

WEEK1

Q1) In your own words, explain Web Engineering.

Ans) Web Engineering means applying engineering principles (like planning, design methods, coding standards, testing, and maintenance) to build web systems in a structured and reliable way, instead of just creating web pages randomly.

Example:

When you build a small personal webpage, you can just code it directly.

But when you build large systems like Amazon, Instagram, or university portals, you need:

- proper planning
- requirement analysis
- good design
- secure coding
- database management
- testing
- deployment
- maintenance

Q2) Explore and list core technologies used in Web Engineering, including HTML, CSS, JavaScript, and PHP, and explain the role of each.

Ans) Web Engineering relies on a combination of front-end, back-end, and supporting technologies that work together to build complete web applications. Each technology has a specific responsibility, just like different parts of a machine.

HTML (Hyper Text Markup Language) is the foundation of every web page. It defines the structure and content of the page. Using HTML, we create elements such as headings, paragraphs, images, links, forms, tables, and buttons. You can think of HTML as the *skeleton* of a website.

CSS (Cascading Style Sheets) is responsible for the appearance and design of the webpage. While HTML creates the structure, CSS controls how it looks — colors, fonts, spacing, layouts, animations, and responsiveness for mobile devices.

JavaScript adds interactivity and behavior to websites. It runs in the browser and allows the page to respond to user actions such as clicks, typing, or scrolling. With JavaScript, we can validate forms, create dynamic content, show popups, update data without refreshing the page (AJAX), and build modern applications like Gmail or Google Maps.

PHP (Hypertext Preprocessor) is a server-side scripting language used to build the back end of web applications. It runs on the server, not in the browser.

For example, when you log in to a website and your details are checked in a database, PHP performs that logic.

Q3) Identify front-end and back-end technologies used in web development and give examples of each.

Ans) Web development has two main parts: front-end and back-end.

The **front-end** is the part users can see and use in their browser. It controls the page layout, design, and interactivity. It makes the website look good and respond to user actions like clicks and typing.

Common front-end technologies include **HTML** (structure of the page), **CSS** (style and design), and **JavaScript** (interactivity). Frameworks like React, Angular, and Vue are also used to build modern interfaces.

The **back-end** works behind the scenes on the server. It handles data processing, user login, database operations, and business logic. Users do not see it directly.

Common back-end technologies include PHP, Python (Django/Flask), Node.js, and Java (Spring Boot). Databases like MySQL, PostgreSQL, and MongoDB store the data.

In short:

Front-end → what users see

Back-end → how the system works

Examples:

Front-end: HTML, CSS, JavaScript, React

Back-end: PHP, Node.js, Python, MySQL

Q4) Explore popular web frameworks or platforms and write short notes on any two.

Ans) Web frameworks and platforms help developers build websites and web applications faster and more easily. They provide ready-made tools, libraries, and structure, so we don't have to write everything from scratch.

Here are short notes on two popular frameworks:

Django (Python Framework)

Django is a high-level back-end web framework built using Python. It follows the "batteries-included" approach, meaning it provides many built-in features like authentication, database handling, admin panel, and security. It helps developers build secure and scalable web applications quickly. Django is widely used for projects like blogs, e-commerce sites, and data-driven applications.

React (JavaScript Front-end Library/Framework)

React is a popular front-end library used to build interactive user interfaces. It allows developers to create reusable components, which makes development faster and code easier to manage. React updates only the necessary parts of the page, making applications fast and smooth. It is commonly used for single-page applications like dashboards and social media platforms.

Django → back-end development (server side)

React → front-end development (user interface)

Q5) Write a short note on the usage of web technologies in education, business or social platforms

Ans) Web technologies play an important role in many areas such as **education, business, and social platforms**, making services faster, easier, and accessible from anywhere through the internet.

In **education**, web technologies are used to create online learning platforms like Google Classroom, Coursera, and Moodle. Students can attend virtual classes, submit assignments, watch lectures, and take exams online. Teachers can share study materials and track student progress. This makes learning flexible and available anytime, anywhere.

In **business**, websites and web applications support online shopping, banking, payments, and customer management. Companies use e-commerce sites, web portals, and cloud tools to sell products, manage data, and communicate with customers. This helps businesses reach more customers and operate efficiently.

In **social platforms**, web technologies power apps like Facebook, Instagram, and Twitter. Users can create profiles, share posts, chat, and connect with others in real time. These platforms make communication and information sharing quick and easy.

