

WEP - Arrays II & Strings

Manipulate arrays, character arrays

Agenda

- Array internal methods
- String and string methods
- Questions

Learn Objectives

- You understand what a method is
- You know how to change array data
- You can use arrays methods to manipulate the internal state of an array
- You know what a string type is and the string is actually also an array
- You can create strings and manipulate them through string methods

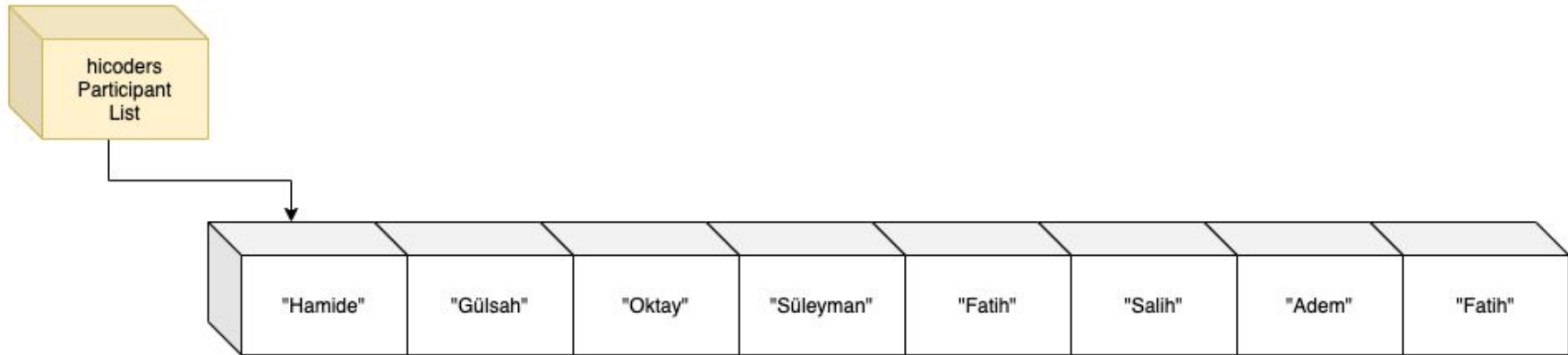
Array manipulation
(change the array data)

Operations on an array

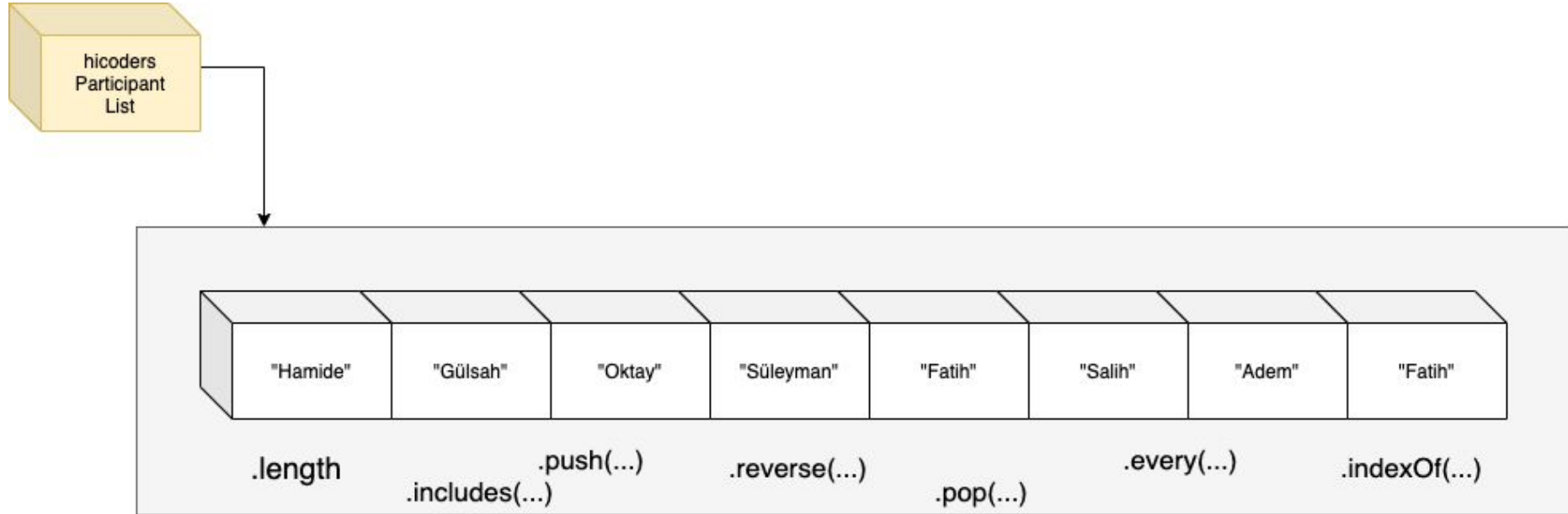
- A value can be read by index.
- An existing value can be overridden.
- A new value can be added into array (in different positions).
- An existing value can be removed/deleted from the array (from different positions).
- A value can be searched in the array.
- An array can be sorted.
- An array can be reversed.
- Two arrays can be combined.
- An array can be converted to a string.

```
let hicodersParticipantList = ["Hamide", "Gülsah", "Oktay", "Süleyman", "Fatih", "Salih", "Adem"]
```

