Some Basic Questions

- What is Software Development?
- Who are the people involved with Software Development?
  - What do these people do?
- What exactly do software testers do?
- Why is software testing important?
- How is Software Development Done?

What is Software Development

- The **process** of developing software through **successive phases** in an orderly way.
- This process includes the following phases:
  - The writing of programming code
  - The preparation of requirements/objectives
  - The design of the software
  - Confirmation that what is developed has met the requirements/objectives
  - Releasing the finished software to the customer (client)
  - Planning
  - Providing support to the customer after releasing the finished software
- Let’s add some order to these phases…

Software Development Lifecycle

Who are the people involved?

- Developers
  - Write the programming code (Java, C++, PHP, etc.)
- Business Analysts
  - Gather and Create Requirements
- QA Testers
  - Verify that the software meets the requirements
- Project Manager
  - Manages the overall Project to ensure it stays within budget and on time

What exactly do Software Testers do?

- Our job is to test the application against the requirements
- Requirement: Valid users are able to login
- Test: Login
  - Step 1: Launch the application
    - Expected Result: The application is launched and available
  - Step 2: Enter a valid user id
    - Expected Result: Valid user id is entered
  - Step 3: Enter a valid password
    - Expected Result: Valid password is entered
  - Step 4: Click on Sign in button
    - Expected Result: _____
- Each step will have an expected result
- When a test is executed (tester performs the steps on the application) the actual results are recorded.
- When the Actual Results do not match the Expected Results ➔ Bug or Defect

Why is Software Testing Necessary

- To prove to the customer that the application is problem free
- To ensure that the product (the application) works as the user requested
- Testing helps increase the reliability of the software as well as improving the quality
- To discover defects or bugs and determine the root cause of the issue

How is Software Development Done

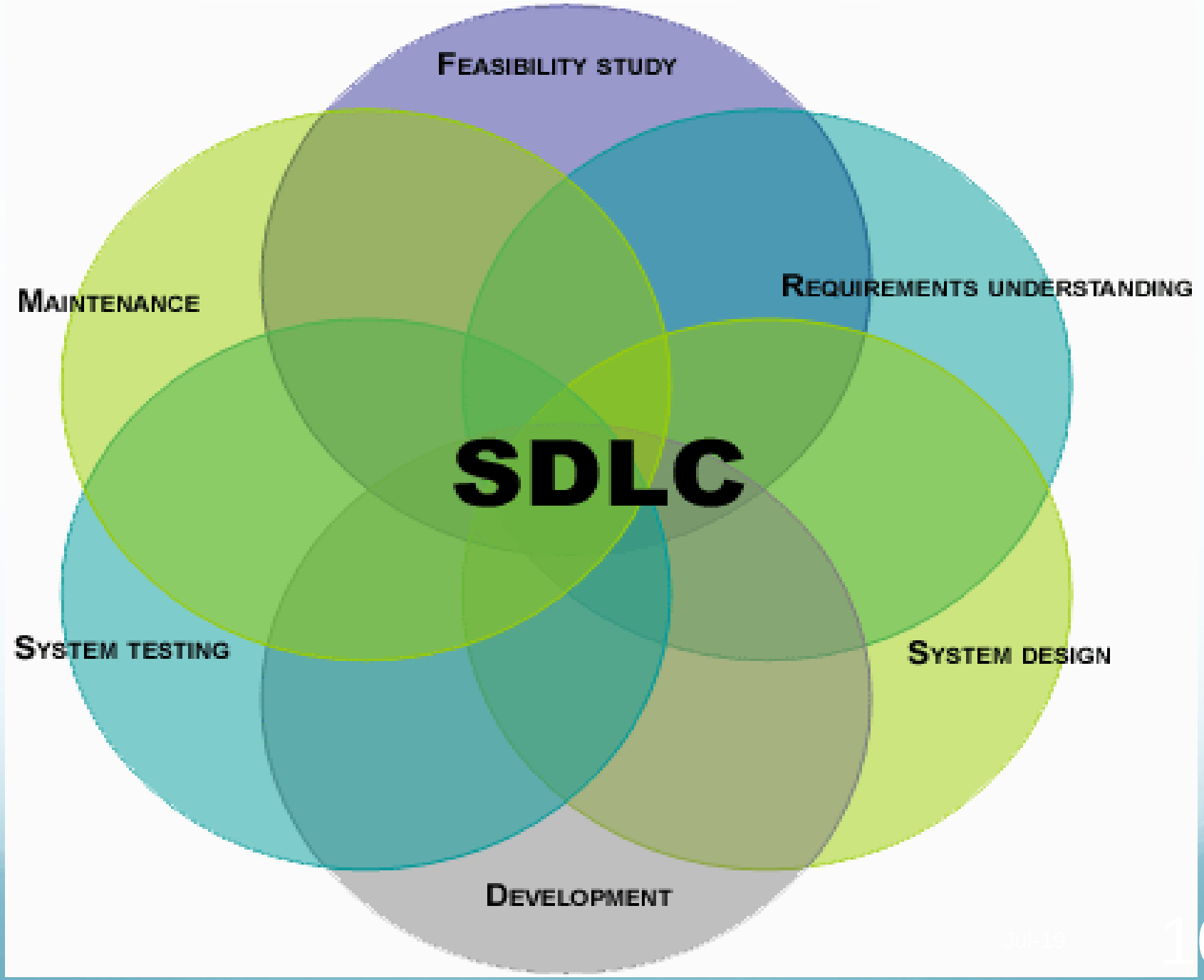
- By following a set guideline known as the **Software Development Lifecycle** (SDLC)
- The SDLC is a process that is followed for a software project
- It's basically a plan
  - HOW to develop
  - HOW to maintain
  - HOW to replace/alter/enhance the specific software (solution)

