Unit -5

Web Application Deployment

Web Design

- Web designing is the process of planning, conceptualizing, and implementing the plan for designing a website in a way that is functional and offers a good user experience.
- User experience is central to the web designing process.
- Websites have an array of elements presented in ways that make them easy to navigate.
- Web designing essentially involves working on every attribute of the website that people interact with, so that the website is simple and efficient, allows users to quickly find the information they need, and looks visually pleasing. All these factors, when combined, decide how well the website is designed.

Concepts of Effective Web Design

- Within just 10-15 seconds a visitor landing on your website can decide whether he/she should stay there or switch from there.
- No matter how much complex code you have written in the backend part of your website if your UI/UX part is not impressive then a user won’t take interest in other things and will move away from there.
- Website designing is subjective where a design can be impressive for one user, but the same design might be ugly for another user and that’s the reason it is one of the most complex and creative jobs for designers.
- Web designing is not just about adding content and elements on your website to make it beautiful, it’s also about how you add everything to make it easy to use.
- Some factors of poor website designing are -
  - If the user is unable to determine the purpose of your website,
  - If the user is facing difficulty in navigating from one page to another page,
  - If the page layout is not impressive and easy to understand.

Principles of Effective Web Design

- User-centric design
- Self-explanatory
- Test Early, Test Often
- Purpose (the needs of the user)
- Navigation / Communication –
  - organising information using headlines and sub headlines, using bullet points instead of long windy sentences
- Typefaces
  - Use easy to read fonts (Sans Serif fonts such as Arial and Verdana).
  - The ideal font size for reading easily online is 16px and stick to a maximum of 3 typefaces in a maximum of 3 point sizes to keep your design streamlined.
- Colours
  - Complementary colours create balance and harmony. Using contrasting colours for the text and background will make reading easier on the eye.
- Images
- “F” Pattern design
  - Most of what people see is in the top and left of the screen and the right side of the screen is rarely seen.
- Load time
- Mobile friendly / Multiple screen size friendly

Web Design Issues

- Browser & Operating System
- Bandwidth and Cache
- Display resolution
- Look and Feel of the Website
- Page Layout and linking
- Locating Information
- User centric design
- Sitemap

Browser & Operating System

- The different browsers and their versions greatly affect the way a page is rendered, as different browsers sometimes interpret same HTML tag in a different way.
- Different versions of HTML also support different sets of tags.
- Same browser may work slightly different on different operating system and hardware platform.
- To make a web page portable, test it on different browsers on different operating systems.
- Validate your HTML doc using W3C validator.

Bandwidth and Cache

- Connection speed plays an important role in designing web pages, if user has low bandwidth connection and a web page contains too many images, it takes more time to download.
- Browser provides temporary memory called cache to store the graphics.
- When user gives the URL of the web page for the first time, HTML file together with all the graphics files referred in a page is downloaded and displayed.

Display Resolution

- As we do not have any control on display resolution of the monitors on which user views our pages.
- Display or screen resolution is measured in terms of pixels and common resolutions are 800 X 600 and 1024 X 786. (1204 X 1024)
- We have 3 choices for Web page design.
  - Design a web page with fixed resolution.
  - Make a flexible design using HTML table to fit into different resolution.
  - We can use centered design to display page properly.

Look and Feel of the Website

- Look and feel of the website decides the overall appearance of the website.
- It includes all the design aspects such as
  - Web site theme
  - Presentation
  - Graphics
  - Visual structure
  - Fonts, Graphics, and colors
  - Navigation etc…

Page Layout and linking

- Website contains of individual web pages that are linked together using various navigational links.
- Page layout defines the visual structure of the page and divides the page area into different parts to present the information of varying importance.
- Page layout allows the designer to distribute the contents on a page such that visitor can view it easily and find necessary details.

Locating Information

- Webpage is viewed on a computer screen and the screen can be divided into five major areas such as center, top, right, bottom and left in this particular order.
- Well designed websites put
  - Left side provide links or menu
  - Top is used for logo and title or news
  - Right side provide link for other information
  - Bottom is used for quick link or copyright message

User-Centric Design

- It is very difficult for any Web designer to predict the exact behavior of the Web site users.
- However, idea of general behavior of common user helps in making design of the Web site user centric.
- Users either scan the information on the web page to find the section of their interest or read the information to get details.

