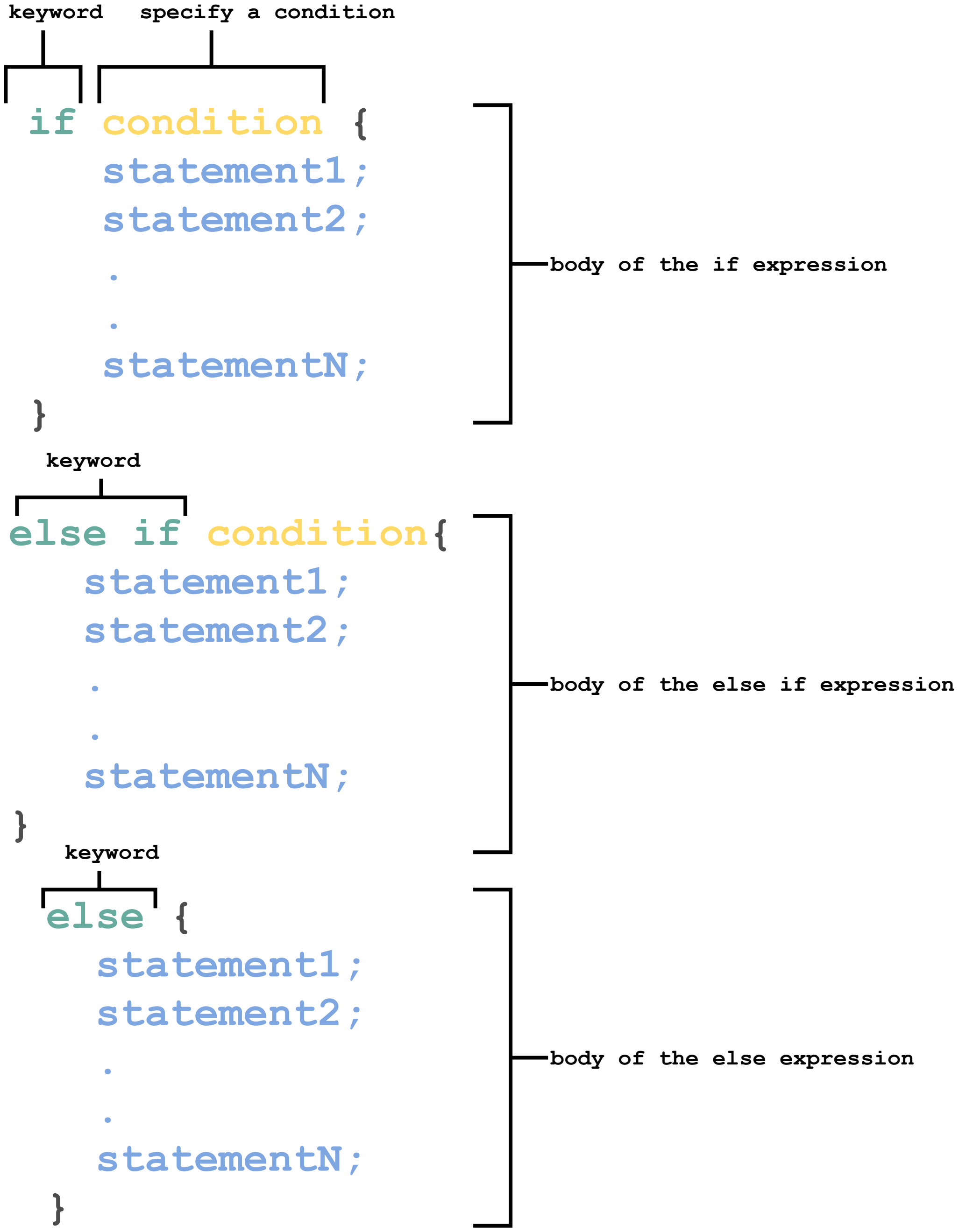
```
fn main() {
    //define a variable
    let learn_language = "Rust";
    // if else construct
    if learn_language == "Rust" {
        println!("You are learning Rust language!");
    }
    else {
      println!("You are learning some other language!");
    }
}
```

if...else if...else Expression

If there are multiple conditions to be checked, then `if..else if..else` construct is used.

