GST 56 – Processes

Formal Description

A process is an organised sequence of interactions and changes through which matter, energy or information are transferred, transformed or maintained over time. Processes involve one or more interacting entities and produce changes in their states. Processes may be simple or highly complex, may operate continuously or intermittently, and provide the dynamic foundation from which systems emerge.

Plain English Explanation

Events help us recognise that something has happened. A process goes further by describing how changes occur through time.

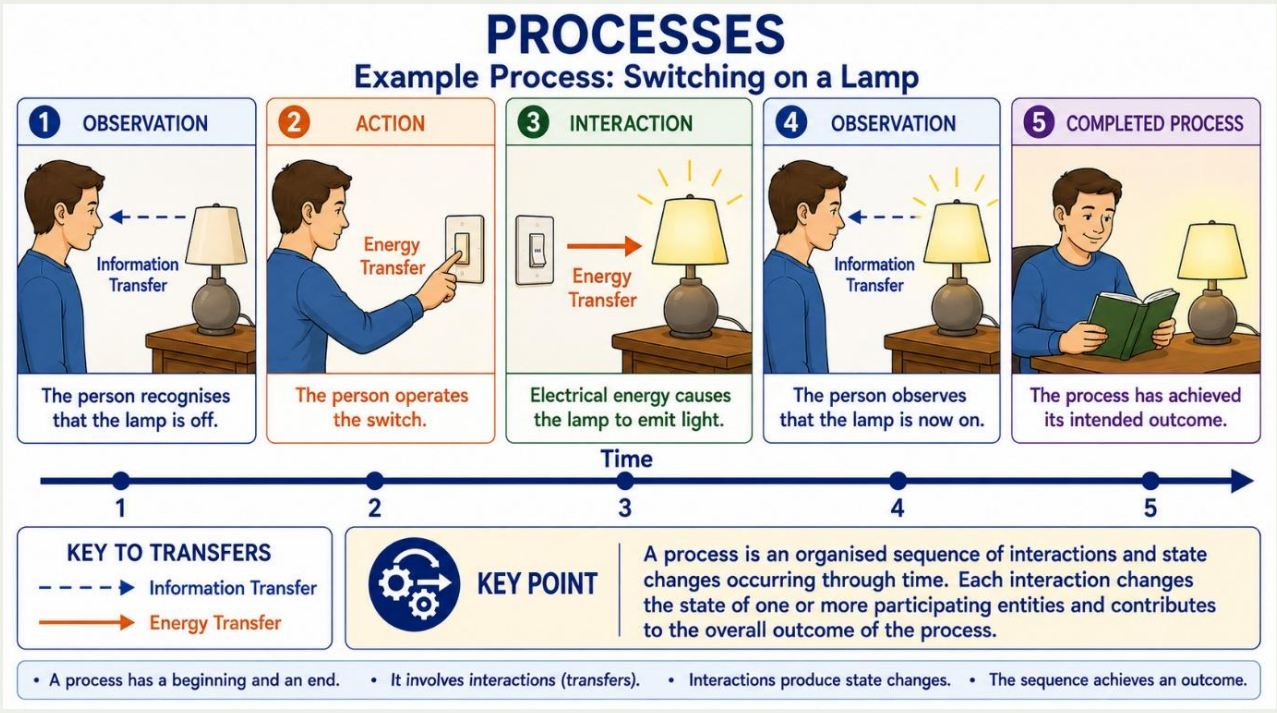
Consider making a cup of tea. Water is heated, the teabag is placed in the cup, hot water is poured onto it, the tea infuses and the drink gradually cools. Each step involves interactions between different entities, and together these interactions form a single organised process.

Processes occur everywhere in nature and society. Rivers transport water from mountains to the sea. Plants convert sunlight, water and carbon dioxide into new biological material. Factories transform raw materials into finished products. Schools help students develop knowledge and skills. Although these examples are very different, each consists of an organised sequence of interactions producing changes over time.

Some processes are continuous. A river flows continuously, and living organisms continually exchange matter and energy with their surroundings. Other processes are intermittent or occur only when particular conditions arise. A traffic light changes only when required, and an emergency response begins only when an incident occurs.

Processes often contain many smaller processes operating simultaneously. The manufacture of a car includes the production of components, their assembly, quality inspection and transportation. Each of these is itself a process composed of many smaller interactions and events.

Understanding processes allows us to explain how changes occur rather than simply observing that they have occurred. In the next module we shall see that when many processes become organised into stable patterns of interaction, they may form systems.



Examples

The water cycle is a process involving evaporation, condensation, precipitation and runoff. Water continually changes location and physical state while moving through the environment. The process has no single beginning or end but continues as long as the necessary conditions exist.

A supermarket checkout also represents a process. Customers arrive, goods are scanned, payments are made and customers leave with their purchases. Each interaction contributes to the overall process of purchasing goods.

Provenance and Links

The concept of process has a long history in philosophy and science. Alfred North Whitehead emphasised the importance of processes in understanding reality, while process modelling has become fundamental in engineering, manufacturing, computing and business management. Systems science regards processes as organised sequences of interactions through which entities change and maintain themselves over time. Processes therefore provide the dynamic basis for understanding organisation, function and behaviour.

Practical Exercise

Choose a familiar activity, such as preparing breakfast, posting a letter, travelling to work or growing a plant.

Describe the process as a sequence of interactions and changes. Identify the principal entities involved, the transfers of matter, energy or information that occur, and the changes of state that result.

Finally, consider whether the process operates continuously, intermittently or only under particular conditions. Explain your reasoning.