Conditional Statements

What are Conditional Statements?

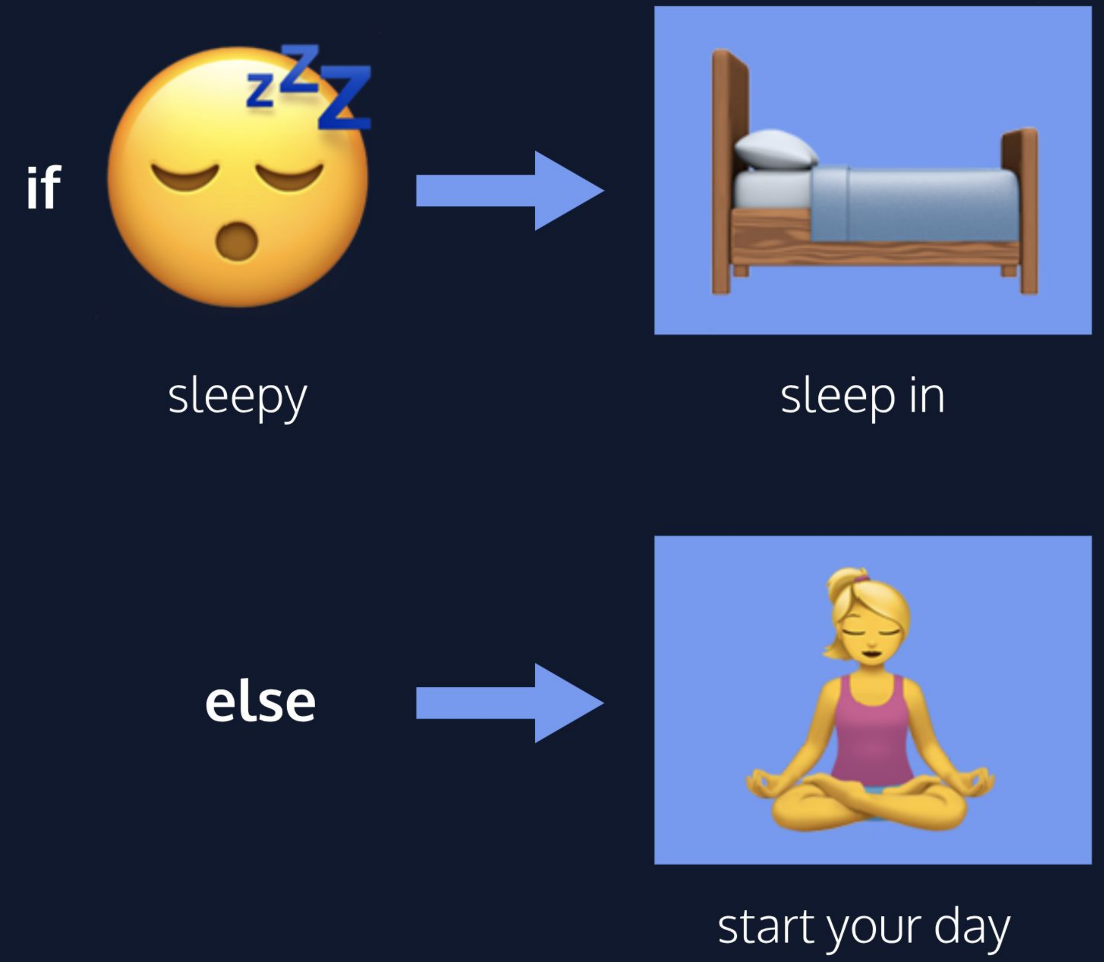
In life, we make decisions based on circumstances. Think of an everyday decision as mundane as falling asleep — if we are tired, we go to bed, otherwise, we wake up and start our day.

These if-else decisions can be modeled in code by creating conditional statements. A conditional statement checks a specific condition(s) and performs a task based on the condition(s).

In this lesson, we will explore how programs make decisions by evaluating conditions and introduce logic into our code!

We'll be covering the following concepts:

- `if`, `else if`, and `else` statements
- comparison operators
- logical operators
- truthy vs falsy values
- ternary operators
- `switch` statement


if
sleepy
sleep in
else
start your day

If statement

We often perform a task based on a condition. For example, if the weather is nice today, then we will go outside. If the alarm clock rings, then we'll shut it off. If we're tired, then we'll go to sleep.

In programming, we can also perform a task based on a condition using an `if` statement:

```
if (true) {
  console.log('This message will print!');
}// Prints: This message will print!
```

If...Else Statements

In the previous exercise, we used an `if` statement that checked a condition to decide whether or not to run a block of code. In many cases, we'll have code we want to run if our condition evaluates to `false`.