Syntax

The general syntax is:

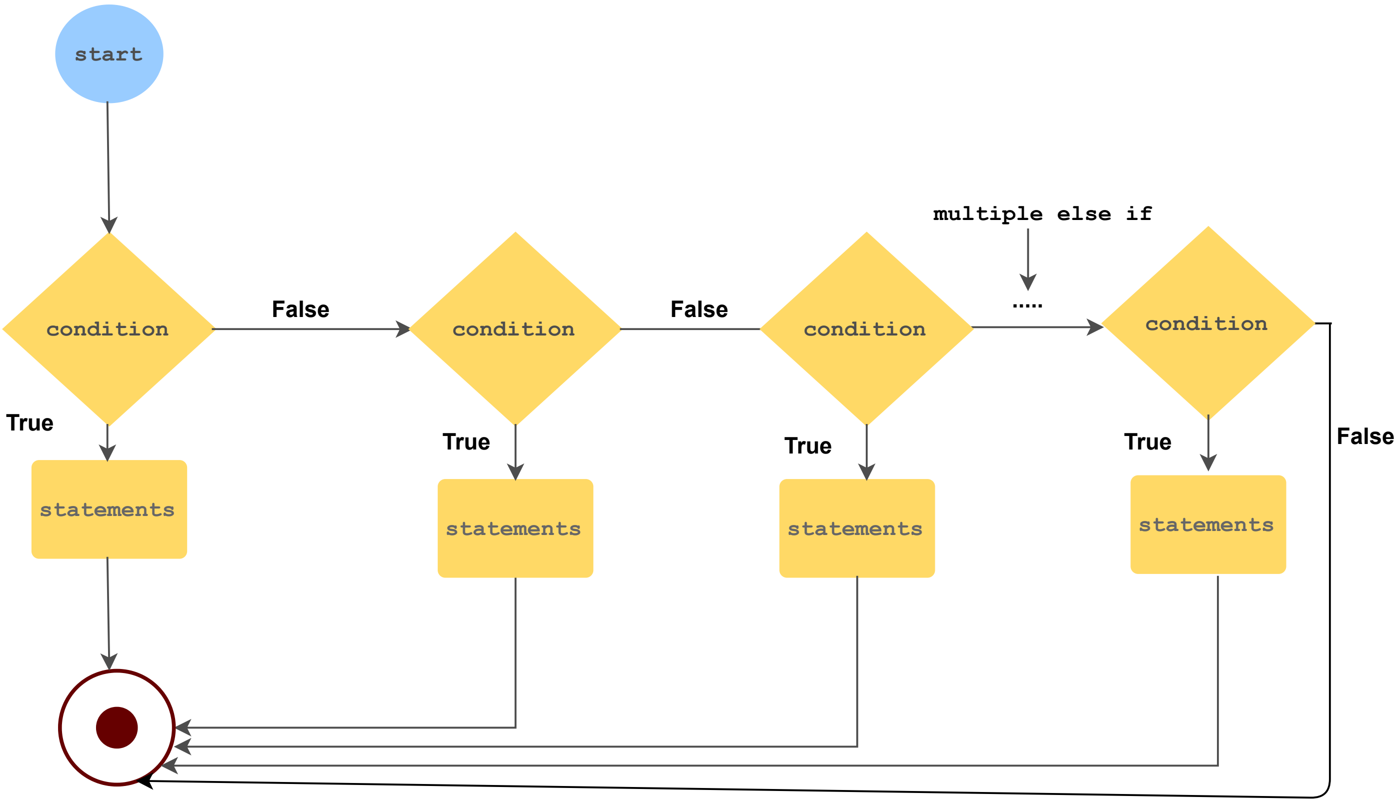


```
if condition {
    statement1;
    statement2;
    .
    .
    statementN;
}
else if condition{
    statement1;
    statement2;
    .
    .
    statementN;
}
 else {
    statement1;
    statement2;
    .
    .
    statementN;
 }
```

keyword
specify a condition
body of the if expression
keyword
body of the else if expression
keyword
body of the else expression

Illustration

The following flow chart explains the concept of an `if..else if..else` expression:



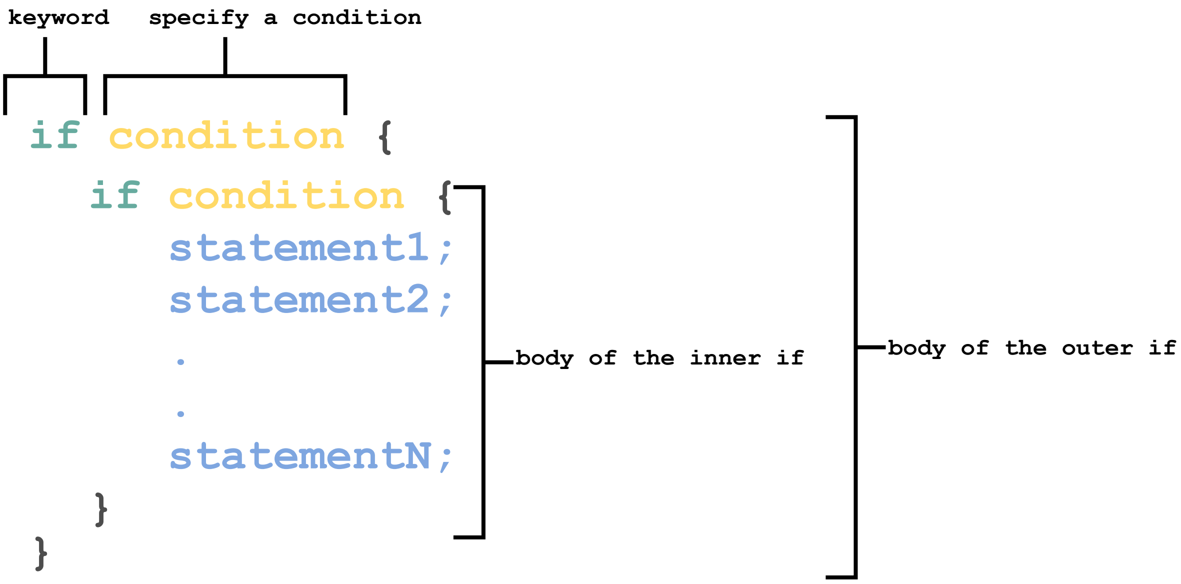
```
fn main() {
      //define a variable
      let learn_language="Rust";
      // if..elseif..else construct
      if learn_language == "Rust" {
         println!("You are learning Rust language!");
      }
      else if learn_language == "Java" {
         println!("You are learning Java language!");
      }
      else {
         println!("You are learning some other language!");
      }
}
```

Nested if Expression

An `if` expression inside the body of another `if` expression is referred to as a nested `if` expression.

Syntax

An `if` construct is enclosed within an `if` construct. The general syntax is:



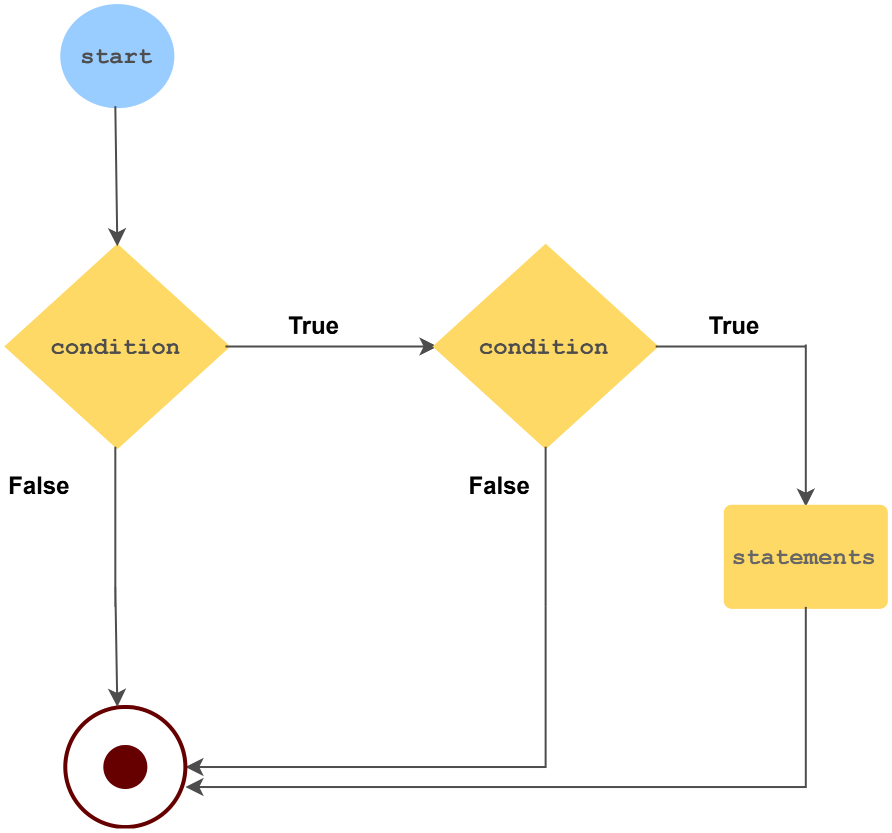
```
if condition {
   if condition {
      statement1;
      statement2;
      .
      .
      statementN;
   }
}
```

> **Note:** The nested if expression can also be written with a AND expression in an if.
>
> ```
> if condition1 && condition2
> {
>  //statement
> }
> ```

This is true only if the second `if` statement is the only thing inside the first if.

