thinkdev #2

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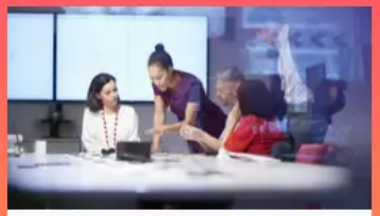

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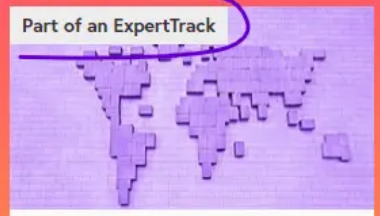

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How do we represent these values?

- We use *strings* for text:
  - `"Most popular"`
  - `'Installed'`

- We use *strings* for text:
  - `"Most popular"`
  - `'Installed'`
- We use *booleans* to choose between alternatives
  - `true`, `false`

What about numbers?

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- Many languages differentiate between types of numbers.
- *Integer* types (*int*) for 20, -7, ...
- *Floating point* types (*float*) for 3.2, -0.789, ...

But in JavaScript ...

But in JavaScript ...

... a number is just a *number*.

typeof a value

Use the typeof keyword to get the type of a value:

```
typeof "Hi"        // "string"
typeof 12.34       // "number"
typeof 3_000_000   // "number"
typeof false       // "boolean"
```

Comments

- Use comments to explain pieces of your code.
- The language ignores them.

```
// Line comment

/* Block comment
can span
multiple lines. */
```

Expressions

Expressions

Things that have value.

- The simplest expressions are literals:
  - `1`, `"Hi"`, `true`.

- The simplest expressions are literals:
  - `1`, `"Hi"`, `true`.
- But they're not so useful alone.

You can use operators to build complex expressions:

```
1 - 2;              // -1
50 * 70 / 67 + 9; // 61.2388…
typeof true;        // "boolean"
```

Wrapping an expression in brackets doesn’t change it’s value:

```
(1 - 2);              // -1
(50 * 70 / 67 + 9); // 61.2388…
(typeof true);        // "boolean"
```

Operator precedence rules apply, even to non-arithmetic operators:

```
(50 * 70 / 67 + 9); // 61.2388…
50 * 70 / (67 + 9); // 46.0526…
typeof (2 - 1);     // "number"
```

You can use an expression where a value is expected:

```
typeof (50 * 70 / 67 + 9)
console.log(typeof true)
```

What if we wanted to store the value of an expression?

Variables

```
// Declare a variable
const costPerItem = 3000
```

```
// Declare a variable
const costPerItem = 3000

// Use the variable
console.log(costPerItem * 10)
```

How to name variables

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  - Invalid: `2a`, `middle name`

How to name variables

- First character must be a letter, underscore `_`, or dollar sign `$`.
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- Following characters may include numbers
  - Valid: `y2`, `first_name`, `_LAST_NAME_`, `$10`
  - Invalid: `2a`, `middle name`
- Names are case-sensitive
  - `message`, `Message`, `MESSAGE` are different variables.