let hicodersParticipantList = ...



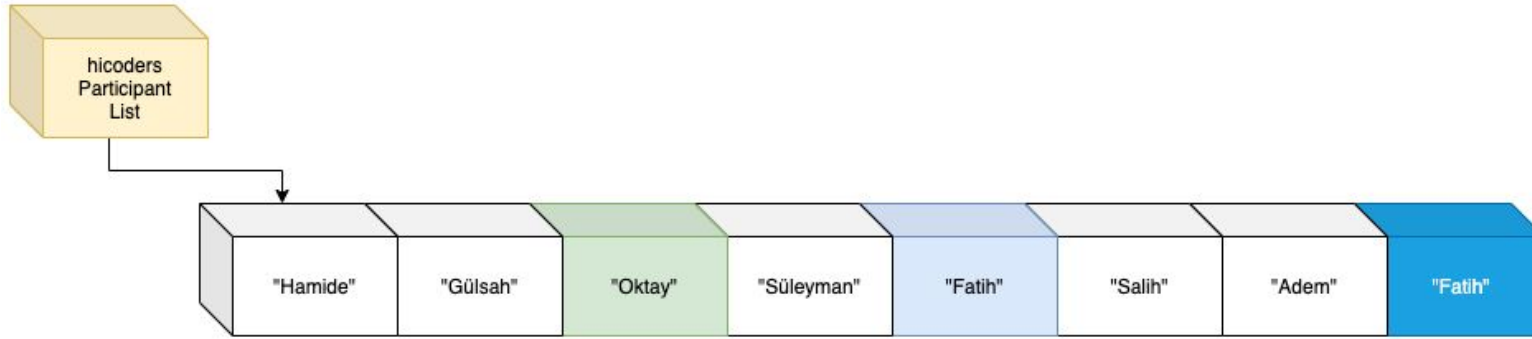
An array has internal methods



Operations – Finding a value

- Use brackets with an index value “[index]” to reach a value
- Methods
 - includes(...)
 - indexOf(...)
 - lastIndexOf(...)


```
let hicodersParticipantList = ...
```



OPERATION

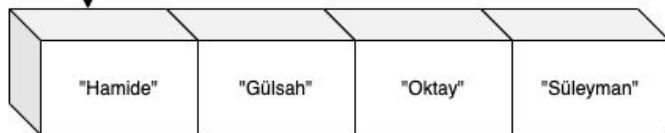
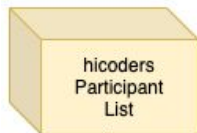
RESULT



