به نام خدا

Intro

MVC Nowruz Workshop

Presented by:

Scientific Society of Computer Engineering Students (SSCES), Bu-Ali Sina University (https://t.me/SSCES)

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Host:

Skills Community (https://skills.community)

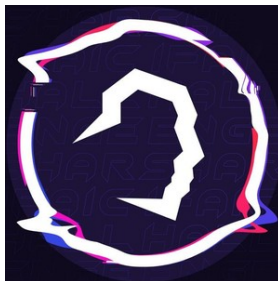# Mission: Implementation of a Robot Fighting Platform

Before letting your minds go crazy, let me notice that it will not be like:

Idea

نبرد هوش مصنوعی شریف یک مسابقه تیمی است که در آن تیم‌ها استراتژی‌های خود را برای پیروزی در یک نبرد استراتژیک طراحی و در قالب کد پیاده‌سازی می‌کنند.
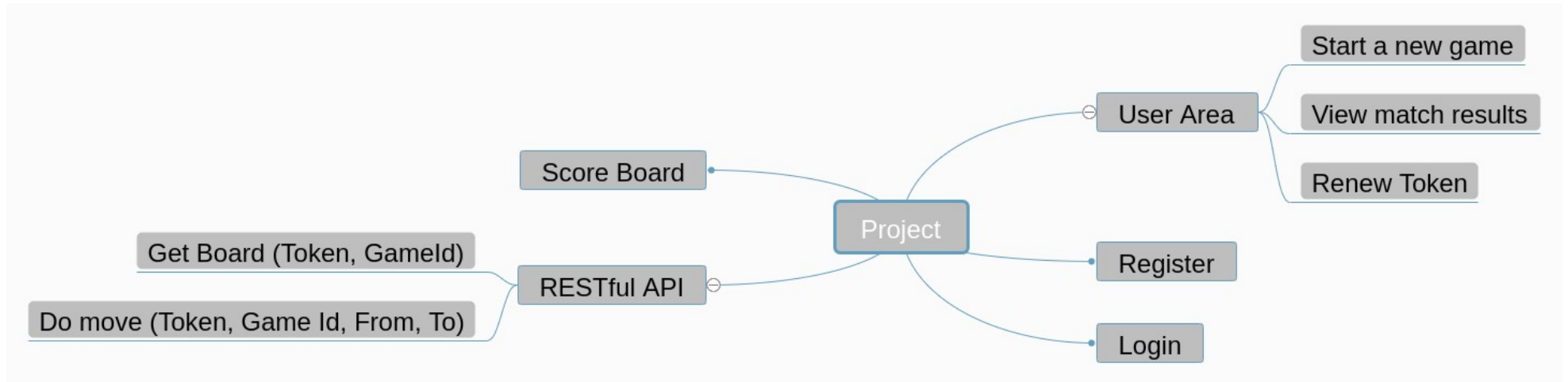
هر تیم با استفاده از ایده‌های خلاقانه و استراتژی‌های متفاوت سعی می‌کند یک هوش مصنوعی قدرتمند طراحی کند که تا جای ممکن بر تیم‌های حریف چیره شود و به مرحلهٔ حضوری مسابقات راه پیدا کند.

درباره نبرد هوش مصنوعی شریف
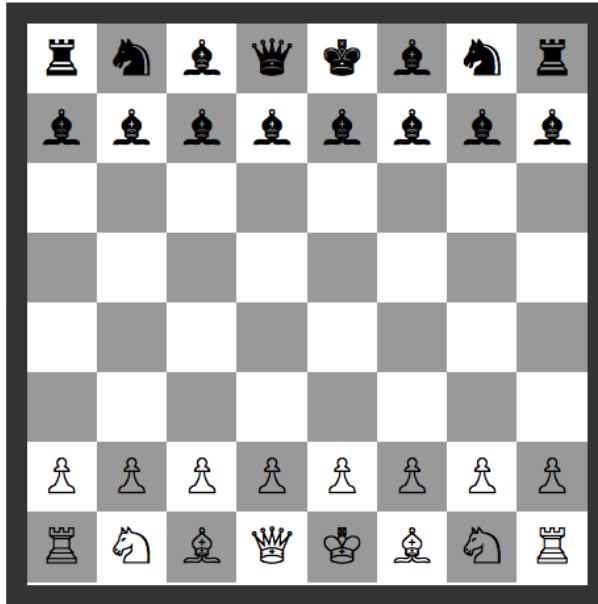
Idea

Project map

Start a new game
View match results
Renew Token
User Area
Score Board
Project
Register
RESTful API
Login
Get Board (Token, GameId)
Do move (Token, Game Id, From, To)

(https://skills.community/index.php/f/2146)

Game subject

It's a simple turn-based strategy game

(https://www.strategygamer.com/articles/best-turn-based-strategy-games/)

Game subject

(Maybe chess)

Game subject

(Definitely Rock-Paper-Scissors => RPS)

Repository

https://github.com/tayyebi/BASU-MVC-99

Session 1

# I know there is a reason behind MVC, but what the why?

- **Simultaneous development — Multiple developers can work simultaneously on the model, controller and views.**

- **High cohesion — MVC enables logical grouping of related actions on a controller together. The views for a specific model are also grouped together.**

- **Low coupling — The very nature of the MVC framework is such that there is low coupling among models, views or controllers.**

I know there is a reason behind MVC, but what the why?