Sitemap

- Many a times Web sites are too complex as there are a large number of sections and each section contains many pages.
- User gets confused about where he/she is and where to go from there.
- Provide the navigation bar on each page to jump directly to a particular section.
- Provide sitemap including links to each section and their page directly.

Planning and Publishing website

- To achieve higher success of the website in terms of user satisfaction, better planning is needed.
- Before we start developing a website, we should ask question such as
  - Why are we developing this website?
  - What do we achieve by developing this website?
  - who will use this website?
  - What are the information contents?
  - How are these contents organized?
  - What are the possible ways?

Designing Effective Navigation

- The most important design element in the web design after page layout is navigation design.
- Navigation means the ways to move from one page to another page in a Web site using hyperlinks provided on the page.
- If navigation design is not proper then user feels the problem in moving around the pages in your site in a desired manner or gets confused and leaves the site.

Tips for Effective Navigation

- Navigation links are either text based, i.e. a word or a phrase is used as a link, or graphical, i.e. a image, i.e. a icon or a logo is used as a link.
- Navigation links should be clear and meaningful.
- It should be consistent (accurate).
- Link should be understandable.
- Organize the links such that contents are grouped logically.

Tips for Effective Navigation

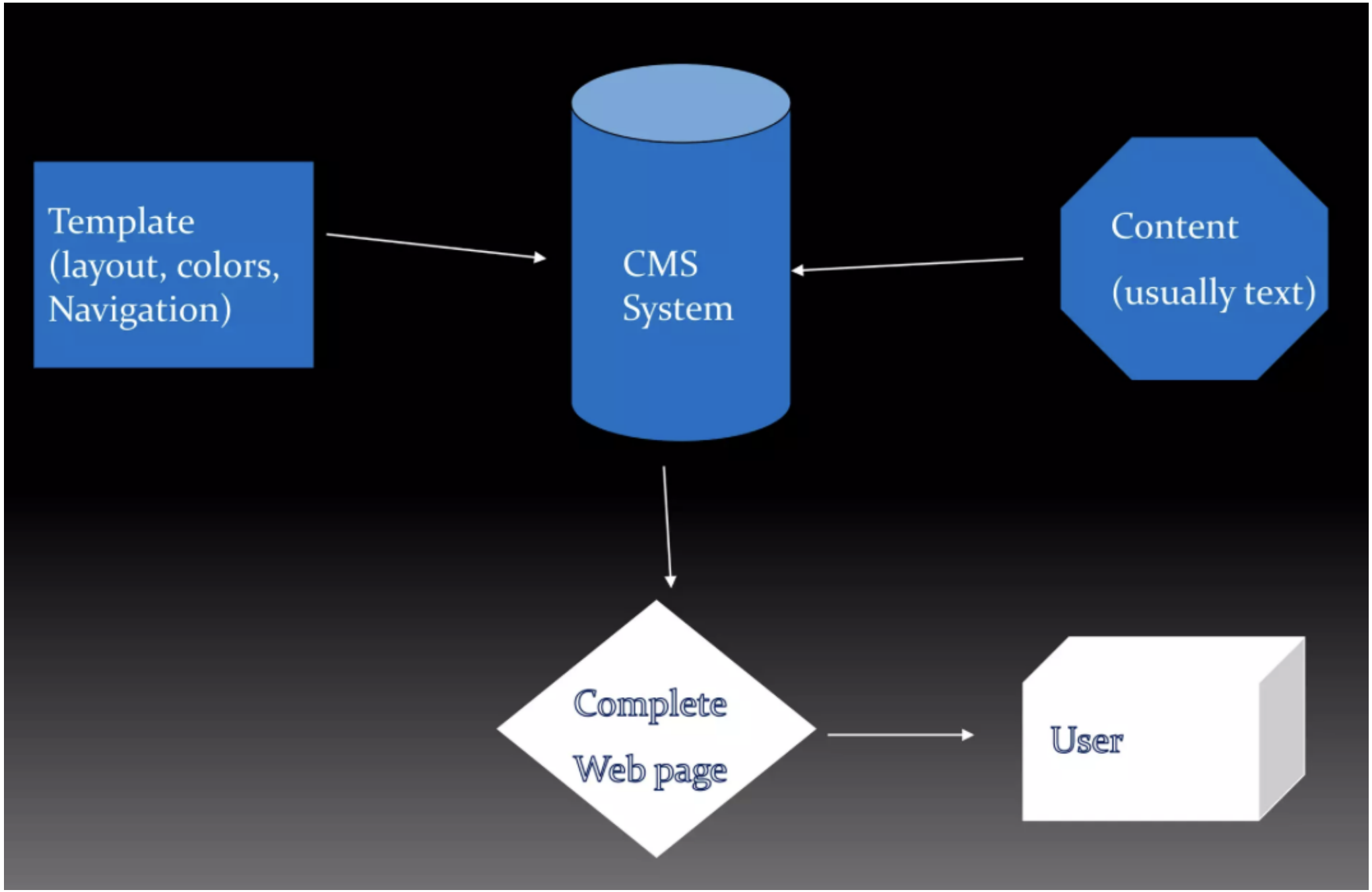
- Provide search link, if necessary, usually on top of the page.
- Use common links such as ‘about us’ or ‘Contact us’.
- Provide the way to return to first page.
- Provide the user with information regarding location
- Horizontal navigation bar can be provided on each page to directly jump to any section