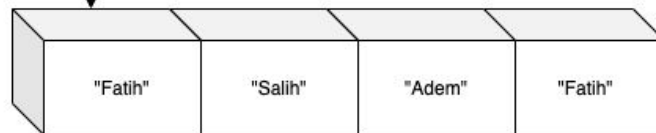
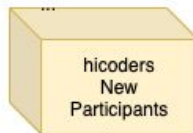
Find Operations

How can I add an array to another one?

let hicodersParticipantList = ...



let hicodersNewParticipants =

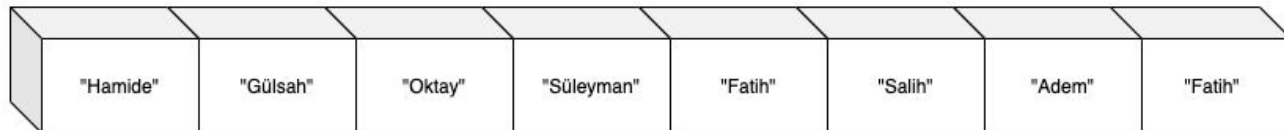


OPERATION



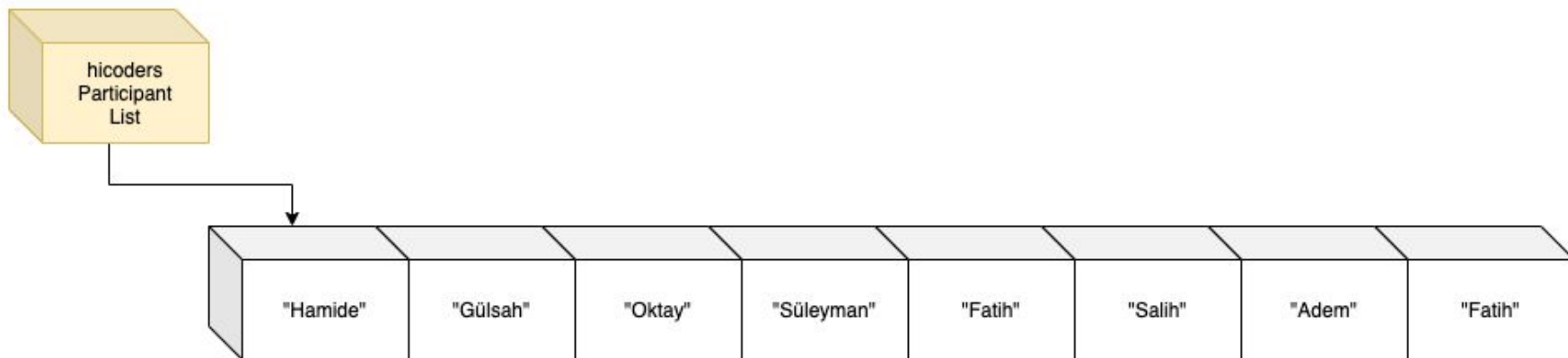
.concat(hicodersNewParticipants);

RESULT



How can I convert an array to a string?

let hicodersParticipantList = ...



