AGILE-PARADIGM SHIFT IN SDLC

Session - 10

Agile Process Models - I

Objectives

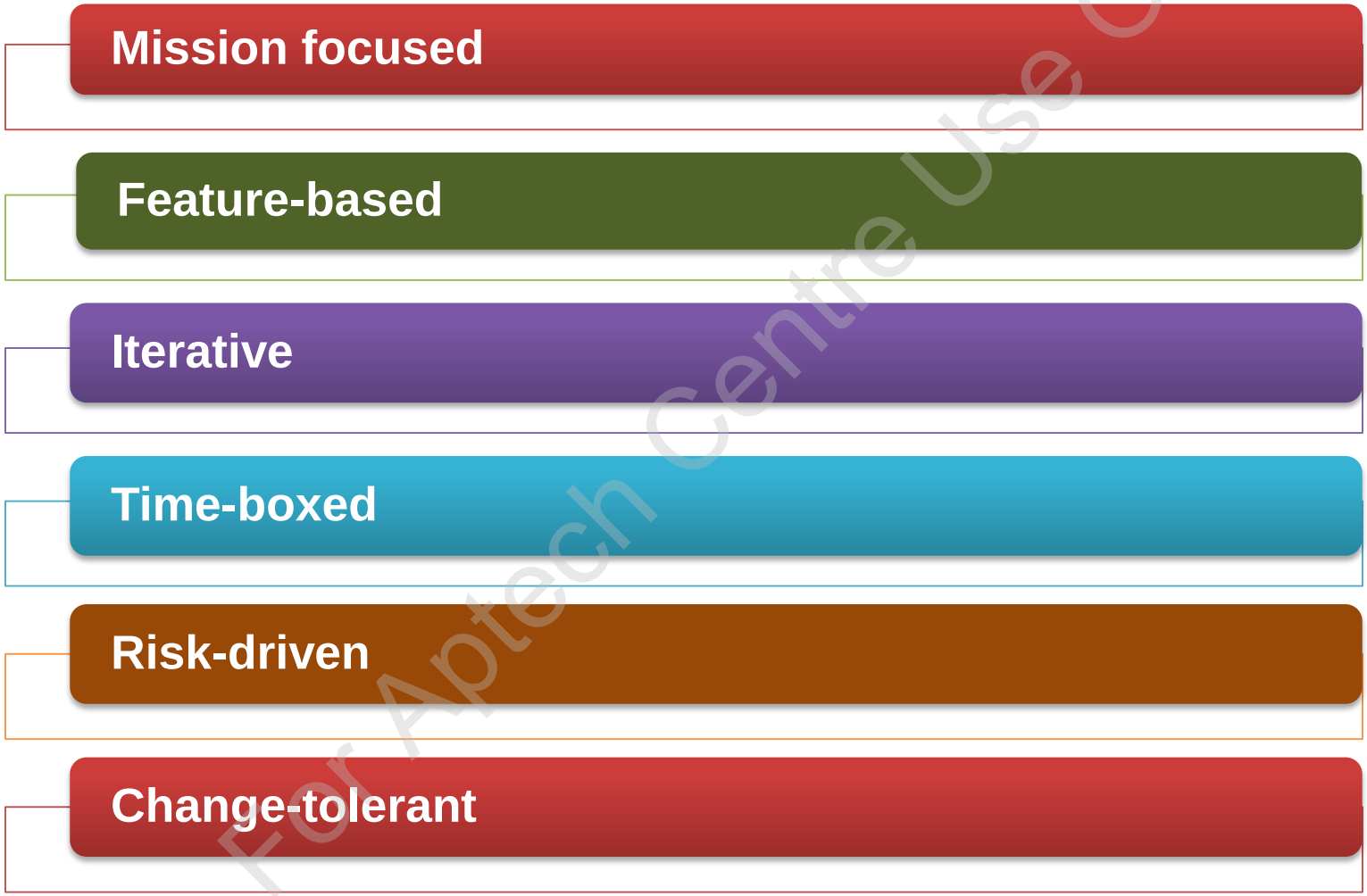
- Explain ASD model
- Explain the life cycle phases of ASD model
- Explain DSDM
- Explain the principles and techniques of DSDM model
- List and describe the different roles in DSDM model
- Explain crystal model
- Describe the core elements and properties of the crystal method

