JAVASCRIPT
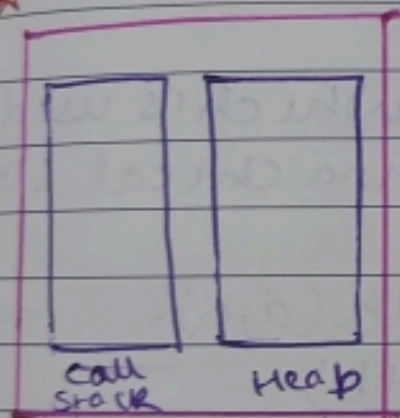
(244-121)

→ JS is initially made to make web page alive.

→ Tody, JS can Run on any device which has has JRE.

→ JRE is basically a container which has all the dependency which are useful to run JS. like JS engine, web APIs event loops & etc. (callback queue).

☆ The JS Engine

Call Stack   Heap

- A JS engine is simple a program that interpret JS code.

- Every major browser has the JS engine that has the/ execute the JS codes. Ex→ one of the popular engine is V8.

☆ Heap is an large unstructured data structure that store all the dynamic data like function, object arrays, etc, the memory heap is where the memory allocation happen.
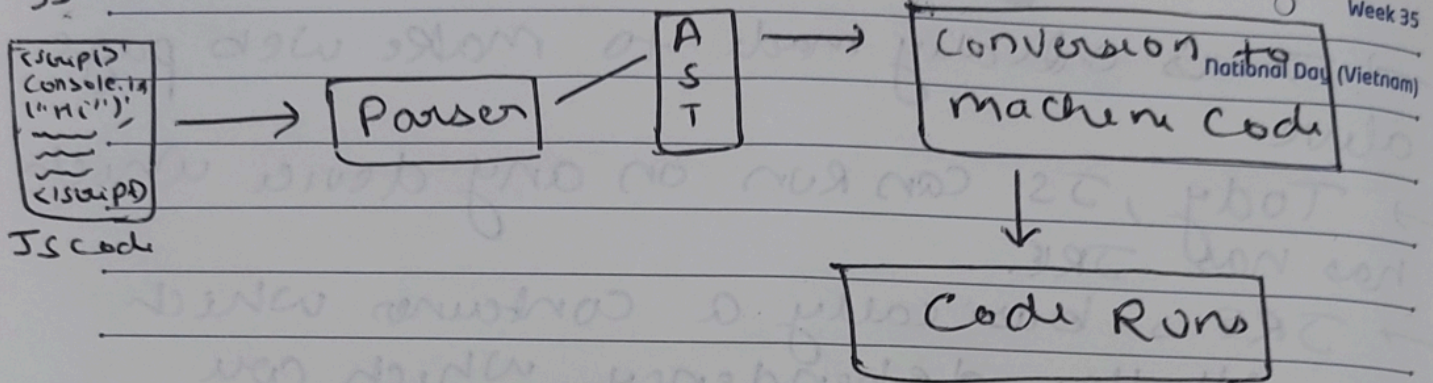
↓↑← How the JS work?.

JS :-

```
<script>
console.log
("Hi")
~~~~
~~~~
<script>
```
JS code

Parser → | A S T | → Conversion to machine code

→ Code Runs

★ parser check errors in the code & if no error is found in our code then it will create the Abstract syntax tree from that piece of code.

★ AST is a data structure, which is used to represent the heirrachical structure of the code.

en →
```
function add(a,b){
  return a+b;
}
```

the AST of this program will look like this →

```
└─ function Declaration (add)
   ├─ Identifier (a)
   ├─ Identifier (b)
   └─ Return statement
      └─ Binary expression (+)
         ├─ Identifier (a)
         └─ Identifier (b)
```
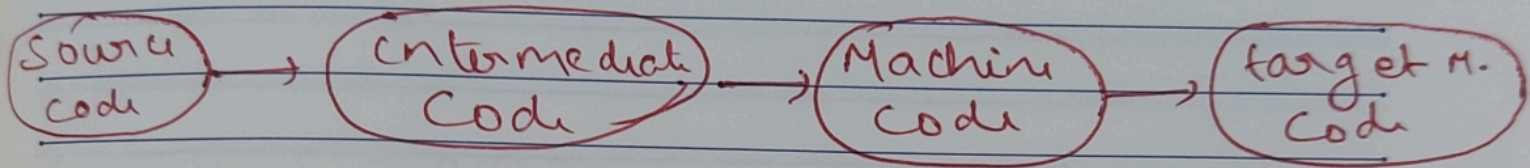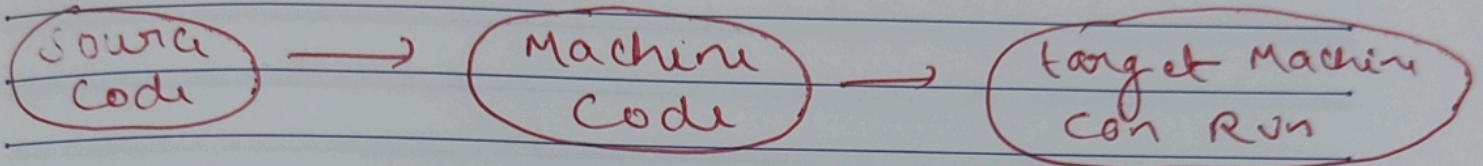
& JS is an compiled or interpreted lang.
→ Compiled lang

(Source Code) ⟶ (Machine Code) ⟶ (target Machine can Run)

(Source Code) ⟶ (Intermediate Code) ⟶ (Machine Code) ⟶ (target M. Code)

- JS used to be an interpreted lang. but the interpreted lang are slower than the compiled one. So, in order to optimize the performance of web application. JS combine both compilation & interpretation. This is called " Just in time Compilation". This method compile the entire code into machine code at once and executes it.

JIT

compilation   execution

| SOURCE CODE | ⟶ | Machine CODE | ⟶ | CODE EXECUTE |