ENSF 381
Full Stack Web Development

Lecture 02:
Foundations of Web Development

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UNIVERSITY OF CALGARY

Outline

- What is full stack development.
- An overview of frontend.
- Frontend technologies.
- An overview of backend.
- Backend technologies.

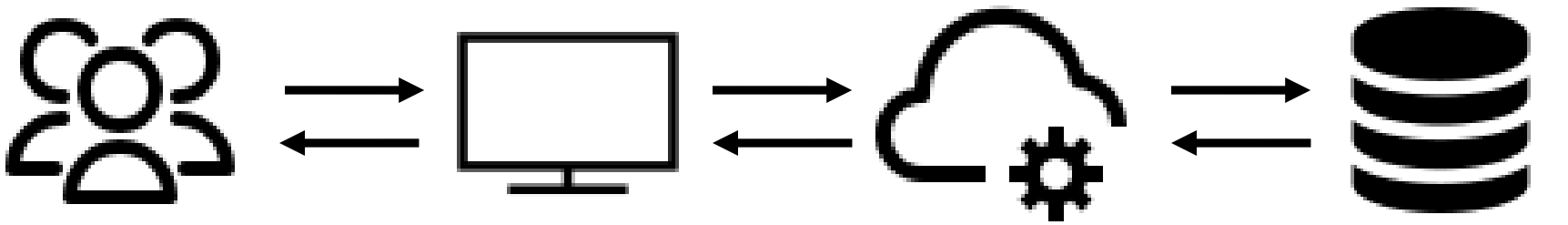
What is full stack development?

The process of **designing**, **developing**, **testing**, and **deploying** end-to-end web application.

It involves working with various technologies and tools:

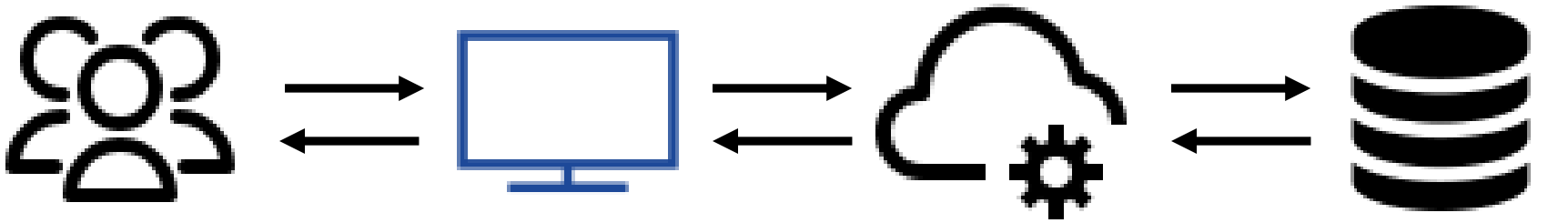
- Front-end web development.
- Back-end web development.
- Database development.

Full stack application overview



User **Frontend** **Backend** **Database**

Full stack application overview



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What is frontend?

Everything a user sees and interacts with when they click on a link or type in a web address. It includes:

- Content and styles.
- Buttons.
- Links.
- Textboxes.
- Images.
- Videos.

Also called **client-side**

Frontend - example

Contents hide

(Top)
- History
- Administration
- Academics
- Campuses
- Facilities
- Athletics
- Media
- Residence
- Student life
- Scholarships and awards
- Aboriginal
- Notable people
- Arms
- See also

University of Calgary

33 languages

Article Talk | Read Edit View history Tools

From Wikipedia, the free encyclopedia

Coordinates: 51°04′39″N 114°07′59″W

The **University of Calgary** (**U of C** or **UCalgary**) is a public research university located in Calgary, Alberta, Canada. The University of Calgary started in 1944 as the Calgary branch of the University of Alberta, founded in 1908, prior to being instituted into a separate, autonomous university in 1966. It is composed of 14 faculties and over 85 research institutes and centres. The main campus is located in the northwest quadrant of the city near the Bow River and a smaller south campus is located in the city centre. The main campus houses most of the research facilities and works with provincial and federal research and regulatory agencies, several of which are housed next to the campus such as the Geological Survey of Canada. The main campus covers approximately 200 hectares (490 acres).