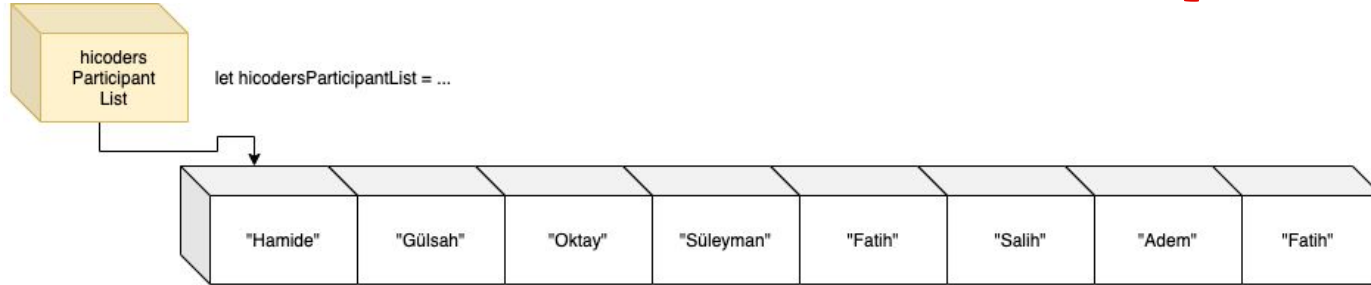
OPERATION



RESULT

"Hamide//Gülsah//Oktaý//Süleyman//Fatih//Salih//Adem//Fatih"

How can I add value(s) into an array?



OPERATION

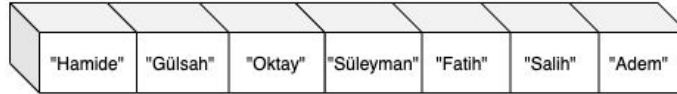
hicoders
Participant
List

.pop();

RESULT

"Fatih"

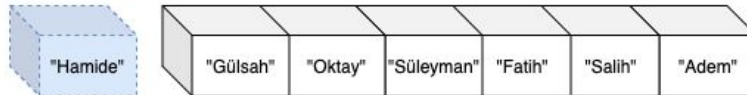
ARRAY



hicoders
Participant
List

.shift();

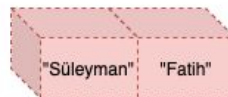
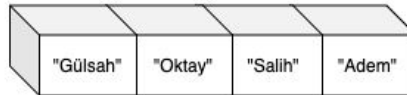
"Hamide"



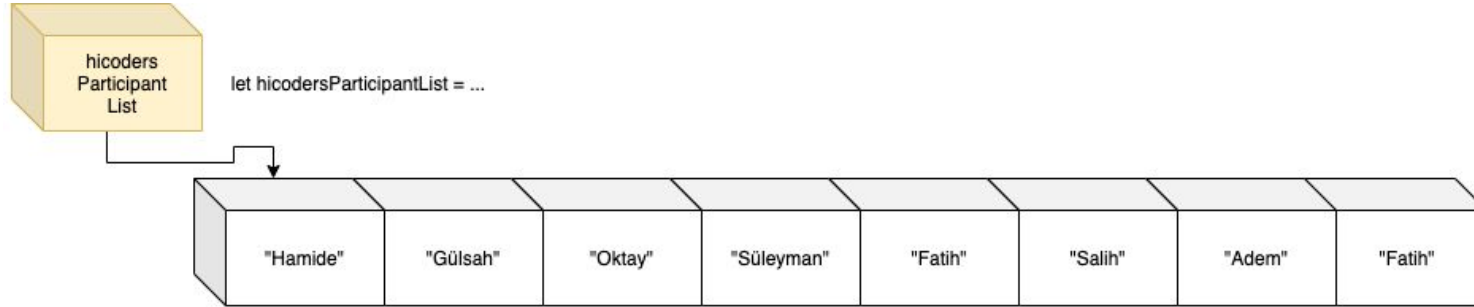
hicoders
Participant
List

.splice(2, 2)

"Süleyman",
"Fatih"



How can I remove value(s) from an array?