Adaptive Software Development (ASD)

- It is a new software development methodology that focuses on rapid creation, application, and evolution of software systems.
- It addresses the Internet and dot-com companies today in the market.
- It is based on Iteration mode, also called as adaptive cycles.

ASD Life Cycle [1-2]

- The ASD life cycle has the following characteristics:

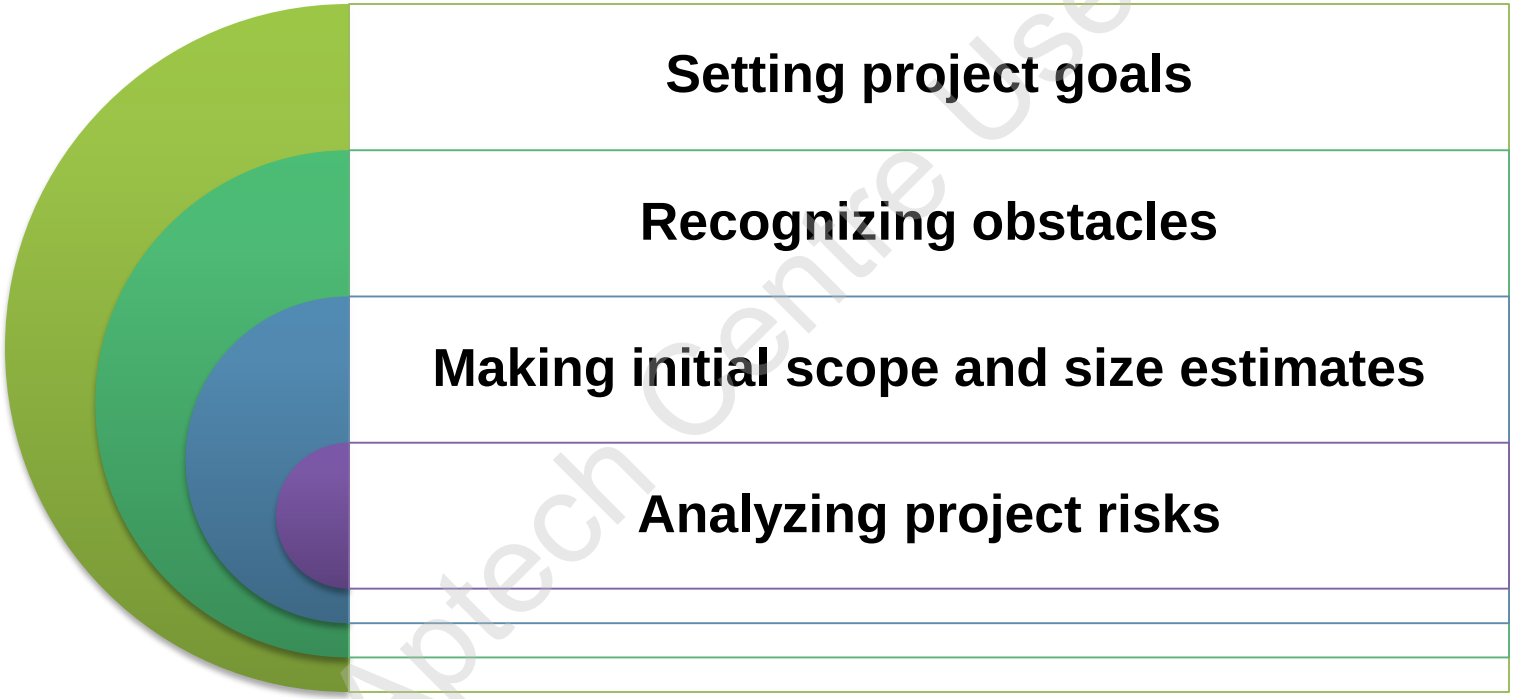


ASD Life Cycle [2-2]