- **Ease of modification — Because of the separation of responsibilities, future development or modification is easier i.e. scalability of the product is increased.**

- **Multiple views for a model — Models can have multiple views.**

(**src: medium.com/@socraticsol**)

MVC, ~~like a~~ *for the* BOSS
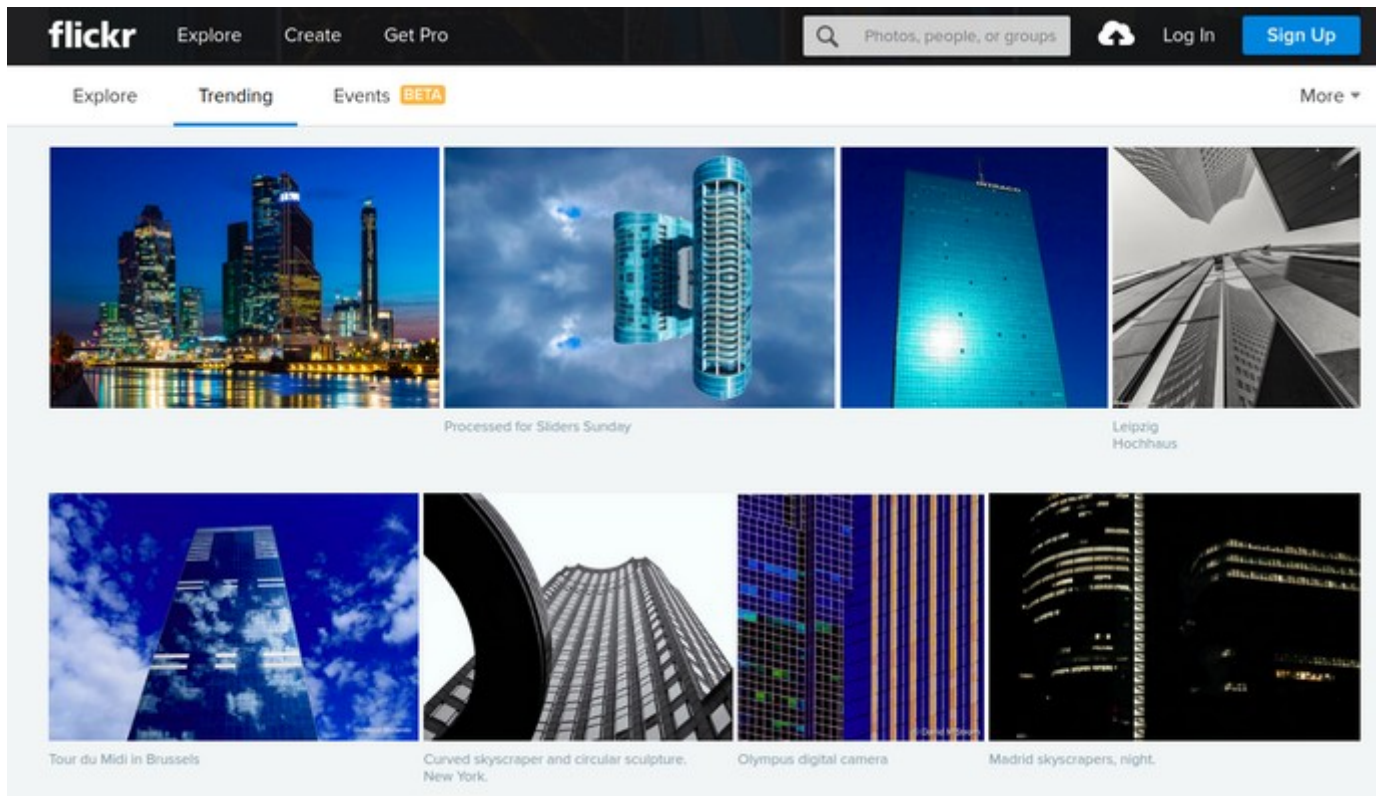
MVC, ~~like a~~ *for the* BOSS

My Boss arrived at work in a brand new Ferrari.

I told him: "Wow that's a nice car".