A member of the U15, the University of Calgary is also one of Canada's top research universities (based on the number of Canada Research Chairs). The university has a sponsored research revenue of $380.4 million,[7][8] with total revenues exceeding $1.2 billion. The university maintains close ties to the petroleum and geoscience industry through the Department of Geosciences and the Schulich School of Engineering.[*further explanation needed*] The university also maintains several other departments and faculties, including the Cumming School of Medicine, the Faculty of Arts, the School of Public Policy, the Faculty of Law, and the Haskayne School of Business.[9][10][11]

Notable former students include Canadian Prime Minister Stephen Harper, Java programming language

University of Calgary

Coat of arms

Motto	*Mo Shùile Togam Suas* (Gaelic)
Motto in English	I will lift up my eyes
Type	Public
Established	26 April 1966 (57 years ago)

Why frontend development is important?

Frontend development is essential for creating an aesthetically pleasing, user-friendly, and high-performing interface that **contributes significantly to the overall success of a website or web application**.

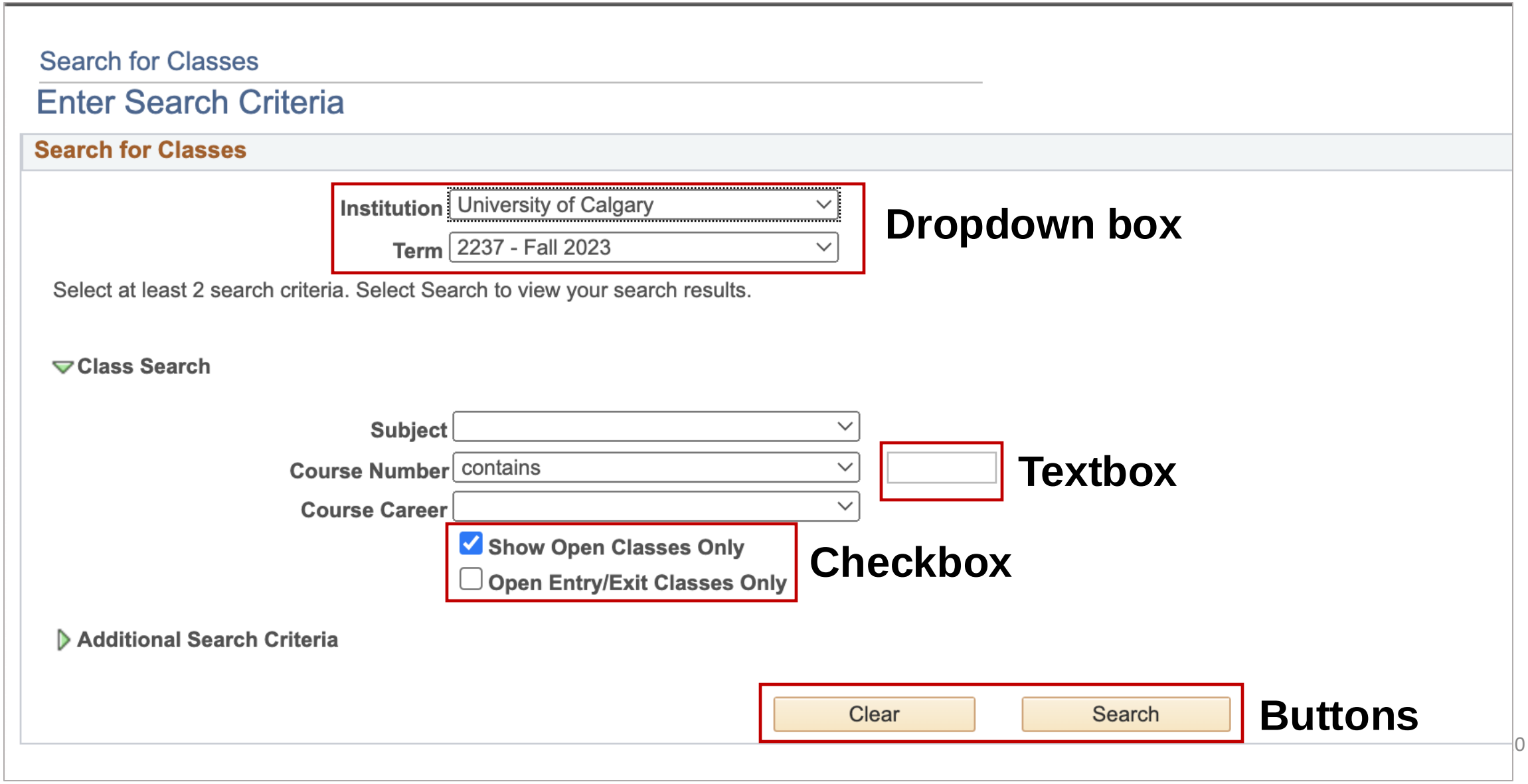
"It takes users 0.05 seconds to decide if your website is worth their time, and 2.6 seconds to form a full impression about your website and your company."[1]