- The adaptive life cycle is divided into the following three main phases:

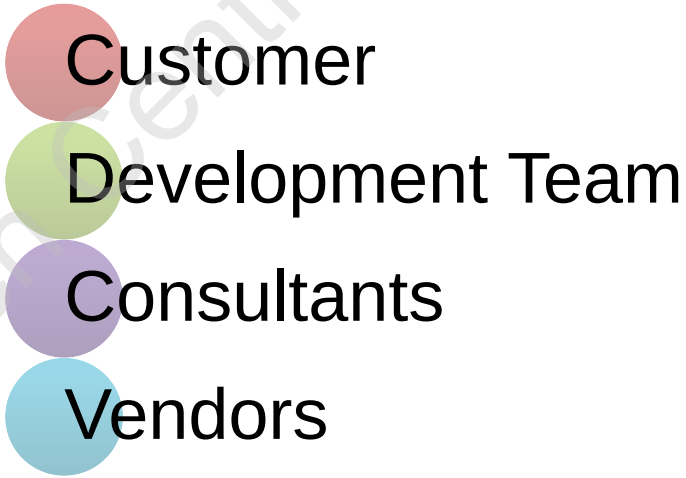
Speculate

- There are five main steps in the Speculate phase.
- Project initiation consists of:



Collaborate

- If project team work from the same physical location, collaboration consists of informal chats during breaks and whiteboard scribbling.
- However, larger projects require collaboration tools and project manager interaction.
- People included are:



Learn

- Four important things to learn at the end of each iteration:

Advantages and Disadvantages of ASD

- Table lists advantages and disadvantages of ASD.

Advantage	Disadvantage
Iterative-incremental process	Not scalable
Based on structural, functional, and behavioral modeling of the system	Over-dependence on inter-human communication
Special focus on quality assessment and control	No clear-cut design effort
Component-based development	No specific models prescribed
Adaptive process	Physical configuration modeling not encouraged
Process continually improved according to experiences	Lacks formalism
Focus on collaborative environment, test-based development, continuous integration, and parallel development of components	

Dynamic System Development Method (DSDM)

- It is a approach that provides a framework for developing and maintaining a system that meets rigid time constraints.
- It is dynamic.
- It is used for systems which are to be developed in short duration and where all the requirements cannot be collected and fixed at the beginning of the project.