The JavaScript convention is

`camelCase` 

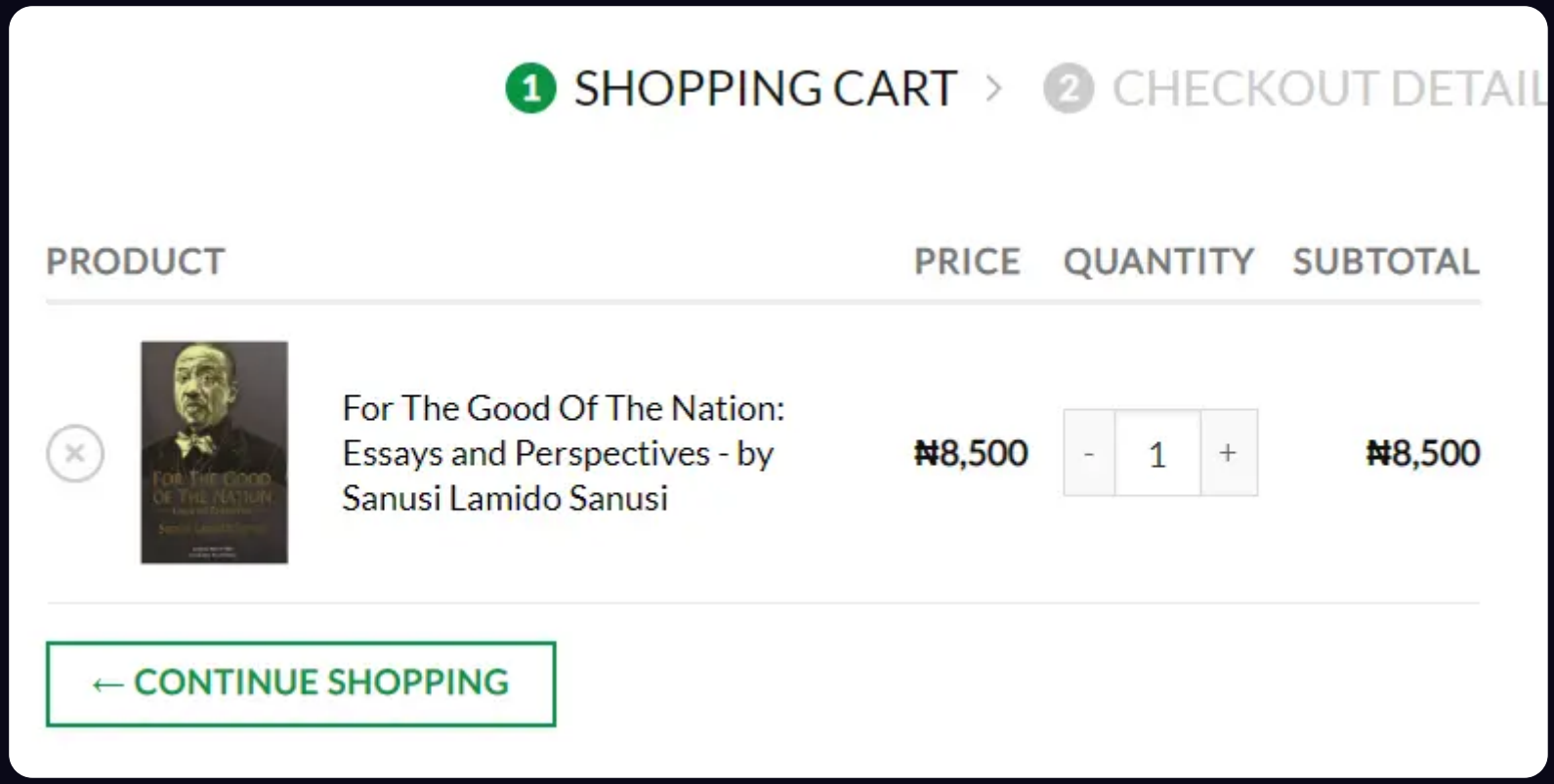
Variables that vary

- A `const` variable is *constant*; it always refers to the same value.

Variables that vary

- A `const` variable is *constant*; it always refers to the same value.
- That's usually fine, but sometimes we'd like to reassign a variable to a different value.

Consider an online shopping cart:



Screenshot of a cart item on Tarbiyah Books Plus.

```
const quantity = 1

// When the user clicks the plus button,
// increase the quantity.
quantity = quantity + 1
```

```
const quantity = 1

// When the user clicks the plus button,
// increase the quantity.
quantity = quantity + 1
// Error: Assignment to constant variable
```

Use the `let` keyword instead:

```
let quantity = 1

quantity = quantity + 1

console.log(quantity) // 2
```

Addition assignment operator

```
let quantity = 1

quantity += 1

console.log(quantity) // 2
```

Increment operator

```
let quantity = 1

quantity++

console.log(quantity) // 2
```

You can initialize a `let` variable with a value after declaring it:

```
let quantity;

// initialize after declaring
quantity = 1

quantity++

console.log(quantity) // 2
```

Its value will be `undefined` until you initialize it:

```
let quantity;

console.log(quantity) // undefined

// initialize after declaring
quantity = 1

quantity++

console.log(quantity) // 2
```

Absence of value

- Special values: `undefined` and `null`.
- `null` is often used for an intentionally absent value.

Operations on strings

Joining strings

Also known as *concatenation*:

```
const firstName = "Mubaraq"
const lastName = "Wahab"

const fullName = firstName + lastName
// "MubaraqWahab"
```

```
const firstName = "Mubaraq"
const lastName = "Wahab"

// Better
const fullName = firstName + " " + lastName
// "Mubaraq Wahab"
```

Interpolation

You can use special strings called *template literals* to interpolate:

```
const firstName = "Mubaraq"
const lastName = "Wahab"

const fullName = `${firstName} ${lastName}`
// "Mubaraq Wahab"
```

Get a character from a string

Use square brackets to specify an *index* (starting from zero):

```
//                  0123456
const firstName = "Mubaraq"

const initial = firstName[0] // "M"
const second = firstName[1] // "u"
// and so on...
```

Get part of a string

Use the `slice` method:

```
//                  0123456
const firstName = "Mubaraq"

const firstThreeLetters = firstName.slice(0, 3)
// "Mub"
const thirdToEnd = firstName.slice(2)
// "baraq"
```

Does a string include this?

Use the `includes` method to check if a string includes another:

```
const firstName = "Mubaraq"

firstName.includes('ba')
// true
firstName.includes('ab')
// false
```

How long is a string?

Use the `length` property to get the length of a string:

```
const firstName = "Mubaraq"

firstName.length
// 7
```

String to number

You need to convert a string to a number sometimes, such as when working with user input:

```
// Assume this is from user input
const input = "20"

// Careful here! Result is "203"
input + 3
```

Use the `Number` function to convert a string to a number:

```
// Assume this is from user input
const input = "20"

// Convert to number first!
const inputAsNumber = Number(input)

// Result is 23
inputAsNumber + 3
```

Or use the + operator:

```
// Assume this is from user input
const input = "20"

// An idiomatic way
const inputAsNumber = +input

// Result is 23
inputAsNumber + 3
```

Number to string

The opposite is possible too, using the `String` function:

```
const num = 20

// Result is "20"
const numAsString = String(num)
```

Or the `toString` method:

```
const num = 20

// Result is "20"
const numAsString = num.toString()
```

Or even concatenating with an empty string:

```
const num = 20

// Result is "20"
const numAsString = "" + num
```

UPPERCASE, lowercase

```
const firstName = "Mubaraq"

firstName.toUpperCase()
// "MUBARAQ"

firstName.toLowerCase()
// "mubaraq"
```

Statements

Statements

- A program is a sequence of statements.
- Statements are executed one after another.

```
const name = 'Mubaraq'
const message = 'Hello ' + name
typeof message
```

A variable declaration is a statement:

```
const name = 'Mubaraq'
const message = 'Hello ' + name
typeof message
```

An expression can act as a statement too:

```
const name = 'Mubaraq'
const message = 'Hello ' + name
typeof message
```

You can’t use a statement as an expression:

```
// Error!
const message = 'Hello ' + (const name = 'Mubaraq')
typeof message
```

An assignment is an expression:

```
let name
const message = 'Hello ' + (name = 'Mubaraq')
typeof message
```