**Software Engineering**

* Software Engineering is the structured process of designing, building, testing, and maintaining software using engineering principles.
* It focuses on creating reliable and scalable software while managing cost, time, and quality.

**SDLC**

* Software Development Life Cycle is the step-by-step process that is followed to create software.
* In includes stages like:
  + Planning
  + Requirement analysis
  + Design
  + Coding
  + Testing
  + Deployment
  + Feedback & Maintenance
* SDLC helps teams stay organized, reduce errors, manage time and cost, and deliver high-quality software by breaking complex tasks into manageable phases.

**Common Software Engineering Tools**

* Code editors like VS Code
* Version control systems like Git
* Bug tracking like Jira
* Testing tools like Selenium or JUnit
* CI / CD tools like Jenkins or GitHub Actions
* Design tools like Figma

**Different Software Models**

* Waterfall Model
* Iteration Model
* Spiral Model
* The V Model

**Web Development**

**Website**

* A **website** can be defined as a collection of web pages that are all related to each other and can be accessed by visiting the homepage from browsers to access information.
* Websites are mainly used to bridge the gap between one who wants to share information and those who want to consume.
* Every website is accessed using a **URL (Uniform Resource Locator)** which is a **Unique Global Address.**
* A **Website URL** looks like this: ***https://www.tutorialspoint.com/resources/tutorials/about\_careers.htm***

andcontains the following:

**1. Protocol**

* **Example**: http:// or https://
* **Purpose**: Specifies how data is transferred between your browser and the server.
  + http uses **port 80**
  + https (secure) uses **port 443**

**2. Subdomain**

* **Example**: www. (default), but can be others like blog., mail., etc.
* **Purpose**: Helps organize and separate different sections of a website.

**3. Domain Name**

* **Example**: tutorialspoint
* **Purpose**: The main identity of the website, often chosen to reflect the brand or purpose.

**4. Top-Level Domain (TLD) or Suffix**

* **Examples**: .com, .org, .net, .info, .biz, or country-specific like .in, .uk, .jp
* **Purpose**: Indicates the type or origin of the website.
* For a full list, you can refer to Wikipedia’s TLD list

**5. Directory Path**

* **Example**: /resources/tutorials/
* **Purpose**: Points to a specific folder or location on the server.

**6. Webpage or File**

* **Example**: about\_careers.htm
* **Purpose**: The actual file or page being accessed.

**Domain Names**

* Domain names are the part of our online address, and our users will use them to find easily, follow below rules while selecting domain names:

**Rule 1: Brand-Friendly Naming**

* Choose a domain that **matches your brand name**.
* Avoid generic or hard-to-remember names like tutorials-points.com.
* Example: tutorialspoint.com is clean and brandable.

**Rule 2: Avoid Numbers (Unless in Your Brand)**

* Don’t use numbers unless they’re part of your brand.
* Example: tutorialspoints29.com is confusing and not brand aligned.

**Rule 3: Buy Multiple Extensions (If Possible)**

* Secure .com, .net, .info, .biz, etc., to protect your brand.
* Also consider **misspellings** (e.g., gogle.com redirects to google.com).

**Rule 4: Avoid Trademark Conflicts**

* Make sure your domain isn’t **already trademarked or copyrighted**.

**Rule 5: Keep It Short**

* Short domains are easier to **type, share, remember**, and rank better on social media/search engines.

**Rule 6: Choose the Right Extension**

* .com is most popular, but hard to get short names.
* Use **country-specific TLDs** (like .in) for local businesses.

**Rule 7: Use Keywords If Not Brand Based**

* If not using a brand name, include **relevant keywords**.
* Example: tutorialspoint.com clearly reflects the site's purpose.

**Domain Name Registration**

Domain Name Registration is very important to achieve the following:

**1. Ownership & Exclusivity**

* Registering a domain gives you **legal ownership** of that domain name.
* No one else can use it as long as you keep renewing it.

**2. ICANN Accreditation**

* ICANN (Internet Corporation for Assigned Names and Numbers) is the **global authority** that manages domain names and IP addresses.
* Platforms like GoDaddy are **ICANN-accredited registrars**, meaning they are authorized to register domains officially.

**3. DNS Setup**

* Registration allows you to configure **DNS (Domain Name System)** settings.
* This is how your domain connects to your hosting (e.g., Netlify, GitHub Pages, etc.).

