In the context of Systems Analysis and Design (SAD), attributes, properties, and characteristics of a system are used to define and describe the various components and aspects of the system. Let's break them down:

1. **Attributes:**

   - **These are the specific details or qualities that define the various elements of the system.**

   - **For example, in a database system, attributes could be fields like Name, Age, Address, etc., in a table.**

2. **Properties:**

   - **These are the inherent qualities or behaviors of the system's elements that describe how they function.**

   - **For instance, a property of a user interface element like a button could be Clickable or Visible.**

3. **Characteristics:**

   - **These are the distinctive features or traits that identify the system and its components.**

   - **Examples include the system's Reliability, Usability, Performance, etc.**

System Stakeholders: User and End User Roles

1. **Stakeholders**:

   - Interested in the system (inside or outside the organization).

2. **Users**:

   - Directly interact with the system.

   - Examples: Admins, managers, data entry staff.

Roles:

   - **Input data**: Keep data accurate.

- o **Customize system**: Adjust settings.

- o **Manage settings**: Handle security and permissions.

- o **Fix issues**: Solve problems.

- o **Give feedback**: Suggest improvements.

- o **Train others**: Teach system use.

3. **End Users**:

- o Use system outputs to achieve goals.

- o Examples: Customers, clients.

Roles:

- o **Use outputs**: Reports, data analysis.

- o **Give feedback**: Suggest improvements.

- o **Follow guidelines**: Use outputs correctly.

The main steps of the System Development Life Cycle (SDLC) are:

1. **Planning**:

- o Define the project scope and goals.

2. **Analysis**:

- o Gather requirements and analyze needs.

3. **Design**:

- o Create the system architecture and design specifications.

4. **Implementation**:

- o Develop and code the system.

5. **Testing**:

- o Test the system to ensure it works correctly.

6. **Deployment**:

   o   Launch the system for users.

7. **Maintenance**:

   o   Provide ongoing support and updates.

the user's problem, opportunity, and solution spaces is essential in designing effective systems. Here's a simplified breakdown:

1. **Problem Space**:

   o   Identify and understand the user's challenges and pain points.

   o   Determine what issues the system needs to address.

   o   Example: Users face difficulties in tracking their expenses.

2. **Opportunity Space**:

   o   Explore potential improvements and benefits.

   o   Identify areas where the system can add value or create new possibilities.

   o   Example: Providing an easy-to-use expense tracking app could help users manage their finances better.

3. **Solution Space**:

   o   Develop and evaluate potential solutions to address the problems and opportunities.

   o   Select the best solution that meets user needs and expectations.

   o   Example: Design and implement a mobile app with features for recording expenses, generating reports, and setting budget goals.

When comparing commercial/consumer products to contract system development, there are key differences to consider:

Commercial/Consumer Product

- **Target Audience**: Designed for a broad audience or market.

- **Development**: Created based on market demand and consumer needs.

- **Customization**: Limited customization options; features are standardized.

- **Distribution**: Available to the general public through retail or online platforms.

- **Support**: General customer support and updates provided to all users.

Contract System Development

- **Target Audience**: Tailored for a specific client or organization.

- **Development**: Built based on specific requirements and specifications provided by the client.

- **Customization**: Highly customizable to meet the unique needs of the client.

- **Distribution**: Exclusively delivered to the contracting client.

- **Support**: Specialized support and maintenance services tailored to the client's needs.

Key Points

1. **Audience**:

   - Commercial: General public.

   - Contract: Specific client.

2. **Development Approach**:

   - Commercial: Market-driven.

   - Contract: Client-driven.

3. **Customization**:

   - Commercial: Limited.

   - Contract: Extensive.

4. **Distribution**:
    - Commercial: Publicly available.
    - Contract: Client-specific.

5. **Support**:
    - Commercial: General.
    - Contract: Specialized.