Content Management System

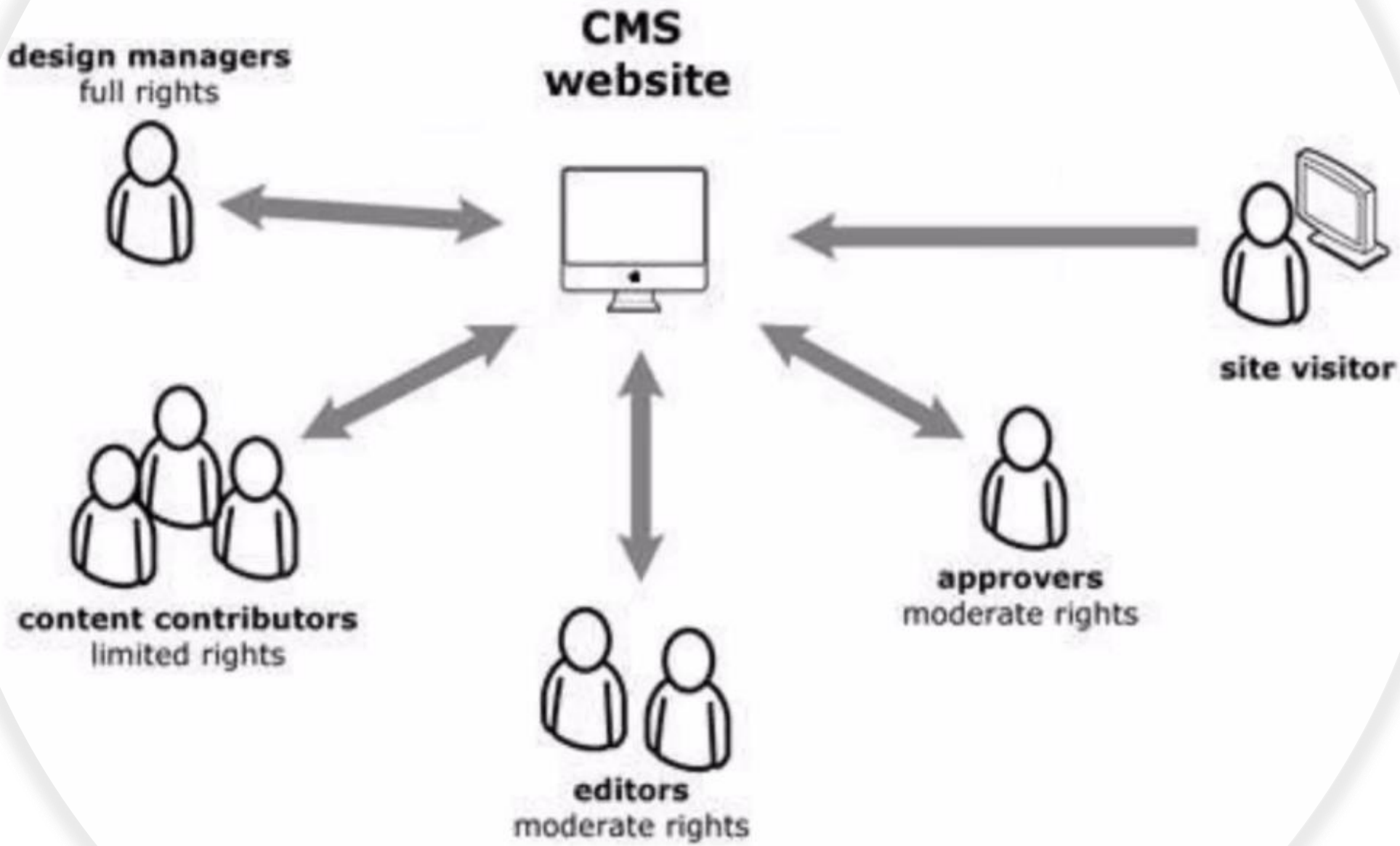
- A content management system (CMS) is software that helps users create, manage, and modify content on a website without the need for technical knowledge.
- In other words, a CMS lets you build a website without needing to write code from scratch (or even know how to code at all).
- Instead of building your own system for creating web pages, storing images, and other functions, the content management system handles all that basic infrastructure stuff for you so that you can focus on more forward-facing parts of your website.
- Some of the best and most popular CMS providers are: Wordpress, Joomla, Drupal, Optimizely CMS, Contentful, Squarespace, and Wix.