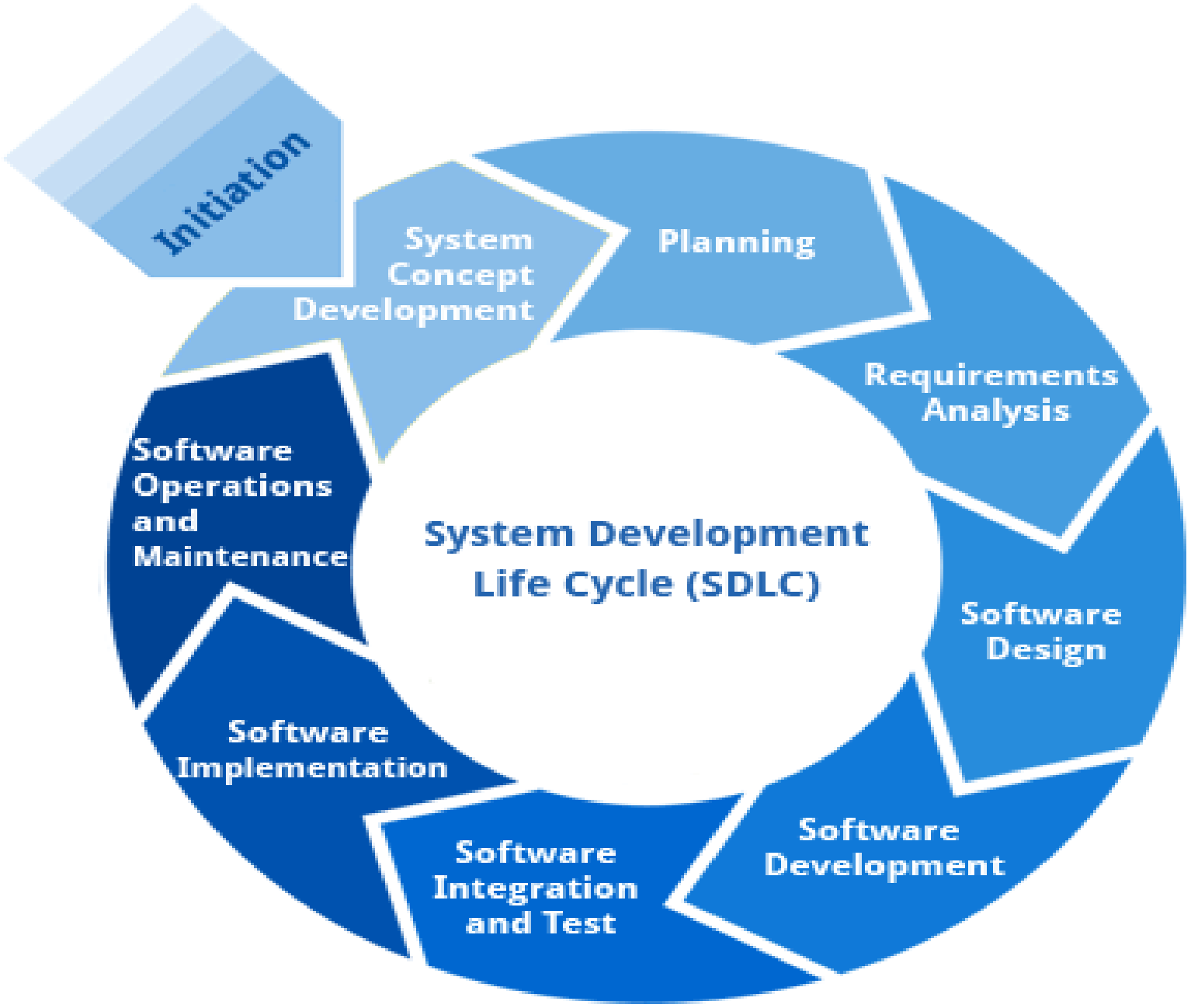
Software Development Lifecycle

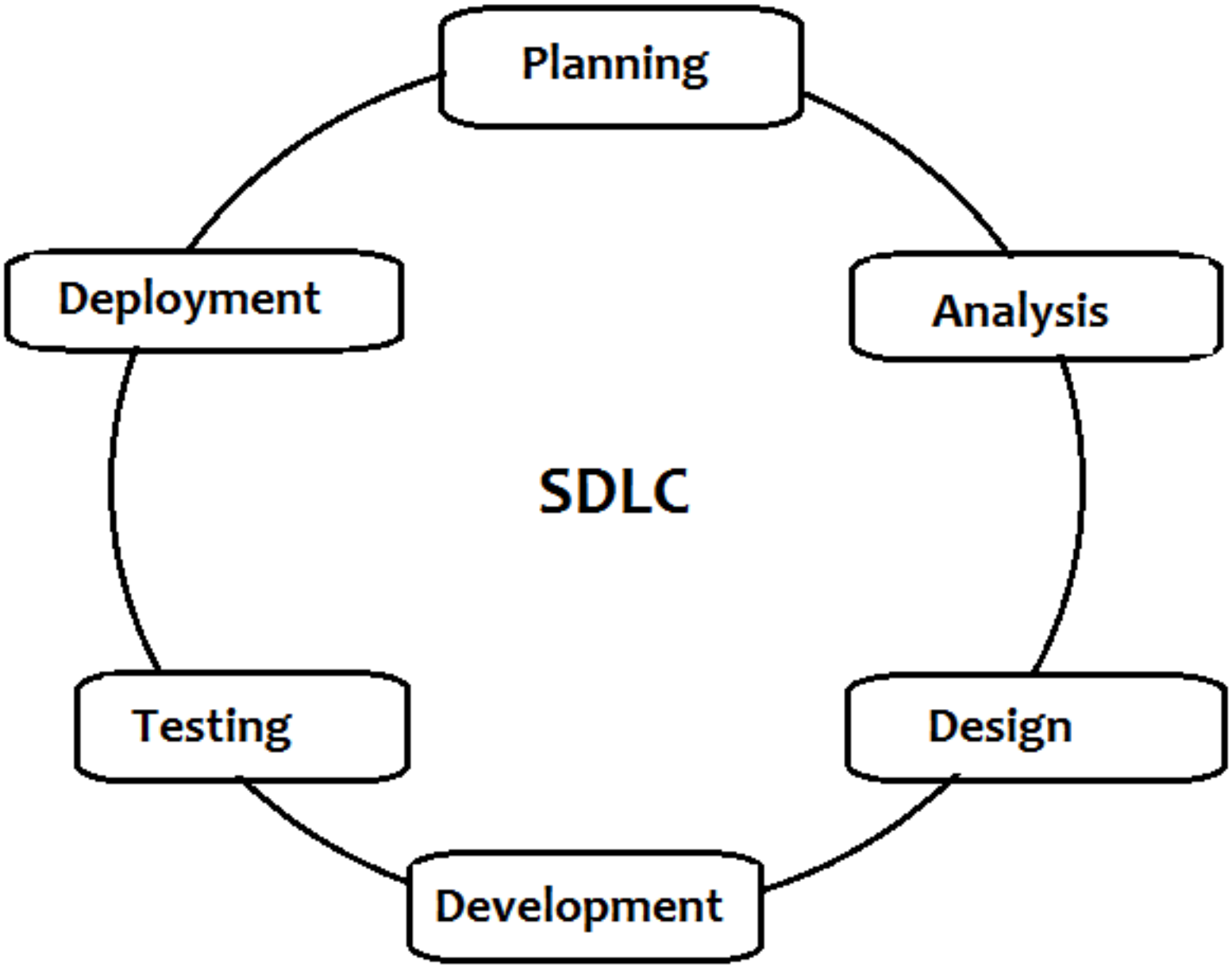
- The entire development process is broken up into several successive phases
  - Many phases occurs one after the other
  - Some phases can occur simultaneously
- Do not pay attention to the number of phases
  - As you do research, you'll find different sources talk about different numbers of phases as part of the SDLC
  - Also, some of the phases have multiple names so don't get confused if you find a source that explains the SDLC using some different names for the phases
- Instead, focus on what's happening in each phase and the order in which it's happening