**4. Security & Legitimacy**

* Registered domains can use **HTTPS**, email services, and other secure features.
* It also adds **credibility** to your brand or portfolio.
* Some of the biggest registrars where you can register your domain are given below −
* [GoDaddy](https://uk.godaddy.com)
* [Name](https://www.name.com/)
* [iPage](https://secure.ipage.com/secure/login.html)
* [Hostinger](https://www.hostinger.com/in/domain-name-search)
* [BlueHost](https://www.bluehost.com/)
* [Hostgator](https://www.hostgator.com/)

**Domain Privacy**

* **ICANN** broadly requires that the mailing address, phone number and e-mail address of those owning and administrating a domain name should be made publicly available through the "WHOIS" directories.
* This rule enables spammers, direct marketers, identity thieves or other attackers to use the directory for personal information.
* However, with the offer of private registration from many registrars, some of the risk has been mitigated.
* There are four contact positions in a domain's WHOIS record, which are −
  + Owner
  + Administrator
  + Billing and Technical
* **WHOIS** is a **public database** that stores information about:
* Who owns a domain name
* When it was registered
* When it expires
* Which registrar was used
* Contact details of the domain owner (unless privacy protection is enabled)

**DNS Records**

* **DNS records** are mainly used to convert domain names into **servers IP** that host this website.
* It is important to mention that the records are entered at domain registrars. They generally provide you with a DNS manager panel.
* The main purpose is that people and applications don’t have to remember big numbers to navigate to a domain.
* While using domain name providers like **godaddy**, we need to configure **DNS Records** manually by referring to this [**page**](https://www.tutorialspoint.com/website_development/configure_dns_record_on_hosting_platform.htm)**.**
* When using domain name providers like **Hostinger** we may not always manually configure DNS Records for our domain names as **Hostinger often auto-configures DNS records for you**, especially if:
* You **buy both the domain and hosting** from Hostinger.
* You use their **website builder or WordPress setup**.

**🔍 When You Might Need to Configure DNS Manually**

You’ll need to manually configure DNS records if:

1. You **buy the domain from Hostinger** but host your site elsewhere (e.g., Netlify, GitHub Pages).
2. You want to set up **custom email services** (like Zoho or Google Workspace).
3. You need to add **special records** like:
   * A Record to point to a specific IP
   * CNAME for subdomains
   * MX for email routing
   * TXT for SPF/DKIM (email security)
   * NS if you're using external name servers

**WebSite Development CPanel**

**CPanel** is a web-based control panel that lets you manage your web hosting account easily — no need for coding or external tools.

Think of it as the dashboard for your website, where you can:

* Upload files
* Manage databases
* Set up emails
* Monitor traffic
* Secure your site

It’s the most widely used control panel in the hosting industry.  
Official site: <https://cpanel.net>

**Why Is CPanel Used?**

| **Purpose** | **Benefit** |
| --- | --- |
| **Website Management** | Upload files, install CMS like WordPress |
| **Database Control** | Create/manage MySQL databases |
| **Email Setup** | Create domain-based email accounts |
| **Security Settings** | Block IPs, enable SSL, manage firewalls |
| **Backup & Restore** | Download full or partial backups |
| **Domain Management** | Add subdomains, redirect URLs, manage DNS |

**How to Use cPanel (Real-World Example)**

Let’s say you bought a domain from **GoDaddy** and hosting from **Hostinger**. You want to host your portfolio site.

**🔹 Step-by-Step:**

1. **Access cPanel**
   * Go to: yourdomain.com/cpanel
   * Login with credentials provided by your hosting provider
2. **Main Dashboard Overview**
   * Left panel: General info (domain, IP, username)
   * Bottom left: Stats (disk usage, databases, email accounts)
3. **FILES Section**
   * **File Manager**: Upload your website files (HTML, CSS, JS)
   * **FTP Accounts**: Create users for tools like FileZilla
   * **Backup**: Download your site for safety
4. **DATABASES Section**
   * **phpMyAdmin**: Manage your site’s database (e.g., for WordPress)
   * **MySQL Databases**: Create/delete databases and users
5. **DOMAINS Section**
   * **Addon Domains**: Host multiple domains under one account
   * **Subdomains**: Create sections like blog.yourdomain.com
   * **Site Publisher**: Quickly launch a basic site with templates
6. **EMAIL Section**
   * **Email Accounts**: Create emails like contact@yourdomain.com
7. **METRICS Section**
   * View traffic, errors, bandwidth usage
8. **SECURITY Section**
   * **IP Blocker**: Block unwanted visitors
   * **ModSecurity**: Protect your site from common threats