Content Management System

- Content Management Systems are typically used for enterprise content management (ECM) and web content management (WCM).
- An enterprise content management system manages both structured and unstructured content. It includes software, strategies and security to effectively manage content.
- A web content management system is similar to an ECM system, but the differentiating factor is the WCMS is for web content -- such as product pages on e-commerce websites. It contains a publishing tool and facilitates collaborative authoring.


Template
(layout, colors,
Navigation)
CMS
System
Content
(usually text)
Complete
Web page
User

How CMS Works



Key Features

- Publishing controls
  - It’s important to have publishing controls and permissions. Authors might have different roles and need varying levels of access to the CMS.
- Content editing tools
  - CMS interface include adding images, videos, "drag-and-drop" features and proper publishing tools that make it easy to schedule and update content as needed.
- Content staging
  - This feature gives the users the ability to test out a new content design without having to make changes that the public can see.
- Analytics
  - A CMS system should have a built-in analytics system to measure performance. Indicators like how visitors are interacting with the content and on which devices are among the important data points the CMS should maintain.
- Security measures
  - A CMS system should have following security measures
    - a web application firewall
    - a security team
    - static code analysis and vulnerability scans
    - A content delivery network (CDN) to help prevent DDoS attacks?
- Template and Theme Offerings

Advantages of Content Management System

- It's puts user in control.
- " Don't have to be expertise.
  - WHY TO LEARN HTML WHEN CMS AVAILABLE.!!
- Large scale changes can be made to site much easier.
- Structured content and content reuse.
- Security and control.
- Saves money and time.
- Open source so, it is WIN-WIN condition for user

Advantages of Content Management System

- Stronger collaboration and organization
  - With a CMS, multiple content marketing team members can contribute and help publish content.
- User friendly
  - With a CMS, users don’t have to learn HTML or CSS. No matter their skill level, users across the organization can create and publish content. A content management system makes it easy to upload content onto web pages and update it through a content editor.
- SEO and content optimization tools and plug-ins
  - A CMS typically provides built-in SEO features or plug-ins for optimizing content. With a CMS, you can add plug-ins and tools to increase your search ranking. These tools can include options within the front-end interface to add web page titles, meta descriptions, and alt tags.
- More time to spend on content
  - Content creators can concentrate on producing quality content. Marketing teams don't have to work with multiple files or code. They can share their work with colleagues easily, even if those colleagues are miles away. They have time to refine copy, tweak imagery, produce more video content, or conduct A/B testing on different subject lines, offers, CTAs, and formats.

Benefits of Content Management System

- **Ease of use**
  - Due to a graphical user interface, even those with limited technical knowledge can use the software.
- **Easy to search for information**
  - A built-in search function enables users to enter what they are searching for and have a list of items returned to them -- much like a Google search engine.
- **Easy to manage content**
  - Not only is creating content easy but so is removing content. A CMS makes it easy to unpublish content to keep websites up to date.
- **Accessible from anywhere**
  - A CMS can be cloud-based or on premises, but users can access content from anywhere with a device that's connected to the internet.
- **Allows multiple users**
  - A CMS makes it easy to manage publishing permissions.
- **Instant content updates**
  - A CMS enables users to manage and update content in real time -- without needing to wait for a developer.
- **Easy to scale**
  - A CMS makes it easy for businesses to add new web pages as their business grows without the need for a developer.
- **Easy to update**
  - Development teams can roll out updates with just a few clicks.

