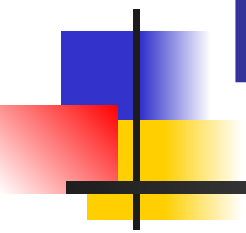
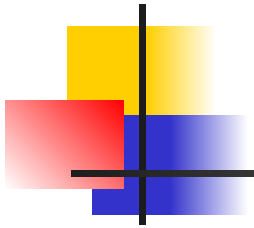


System Development Life Cycle (SDLC)

CS208

Six Phases of the System Development Life Cycle

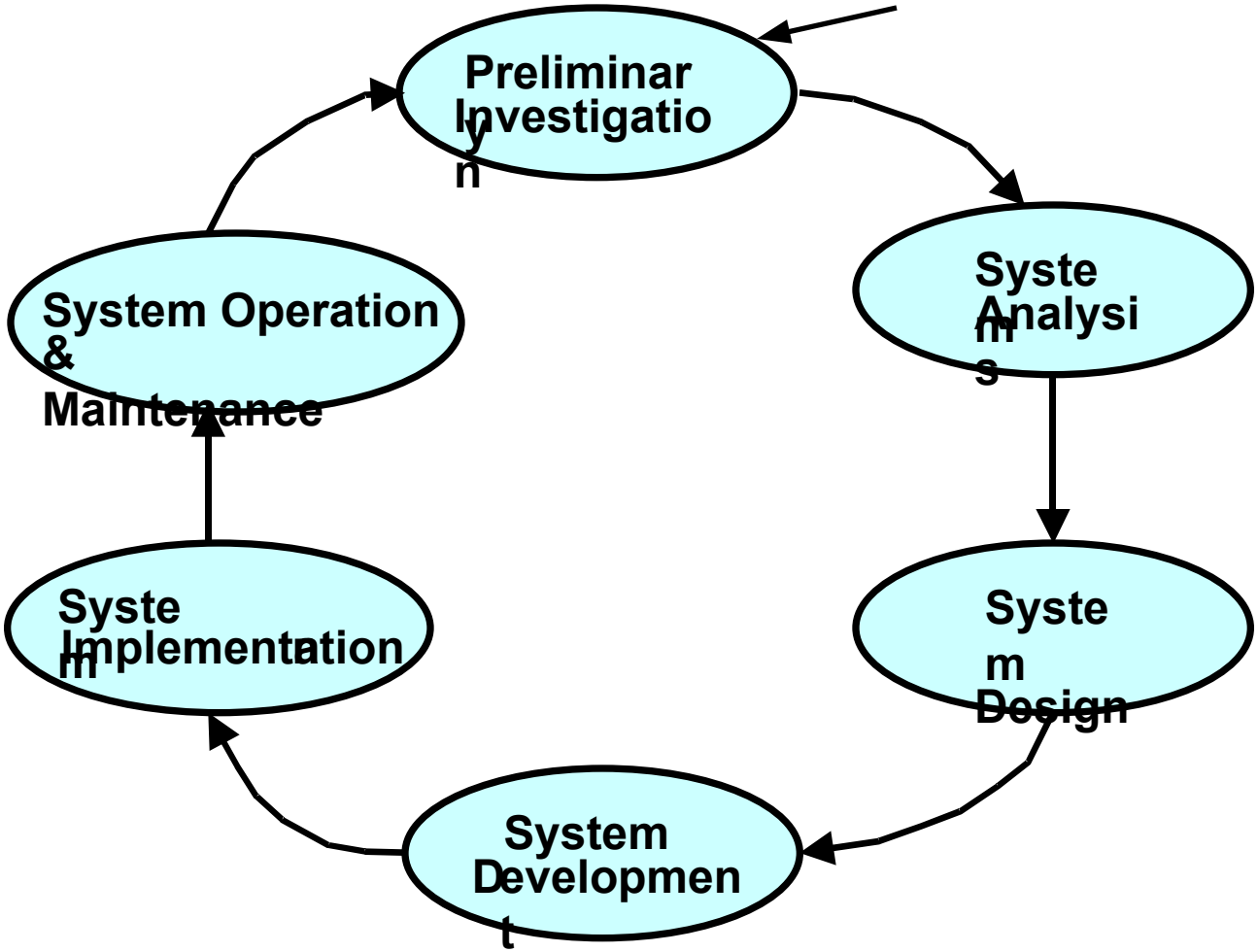


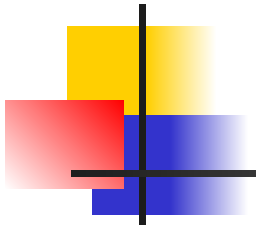
- **Preliminary Investigation**
  - Assesses feasibility and practicality of system
- **System Analysis**
  - Study old system and identify new requirements
  - Defines system from user's view
- **System Design**
  - Design new/alternative system
  - Defines system from technical view