"If you work hard, put all your hours in, and strive for Excellence, I'll get another one next year", He replied!

Design Pattern \vs/ Architecture

(🕊️ I'm a peace fan)

A system can have multiple levels and scope:

I.   **Function- implementation of a function**

II. **Class- implementation of a class**

III. **Project- relations between classes**

IV. **Solution- relations between projects**

V.   **System- relations between solutions**

Architecture is the highest level design of a solution as a whole. Usually, you think big there, as you don't go too much into details of different components. Architecture ensures that different parts of solution can easily talk with one another either directly or through a mediator, it concerns security, performance, non functional deployment and system requirements. Architecture takes care of 4 and 5 scopes and sometimes 3.
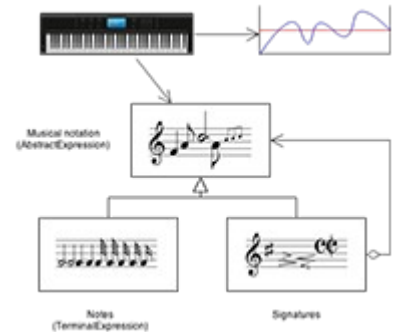
(**www.quora.com/profile/Almantas-Karpavičius**)

Design Patterns and Their Usage
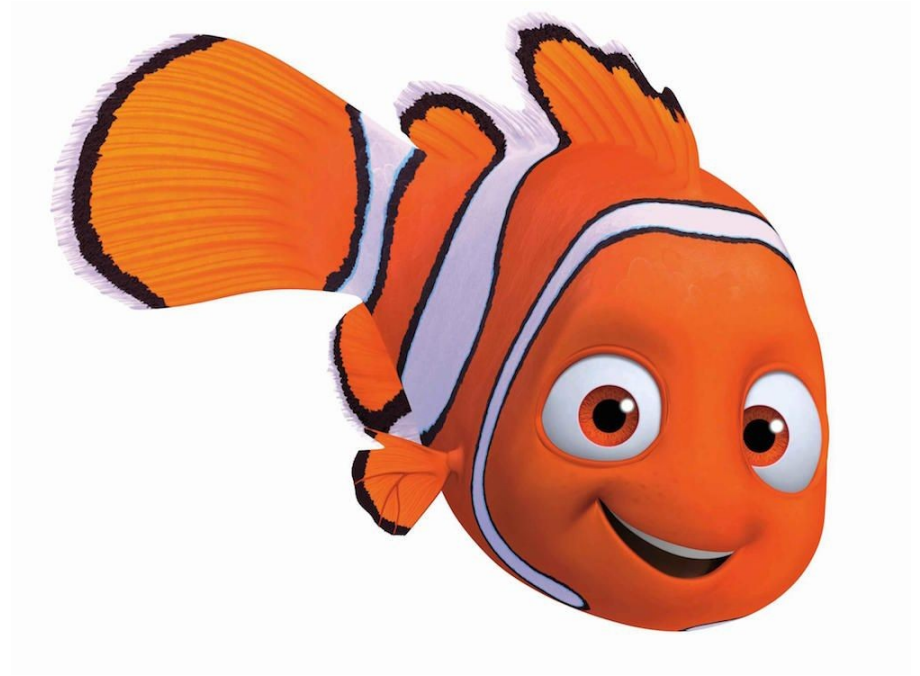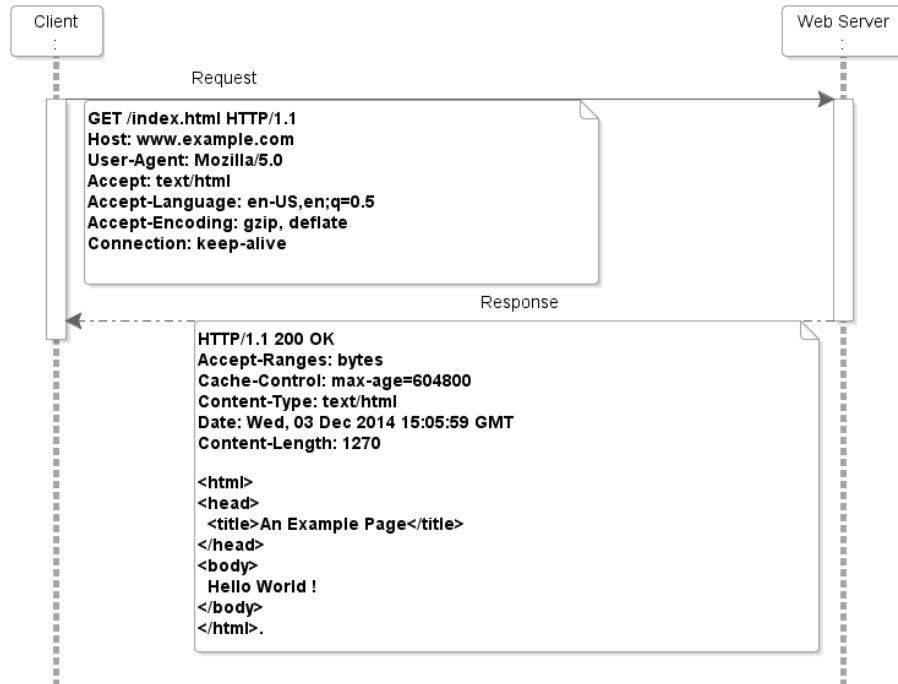
A system can have multiple

levels and scope:

I.   Structural Design Patterns

II.   Behavorial Design Patterns

III. Creational Design Patterns

(https://sourcemaking.com/design_patterns)
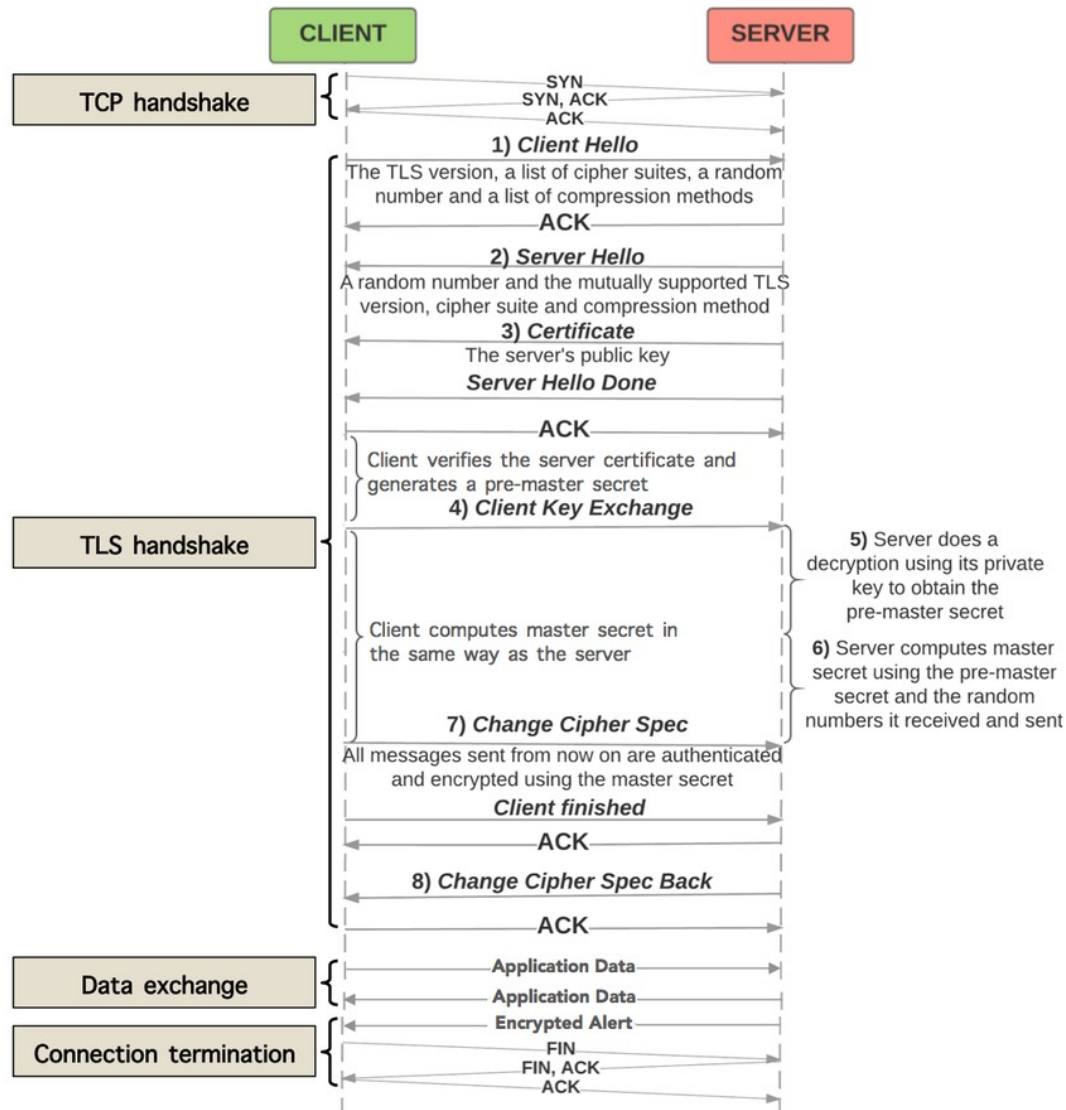
What happens to your HTTP request?
(Bottom to top approach)