OPERATION



.pop();



.shift();



.splice(2, 2)

RESULT

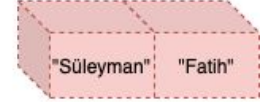
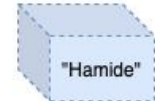
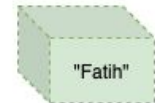
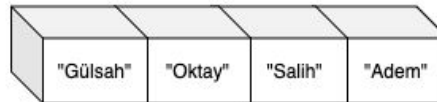
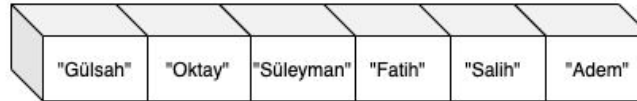
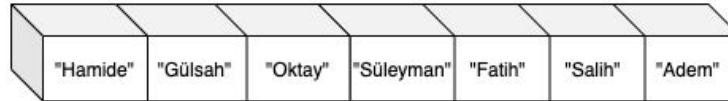
"Fatih"

"Hamide"

"Süleyman"

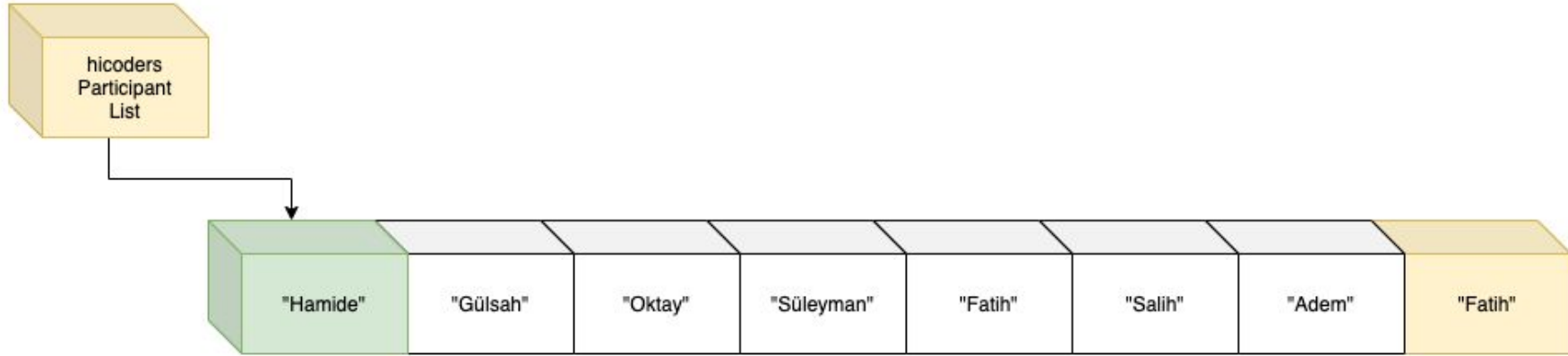
"Fatih"

ARRAY



How can I reverse an array?

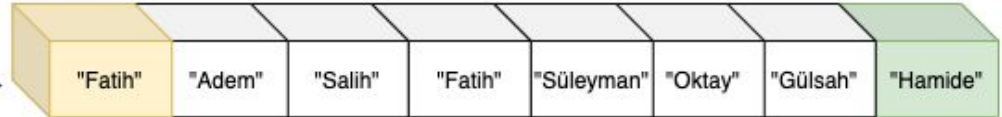
let hicodersParticipantList = ...



