✔ Information Engineering

Information Engineering (IE) or Information Engineering Methodology (IEM) is an approach to designing and developing information systems. Information engineering methodology is an architectural approach to planning, analyzing, designing and implementing applications with in an enterprise. It aims to enable an enterprise to improve the management of its resources, including capital, people and information systems to support the achievement of its business vision.

Information engineering can be defined as "An integrated and evolutionary set of tasks and techniques that enhance business communication through an enterprise enabling it to develop people procedures and systems to achieve its vision.

✔ Purposes of Information Engineering

(a) Organization Planning
(b) Business Re-engineering
(c) Application development
(d) Planning of Information System
(e) Re-engineering of Systems

✔ Variants of Information Engineering

There are 2 variants of information engineering i.e.,
(1) Driven Variant
(2) Business Driven Variant

(1) **Driven Variant**: The driven variant of information engineering was designed to enable information system development to develop a information system that satisfies the information needs of the 1980's which was largely a driven development environment. Most of the CASE tools available today support this driven variant of information engineering. It includes :

SSAD and Object Oriented Methodologies

(a) Information Strategy Planning : The fundamental objective of information strategy planning (ISP) is to develop a plan for implementing business systems to support business needs.

(b) Outline Business Area Analysis : The outline Business area analysis answers a range of questions that are related to implementation of a business area.

(c) Detailed Business Area Analysis : The purpose of detailed business area analysis is to provide detailed models as a solid basis for system design. This methodology helps in finding the right answers to the right questions.

(d) Business System Design : The purpose of Business system design project is to specify all aspects of a system that are relevant to its users is preparation for the technical design, construction and installation of one or more closing related databases and systems.

(e) Technical Design : A technical design project prepares an implementation area for construction and installation. The key tasks are structured to produce a system and database that meets users's acceptance criteria and technically sound.

2. Business Driven : Information engineering was extended into strategic business planning for the business driven variant of Information Engineering. This variant was designed for rapid change in the client/server, object orieted environment of the business driven 1990's. It includes :

(a) Strategy Analysis : This is a rapid delivery method for senior business managers for refinement of existing business plans, or development of new strategic business plans if none exist yet.

(b) Strategic Modeling : This uses a facilitated modeling session with senior business managers' who review the strategic business plans to develop a strategic model. This is an enterprise data model where many-to-many associations have been decomposed to identify priority business activities and processes identified by management.

(c) Tactical and Operational Modeling : This uses the same approach as for strategic modeling, but focuses on tactical business units expanding into tactical attribute detail and later operational attribute detail for physical database generation and installation.

(d) Activity Modeling : Activity modeling are based on activity based costing, they are used to document priority business activities for rapid delivery.

(e) Process Modeling : Business Process Modeling Notation (BPMN) is used, supported by modeling tools, to define process model diagrams in BPMN of priority activities for rapid delivery into production.

Techniques used in Information Engineering Projects

Some techniques that are used in I.E. projects are :

(a) Entity analysis

(b) Function analysis

(c) Process logic analysis

(d) Entity type life cycle analysis

(e) Matrix cross checking

(f) Normalization

(g) Cluster analysis

(h) Data analysis

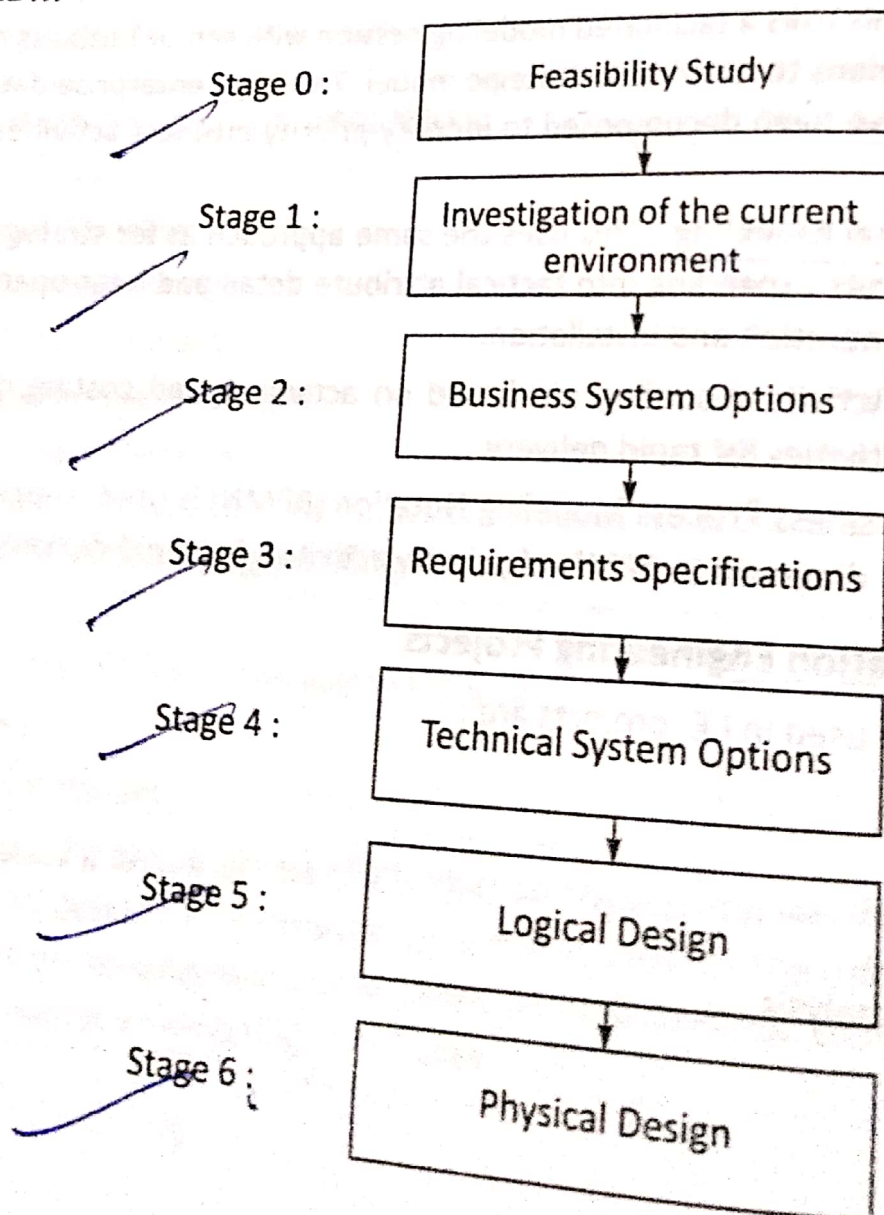## ✔ Structured System Analysis and Design (SSAD) | SSADM