Client ... Web Server

Request

```
GET /index.html HTTP/1.1
Host: www.example.com
User-Agent: Mozilla/5.0
Accept: text/html
Accept-Language: en-US,en;q=0.5
Accept-Encoding: gzip, deflate
Connection: keep-alive
```

Response

```
HTTP/1.1 200 OK
Accept-Ranges: bytes
Cache-Control: max-age=604800
Content-Type: text/html
Date: Wed, 03 Dec 2014 15:05:59 GMT
Content-Length: 1270

<html>
<head>
  <title>An Example Page</title>
</head>
<body>
  Hello World !
</body>
</html>.
```

(https://www.oreilly.com/library/view/restful-java-web/9781788294041/1889f99d-f907-41c3-a0f0-925bbf1d3825.xhtml)

Finding Nemo
(Network Segments)

(https://www.researchgate.net/figure/HTTPS-message-sequence-diagram-with-detailed-TLS-handshaking-steps_fig1_306187575)

Finding Nemo (System Layers)

Business Layer	Business Process	Our Business Process
Application Layer	Applications	Our program
Infrastructure Layer	Middleware	Apache + MySQL + PHP
	OS	Linux / Windows Server
	Hardware	Intel CPU + HDD + SSD + RAM

Could be for HTML, CSS, PHP or a combination.

Response is not PHP, but the result of interpreting PHP, usually more HTML and CSS.

(https://www.oreilly.com/library/view/php-mysql/9781449355517/ch01.html)
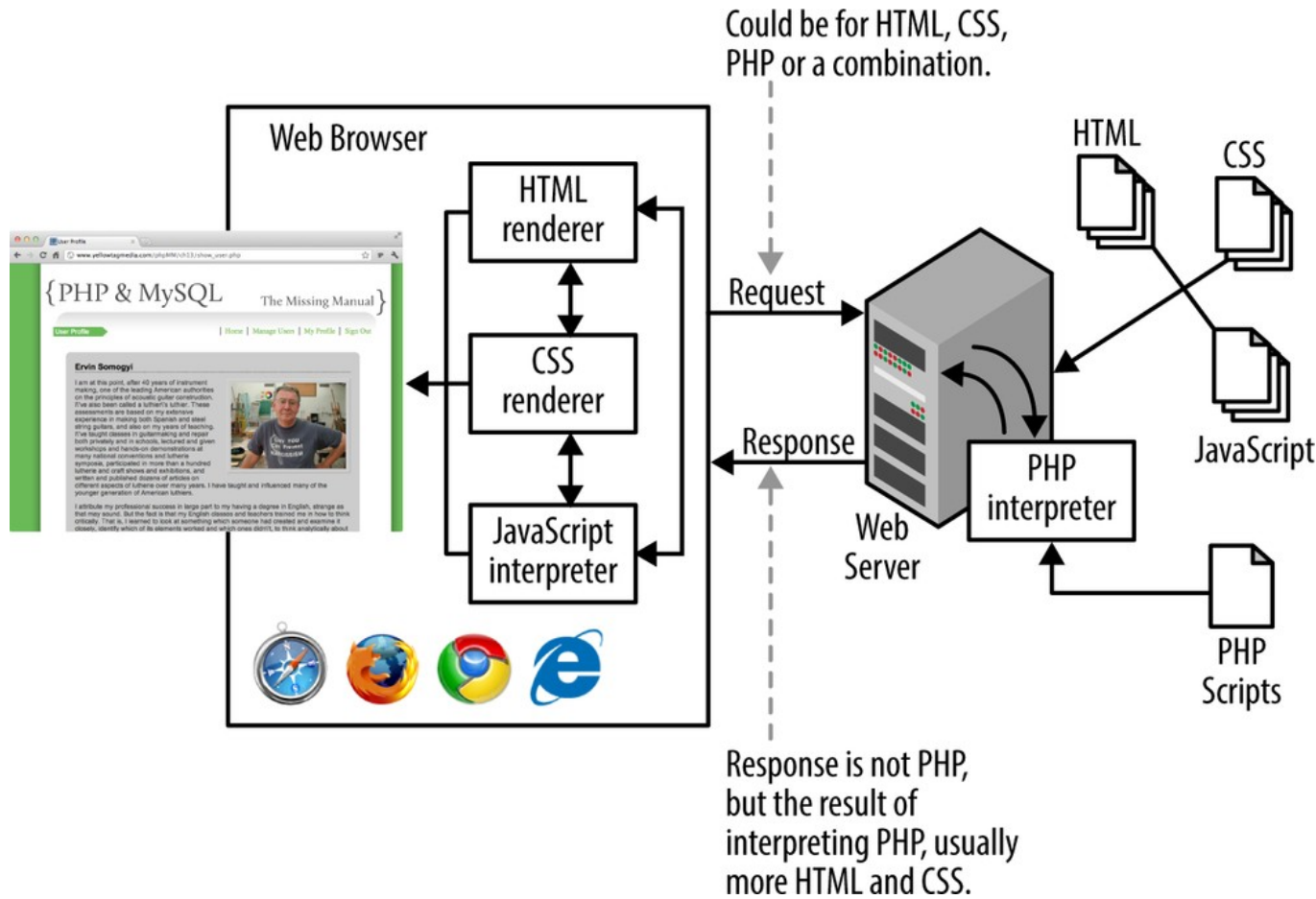
A server usually listens on a port