Need for DSDM

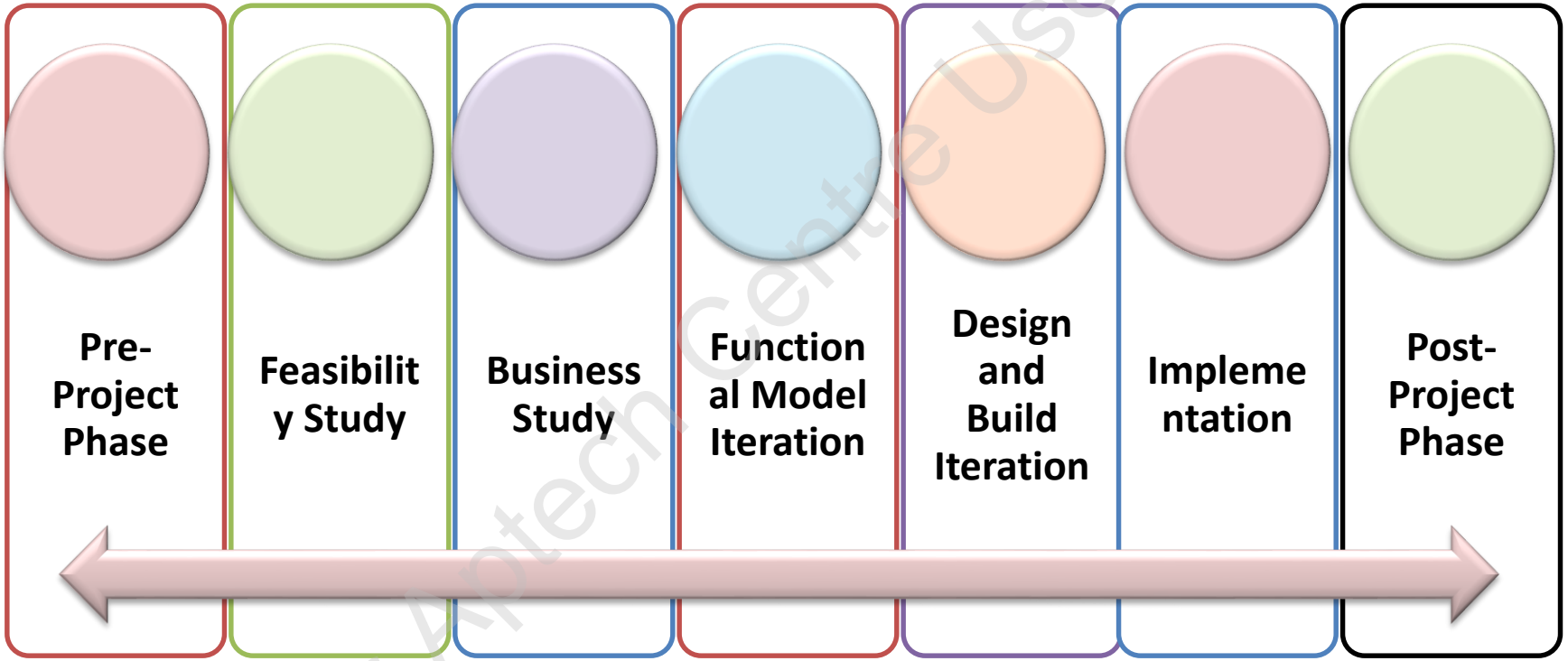
- Delivers working systems to organizations in shorter period of time.
- Guides people to work together in such a way that business goals are profitably accomplished.
- Focuses on the current requirements.

DSDM Principles

- Active user involvement is essential.
- Teams must be empowered to make decisions.
- The target is frequent product delivery.
- The essential criterion for acceptance of deliverables is the compliance to business purpose.
- Iterative and incremental development is necessary to reach an accurate business solution.
- All changes during development are reversible.
- Testing is integrated throughout the life cycle.
- Requirements are base lined at a high level.
- A cooperative and collaborative approach between all stakeholders is imperative.

Phases of DSDM [1-8]

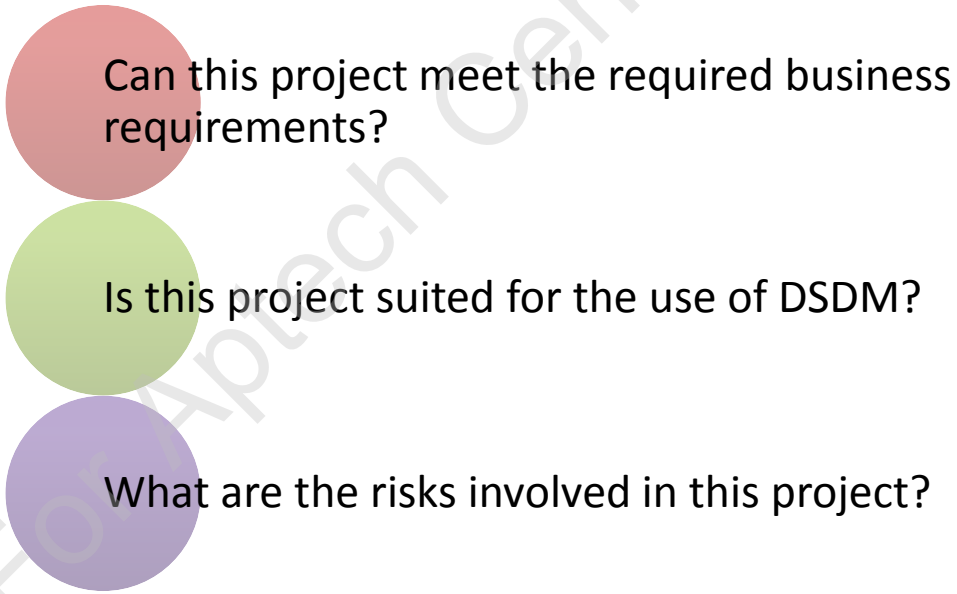
- For both the development of new systems and for change of business processes, the following phases are applicable:



Phases of DSDM [2-8]

Feasibility Study

- The most important technique used in this phase is workshops.
- Following questions are answered as pre-requisites for the use of DSDM:



Phases of DSDM [3-8]

Business Study

- This stage examines the business processes, the user groups involved, and their requirements.
- Workshops are very important in this phase, where the proposed system is discussed by the different stakeholders.
- Time-boxing is used in the development of the plan.
- Time-boxing is essential in attaining the goals of DSDM, namely, being on time, budget, and guaranteeing quality.

Phases of DSDM [4-8]

Business Study

- The deliverables for this stage are as follows:
  - Business area definition that describes the context of the project within the company.
  - System architecture definition that provides an initial global architecture.
  - Development plan that defines the most important steps in the development process.
  - The Risk Log is also brought up-to-date with the risks that are identified in this phase.

Phases of DSDM [5-8]

Functional Model Iteration

- Consists of both a functional prototype and models.
- Testing is done in each iteration of DSDM in order to ensure quality.
- The functional model can be divided into the following sub-stages:
  - **Identify functional prototype**
  - **Agree on schedule**
  - **Create functional prototype**
  - **Review prototype**

Phases of DSDM [6-8]

Design and Build Iteration

- The main focus of this stage is to integrate the functional components from the previous phase into one system.
- It also addressed the non-functional requirements of the system being built.
- Testing is an important ongoing activity in this stage too.
- Main deliverables are as follows:
  - A design prototype that is tested by the end users at the end of the iteration. The tested system is then handed over to the next phase
  - User documentation