**Accessing CPanel via GoDaddy**

If you use **GoDaddy for both domain and hosting**, here’s how to access cPanel:

1. Login to your GoDaddy account
2. Go to **My Products**
3. Under **Web Hosting**, click **Manage**
4. Click **cPanel Admin** to open your dashboard

**Website Testing**

* It is very important to make sure that our website is available to users and it is accessible very Fastly.
* Before troubleshooting a website, we need to make sure internet is connected and all the pages are available in deployed server.

**Ping Website Testing**

* **Website testing** using the ping command in Command Prompt is a simple way to check if a website or server is reachable and how fast it responds.
* ping is a **network utility** used to test the **connectivity** between your computer and a remote server (like a website). It sends small packets of data and waits for a response.

| **Purpose** | **What It Tells You** |
| --- | --- |
| ✅ **Check if a website is online** | Confirms if the server is reachable |
| ✅ **Measure response time** | Shows how fast the server responds (in milliseconds) |
| ✅ **Detect network issues** | Helps identify delays or packet loss |

**How to Use ping in Command Prompt**

**🔹 Step-by-Step:**

1. Open **Command Prompt** (cmd) on Windows.
2. Type:ping www.tutorialspoint.com
3. Press **Enter**.

**🔍 What You’ll See:**

* **Reply from**: The server responded.
* **Time**: How long it took (lower is better).
* **TTL (Time to Live)**: Limits how long the packet stays in the network.
* **Request timed out**: The server didn’t respond (could be offline or blocked).

**Speeding Up Your Website**

Speeding Up Your Website is very important due to the following reasons:

* Most statistics show that increasing website access speed increases users.
* Most users expect the website to be accessible in seconds.
* [**Webpagetest**]((https:/www.webpagetest.org/)): It is an open-source project that is primarily being developed and supported by Google.
* It does the website speed test from multiple locations around the globe using real browsers (IE and Chrome) and at real consumer connection speeds.
* If we go to the **Performance Review** section, it will indicate which elements should be optimized.
* Test your website and start optimizing your website accordingly.

**SEO Optimisation**

**SEO (Search Engine Optimization)** is the process of improving a website’s visibility in search engines like Google, Bing, etc., so that it appears higher in search results when users search for relevant keywords.

**Why is SEO Important for Websites?**

| **Benefit** | **Explanation** |
| --- | --- |
| **✅ Increases Traffic** | **Higher rankings = more visitors** |
| **✅ Improves User Experience** | **SEO encourages faster, mobile-friendly, and well-structured websites** |
| **✅ Boosts Credibility** | **Top-ranked sites are seen as more trustworthy** |
| **✅ Better ROI** | **Organic traffic is free and long-lasting compared to paid ads** |
| **✅ Supports Branding** | **Helps your site become more recognizable and authoritative** |

***How to Achieve SEO in Web Development***

**🔹 1. On-Page SEO**

**Focuses on optimizing elements within your website:**

* **Title Tags & Meta Descriptions: Include keywords and keep them concise.**
* **Headings (H1, H2, etc.): Use structured headings with relevant keywords.**
* **URL Structure: Keep URLs clean and readable (e.g., example.com/portfolio).**
* **Image Alt Text: Describe images for accessibility and search indexing.**
* **Internal Linking: Link to other pages within your site to improve navigation.**

**🔹 2. Technical SEO**

**Improves the backend and performance of your site:**

* **Fast Loading Speed: Optimize images, use caching, and minify code.**
* **Mobile Responsiveness: Ensure your site works well on all devices.**
* **Secure Connection (HTTPS): Use SSL certificates.**
* **XML Sitemap: Helps search engines crawl your site efficiently.**
* **Robots.txt: Controls which pages search engines can index.**

**🔹 3. Off-Page SEO**

**Involves actions outside your website:**

* **Backlinks: Get links from reputable websites.**
* **Social Sharing: Promote your content on social media.**
* **Guest Blogging: Write on other sites to build authority.**