Six Phases of the System Development Life Cycle

- **System Development**
  - New hardware and software is acquired, developed, and tested
- **System Implementation**
  - System installation and training
- **System Operation & Maintenance**
  - Daily operation
  - Periodic evaluation and updating

SDLC Phases


Preliminary Investigation
System Analysis
System Design
System Development
System Implementation
System Operation & Maintenance



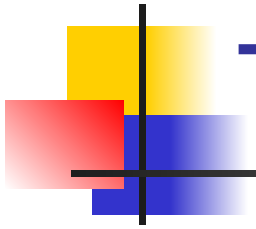
Phase 1: Preliminary Investigation

- Determine if a new system is needed
- Three primary tasks:
  - Define the problem
    - By observation and interview, determine what information is needed by whom, when, where and why
  - Suggest alternative solutions
  - Prepare a short report

Phase 2: System Analysis

- In depth study of the existing system to determine what the new system should do.
  - Expand on data gathered in Phase 1
- In addition to observation and interviews, examine:
  - Formal lines of authority (org chart)
  - Standard operating procedures
  - How information flows
  - Reasons for any inefficiencies

Phase 2: System Analysis Tools Used



- Checklists - list of questions
- Top-down analysis - start with top level components, break down into smaller parts through each successive level
- Grid charts - to show relationship between inputs and outputs
- System flowcharts - charts flow of input data, processing, and output which show system elements and interactions

Phase 2: System Analysis Documentation Produced

- Complete description of current system and its problems
- Requirements for for new system including:
  - Subject
  - Scope
  - Objectives
  - Benefits
- Possible development schedule

Phase 3: System Design

- Uses specifications from the systems analysis to design alternative systems
- Evaluate alternatives based upon:
  - Economic feasibility - Do benefits justify costs?
  - Technical feasibility - Is reliable technology and training available?
  - Operational feasibility - Will the managers and users support it?

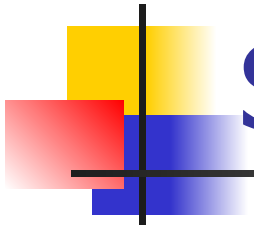
Phase 3: System Design Tools Used

- **Computer-Aided Software Engineering (CASE)** tools are software-based products designed to help automate the production of information systems.
- Examples:
  - Diagramming Tools
  - Data Repositories
  - Prototyping Tools
  - Test Data Generators
  - Documentation Tools
  - Project Management Tools

Phase 3: System Design Documentation Produced

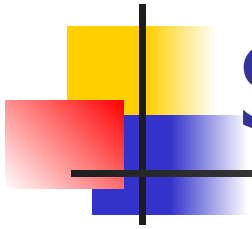
- System Design Report
  - Describe Alternatives including:
    - Inputs/Outputs
    - Processing
    - Storage and Backup
  - Recommend Top Alternative based upon:
    - System Fit into the Organization
    - Flexibility for the future
    - Costs vs. benefits

Phase 4: System Development



- Build the system to the design specifications
  - Develop the software
    - Purchase off-the-shelf software OR
    - Write custom software
  - Acquire the hardware
  - Test the new system
    - Module (unit) test - tests each part of system
    - Integration testing - tests system as one unit
  - Create manuals for users and operators

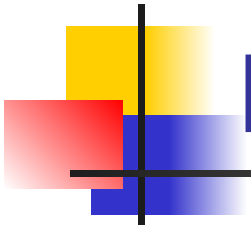
Phase 5: System Implementation



- Convert from old system to new system
- Train users
- Compile final documentation
- Evaluate the new system

Phase 5: System Implementation Types of Conversion

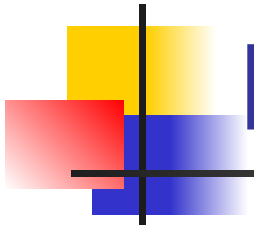
- **Direct/plunge/crash** approach – entire new system completely replaces entire old system, in one step
- **Parallel** approach - both systems are operated side by side until the new system proves itself
- **Pilot** approach - launched new system for only one group within the business -- once new system is operating smoothly, implementation goes company-wide
- **Phased/incremental** approach - individual parts of new system are gradually phased-in over time, using either crash or parallel for each piece.



Phase 5: System Implementation

- User Training
  - Ease into system, make them comfortable, and gain their support
  - Most commonly overlooked
  - Can be commenced before equipment delivery
  - Outside trainers sometimes used

Phase 6: Operations & Maintenance



- Types of changes:
  - Physical repair of the system
  - Correction of new bugs found (corrective)
  - System adjustments to environmental changes
  - Adjustments for users' changing needs (adaptive)
  - Changes to user better techniques when they become available (perfective)

Phase 6: Operations & Maintenance

- Evaluation Methods
  - Systems audit - performance compared to original specifications
  - Periodic evaluation - “checkups” from time to time, modifications if necessary

Deliverables of the SDLC