OPERATION

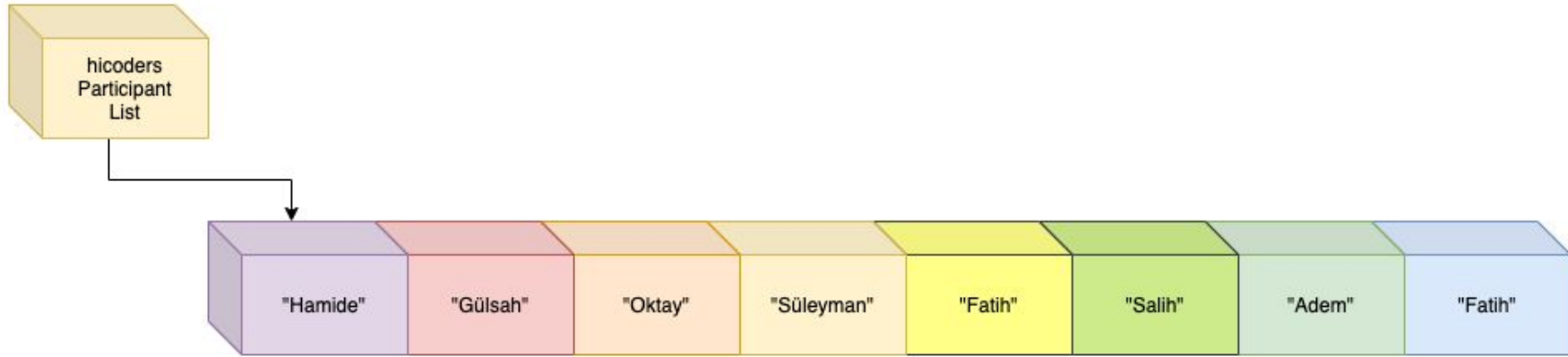


RESULT



How can I sort values in the array?

let hicodersParticipantList = ...



OPERATION



RESULT



let's try it!

- Find the product of a number array**
- Find the maximum number of an array**
- Create a quiz**

Multidimensional Array

- Keep more than one array in an array
- 2 dimensional array is like a table (x, y)
- 3 dimensional array is like a cube (x, y, z)

notlar	Hannes	Elisa	Mahir	Mirjam	Jürg	Roger	Olivia
Math	100	34	77	100	55	100	23

Tabular Data: Sinifin Matematik Notlari

Mahirin matematik notu: 77

not[index]; index: sıra

not[2]; // 77

notlar	Hannes	Elisa	Mahir	Mirjam	Jürg	Roger	Olivia
Math	100	34	77	100	55	100	23
Eng	78	56	78	100	78	45	76
IT	95	45	22	95	100	100	78
Music	10	10	65	54	10	100	74

