

Web Engineering & Development (SWE 363)

Introduction to Web Development

Created by: Dr. Omar Hammad

Announcements

- Join Slack
- Join the Common section
- Start looking for a project team

Today's plan:

We will explore the journey of an HTTP request. In particular:

- HTTP Requests
- HTTP Responses
- IP addresses
- DNS (Domain names system)
- URLs (Uniform Resource Locator)
- intro to HTML, CSS & JS

~10m

Explore it yourself

- Go to google.com
- Right click > inspect
- Search for any keyword (e.g. KFUPM)
- Notice: # requets, requests
latecny, type of resource
requested, size of response)

What happens when we Google "KFUPM"?

- Where does our request be **directed**?
- How does it know the **path**?
- How does it ask for specific **results**?
- How are the results **displayed**?

The Journey of a Web Request

1. User types **URL**
2. **DNS** Lookup
3. **IP Address** Found
4. HTTP **Request** Sent
5. HTTP **Response**
6. Browser **Renders** Page

1. User types a URL

<https://www.google.com/search?q=kfupm>

- Scheme
- Hostname
- Path
- Query string

2. DNS Lookup

- **Browser** checks its **cache** first
- If not found, check **OS cache**
- If not found, check **router cache**
- If not found, ask **ISP DNS server**
- **ISP** asks **Root DNS servers**
- **Root** points to **TLD servers** (.com)
- **TLD** points to **authoritative server**
- **Authoritative server** returns **IP address**
- **Result** is **cached** at all levels

3. IP Address found

Google.com -> 172.217.18.36

- A unique number that **identifies** each computer using the Internet Protocol to communicate over the internet

4. HTTP Request Sent

HTTP REQUEST

```
GET /search?q=KFUPM HTTP/1.1
Host: google.com
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64)
Accept: text/html,application/xhtml+xml,application/xml
Accept-Language: en-US,en;q=0.9
```

[Empty body for GET request]

5. HTTP Response Recieved

HTTP RESPONSE

```
HTTP/1.1 200 OK
Date: Mon, 26 Aug 2024 12:34:56 GMT
Content-Type: text/html; charset=UTF-8
Content-Length: 10240
Connection: keep-alive

<!DOCTYPE html>
<html>
  <head><title>Search results for KFUPM</title></head>
  <body>... (HTML content) ...</body>
</html>
```

6. Browser Renders Page

Response is returned in HTML, CSS and JS

A Simple HTML Page

```
<!doctype html>
<html>
  <head>
    <style>
      body { background-color: lightblue; }
    </style>
  </head>
  <body>
    Hello, world!
    <script>
      console.log('Hello from JavaScript!');
    </script>
  </body>
</html>
```

30 mins

Build a simple HTML page

- Pull the latest changes from the Repo
- Go to demo 1.2 hello html
- Read the instructions in the README.md file

Thank you

Next class:

- HTML Document
- Basic HTML Tags
- HTML Lists
- HTML Tables
- HTML Images