In short, **web technologies connect people, services, and information online**, improving learning, business operations, and social interaction.

WEEK2

Q1) In your own words, explain what Data Science is and why it is important in today's world.

Ans) **Data Science** is the field of studying data to find useful information, patterns, and insights that help in making better decisions. It combines statistics, programming, and domain knowledge to collect, clean, analyze, and interpret large amounts of data.

In simple words, Data Science means turning raw data into meaningful knowledge. For example, analyzing customer data to predict sales, studying medical data to detect diseases early, or using user behavior data to recommend products or movies.

Data Science is important today because we generate huge amounts of data every day from mobile apps, websites, social media, banks, and sensors. Without Data Science, this data would be useless. With it, organizations can understand trends, solve problems, and make smart decisions.

It is widely used in areas like healthcare, business, finance, education, and social media. Companies use it to improve services, reduce costs, predict future outcomes, and personalize user experiences.

In short, Data Science helps convert data into knowledge and knowledge into action, which makes it very valuable in today's digital world.

Q2) Identify and describe any five real-world datasets.

Ans) Here are five common **real-world datasets** with simple descriptions:

1. Healthcare Dataset

This dataset contains patient information such as age, symptoms, medical history, test results, and diagnoses. It is used to predict diseases, analyze treatment effectiveness, and improve healthcare services. For example, hospitals use it to detect heart disease or diabetes early.

2. E-commerce Sales Dataset

This includes data about products, customers, orders, prices, and purchase history. Businesses use it to study customer behavior, predict sales, recommend products, and manage inventory. For example, Amazon uses sales data to suggest “recommended for you” items.

3. Social Media Dataset

This dataset contains posts, likes, comments, shares, and user profiles from platforms like Facebook or Twitter. It helps analyze trends, user engagement, and public opinion. Companies use it for marketing and sentiment analysis.

4. Weather Dataset

It includes temperature, rainfall, humidity, wind speed, and other climate measurements collected over time. It is used for weather forecasting, climate studies, and disaster management. For example, predicting storms or rainfall patterns.

5. Transportation/Traffic Dataset

This dataset records vehicle counts, routes, travel time, and traffic conditions. It is used to optimize routes, reduce congestion, and improve public transport planning. Apps like Google Maps use this data to suggest the fastest route.

Q3) List major tools used in Data Science (programming languages, libraries, platforms) and state their purpose.

Ans) Data Science uses different tools and technologies to collect, analyze, and visualize data. These tools can be grouped into programming languages, libraries, and platforms, each serving a specific purpose.

Programming languages form the base of Data Science. Python is the most popular because it is easy to learn and has many data analysis libraries. R is mainly used for statistics and data visualization. SQL is used to store, manage, and retrieve data from databases.

Libraries and frameworks help perform specific tasks. In Python, NumPy is used for numerical calculations, Pandas for data cleaning and manipulation, and Matplotlib/Seaborn for data visualization. Scikit-learn is used for machine learning tasks like classification and prediction, while TensorFlow and PyTorch are used for deep learning and neural networks.

Platforms and tools make development and collaboration easier. Jupyter Notebook allows writing and running code with explanations and visual outputs. Google Colab provides free cloud-based notebooks with GPU support. Tableau and Power BI are used to create dashboards and visual reports. Apache Spark handles big data processing, and Git/GitHub helps manage and share code.

In short:

Programming languages → write code and logic

Libraries → analyze and model data

Platforms → develop, visualize, and collaborate efficiently

Q4) Explore and write short notes on any three Data Science frameworks.

Ans) Here are short notes on three popular **Data Science frameworks**:

1. TensorFlow

TensorFlow is an open-source framework developed by Google for machine learning and deep learning. It is mainly used to build neural networks and train large models for tasks like image recognition, speech processing, and prediction. It supports both research and production-level applications and works well with CPUs and GPUs.

2. PyTorch

PyTorch is an open-source deep learning framework developed by Facebook. It is easy to use and flexible, which makes it popular among researchers and beginners. It allows dynamic model building and is widely used for tasks like natural language processing, computer vision, and AI research.

3. Scikit-learn

Scikit-learn is a simple and powerful machine learning framework in Python. It provides ready-made algorithms for classification, regression, clustering, and data preprocessing. It is best suited for small to medium-sized datasets and is commonly used for predictive modeling and data analysis.