That can be as simple as

```
nc -l 5000
```

~ nc -l 5000

A client can be as simple as

File   Edit   View   Search   Terminal   Help

```
→  ~ curl --header "Content-Type: application/json" \
   --request POST \
   --data '{"username":"xyz","password":"xyz"}' \
   http://localhost:5000/api/login
```

Finding Nemo (Web Server)

```
location ~ \.php$ {
    fastcgi_split_path_info ^(.+\.php)(/.+)$;
    # NOTE: You should have "cgi.fix_pathinfo = 0;" in php.ini

#    # With php5-cgi alone:
#    fastcgi_pass 127.0.0.1:9000;
    # With php5-fpm:
    fastcgi_pass unix:/var/run/php5-fpm.sock;
    fastcgi_index index.php;
    include fastcgi_params;
}
```

(https://askubuntu.com/questions/134666/what-is-the-easiest-way-to-enable-php-on-nginx)

Finding Nemo (VirtualHost)

Virtual hosting is a method for hosting multiple domain names (with separate handling of each name) on a single server (or pool of servers). This allows one server to share its resources, such as memory and processor cycles, without requiring all services provided to use the same host name. The term virtual hosting is usually used in reference to web servers but the principles do carry over to other internet services.

- **Name-based**

- **IP-based**

- **Port-based**

(**https://en.wikipedia.org/wiki/Virtual_hosting**,

https://httpd.apache.org/docs/2.4/vhosts/examples.html)

```
# Ensure that Apache listens on port 80
Listen 80
<VirtualHost *:80>
    DocumentRoot "/www/example1"
    ServerName www.example.com

    # Other directives here
</VirtualHost>

<VirtualHost *:80>
    DocumentRoot "/www/example2"
    ServerName www.example.org

    # Other directives here
</VirtualHost>
```

Finding Nemo (HTTP Methods)

- **GET**

  The GET method requests a representation of the specified resource. Requests using GET should only retrieve data.

- **POST**

  The POST method is used to submit an entity to the specified resource, often causing a change in state or side effects on the server.

(https://developer.mozilla.org/en-US/docs/Web/HTTP/Methods)

Finding Nemo (HTTP Methods)

▼ **General**

    Request URL: https://developer.mozilla.org/en-US/docs/Web/HTTP/Methods

    Request Method: GET

    Status Code: 🟢 200

    Remote Address: 99.86.7.128:443

    Referrer Policy: origin

▼ **Response Headers**

    access-control-allow-origin: *

    cache-control: public, max-age=0, s-maxage=300

    content-encoding: gzip

    content-language: en-US

    content-type: text/html; charset=utf-8

    date: Sat, 28 Mar 2020 15:49:32 GMT

    server: meinheld/1.0.1

    status: 200

    strict-transport-security: max-age=63072000

    vary: Accept-Encoding,Cookie

    via: 1.1 560d8d35213ac925f8d05c5730db1582.cloudfront.net (CloudFront)

    x-amz-cf-id: mRfQPoJoUO6rZPImarNyxcLz_Jq6os0X7tigJFr5diZerhTeV0FX-g==

▼ **Request Headers**

    :authority: developer.mozilla.org

    :method: GET

    :path: /en-US/docs/Web/HTTP/Methods

    :scheme: https

    accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,imag

    accept-encoding: gzip, deflate, br

    accept-language: en-US,en;q=0.9,fa;q=0.8

    cache-control: max-age=0

    cookie: _ga=GA1.2.961233685.1583674091; dwf_sg_task_completion=False; _gid=GA

    referer: https://www.google.com/

    sec-fetch-dest: document

    sec-fetch-mode: navigate

    sec-fetch-site: cross-site

    sec-fetch-user: ?1

    upgrade-insecure-requests: 1

    user-agent: Mozilla/5.0 (Linux; Android 6.0; Nexus 5 Build/MRA58N) AppleWebKi
    afari/537.36

Finding Nemo (Web Routing)

Routing or router in web development is a mechanism where HTTP requests are routed to the code that handles them. To put simply, in the Router you determine what should happen when a user visits a certain page.