Tabular Data: Sinifin tüm ders notlari

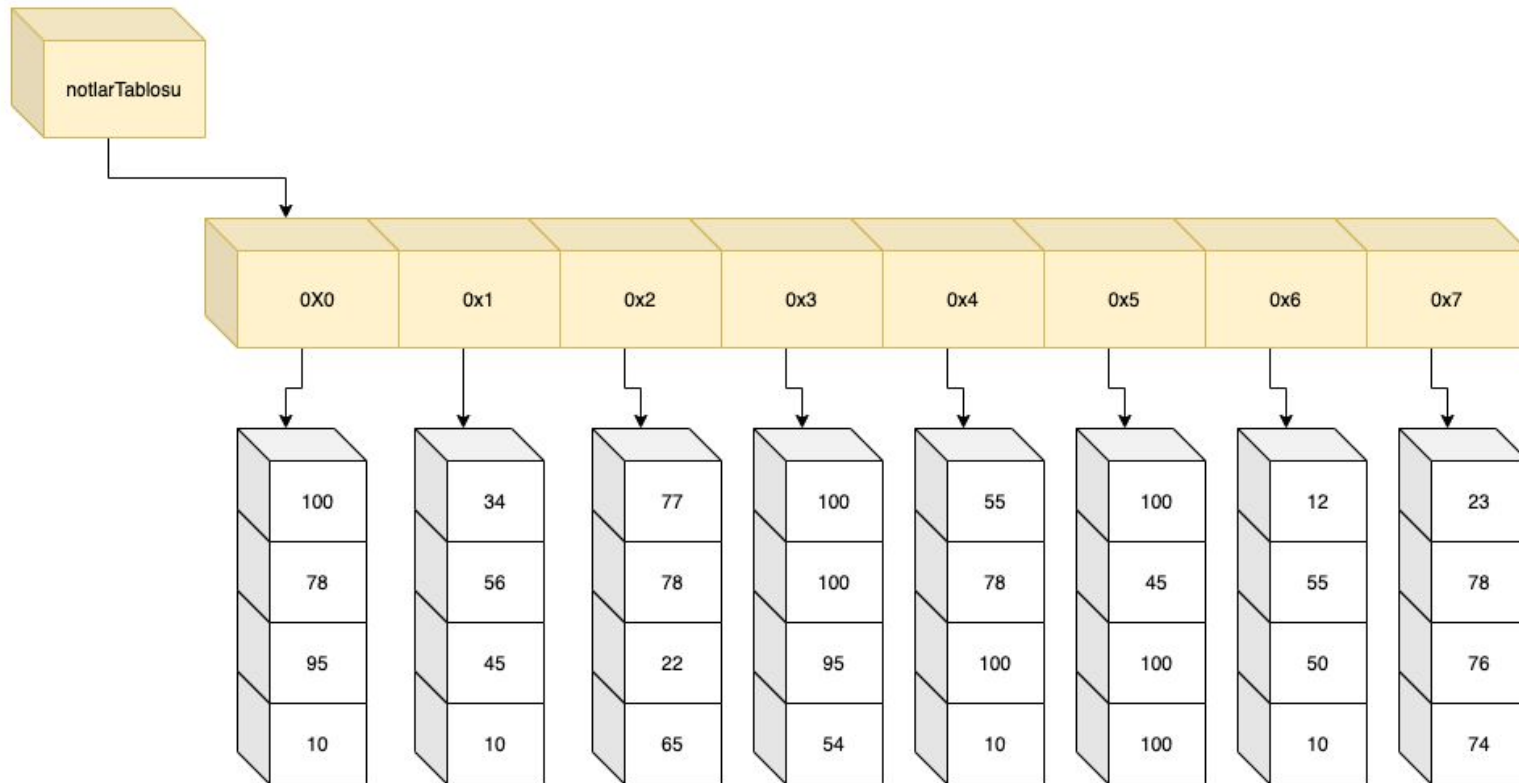
Mirjam'ın ingilizce notu: 100

notlar(Math, Mirjam): 100

notlar[satir][sutun]

notlar[0][3]: 100

let notlarTablosu = ...



```
let notlarTablosu = [[100,78,95,19], [34,56,45,10], [...] ...];
```

String
–array of characters–

String

A data structure which holds a set of characters

1. It contains text as data
2. It could be any charset like UTF-16, emojis
3. It could be maximum size of ~4GB.
4. It is created contiguously in a memory
5. It is an object just like an array.
6. It has its own properties and methods
7. Strings are immutable

How to create a string in javascript?

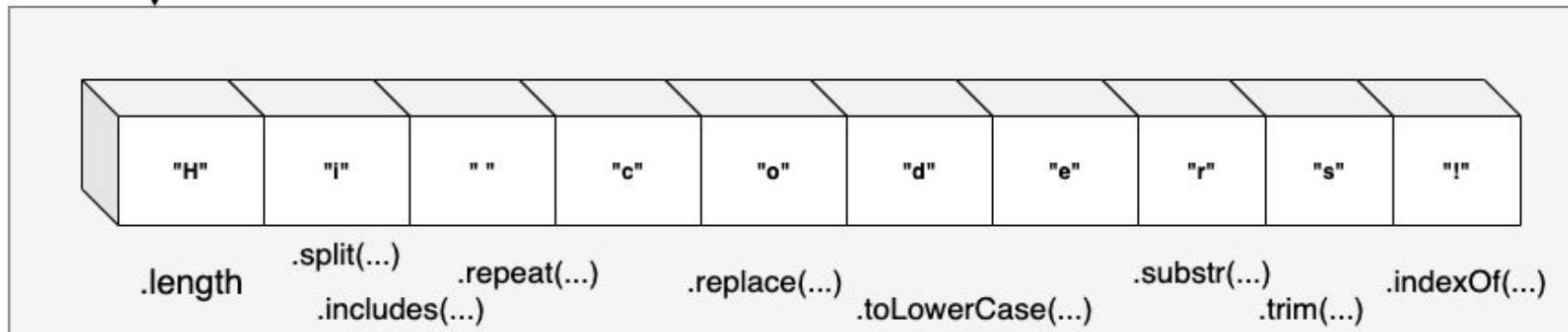
- By using String constructor
 - `let shortText = new String("hi there!");`
- By using double quotes
 - `let shortText = "hi there, again!";`
- By using single quotes
 - `let shortText = 'hi again!';`
- By using template Strings with backticks
 - `let shortText = `bye guys!`;`
 - Creating multiline strings is easier with backticks