[1] https://www.studioumbrella.com/raindrops-blog/post/10-statistics-to-consider-when-thinking-about-your-website-ui-and-ux-performance

Frontend tools and technologies

- HyperText Markup Language (HTML): create content and layout of a webpage using semantic HTML.

HTML elements – example



Frontend tools and technologies

- HyperText Markup Language (HTML): create content and layout of a webpage using semantic HTML.

- Cascading Style Sheets (CSS): Used to style HTML elements (e.g., font color, text size).

Frontend - example

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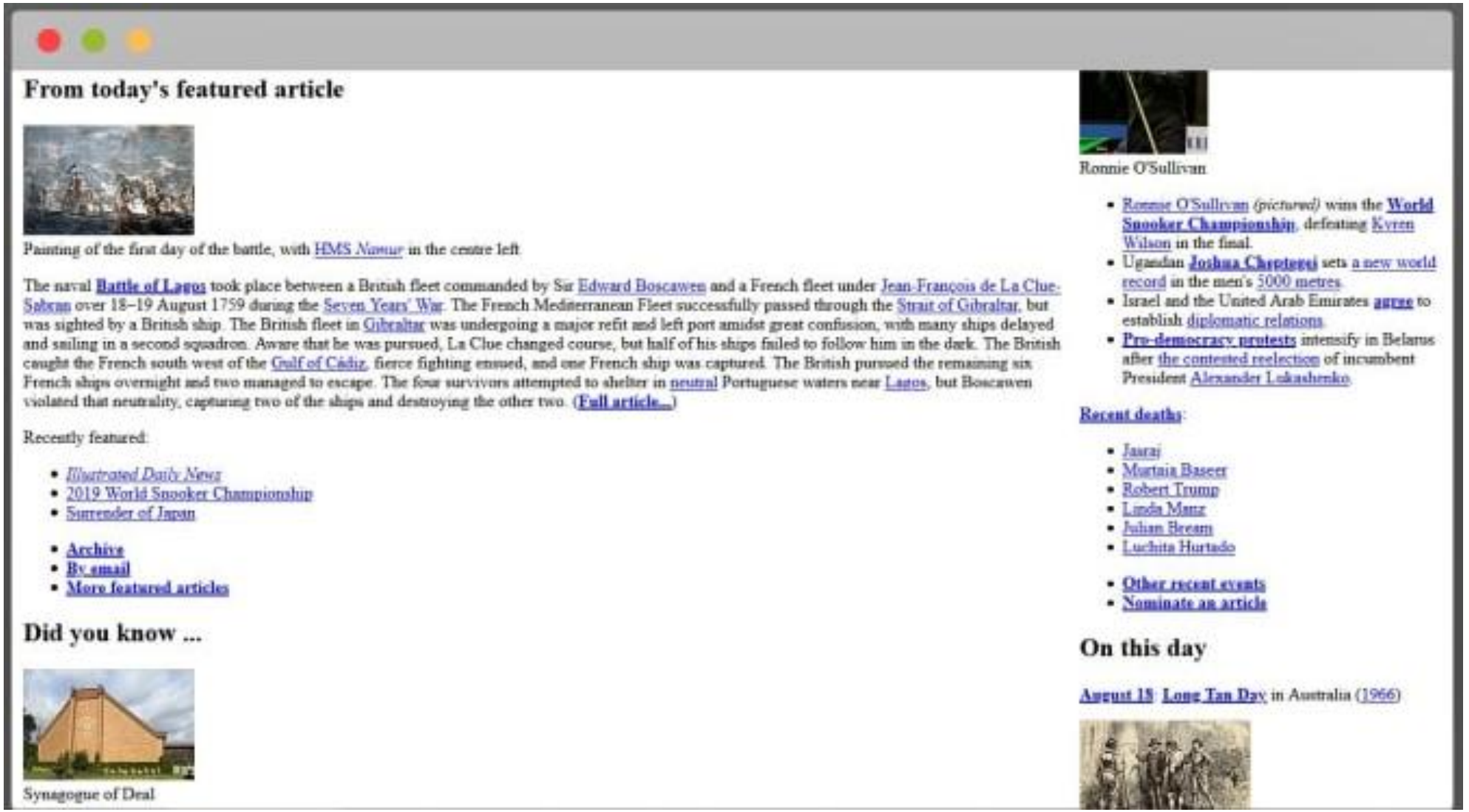
Wikipedia without CSS



From today's featured article

Painting of the first day of the battle, with HMS *Namur* in the centre left

The naval **Battle of Lagos** took place between a British fleet commanded by Sir Edward Boscawen and a French fleet under Jean-François de La Clue-Sabran over 18–19 August 1759 during the Seven Years' War. The French Mediterranean Fleet successfully passed through the Strait of Gibraltar, but was sighted by a British ship. The British fleet in Gibraltar was undergoing a major refit and left port amidst great confusion, with many ships delayed and sailing in a second squadron. Aware that he was pursued, La Clue changed course, but half of his ships failed to follow him in the dark. The British caught the French south west of the Gulf of Cádiz, fierce fighting ensued, and one French ship was captured. The British pursued the remaining six French ships overnight and two managed to escape. The four survivors attempted to shelter in neutral Portuguese waters near Lagos, but Boscawen violated that neutrality, capturing two of the ships and destroying the other two. (**Full article...**)

Recently featured:

- *Illustrated Daily News*
- 2019 World Snooker Championship
- Surrender of Japan

- **Archive**
- **By email**
- **More featured articles**

Did you know ...

Synagogue of Deal

Ronnie O'Sullivan

- Ronnie O'Sullivan *(pictured)* wins the **World Snooker Championship**, defeating Kyren Wilson in the final.
- Ugandan **Joshua Cheptegei** sets a new world record in the men's 5000 metres.
- Israel and the United Arab Emirates **agree** to establish diplomatic relations.
- **Pro-democracy protests** intensify in Belarus after the contested reelection of incumbent President Alexander Lukashenko.

