**Task 1: Common Cloud Services**

## 1. Compute (Virtual Machines & Processing Power)

- Compute services provide the raw processing power needed to run applications.
- **Example services:**
    - **Virtual Machines (VMs)** – AWS EC2, Azure Virtual Machines, Google Compute Engine
    - **Auto Scaling** – Automatically adds or removes VMs based on demand
    - **High-Performance Computing (HPC)** – For scientific or heavy workloads
- **Real-life example:**
  Hosting a web server, running a backend API, or deploying a game server.

## 2. Storage Services

- Cloud storage is used to store files, backups, and data securely.
- **Types of storage:**
    - **Object Storage** – Stores unstructured data like images, videos, logs
        - Example: AWS S3, Azure Blob Storage
    - **Block Storage** – Like a virtual hard disk for VMs
        - Example: AWS EBS, Azure Disk Storage
    - **File Storage** – Network-based shared file systems
        - Example: AWS EFS, Azure Files
- **Real-life example:**
    - Saving uploaded photos for a social media app
    - Backing up databases or documents

## 3. Databases

- Cloud providers give managed databases so you don't need to set up and maintain database servers yourself.

- **Types of cloud databases:**

    1. **Relational (SQL)** – AWS RDS, Azure SQL Database, Cloud SQL
       Example: MySQL, PostgreSQL

    2. **NoSQL** – AWS DynamoDB, Azure CosmosDB
       Example: MongoDB, Cassandra

    3. **Data Warehousing** – AWS Redshift, BigQuery
       For analytics and reporting

- **Real-life example:**
  Storing user details, product catalog, or transaction data.

## 4. Networking

- Networking services connect cloud resources securely.

- **Services include:**

    - **VPC (Virtual Private Cloud)** – Isolated private network

    - **Load Balancer** – Distributes traffic across servers

    - **VPN Gateway** – Securely connects cloud with on-premises network

    - **DNS Services** – Like AWS Route 53 for domain management

- **Real-life example:**
  Ensuring that a website remains online and distributes traffic to multiple servers.

## 5. Monitoring and Logging

- Helps you **track performance, errors, and security issues** in cloud resources.

- **Examples:**

    - AWS CloudWatch

    - Azure Monitor
    - Google Cloud Operations Suite

- **Real-life example:**
  Monitoring CPU usage of your app, tracking failed login attempts, or sending alerts when a server goes down.

## 6. Containers

- Containers package applications and their dependencies so they run the same everywhere.
- **Examples:**
    - Docker (container tool)
    - Kubernetes (container orchestration)
    - AWS ECS, Azure Kubernetes Service (AKS), Google Kubernetes Engine (GKE)
- **Real-life example:**
  Deploying microservices in a scalable way.

## 7. Serverless Computing

- Run code **without managing servers**. You just write the function, and the cloud runs it automatically.
- **Examples:**
    - AWS Lambda
    - Azure Functions
    - Google Cloud Functions
- **Real-life example:**
  Processing an image when a user uploads it, sending notifications automatically.

## 8. AI and Machine Learning

- Pre-built AI and ML services to add intelligence to applications.

- **Examples:**
    - AWS Rekognition (image recognition)
    - Azure Cognitive Services
    - Google Vertex AI
- **Real-life example:**
    - Chatbots
    - Fraud detection
    - Product recommendations

## 9. Security and Identity Management

- Protects cloud resources and controls access.
- **Examples:**
    - AWS IAM (Identity and Access Management)
    - Azure Active Directory
    - Google Cloud IAM
- **Real-life example:**
  Giving different permissions to developers, admins, and testers.