(https://divpusher.com/glossary/routing/)

Finding Nemo (Web Routing, ASP.NET)

```
routes.IgnoreRoute("{resource}.axd/{*pathInfo}");

routes.MapRoute(
    name: "Default",
    url: "{controller}/{action}/{id}",
    defaults: new { controller = "Home", action = "Index", id = UrlParameter.Optional }
);
```

Finding Nemo (Web Routing, ASP.NET)

```csharp
// GET: Admin/Edit/5
public ActionResult Edit(string id)
{
    if (id != "" && id != null)
    {
        ViewBag.Message = "شما در حال وارد کردن اطلاعات جدید برای " + id + " هستید";
        return View();
    }
    else
    {
        return HttpNotFound();
    }
}
```

Finding Nemo (Web Routing, .htaccess)

⚙ *.htaccess* *.htaccess*

```
RewriteEngine On
RewriteCond %{REQUEST_FILENAME} !-f
RewriteCond %{REQUEST_FILENAME} !-d
RewriteRule ^(.+)$ index.php/$1 [L]
```

Index.php, App.php

index.php

```php
 4    // Read configuration
 5    include('Core/Config.php');
 6
 7    if (_Debug)
 8        // Report all PHP errors
 9        error_reporting(-1);
10    else
11        // Turn off all error reporting
12        error_reporting(0);
13
14    // Exception handler
15    include('Core/Exceptions.php');
16
17    // Cryptography
18    include('Libs/Cryptography.php');
19
20    // Models core
21    include('Core/Model.php');
22
23    // Jalali Date
24    include('Libs/jdf.php');
25
26    // Controllers core
27    include('Core/Controller.php');
28
29    // Router
30    include('Core/App.php');
31
32    new App;
```

App.php

```php
        // Get other parameters
        $this->Params = array_values($URL);
        // Call the method form class
        $ControllerFilePath = 'Controller/' . $this->Controller.'.php';
        // If controller file does not exist
        if (!file_exists($ControllerFilePath))
        $this->ThowError(404);
        // Include the controller file
        include($ControllerFilePath);
        // Create an instance of controller class
        $ClassObject = new $this->Controller();
        // Set the view folder
        $ClassObject->SetViewDirectory($this->DefaultViewDirectoryOfController);
        // Get the method
        $HttpMethod = $_SERVER['REQUEST_METHOD'];
        // Find the function
        $ControllerMethod = $this->View . $HttpMethod;
        // Call the method if exists
        if (!method_exists($ClassObject, $ControllerMethod))
            $this->ThowError(404);
        try {
            // Call the view
            call_user_func_array([$ClassObject, $ControllerMethod], $this->Params);
        } catch (AuthException $exp ){ // On auth error
            $this->ThowError(403);
        } catch (NotFoundException $exp ){ // on not found error
            $this->ThowError(404);
        }
    }
```

Application Class

danialdezfouli commented on Feb 14, 2019 • edited ▾

1.

Functionalities::IfExistsIndexInArray
array_key_exists()

2. make Application class and usage:
   $app = new Application()

File Structure

> Controller
∨ Core
  🐘 App.php
  🐘 Config.php
  🐘 Controller.php
  🐘 Exceptions.php
  🐘 Model.php
> Docs
> Helpers
> Libs
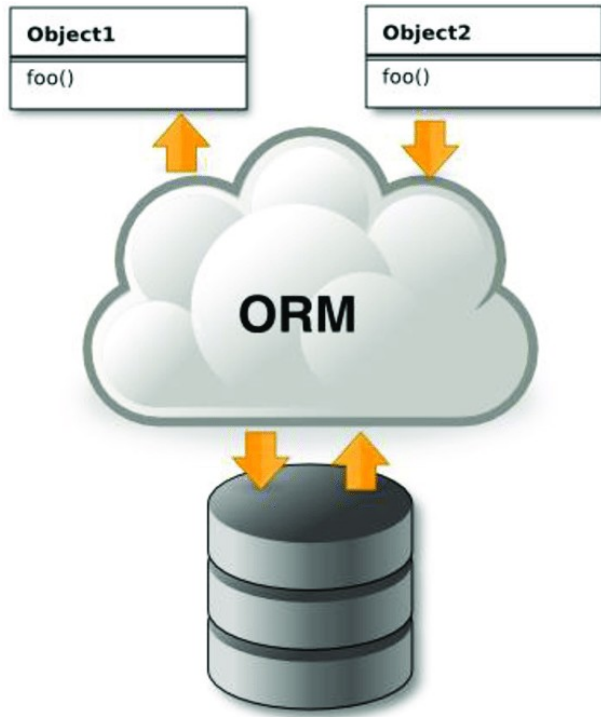> Model
> node_modules
> static
> Uploads
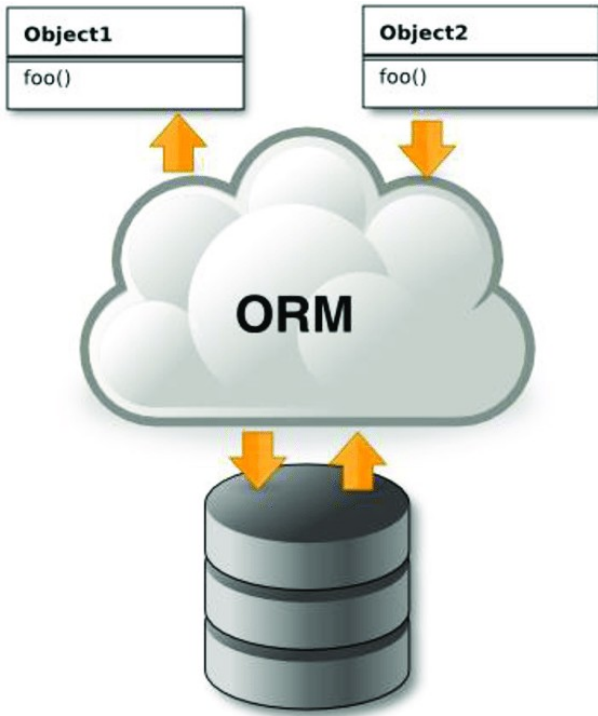> View

