System Modeling

System Modeling has several concepts to study underline simulation. System modeling includes:

i). System

ii). Model

iii). Events

iv). System State Variables

v). Entities and Attributes

vi). List Processing

vii). Activities and Delays

viii). Finally the Definition of District

i) System, Model and Events

A model is an abstraction of the real system in simulation. In a system, the relevant information are used to capture important behavior. Line-Arization, Time-Bound, Behavior, etc. mimic analysis track table are some important examples.

Modelling

Modelling is the application of methods to analyse complex real-world problem in order to make predictions about what might happen with various actions.

✓ **Objects:** It is an entity in the real world. Such an object can exhibit widely varying behaviour depending on the context in which it is studied as well as the aspects of is its behaviour which are under study.

✓ **Base Model:** It is a hypothetical abstract representation of the object's properties in particular its behaviour which is valid in all possible contexts and describe all the objects facts.

A Base Model is **Hypothetical** as we will never in partice be able to contract/represent such a total model.

✓ **System:** A system is a well-defined object in the real world under specific condition only considering specific aspects of its structure and behaviour.

✓ **Experimental Frame:** When one studies a system in the real world the experimental frame described experimental conditions aspects within which the date system and corresponding model will be used.

As such the experimental frame reflects the objectives of the experimenter who performs experiments on a real system or 1through simulation on a model.

✓ Model has many uses

a) Models are used to understand the behaviour of an existing system.

b) Models are used to predict the effect of changes or upgrade to the system.

c) Models are used to study of the imaginary systems.

iv) System State Variables

The System State Variables are the collection of all information needed to define what is happening within the system to attend the described output at a given point intire.

The determination of the System State Variables in a function of the purpose of the investigation so what may be the system state variable in one case may not be the same in another case even though the physical system is the same. Determining the system state variables is as much an art as a science.

The System State Variables in a discrete event model remain constant over internal of time and change well you only at certain well-defined point code event time

Continuous Model have System State Variables defined by differential or difference equations giving rise to variables that may act change continuously over time

v) Entities and Attributes

An entity represents an object that requires explicit definition. It can be dynamic in that it moves through the system or it can be static in that it serves other entities.In the example the customer is a **dynamic entity** whereas the bank teller is a **static entity.**

An entity may have attributes that perform to that entity alone. This attribute should be considered as local values.

✓**Resources:** A resource is an entity that provides service to Dynamic Entities. The resource can serve more than one **Dynamic Entity** at the same time.

i.e. Operate as a Parallel. A Dynamic Entity can request to one or more units resource and release them after the completion of their work.

vi) List-Processing

Entities are managed by allocating them to resources that provide service, by acting them to event notice thereby suspending their activity into the future or by placing them into an ordered list. Lister used to represent queues. List are often processed according to (FIFO) but there are many other possibilities.

vii) Activities and Delays

Activities are the duration of time whose duration is known prior to commencement of the activity. Thus when the duration beings, its end can be scheduled. The duration can be a constant a random value for a statistical distribution, the result of an equation, input from a file or computed based on the event state.

A delay is an infinite duration that is caused by some combination of system conditions.

When an entity joins a queue for a resource the time that it will remain in the queue may be unknown initially since that time meaning depend on other events that may occur.

The beginning sending of activity or delay is an event.