What is a System?

* a collection of related components that serve a common purpose.
* In the phrase “System Life Cycle”, a system is either a program or a collection of programs.
* a system life cycle describes how programs are developed from an idea, to completed programs and then, to revised or discontinued programs.

Stages of a System Life Cycle

The process of replacing the old system with the new happens in a series of stages and the whole process is called the “system life cycle”.

Elements of the System Life Cycle

In each stage, different documents are required as input, different activities take place with different people involved and different documents are generated.



Figure 1-1 : The stages of a system life cycle

1. Initial Study

A system project will not start for no apparent reasons. It must have been initiated by someone (we will generally call him the user). Based on the user’s requests, the System Analyst (SA) will check the background of the problems to see if it is possible to solve them. After the study, the SA will produce a feasibility report. This report will describe the scope of the new system and contains estimates of the time, costs and benefits that would result from the system.

1. System Analysis and Design

Based on the feasibility report, the SA will carry out a requirement analysis. The SA will use techniques like interviewing, observation, questionnaires and/or reading of manuals to find out from the user the new system’s requirements. What the SA has gathered will be documented using tools like Data Flow Diagrams and/or Run Charts. There will normally be a presentation by the SA to the user to verify the findings.

1. Program Design

Based on the system specification, the SA or the Senior Programmer will then produce the program specification for each of the programs (if there is more than one program). The SA or the Senior Programmer will have to ensure that all program specifications adhere to the system specification and standards. They will also have to ensure that a test schedule is prepared for each program.

Typically, the program specification consists of:

¨ Program/module description and objectives

¨ Input file(s) specification

¨ Output file(s) specification

¨ Processing requirement

The programmer will take the program specification and use a method agreed upon to design the program before coding it. Common methods are Jackson Structured Programming, Pseudocode, Flowchart, Structured Chart and Nassi Shneiderman diagrams.

1. Development

When the design is completed, the development stage begins, which is to convert the design into workable solutions (programs). The development stage can be divided into two main activities:

¨ File creation

¨ Application program creation

Detailed documentation on the files and program used in the system are also done at this stage. These include:

¨ Input and output specifications

¨ Data dictionary

¨ Operating instruction

1. Testing

Throughout the development, and as a separate stage after development is completed, testing and debugging will be necessary. Tests will be carried out according to the schedule prepared by the SA or Senior Programmer. During the process of testing, changes can be made in any of the previous stages (refer to Figure 1-2) to rectify any errors or problems discovered.

At this stage, the documents generated are:



Figure 1-2 : Testing and debugging

At this stage, the documents generated are:

¨ Test log

¨ Test plan

¨ Test data

¨ Test results (both expected and actual)

1. Implementation

After adequate testing, implementation of the system takes place. The stage includes the installation of the hardware before the system is handed over to the user. It covers:

* ¨ User training
* ¨ Data conversion
* ¨ Control procedures for the changeover

The System Analyst will be responsible for the implementation plan which covers in detail the time frame for each of the activities mentioned above, and the duties and responsibilities of each of the personnel involved. The 4 implementation methods:

* ¨ Direct changeover
* ¨ Parallel changeover
* ¨ Pilot changeover
* ¨ Phased/Gradual changeover

1. Live Running and Maintenance

This is the stage where the system becomes functional in a live environment, and is expected to be able to cope with any of the situations it is built to handle.

Live usage gives rise to maintenance requests. Errors may be detected which might have slipped through the testing stage. There may be changes in the user requirements or discovery of requirements which have not been included in the first place due to a misunderstanding between the user and the System Analyst. Sometimes it may be due to external influences like changes in government policies which require modifications to the program (e.g. GST).

As long as there is some alteration, all documentation related to the change must be updated.

1. Review

Once the “dust” has settled, i.e. the system has been used for a sufficient length of time and emergencies have been coped with, an evaluation review should be carried out. The review should be carried out by a person who has not been involved in the design and development stages so as to ensure that the review will be carried out objectively. The content of the review will include:

* ¨ Objectives met
* ¨ Cost
* ¨ Performance
* ¨ Standards
* ¨ Recommendations

After the review, maintenance may be carried out to enhance the system or it may be decided that part or the whole of the system needs to be re-designed, and hence re-developed. If redesigning needs to be done, the initial study will come in again, thus calling into play the entire System Life Cycle once more.