Recent deaths:

- Jasraj
- Murtaja Baseer
- Robert Trump
- Linda Manz
- Julian Bream
- Luchita Hurtado

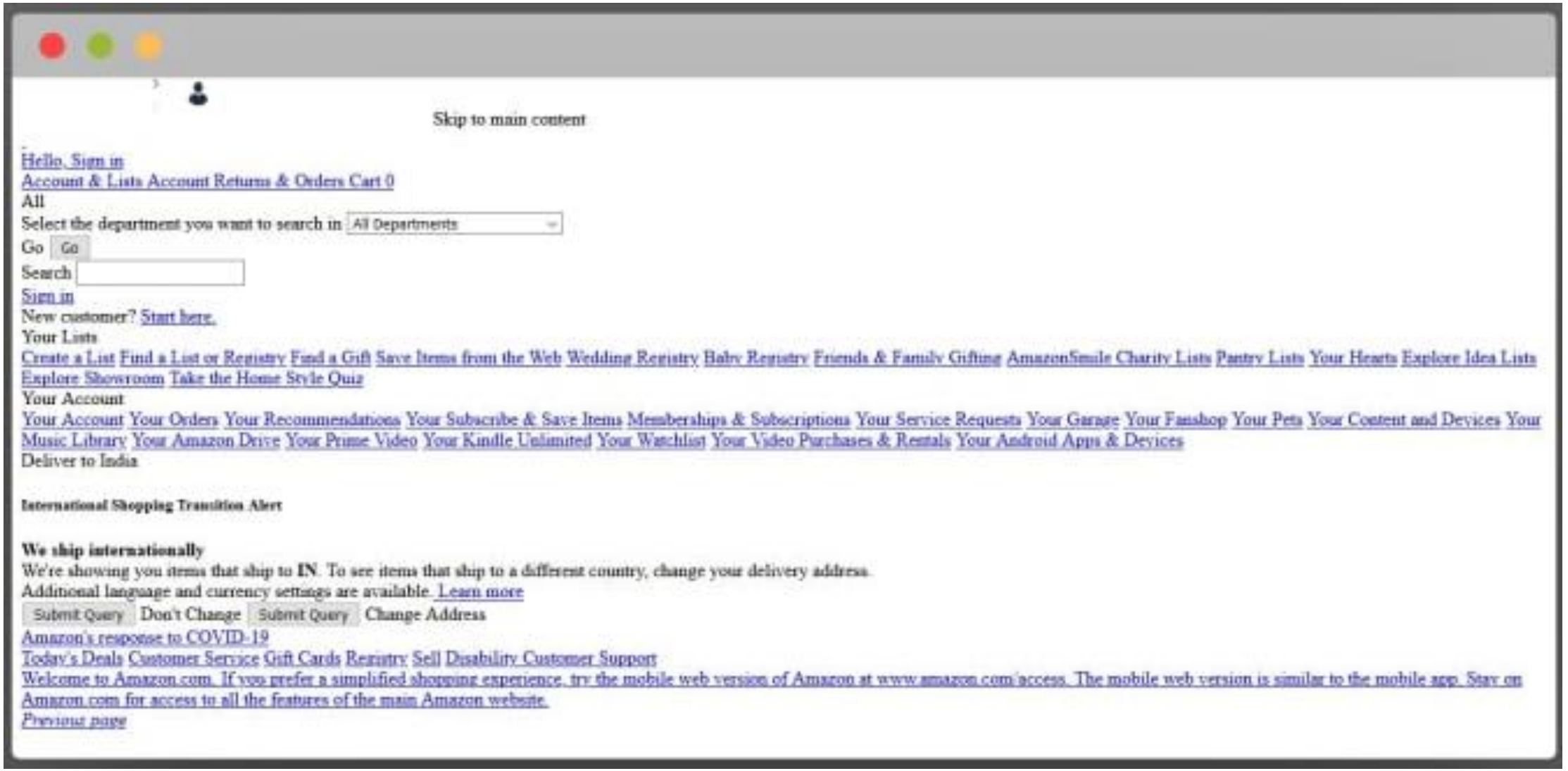
- **Other recent events**
- **Nominate an article**