Illustration

The following flow chart explains the concept of a **nested** `if` statement:



> **Note:** There can be as many levels of nesting as you want.

```
fn main() {
    //define a variable
    let learn_language1 = "Rust";
    let learn_language2 = "Java";
    // outer if statement
    if learn_language1 == "Rust" {  // inner if statement
        if learn_language2 == "Java"{
              println!("You are learning Rust and Java language!");
        }
    }
    else {
      println!("You are learning some other language!");
    }
}
```

Shorthand if

Instead of writing a lengthy `if-else` construct, we can use a **shorthand** `if`.

Syntax

The general syntax is:

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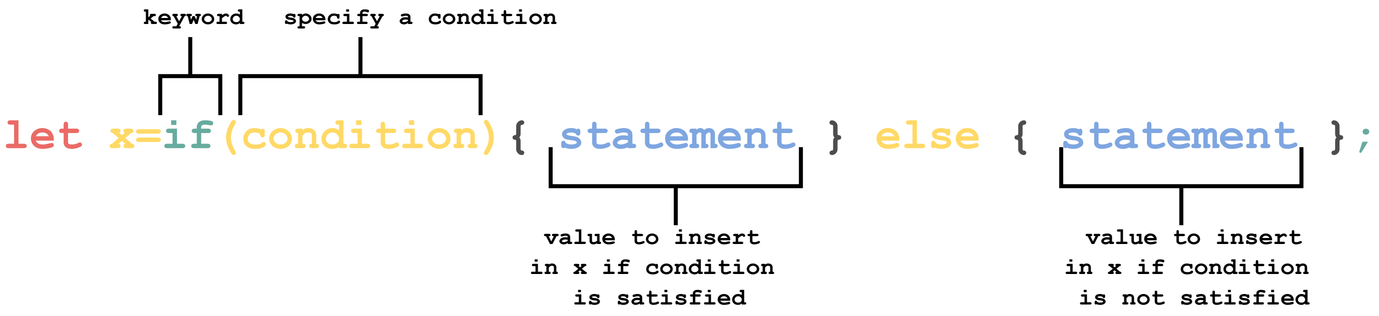
keyword
specify a condition
let x=if (condition) { statement } else { statement };
value to insert in x if condition is satisfied
value to insert in x if condition is not satisfied

> **Note:** This is similar to a ternary operator in languages like C and C++.

```
fn main() {
    //define a variable
    let learn_language = "Rust";
    // short hand construct
    let res= if learn_language == "Rust" {"You are learning Rust language!"} else {"You are learni
    println!("{}", res);
}
```

> **Note:** Expressions can return a value, unlike statements. Recall that the semicolon turns any expression into a statement. It throws away its value and returns a unit **()** instead.

```
fn main() {
    let x = "Rust";

    let y: bool = if x == "Rust" { true } else { false };

    // let z: bool = if x == "Rust" { true; } else { false; };

    println!("x:{}", x);
    println!("y:{}", y);

}
```

> **Note:** Uncommenting **line 6** in the above code gives an error ✕ since we are trying to convert an expression to a statement and hence not returning a

> value.

Quiz

Test your understanding of `if` expressions in Rust.

Quick Quiz on If Expression!

1

What is the output of the following code?

```
fn main() {
   let age=23;
   if age >=21{
      println!("Age is greater than 21");
   }
    else if age <21{
       println!("Age is less than 21");
    }
    println!("Value Printed");
}
```

2

Which `If` block is executed?

```
 fn main() {
   let age=23;
   let play=true;
   let activity="Tennis" ;
   if age >=21 && play==false && activity=="Tennis"{
     println!("Age is greater than 21");
     println!("You are not allowed to play");
     println!("The sport is {}",activity);
   }
   else if  age >=21 && play==true && activity=="Tennis"{
     println!("Age is greater than 21");
     println!("You are allowed to play");
     println!("The sport is {}",activity);
   }
   else if age <21 && play==false && activity=="Tennis"{
     println!("Age is less than 21");
     println!("You are allowed to play");
     println!("The sport is {}",activity);
   }
   else {
     println!("Value Printed");
   }
}
```

3

What is the output of the following code?

```
fn main() {
  let age = 23;
  let play = true;
 let activity="Baseball" ;
 if age >= 21 && play==true || activity == "Tennis" {

   println!("Age is greater than 21");
   println!("You are allowed to play");
   println!("The sport is {}",activity);
 }
 else if  age >= 21 && play == true && activity == "Tennis"{
   println!("Age is greater than 21");
   println!("You are allowed to play");
   println!("The sport is {}",activity);
 }
 else if age <21 && play == false && activity == "Tennis"{
   println!("Age is less than 21");
   println!("You are allowed to play");
   println!("The sport is {}",activity);
 }
 else{
   println!("Value Printed");
 }
}
```

Retake Quiz

Now that we have learned about if expressions, let’s learn about If let expression in the next lesson.