“text”

‘text’

`text`

```
let simpleText = "Hi coders!";
```



Operations on a string

```
let shortText = "hi again!";
```

- Length of a string
 - `shortText.length` // 9
- Access a character
 - `shortText[3]` // "a";
- Find the location of string in a string
 - `shortText.indexOf("again");` // 3
 - `lastIndexOf()`
- Check whether a string exists in a string
 - `shortText.includes("ga");` // true
- Add string to each other
 - `let total = "hi" + "again";`

Operations on a string

let shortText = "hi again!";

- Copy a part of a string
 - `shortText.substring(1, 3);` // "i a"
 - `substr`
 - `slice`
- Change to lower/upper case
 - `shortText.toLowerCase();` // "hi again!"
 - `shortText.toUpperCase();` // "HI AGAIN!"
- Remove the empty space from the beginning and end
 - `let term = " abc ";`
 - `term.trim();` // "abc"

Operations on a string

```
let shortText = "hi again!";
```

- Repeat the string
 - `let text = "ab";`
 - `text.repeat(5); // "ababababab"`
- Find and replace a part of a string
 - `let result = shortText.replace("aga", "iyi"); // "hi iyiin!"`
- Pad values
 - `shortText.padStart(12, "0"); // "000hi again!"`
 - `padEnd`
- Convert to an array
 - `shortText.split(""); // ["h", "i", " ", "c", "o", "d", "e", "r", "s", "!"]`

Comparing Strings

String can be compared like numbers.

Remember the ASCII table, each character has its own number correspondence. The char “A” has the numeric value 65 and others go up.

- ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~
• ¡¢£¤¥¦§¨©ª«¬®¯°±²³´µ¶·¸¹º»¼½¾¿ÀÁÂÃÄÅÆÇÈÉÊËÌÍÎÏÐÑÒÓÔÕÖ×ØÙÚÛÜ

`'a' > 'Z' // true`

`'Ördek' > 'Tosun' // true`

`'Ördek'.localeCompare('Tosun')`

Special Characters

Some characters require special handling. let's look at them.

Character	Description
<code>\n</code>	New line
<code>\r</code>	Carriage return: not used alone. Windows text files use a combination of two characters <code>\r\n</code> to represent a line break.
<code>\'</code> , <code>\"</code>	Quotes
<code>\\</code>	Backslash
<code>\t</code>	Tab
<code>\b</code> , <code>\f</code> , <code>\v</code>	Backspace, Form Feed, Vertical Tab – kept for compatibility, not used nowadays.
<code>\xxx</code>	Unicode character with the given hexadecimal Unicode <code>XX</code> , e.g. <code>'\x7A'</code> is the same as <code>'z'</code> .
<code>\uXXXX</code>	A Unicode symbol with the hex code <code>XXXX</code> in UTF-16 encoding, for instance <code>\u00A9</code> – is a Unicode for the copyright symbol ©. It must be exactly 4 hex digits.
<code>\u{X...XXXXXX}</code> (1 to 6 hex characters)	A Unicode symbol with the given UTF-32 encoding. Some rare characters are encoded with two Unicode symbols, taking 4 bytes. This way we can insert long codes.

let's try it!

- Find the shortest string in an array**
- Find the total character of an string array**
-

immutability

Array vs String

Immutability

- Strings are immutable, that means you can not change the original value. But instead you copy it into another memory area
- Arrays are mutable
- Some array methods change the original array, but others return a new array and do not touch the original one.

Questions?