Data Models and Database

```sql
CREATE TABLE [dbo].[tblCars](
        [ID] [int] IDENTITY(1,1) NOT NULL,
        [CarName] [nvarchar](50) NULL,
        [IdentityNumber] [nvarchar](50) NULL,
        [CarColor] [nvarchar](50) NULL,
        [DriverID] [int] NULL,
 CONSTRAINT [PK_tblCars] PRIMARY KEY CLUSTERED
(
        [ID] ASC
)WITH (PAD_INDEX = OFF, STATISTICS_NORECOMPUTE = OFF, IG
) ON [PRIMARY]
```

Data Models and Database

```csharp
public partial class tblCar
{
    [System.Diagnostics.CodeAnalysis.SuppressMessage("Micros
    public tblCar()
    {
        tblServiceCars = new HashSet<tblServiceCar>();
    }

    public int ID { get; set; }

    [StringLength(50)]
    public string CarName { get; set; }

    [StringLength(50)]
    public string IdentityNumber { get; set; }

    [StringLength(50)]
    public string CarColor { get; set; }

    public int? DriverID { get; set; }

    public virtual tblUser tblUser { get; set; }
```
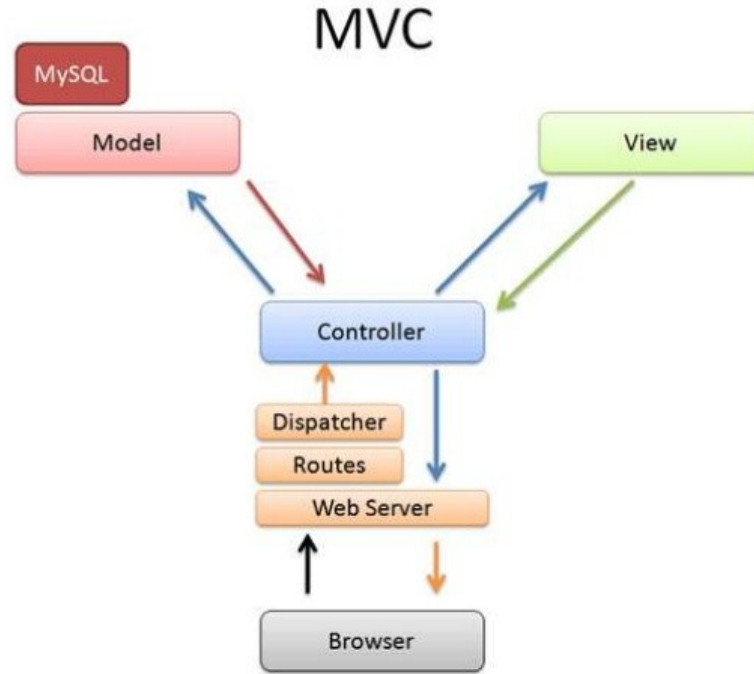
Model-View-Controller

(https://www.slideshare.net/victorporof/beginners-guide-to-ruby-on-rails/6)

Model-View Communications, But How?

```
@model IEnumerable<v_Admin>
@Html.ActionLink("تعریف ادمین جدید", "Create
```

```
@foreach (var item in Model)
{
    <tr>
        <td>
            @item.Username
        </td>
        <td>
            @item.Fullname
        </td>
```

Session 2