SDLC Phases

- Planning Phase
- Requirement Analysis Phase
- Design Phase
- Development Phase
- QA/Testing Phase
- Production/Maintenance Phase


FEASIBILITY STUDY
REQUIREMENTS UNDERSTANDING
MAINTENANCE
SDLC
SYSTEM TESTING
SYSTEM DESIGN
DEVELOPMENT


Initiation
System Concept Development
Planning
Requirements Analysis
Software Design
Software Development
Software Integration and Test
Software Implementation
Software Operations and Maintenance
System Development Life Cycle (SDLC)


Planning
Analysis
Design
Development
Testing
Deployment
SDLC

SDLC - Planning Phase

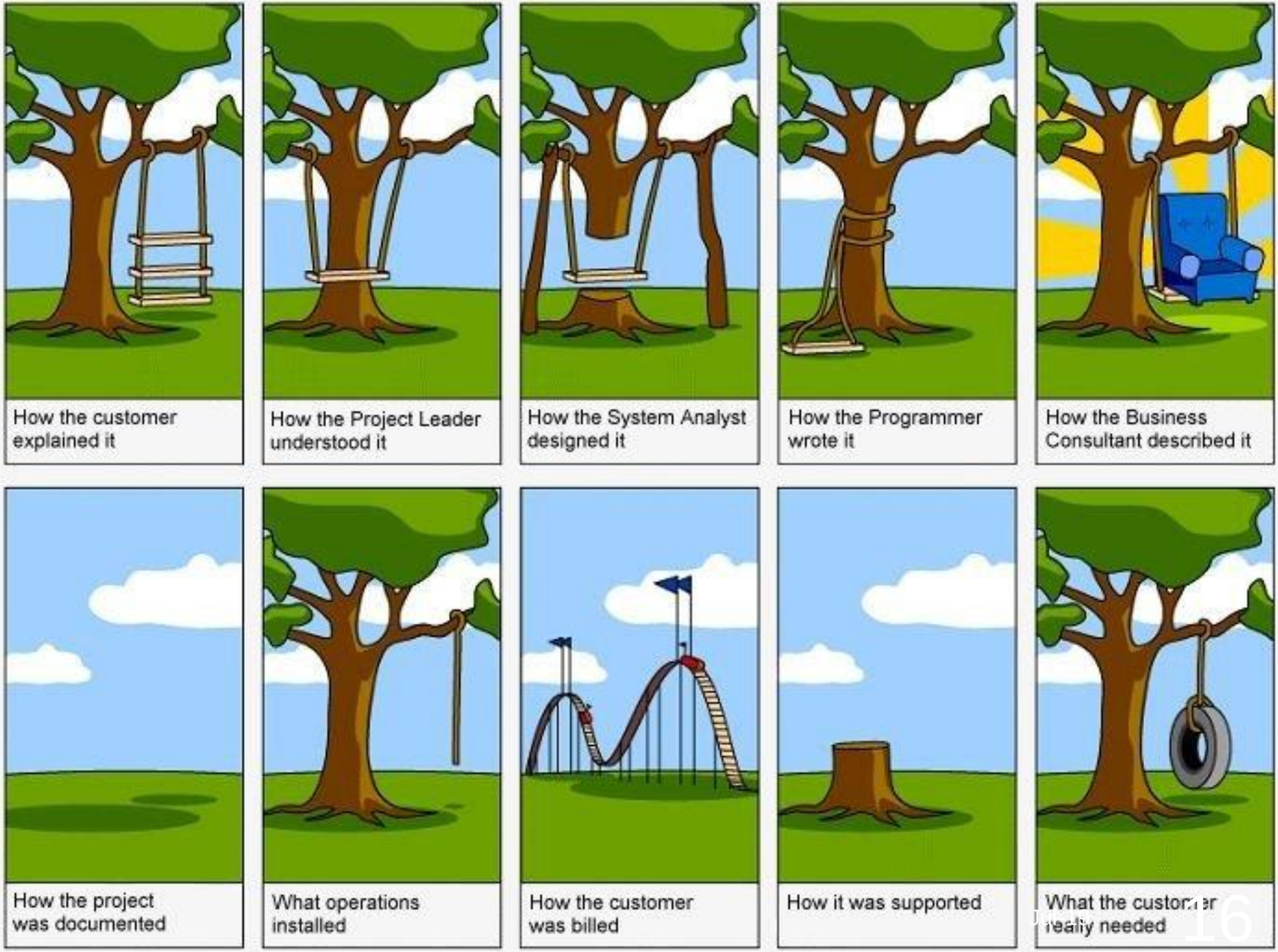
- You must have a plan before you begin any kind of endeavor!
- Planning is the most important and fundamental phase in the SDLC
- **People Involved**:
  - Senior members of the Development Team (PMs, Sr. BAs, Sr. Dev, Sr. Testers and/or Test Lead/Test Manager)
  - Client
- Information gathered in this phase is used to plan the basic project approach and to conduct a product feasibility study
  - Feasibility Study – Is the product (as described) feasible? (is it practical)
  - The entire project is being planned out in this phase
    - Schedules are being determined
    - Deliverables are being determined
    - Budgets are being set

SDLC - Requirement Analysis Phase

- **Main Contributor**: Business Analysts (Translate Requirements)
- BAs gather the **Business Requirements** from the client (the business side)
- BAs then convert the Business Requirements into **Technical Requirements** which will be used by the development and testing teams (the technical side)
- BAs are the Subject Matter Experts (SMEs) for the requirements
  - They understand the requirements completely (they wrote them!)

