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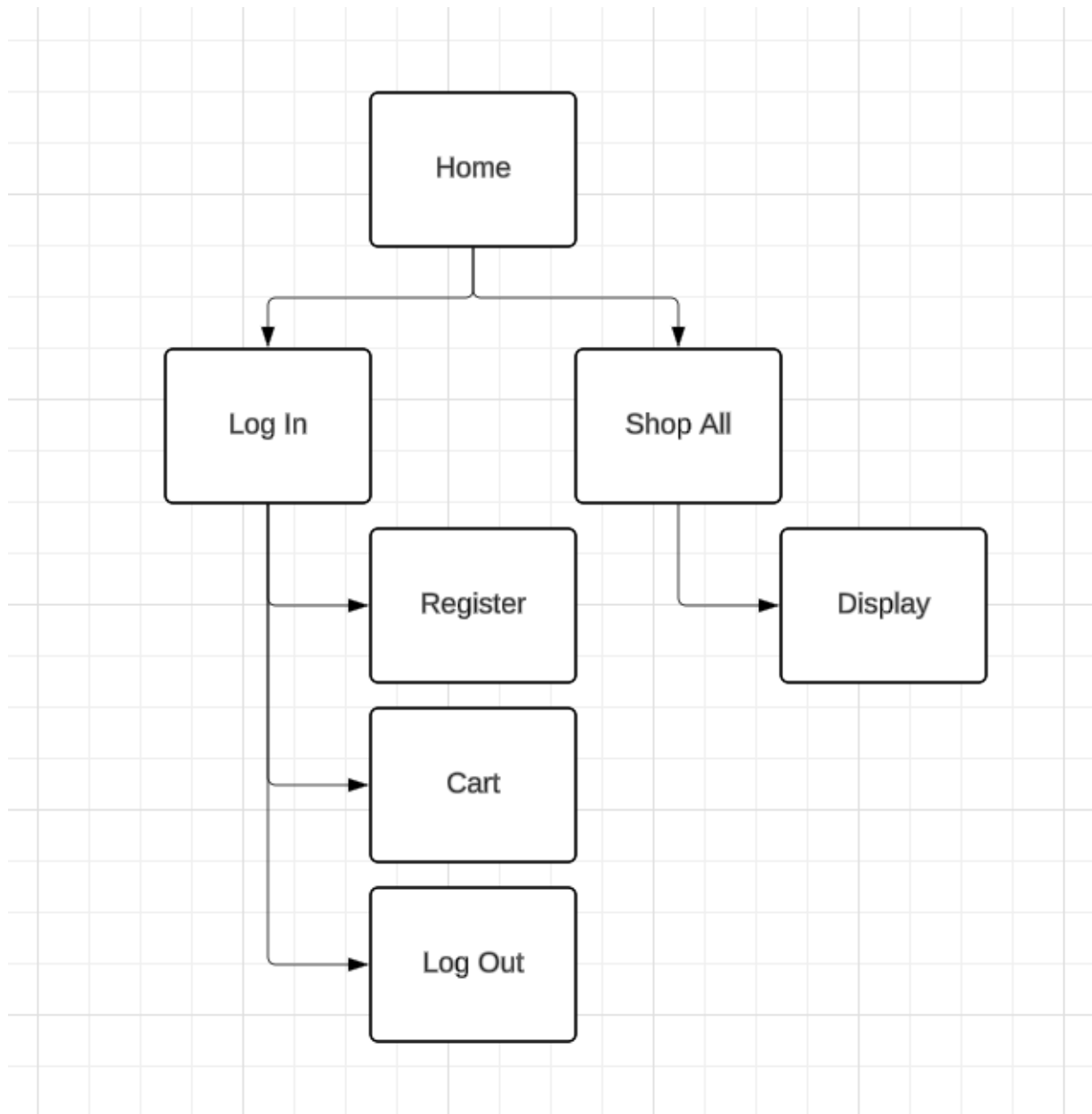
Activity 2

Database Design:

Plants	
<u>_id</u>	ObjectId
plant_name	string
family_name	string
scientific_name	string
plant_description	string
image	string
price	string
difficulty	string
featured	boolean
indoor	boolean
edible	boolean

Users	
<u>_id</u>	ObjectId
username	string
password	string
admin	boolean
cart	array

Application Design:



Screencast: <https://www.youtube.com/watch?v=TemviAMneaM>

(Since the website was already created a while back, the video is the same)

Cloud Deployment Models: Public, Private, and Hybrid Clouds

1. Public Cloud Model

The public cloud model is where cloud services are provided over the internet. Some of the major providers include AWS, Microsoft Azure, and Google Cloud Platform.