If we wanted to add some default behavior to the `if` statement, we can add an `else` statement to run a block of code when the condition evaluates to `false`. Take a look at the inclusion of an `else` statement:

```
if (false) {

  console.log('The code in this block will not run.');

} else {

  console.log('But the code in this block will!');

} // Prints: But the code in this block will!
```

An `else` statement must be paired with an `if` statement, and together they are referred to as an `if...else` statement.

Comparison operators

When writing conditional statements, sometimes we need to use different types of operators to compare values. These operators are called *comparison operators*.

Here is a list of some handy comparison operators and their syntax:

- Less than: `<`
- Greater than: `>`
- Less than or equal to: `<=`
- Greater than or equal to: `>=`
- Is equal to: `===`
- Is not equal to: `!==`

Comparison operators compare the value on the left with the value on the right. For instance: `10 < 12 // Evaluates to true`

Logical Operators

Working with conditionals means that we will be using booleans, `true` or `false` values. In JavaScript, there are operators that work with boolean values known as *logical operators*. We can use logical operators to add more sophisticated logic to our conditionals. There are three logical operators:

- the *and* operator (`&&`)
- the *or* operator (`||`)
- the *not* operator, otherwise known as the *bang* operator (`!`)

When we use the `&&` operator, we are checking that two things are `true`:

```
if (stopLight === 'green' && pedestrians === 0) {

  console.log('Go!');

} else {

  console.log('Stop');
```

When using the `&&` operator, both conditions *must* evaluate to `true` for the entire condition to evaluate to `true` and execute. Otherwise, if either condition is `false`, the `&&` condition will evaluate to `false` and the `else` block will execute.

If we only care about either condition being `true`, we can use the `||` operator:

```
if (day === 'Saturday' || day === 'Sunday') {

  console.log('Enjoy the weekend!');

} else {

  console.log('Do some work.');
```

When using the `||` operator, only one of the conditions must evaluate to `true` for the overall statement to evaluate to `true`. In the code example above, if either `day === 'Saturday'` or `day === 'Sunday'` evaluates to `true` the `if`'s condition will evaluate to `true` and its code block will execute. If the first condition in an `||` statement evaluates to `true`, the second condition won't even be checked. Only if `day === 'Saturday'` evaluates to `false` will `day === 'Sunday'` be evaluated. The code in the `else` statement above will execute only if both comparisons evaluate to `false`.

The `!` *not operator* reverses, or *negates*, the value of a boolean:

```
let excited = true;
console.log(!excited); // Prints false

let sleepy = false;
console.log(!sleepy); // Prints true
```

Essentially, the `!` operator will either take a `true` value and pass back `false`, or it will take a `false` value and pass back `true`.

Logical operators are often used in conditional statements to add another layer of logic to our code.

Truthy and Falsy

Let’s consider how non-boolean data types, like strings or numbers, are evaluated when checked inside a condition.

Sometimes, you’ll want to check if a variable exists and you won’t necessarily want it to equal a specific value — you’ll only check to see if the variable has been assigned a value.

```
let myVariable = 'I Exist!';

if (myVariable) {

   console.log(myVariable)

} else {

   console.log('The variable does not exist.')
```

The code block in the `if` statement will run because `myVariable` has a *truthy* value; even though the value of `myVariable` is not explicitly the value `true`, when used in a boolean or conditional context, it evaluates to `true` because it has been assigned a non-falsy value.

So which values are *falsy*— or evaluate to `false` when checked as a condition? The list of falsy values includes:

- `0`
- Empty strings like `""` or `''`
- `null` which represent when there is no value at all
- `undefined` which represent when a declared variable lacks a value
- `NaN`, or Not a Number

```
let numberOfApples = 0;

if (numberOfApples){
   console.log('Let us eat apples!');
} else {
   console.log('No apples left!');
}

// Prints 'No apples left!'
```
The condition evaluates to `false` because the value of the `numberOfApples` is `0`. Since `0` is a falsy value, the code block in the `else` statement will run.

Truthy and Falsy Assignment

Truthy and falsy evaluations open a world of short-hand possibilities!

Say you have a website and want to take a user’s username to make a personalized greeting. Sometimes, the user does not have an account, making the `username` variable falsy. The code below checks if `username` is defined and assigns a default string if it is not:

```
let username = '';

let defaultName;

if (username) {

  defaultName = username;

} else {

  defaultName = 'Stranger';

}

console.log(defaultName); // Prints: Stranger
```

If you combine your knowledge of logical operators you can use a short-hand for the code above. In a boolean condition, JavaScript assigns the truthy value to a variable if you use the `||` operator in your assignment:

```
let username = '';
let defaultName = username || 'Stranger';

console.log(defaultName); // Prints: Stranger
```

Because `||` or statements check the left-hand condition first, the variable `defaultName` will be assigned the actual value of `username` if it is truthy, and it will be assigned the value of `'Stranger'` if `username` is falsy. This concept is also referred to as *short-circuit evaluation*.