Requirement Analysis *Continued*

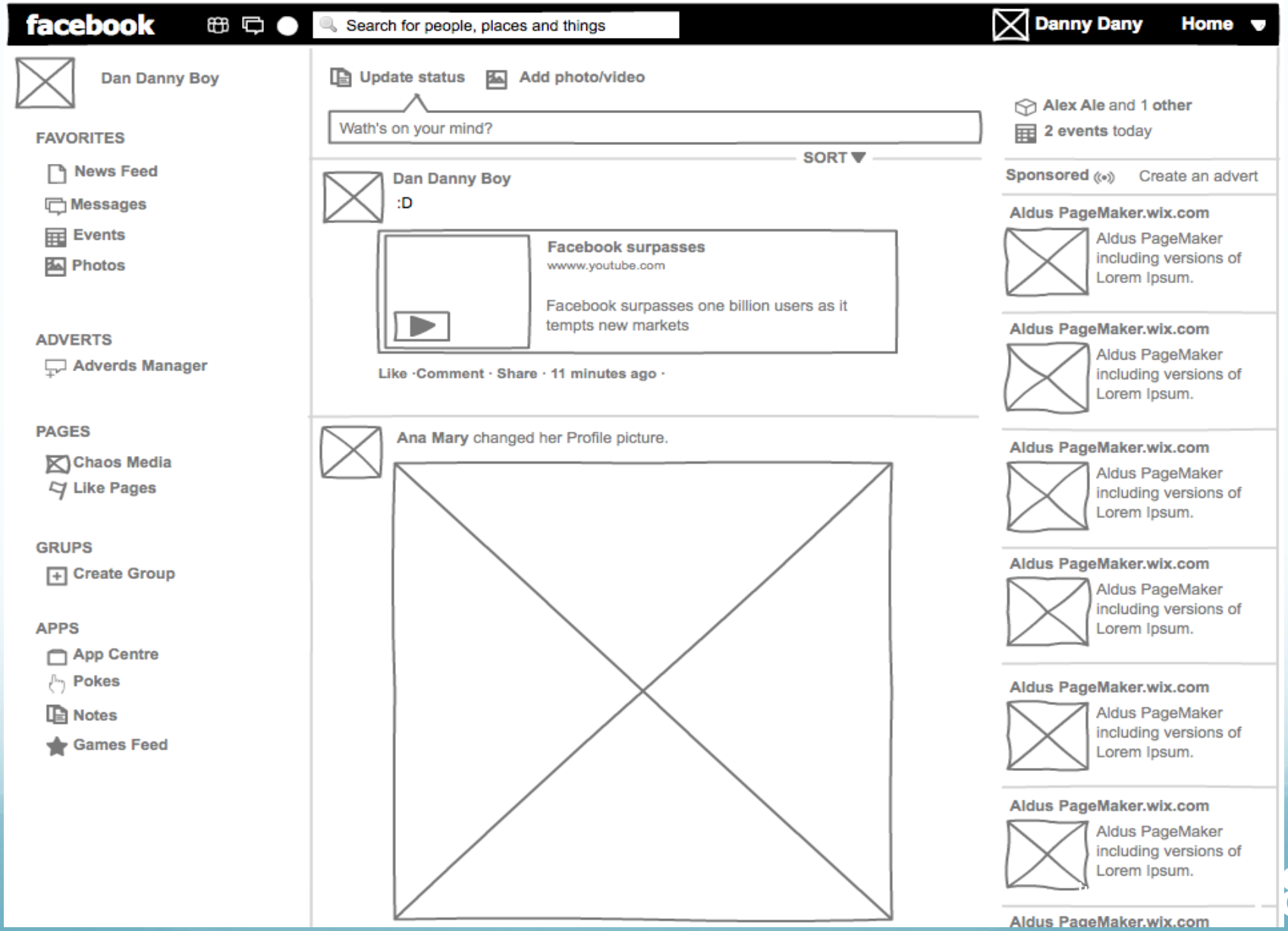
- What exactly happens in this phase –
  - BA will meet the client – gather the **business requirements**
  - BA then defines and documents the business requirements and gets final approval from the client
  - Once the client approves the BAs work, the Business Analyst creates a document with the formalized Business Requirements (BRD)
  - Then the BRD is approved by the Project Manager
  - After approval from Project Manager (PM), the Business Analyst begins the task of converting the business requirements to technical requirements (SRS)
  - **Documentation:**
    - **BRD – B**usiness **R**equirement **D**ocument
      - BA documents all requirements specified by the client
      - Business Requirements
    - **SRS – S**oftware **R**equirement **S**pecifications
      - Consists of all the product requirements to be designed and developed during the project's life cycle
      - Technical Requirements