On this day

August 18: **Long Tan Day** in Australia (1966)

https://dev.to/vaibhavkhulbe/the-web-without-css-18d

Amazon without CSS

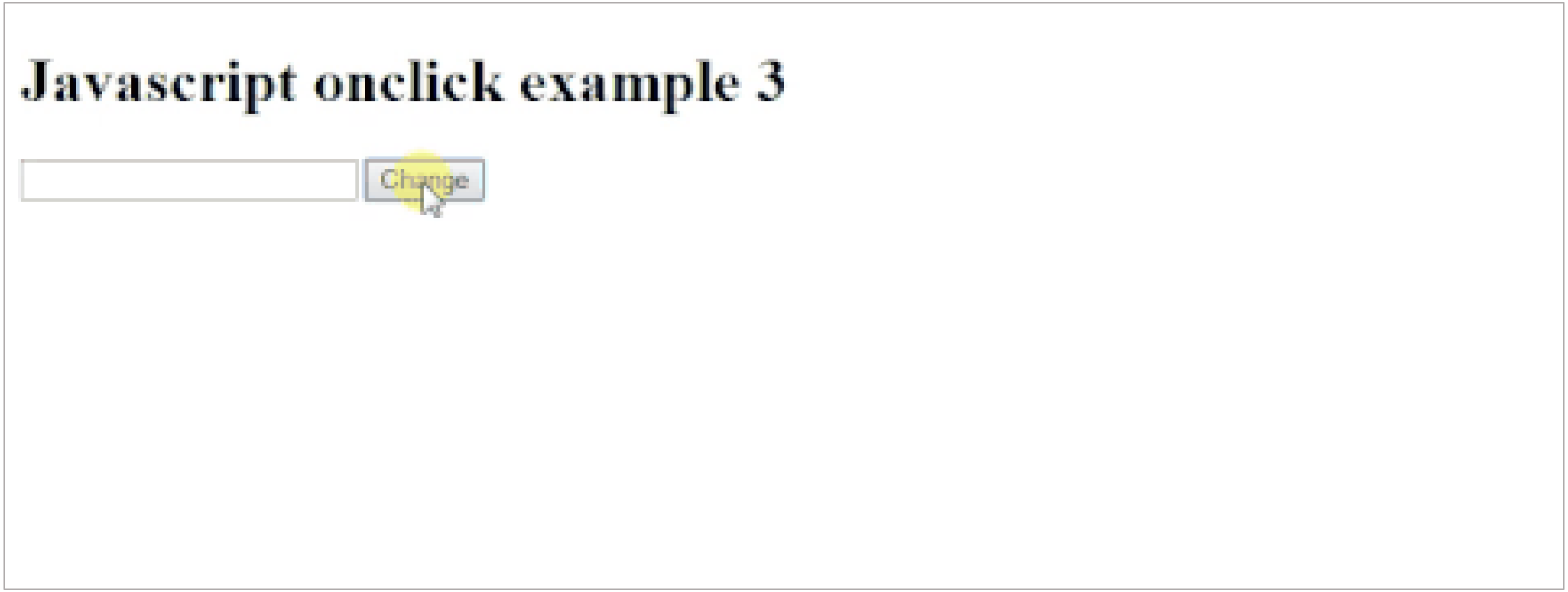


https://dev.to/vaibhavkhulbe/the-web-without-css-18d

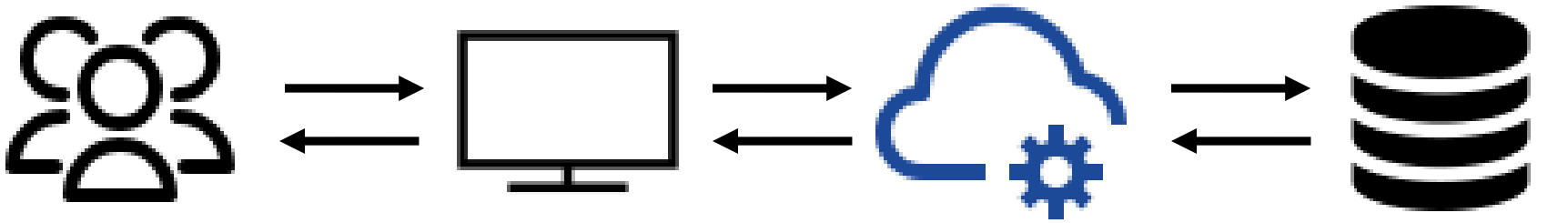
Frontend tools and technologies

- HyperText Markup Language (HTML): create content and layout of a webpage using semantic HTML.
- Cascading Style Sheets (CSS): Used to style HTML elements (e.g., font color, text size).
- JavaScript: Adding dynamic behavior for web pages.

JavaScript - Example



Full stack application overview



User **Frontend** **Backend** **Database**

What is backend?

- Backend development is responsible for manipulating and storing user data.
- Backend contains the **business logic** of the web application.
- Pertains to the underlying processes and essential components responsible for the seamless and proper functioning of the front-end.
- Also called **server-side**.
- Users have no direct access to or interact with.

Why backend development is important?

- Creating, managing, and maintaining the type of database the product/service uses.
- Conducting data validation to verify the correct format of data before its storage in the database.
- Ensuring secure user interactions with their accounts.
- Managing interactions with third-party services.

Backend - examples