Ternary Operator

In the spirit of using short-hand syntax, we can use a *ternary operator* to simplify an `if...else` statement.

```
let isNightTime = true;

if (isNightTime) {

  console.log('Turn on the lights!');

} else {

  console.log('Turn off the lights!');
```

We can use a *ternary operator* to perform the same functionality:

```
isNightTime ? console.log('Turn on the lights!') : console.log('Turn off the lights!');
```

In the example above:

- The condition, `isNightTime`, is provided before the `?`.
- Two expressions follow the `?` and are separated by a colon `:`.
- If the condition evaluates to `true`, the first expression executes.
- If the condition evaluates to `false`, the second expression executes.

Like `if...else` statements, ternary operators can be used for conditions which evaluate to `true` or `false`.

Else If Statements

We can add more conditions to our `if...else` with an `else if` statement. The `else if` statement allows for more than two possible outcomes. You can add as many `else if` statements as you'd like, to make more complex conditionals!

The `else if` statement always comes after the `if` statement and before the `else` statement. The `else if` statement also takes a condition. Let's take a look at the syntax:

```
let stopLight = 'yellow';

if (stopLight === 'red') {

  console.log('Stop!');

} else if (stopLight === 'yellow') {

  console.log('Slow down.');

} else if (stopLight === 'green') {

  console.log('Go!');

} else {

  console.log('Caution, unknown!');
```

The `else if` statements allow you to have multiple possible outcomes. `if`/`else if`/`else` statements are read from top to bottom, so the first condition that evaluates to `true` from the top to bottom is the block that gets executed.

In the example above, since `stopLight === 'red'` evaluates to `false` and `stopLight === 'yellow'` evaluates to `true`, the code inside the first `else if` statement is executed. The rest of the conditions are not evaluated. If none of the conditions evaluated to `true`, then the code in the `else` statement would have executed.

The switch keyword

`else if` statements are a great tool if we need to check multiple conditions. In programming, we often find ourselves needing to check multiple values and handling each of them differently. For example:

```
let groceryItem = 'papaya';

if (groceryItem === 'tomato') {

  console.log('Tomatoes are $0.49');

} else if (groceryItem === 'papaya'){

  console.log('Papayas are $1.29');

} else {

  console.log('Invalid item');
```

In the code above, we have a series of conditions checking for a value that matches a `groceryItem` variable. Our code works fine, but imagine if we needed to check 100 different values! Having to write that many `else if` statements sounds like a pain!

A `switch` statement provides an alternative syntax that is easier to read and write. A `switch` statement looks like this:

```
let groceryItem = 'papaya';
switch (groceryItem) {
  case 'tomato':
    console.log('Tomatoes are $0.49');
    break;
  case 'lime':
    console.log('Limes are $1.49');
    break;
  case 'papaya':
    console.log('Papayas are $1.29');
    break;
  default:
    console.log('Invalid item');
    break;
}
// Prints 'Papayas are $1.29'
```

The `switch` keyword initiates the statement and is followed by `( ... )`, which contains the value that each `case` will compare. In the example, the value or expression of the `switch` statement is `groceryItem`.

Inside the block, `{ ... }`, there are multiple `case`s. The `case` keyword checks if the expression matches the specified value that comes after it. The value following the first `case` is `'tomato'`. If the value of `groceryItem` equalled `'tomato'`, that `case`‘s `console.log()` would run.

The value of `groceryItem` is `'papaya'`, so the third `case` runs— `Papayas are $1.29` is logged to the console.

The `break` keyword tells the computer to exit the block and not execute any more code or check any other cases inside the code block. Note: Without `break` keywords, the first matching case will run, but so will every subsequent case regardless of whether or not it matches—including the default. This behavior is different from `if`/`else` conditional statements that execute only one block of code.

At the end of each `switch` statement, there is a `default` statement. If none of the `case`s are true, then the code in the `default` statement will run.

Review

- An `if` statement checks a condition and will execute a task if that condition evaluates to `true`.
- `if...else` statements make binary decisions and execute different code blocks based on a provided condition.
- We can add more conditions using `else if` statements.
- Comparison operators, including `<`, `>`, `<=`, `>=`, `===`, and `!==` can compare two values.
- The logical and operator, `&&`, or “and”, checks if both provided expressions are truthy.
- The logical operator `||`, or “or”, checks if either provided expression is truthy.
- The bang operator, `!`, switches the truthiness and falsiness of a value.
- The ternary operator is shorthand to simplify concise `if...else` statements.
- A `switch` statement can be used to simplify the process of writing multiple `else if` statements. The `break` keyword stops the remaining `case`s from being checked and executed in a `switch` statement.