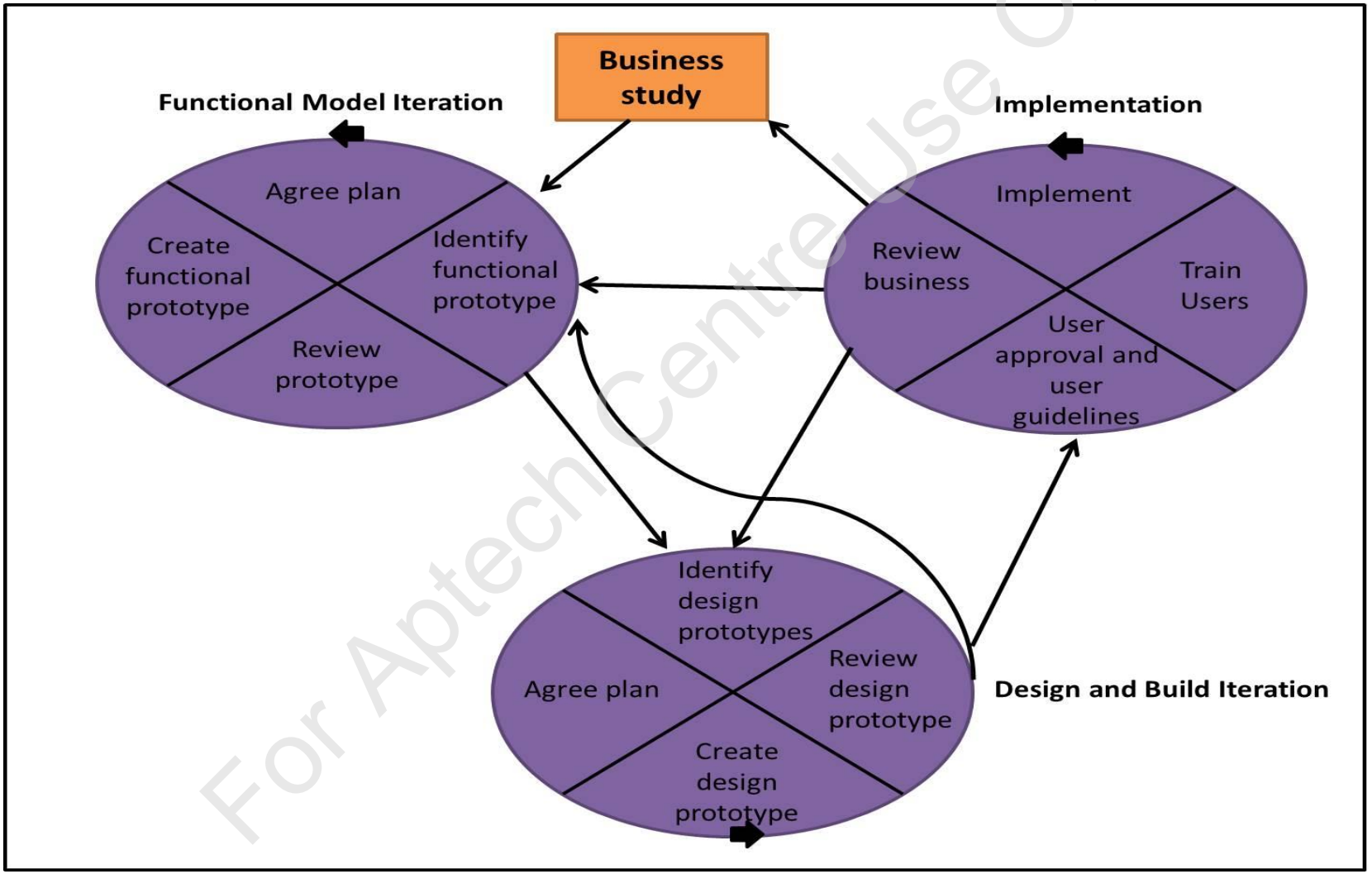
Phases of DSDM [7-8]

Implementation

- The tested system and the user documentation is handed over to the users. The future users are trained.
- The implementation stage can be subdivided into four sub-stages:
  - **End-user approval and guidelines**
  - **Train users**
  - **Implement**
  - **Review**

Phases of DSDM [8-8]

- Figure shows the DSDM phases.



Roles in DSDM [1-3]

- The different roles in the DSDM team are as follows:

Executive Sponsor or Project Champion

- This is a person from the customer's organization who has the ultimate power to make decisions.

Visionary

- A visionary possesses the most accurate perception of the business objectives of the system and the project.

Ambassador User

- A representative of the user community who ensures that the developers receive enough amount of feedback from the user during the development process.

Project Manager

- The project manager manages the project in general. A project manager can be from the user community or IT staff.

Roles in DSDM [2-3]

Technical Coordinator

- The technical coordinator is responsible for designing the system architecture and controlling the technical quality in the project.

Team Leader

- The team leader ensures that the team works effectively as a whole.

Developer

- A developer interprets the system requirements and models it. A developer is also responsible for developing the deliverable codes and building the prototypes.

Tester

- A tester checks the code and ensures it is technically correct.

Scribe

- A scribe is responsible for collecting and recording the requirements, agreements, and decisions made in each workshop.

Roles in DSDM [3-3]

Facilitator

- A facilitator is responsible for managing the workshops progress and also facilitates preparation and communication.

Specialist Roles

- Business Architect, Quality Manager, System Integrator, and so on.