Advantages:

- **Cost-Effectiveness:** Avoid large upfront costs on physical hardware and maintenance, pay-as-you-go model
- **Scalability:** Easily scale up or down based on their changing needs without the delays in infrastructure changes
- **Accessibility:** Resources are accessible from anywhere

Disadvantages:

- **Security:** As a third party manages a company's data, public clouds are seen as less secure, which can be a drawback for companies with sensitive data
- **Customization:** Environments are offered and usually standard to the third party, causing unique companies to struggle with needs
- **Compliance:** Companies in heavily regulated industries (like finance or healthcare) may struggle to meet compliance requirements with public cloud environments

2. Private Cloud Model

A private cloud is a dedicated cloud environment managed internally or by a third party but exclusively for a single organization. It can be hosted on-premises or at a third-party data center.

Advantages:

- **Security:** Resources are dedicated to a single organization, allowing for a higher level of control over data security and privacy
- **Customization:** Private clouds offer greater flexibility to customize infrastructure and applications to meet needs
- **Compliance:** For industries with strict regulatory requirements, private clouds provide better control over data and regulatory compliance

Disadvantages:

- **Costs:** Higher operational costs, as companies are responsible for hardware, maintenance, and management
- **Limitations:** Scaling a private cloud can be challenging and time-consuming, as it requires purchasing additional physical resources

- **Complex:** Managing a private cloud requires specialized IT expertise, leading to increases in labor costs and management complexities

3. Hybrid Cloud Model

A hybrid cloud combines both public and private clouds, allowing data and applications to be shared between them, offering flexibility based on needs.

Advantages:

- **Flexibility:** Hybrid models allow companies to use private clouds for sensitive workloads and public clouds for less critical tasks
- **Cost:** Companies can reduce costs by offloading less critical workloads to the public cloud
- **Recovery:** Hybrid clouds allow organizations to back up data and applications to the public cloud

Disadvantages:

- **Complexity:** Managing a hybrid cloud environment can be challenging, as it involves coordinating across public and private environments
- **Security:** Transferring data between private and public clouds may expose it to security risks and compliance issues if not properly managed
- **Initial Setup Costs:** Establishing a hybrid cloud infrastructure requires integrating two environments

SaaS Applications: Examples, Advantages, and Disadvantages

Two popular SaaS applications are Salesforce (CRM) and Google Workspace (productivity suite).

1. Salesforce (CRM)

Advantages:

- **Management:** Salesforce is entirely managed by the provider
- **Updates:** Salesforce regularly updates its features
- **Scalability:** Salesforce can be easily scaled to add more users or features as the business grows

Disadvantages:

- Customization: While Salesforce is flexible, it may not allow for deep customization or unique integrations that an internally hosted CRM might support
- Internet: As a cloud-based solution, Salesforce requires a stable internet connection; disruptions can interrupt access to the CRM
- Privacy: Data stored on Salesforce servers may be subject to data privacy issues or regulatory concerns, especially for companies with sensitive client data

2. Google Workspace (Productivity Suite)

Advantages:

- Collaboration: Google Workspace allows real-time collaboration, and users can access their work from anywhere with internet access
- Costs: With Google Workspace, organizations don't need to manage email servers or file storage, reducing the IT workload and associated costs
- Backups: Google automatically backs up data, helping prevent data loss and enhancing continuity in case of disruptions

Disadvantages:

- Privacy: As with any cloud-based application, storing business data on Google's servers may pose data privacy concerns for some organizations
- Offline Capabilities: Google Workspace relies heavily on internet connectivity; while some offline functionality exists, it's limited
- Subscription: Google Workspace requires ongoing subscription fees, which can add up over time compared to an in-house solution that only requires a one-time setup

Differences Between PaaS and IaaS for Application Developers

From an application developer's perspective, PaaS (Platform as a Service) and IaaS (Infrastructure as a Service) differ in terms of control, maintenance, and deployment.

1. Level of Control

- PaaS: Provides a managed platform where developers can deploy and run applications without managing underlying hardware. The provider handles OS updates, load balancing, and other platform-level services, allowing developers to focus on writing code
- IaaS: Offers greater control over infrastructure, including virtual machines, networks, and storage. Developers are responsible for OS management and server configuration, giving flexibility to customize the environment.

2. Development Speed

- PaaS: Speeds up development by providing pre-configured environments, development frameworks, and middleware, ideal for quick deployments and scaling. This makes PaaS useful for rapid application development but less ideal for highly specialized needs.
- IaaS: Takes longer to set up since developers must manage the operating environment, network configurations, and middleware themselves. However, this flexibility can be beneficial for specialized applications that require specific configurations.

3. Maintenance Responsibility

- PaaS: Since platform maintenance is managed by the provider, developers are relieved of responsibilities like patching, load balancing, and infrastructure scaling. This makes it attractive for applications that don't require high control over the underlying architecture.
- IaaS: Requires developers to handle maintenance of the environment, including patching, monitoring, and scalability, which gives greater control but also requires more time and expertise.