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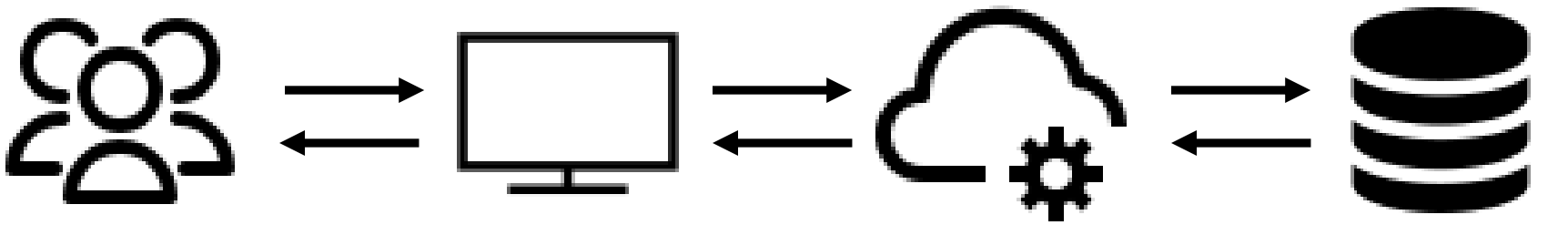
facebook

Uber

NETFLIX

Full stack application overview



User **Frontend** **Backend** **Database**

Backend tools and technologies

Backend developers employ various tools and technologies in their daily tasks:

- PHP
- Python
- Ruby
- Java
- Node.js
- Django
- Flask
- Express
- Ruby on Rails

Frontend vs. backend

- **Responsibility:**
  - Frontend: Concerned with the user interface.
  - Backend: Manages server-side logic, database interactions, and application functionality.

- **Execution Environment:**
  - Frontend: Runs in the user's browser, executing code locally.
  - Backend: Operates on a server and interacting with databases.

Frontend vs. backend

- **Visibility:**
  - Frontend: Visible to users and responsible for the visual aspects of the application.
  - Backend: Invisible to users, working behind the scenes to process requests and manage data.

- **User Interaction:**
  - Frontend: Directly interacts with users, presenting information and collecting input.
  - Backend: Indirectly interacts with users through managing data and business logic.

Questions

Question…

Is it always essential to have a backend or frontend?

- The necessity of a backend or frontend depends on the specific requirements and functionalities of the project.
- In some cases, both may be essential, while in others, one or the other may suffice.