Techniques in DSDM [1-3]

Time-boxing

- DSDM used the time-boxing technique where milestones are used in the traditional methods.
- The time-box usually consists of two to six weeks, where the planned tasks are completed.
- A time-box:
  - Can contain several tasks.
  - Has to deliver a product at the end.
  - Is subject to change.

Techniques in DSDM [2-3]

- MoSCoW rules are the DSDM techniques used to weigh the importance of requirements. They are as follows:

Must have

- All features belonging to this group must be implemented. The system would not work if they are not delivered.

Should have

- Features of this priority, although important, can be omitted if there are time constraints.

Could have

- The features in this group add functional enhancements to the system and can easily be reassigned to a later time-box.

Want to have

- These features are of little value and serve only a limited group of users.

Techniques in DSDM [3-3]

Prototyping

- Evolutionary prototyping in DSDM encourages incremental development and frequent delivery.
- Critical functionality is developed first, so that difficulties are discovered and sorted out early and product is delivered early.
- The feedback is provided through a workshop.
- The different prototypes in DSDM are as follows:

Business Prototype	Allows assessment of the evolving system.
Usability Prototype	Checks the user interface.
Performance Prototype	Ensures that the performance of the product and its ability to handle volume.
Capability Prototype	Evaluates the capability of the product by exploring all possible options.

Key Factors in DSDM

- Acceptance of DSDM philosophy before starting work on the project.
- Decision making powers of users and developers.
- Responsibility of the senior user management to provide significant involvement of end users.
- Incremental delivery.
- Approachability of end users to developers.
- Stability of the team.
- Skills of development team.
- Size of the development team.
- Supportive commercial relationship.
- Development technology.

Advantages and Disadvantages of DSDM

- Table lists the advantages and disadvantages of DSDM.

Advantage	Disadvantage
Results of development are directly visible	High cost of licensing
Basic functionality is delivered quickly and additional functionality is delivered at regular intervals	Relatively higher barrier to entry
Users can steer the direction of the project at any point	Cultural shift in organization
As the constant feedback is provided from the users, the system being developed meets all the user requirements	Very costly as the manpower need to be trained properly
Early indications of whether a project will work or not are available rather than unpleasant surprises at the end	It is not suitable for small organizations
Deliverables on time and budget	Not very user friendly as users need to have proper knowledge of the system to implement it. Implementation is not easy

Crystal [1-3]

- Crystal is a lightweight methodology based on the belief that different projects call for different methodologies.
- Projects are categorized according to the size of the project and the criticality of the system being developed.
- The Crystal family has two common rules, they are as follows:

The project must use incremental development, with increments of four months or less.

The team must hold pre and post-increment reflection workshops.

Crystal [2-3]

- The two basic Crystal techniques are as follows:
  - **Methodology tuning technique**
  - **Reflection workshop technique**

Crystal [3-3]

- Crystal methods are mainly focused on:

The Crystal Family [1-4]