How the customer explained it
How the Project Leader understood it
How the System Analyst designed it
How the Programmer wrote it
How the Business Consultant described it
How the project was documented
What operations installed
How the customer was billed
How it was supported
What the customer really needed

SDLC – Design Phase

- **Main Contributors**: Developers, BAs, PMs
- In this phase, the **Developers are planning their work** (planning how they'll develop the software application)
- Based on the requirements in the **SRS**, multiple design approaches for the product architecture are proposed/documented in the **DDS**
- **DDS** – **D**esign **D**ocument **S**pecifications
  - Documents that are based on various parameters
    - Risk Assessment, Product Robustness, Design, Design Modularity, Budget, Time Constraints
  - The best design approach is selected for the product
- A design approach clearly defines all the architectural modules of the product along with its communication and data flow representation with external modules
- A **blueprint** is created that shows how the various servers are going to be working together – App Servers, DB Servers, Web Servers, Load Balancers, etc.
- Wireframes and Mockups are also part of the **DDS** documents

Facebook Wireframe



SDLC – Development Phase

- Actual development of the software product begins and the product is built
- Developers use the Technical Requirements found in the **SRS** *AND* the Design Documents (**DDS**) as a guide to know what and how to develop the application
- Programming Code (Java, C, C++, C#, PHP, etc.) is generated according to the technical requirements
- Developers must follow coding guidelines defined by their organization and the programming languages/tools they're using
  - Examples:
    - Java is a case-sensitive language ➔ The application must be developed with this restriction in mind
    - The organization wants all classes to follow a set naming convention (increases standardization)
  - Programming language is chosen based on the needs of the software being developed

SDLC – QA/Testing Phase

- **Main Contributors**: QA Testing Team
- Once the programming code is developed by the developers, the application is tested against the requirements
- Testing Against Requirements:
  - Ensures that the product is actually solving the needs addressed and gathered during the Requirement Analysis Phase
  - If the client requested that only customers who have paid can access the application, then we design a test case that will **verify** that only paid customers can access the application
  - Testers design test cases (containing test steps) and link them to the requirements to prove to the client that the requirements they asked for have been met (**Requirement Traceability Matrix**)
- All types of testing are done during this phase

QA/Testing Phase *continued*

- **Types of Testing**:
  - Functional Testing: Determines if the application is working (functioning) the way it's supposed to
    - Unit Testing
    - Integration Testing
    - Regression Testing
    - System Testing
    - Acceptance Testing
    - And many others
  - Non-Functional Testing: Determines how efficiently the application is working
    - Performance Testing
    - Stress Testing
    - Load Testing
    - Security Testing

SDLC – Production/Implementation Phase

- Also Known As: **Deployment Phase**
- After the application has been successfully tested (and all issues have been resolved) the product is delivered to the client
- As soon as the product is deployed to the customer, they will first do **beta testing**
- If any changes are required or if any bugs are found, the client will report them to the development team
- After the changes are made and the bugs are fixed, the final deployment will happen

SDLC – Maintenance Phase

- Once the client starts using the finished application, they may encounter problems or issues that slipped past the Testing Testing team
- Additionally, finished applications need to be updated from time to time
- To deal with these situations, the development team (BAs, Developers, & Testers) work to maintain the finished application
- When issues are found, the client's help desk organization will verify that it's an issue
- If the help desk determines the issue to be valid, they will pass it on to the QA Team to further analyze the issue and verify that it is indeed a bug.
  - In this situation, the QA Team will log a defect and report it to the Developers to fix
  - The Developers will fix the bug, and a new build (version) will be released to the client after the QA Team tests the new build