TensorFlow → large-scale deep learning

PyTorch → flexible deep learning and research

Scikit-learn → basic machine learning and data analysis

Q5) Identify different roles in Data Science (e.g., Data Analyst, Data Scientist, ML Engineer) and their responsibilities.

Ans) Data Science involves different roles, and each role has a specific responsibility in handling and using data effectively.

A Data Analyst focuses on understanding and summarizing data. They collect, clean, and analyze data to find trends and patterns. They create reports, charts, and dashboards to help organizations make decisions. Their main goal is to answer business questions using data. For example, analyzing monthly sales or customer behavior.

A Data Scientist works on advanced analysis and prediction. They use statistics, machine learning, and programming to build models that predict future outcomes. They solve complex problems like fraud detection, recommendation systems, or demand forecasting. Their role includes data preparation, model building, and interpreting results.

A Machine Learning (ML) Engineer focuses on implementing and deploying models into real-world systems. They convert data science models into scalable and efficient applications. They handle coding, testing, optimization, and integration with software systems. Their goal is to make models work smoothly in production.

A Data Engineer manages the data infrastructure. They design and build pipelines to collect, store, and process large amounts of data. They ensure data is clean, reliable, and available for analysts and scientists. They work with databases, cloud platforms, and big data tools.

In short:

Data Analyst → analyze and report data

Data Scientist → build predictive models

ML Engineer → deploy models into applications

Data Engineer → manage data pipelines and storage

Q6) Write a short note on the usage of Data Science being in your own domain of interest.

Ans) In my domain of interest, which is computer science and web application development, Data Science plays a very important role in improving user experience and building smarter systems. It helps in analyzing user behavior, system performance, and large amounts of application data to make better decisions.

For example, Data Science can be used to study how users interact with a website or app, which features they use most, and where they face problems. This helps developers improve design and performance. It is also used to build recommendation systems, chatbots, fraud detection systems, and personalized content for users.

In web platforms and online services, Data Science helps predict user needs, automate tasks, and optimize resources. For instance, e-commerce sites recommend products based on past purchases, and analytics tools track website traffic and user engagement.

In short, Data Science makes web and software systems more intelligent, efficient, and user-friendly by using data-driven decisions.

WEEK3

Q1) Write a Python program to generate the first n Fibonacci numbers using a loop.

```
def fib(n):
    if n <= 1:
        return n
    return fib(n-1) + fib(n-2)

n = int(input("Enter n: "))

for i in range(n):
    print(fib(i), end=" ")
```

```
V@V-OptiP-510: ~, Desktop, 8TH SEM LAB
$ python -u "c:\Users\v\Desktop\8TH SEM LAB\W3Q1.PY"
Enter n: 4
0 1 1 2
```

Q2) Write a Python program to count the number of vowels in a given string.

```

text = input("Enter a string: ")

count = 0
vowels = "aeiouAEIOU"

for ch in text:
    if ch in vowels:
        count += 1

print("Number of vowels:", count)

```

```

● $ python -u "c:\Users\v\Desktop\8TH SEM LAB\W3Q2.PY"
Enter a string: hello
Number of vowels: 2

```

Q3)

Create the following table in HTML with Dummy Data:

Name of the Train	Place	Destination	Train No.	Time		Fare
				Arrival	Departure	

```

<!DOCTYPE html>
<html>
<body>

<table border="1">

<tr>
    <th rowspan="2">Name of the Train</th>
    <th rowspan="2">Place</th>
    <th rowspan="2">Destination</th>
    <th rowspan="2">Train No.</th>
    <th colspan="2">Time</th>
    <th rowspan="2">Fare</th>
</tr>

```

```
<tr>
    <th>Arrival</th>
    <th>Departure</th>
</tr>
<tr>
    <td>Express</td>
    <td>Delhi</td>
    <td>Mumbai</td>
    <td>101</td>
    <td>09:00</td>
    <td>09:10</td>
    <td>500</td>
</tr>
<tr>
    <td>Superfast</td>
    <td>Chennai</td>
    <td>Bangalore</td>
    <td>102</td>
    <td>11:00</td>
    <td>11:05</td>
    <td>300</td>
</tr>
<tr>
    <td>Passenger</td>
    <td>Kolkata</td>
    <td>Patna</td>
    <td>103</td>
    <td>02:00</td>
    <td>02:20</td>
    <td>200</td>
</tr>
</table>
</body>
</html>
```