Crystal Clear

Crystal Orange

Crystal Orange Web

Crystal Yellow

Crystal Diamond

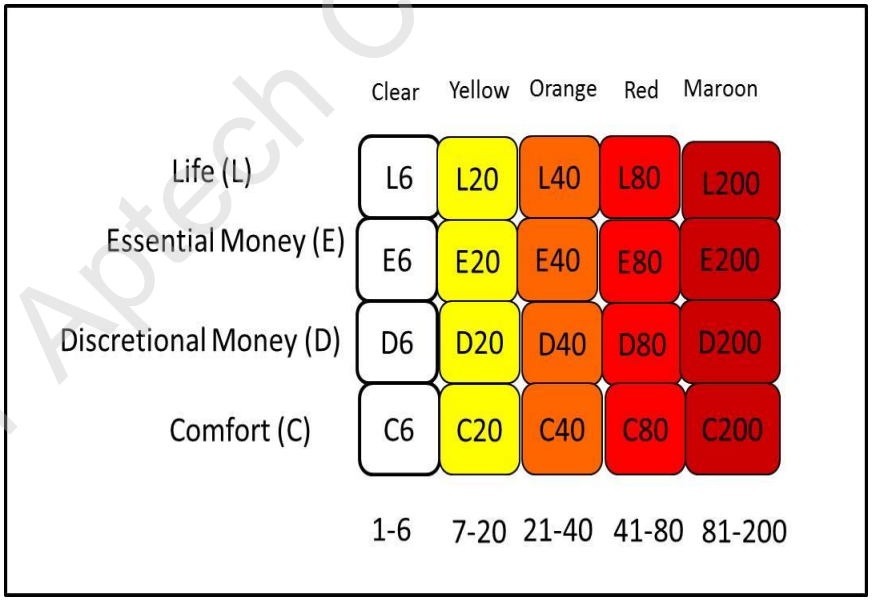
Crystal Red

Crystal Maroon

Crystal Sapphire

The Crystal Family [2-4]

- Crystal methodologies are characterized by color, according to the number of people being coordinated:
  - Clear is for collocated teams of eight or fewer.
  - Yellow is for teams of approximately 10-20 people.
  - Orange is for approximately 20-50 people.
  - Red is for approximately 50-100 people, and so on, through Maroon, Blue, and Violet.



The Crystal Family [3-4]

- Following are seven prevailing common properties between all the members in the Crystal family:

Frequent delivery

- This step focuses on regular release of iterations of the software product.

Reflective improvement

- Finds new and better ways to improve their processes. Iterations help by providing feedback on whether the current process is working or not.

Osmotic communication

- Osmotic communication involves the team being together in a room and getting the information to flow around it.

The Crystal Family [4-4]

Trust

- The people in the team must be able to speak up about the issues they face and trust each other.

Focus

- **Focus in crystal refers to two things:**
- Focusing on an individual task in a project till there is progress
- Focusing on the direction in which the project is heading

Easy access to expert users

- This involves the developers working with a project expert, so that they can clarify queries and request for solutions to problems.

Technical environment

- The idea behind a technical environment is that errors can be spotted easily when changes are made.

Advantages and Disadvantages of Crystal

- Table lists the advantages and disadvantages of Crystal methodologies.

Advantage	Disadvantage
Iterative and incremental process	Limited scalability
Continuous integration	Limited applicability. Not suitable for developing highly critical systems
Iterative development managed by planning and reviewing	Over-dependence on inter-human communication
Methodologies used in a low-criticality project can be used for a high-criticality project too	Lack of a clear common process
Active user involvement	Seamlessness not addressed (Crystal Clear)
Flexible and configurable process requirements-based (Crystal Clear)	Traceability to requirements suffer as planning and development activities are not necessarily
Early and frequent releases	Design of the entire system is not performed as a team effort and is carried out by individual developers in the manner they choose (Crystal Clear)
Specific work-products prescribed	Behavioral and functional modeling can be of low quality as details of many work products are left to the individual developers to decide (Crystal Clear)
Continuous validation	No formalism
Traceability to requirements, Requirements evolve over time, and Text-based development (Crystal Clear)	

Summary

- ASD is a new software development methodology that focuses on rapid creation and application and evolution of software systems. It was derived from rapid application development and addresses the Internet economy.
- The ASD life cycle is divided into three main phases namely, Speculate, Collaborate, and Learn.
- DSDM is an Agile software development approach that provides a framework for building and maintaining a system that meets tight time constraints through the use of incremental prototyping in a controlled project management.
- The different phases in DSDM are namely, Pre-Project, Feasibility Study, Business Study, Functional Model Iteration, Design and Build Iteration, Implementation, and Post-Project.
- The techniques used in DSDM are Time-boxing, MoSCoW Rules, and Prototyping.
- Crystal was introduced as a family of methodologies in 1998. These are lightweight methodologies and are based on the belief that different projects call for different methodologies.
- There are seven prevailing common properties between all the members in the Crystal family. The more these properties are there in a project, the more likely it is to succeed.