Examples of a CMS

- **WordPress:** Originally was a web content management system that was built to publish blogs, but has extended into many other areas. The open source management system can be used for websites, professional portfolios, e-commerce stores and more.
- **Drupal:** The open source CMS is used by many companies around the globe to build and maintain their websites. The user interface is easily accessible and allows you to create and publish unlimited content.
- **Squarespace:** Unlike the CMSs mentioned above, Squarespace is an all-in-one content management system, meaning with a single subscription the owner can do it all without needing third-party integrations. This is a popular CMS for small businesses online and in-store.
- **Joomla:** This CMS is another open source system to build websites and online applications. It is SEO-friendly and features unlimited designs and built-in multilingual capabilities.
- **Shopify:** This e-commerce platform wouldn't be able to function without its CMS. The platform is built for businesses that want to create online stores. They are then able to edit and manage different content types through one software system.
- **Adobe Experience Manager:** The "marketer-and developer-friendly" software has a combination of CMS and DAM features. It's fitting for businesses looking for one platform to handle their content management, digital asset management, digital enrollment, forms, and more.
- **Salesforce CMS:** This hybrid CMS allows organizations to create and deliver content to any device and customize as the customer sees fit. The software is multi-language and can be run on the web or on an app.
- **Wix:** The web-based platform is software that creators and businesses use to make and manage their own websites without needing to know how to code. The platform provides advanced SEO features and marketing tools.

Examples of CMS Applications

- Website Management:
  - CMSs are widely used for building and managing websites, allowing users to create, edit, and publish web pages without needing to code.
- Blog Management:
  - They provide tools for creating and managing blogs, including features for posting, commenting, and managing categories.
- App Development:
  - CMSs can be used to manage content for mobile apps, including text, images, and other assets.
- Digital Marketing:
  - CMSs can be used for managing digital marketing campaigns, including email marketing, social media, and website optimization.

What is MongoDB?

- Most popular NoSQL database.
- Open-source document-oriented database.
- Its scale-out architecture allows you to meet the increasing demand for your system by adding more nodes to share the load.
- MongoDB uses BSON (Binary JSON) to query database.
- Stores data in the form of BSON documents.

Features of MongoDB

- **Indexing**: Efficient search & data processing in very less time.
- **Scalability**: MongoDB scales horizontally using sharding (partitioning data across various servers). Also, new machines can be added to a running database.
- **Replication & High Availability:** Multiple copies of data is replicated on different servers which protects the database from hardware failures. If one server goes down, the data can be retrieved easily from other active servers which also had the data stored on them.
- **Load balancing:** It has an automatic load balancing configuration because of data placed in shards.
- **Aggregation:** Aggregation operations process data records and return the computed results. It is like the GROUPBY clause in SQL. A few aggregation expressions are sum, avg, min, max, etc.
- **Languages supported:** The list of supported languages includes Node.js, C, C++, C#, Go, Java, Perl, PHP, Python, Ruby, Rust, Scala, and Swift.

MongoDB Data Types

- String
- Integer
- Boolean
- Double
- Min/ Max keys
- Arrays
- Timestamp
- Object
- Null
- Symbol
- Date
- Object ID
- Binary data
- Code
- Regular expression

Who's is using MongoDB?

MongoDB has been adopted as backend software by a few major websites and services including Toyota, Cisco, Shutterfly, Adobe, Ericsson, Craigslist, eBay, and Foursquare.

MongoDB Terms

- **Databases:** A database stores one or more collections of documents.
- **Collections:** MongoDB stores documents in collections. Collections are analogous to tables in relational databases.
- **Documents:** MongoDB stores data records as BSON documents & similar to JSON objects. It is analogous to row in relational databases. These are composed of field-and-value pairs and have the following structure:

```
{
  field1: value1,
  field2: value2,
  field3: value3,
  ...
  fieldN: valueN
}
```

- **Fields Names:** These are strings analogous to column in relational databases.

Example


{
name: "sue",
age: 26,
status: "A",
groups: ["news", "sports"]
}
field: value
field: value
field: value
field: value

SQL Vs MongoDB Terms

SQL Term	MongoDB Term
Database	Database
Table	Collection
Index	Index
Row	BSON document
Column	BSON field
Primary Key	_id field
Group by	Aggregation
Join	Embedding and Linking