Structured system analysis and design method (SSADM) was selected by UK government as the mandatory method to be used in government projects. SSADM is a systems concept that is used for analysis and design of information system. SSADM was produced for the central computer and telecommunications agency (now office of government commerce).

✔ Various Techinques of SSADM

The three most important techniques that are used in SSADM are as follows :

1. **Logical Data Modeling** : The process of identifying, modeling and documenting the data requirements of the system being designed. The result is a data model containing entities; attributes and relationships.

2. **Data Flow Modeling** : The process of identifying, modeling and documenting how data moves around an information system. Data flow modeling examines processsses, data stores, external entities and dat flows.

3. **Entity Event Modeling** : A two standard process. Entity Behaviour Modeling, identifying and documenting the events that affect each entity and the sequence in which these events occurs.

Stages in SSADM

Stage 0 : **Feasibility Study**

Stage 1 : **Investigation of the current environment**

Stage 2 : **Business System Options**

Stage 3 : **Requirements Specifications**

Stage 4 : **Technical System Options**

Stage 5 : **Logical Design**

Stage 6 : **Physical Design**

SSAD and Object Oriented Methodologies

Stage 0 : Feasibility Study

In order to determine whether or not a given project is feasible, there must be some form of investigation into the goals and implications of the project. For very small scale projects, this may not be necessary at all as the scope of the project is easily understood. In larger projects, the feasibility may be done but in an informal sense, either because there is no time for a formal study or because the project is a "must have" and will have to be done one way or the other. When a feasibility study is carried out, there are four main areas of concern.

(a) **Technical** : Is the project technically possible?

(b) **Financial** : Can the business afford to carryout the project?

(c) **Organizational** : Will the new system be compatible with existing practices.

(d) **Ethical** : Is the impact of the new system socially acceptable?

To answer these questions, the feasibility study is effectively a condensed version of a fully blown system analysis and design. The requirements and users are analyzed to some extent, some business options are drawn up and even some details of the technical implementation. The product of this stage is a formal feasibility study document.

Stage 1 : Investigation of Current Environment

This is one of the most important stages of SSADM. The developers of SSADM understood that, in almost all the cases there in some form of current system even if it is entirely composed of people and paper. Through a combination of interviewing employees, circulating questionnaires, observations and existing documentation, the analyst comes to full understanding of the system as it is the start of the project. This serves many purposes such as

(a) The analyst learns the terminology of the business, what users do how they do it.

(b) The old system provides the core requirements for the new system.

(c) The data model can be constructed.

(d) The users becomes involved and learn the techniques and models of the analyst.

(e) The Boundaries of the systems can be defined.

The products of this stages are :

(a) Users Catalogues

(b) Requirements Catalogue

(c) Context Diagram

(d) Full Data Dictionary

(e) Current Environment Logical Data Model

Stage 2 : Business System Options

Having investigated the current system, the analyst must decide on the overall design of the new system. To do this, he/she using the outputs of the previous stage, develops a set of business system options. There are different ways in which the the new system could be produced varying from doing nothing to throwing out the old system entirely and building an entirely new one. The analyst must hold a brainstroming session so that as many and various ideas as possible, are generated. The ideas are then collected to form a set of two or three different options which are presented to the user. The options considers the following :

- The degree of automation
- The Boundary between the system and the users.