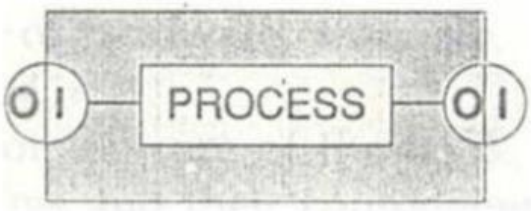
Câu 1: Hãy đọc kỹ đoạn văn sau và trả lời câu hỏi

Throughout the ages people have sought to understand the world around them and to explain it in a systematic way. A *system* is simply a group of elements which work together to achieve a purpose. Systems can be very large, such as the system of courts and laws we call our 'legal system', or very small, such as the system involved in cleaning your teeth. Systems can occur in nature or be designed by people. The water cycle (described below) is an example of a natural system. Banking systems and computer systems are examples of systems designed by people.

Input-process-output

Processing systems accomplish a task: they take one or more *inputs* and carry out a *process* to produce one or more *outputs*. An input is something put into the system, a process is a series of actions or changes carried out by the system, while an output is something taken from the system. All systems can be represented by the following input-process-output *(IPO)* diagram.



The shaded area in the diagram represents the system. The letter 'I' stands for input and the letter '0' stands for output. The input into this system is an output from another system and the output from this system is an input into another system.

To develop these ideas further we will consider three systems: coffee making the water cycle and the shop.

THE WATER CYCLE

Water circulates between the earth and the atmosphere; this is an example of a system occurring in nature. It is driven by. the heat of the sun which causes evaporation from bodies of water and transpiration from plants. The water vapour in the atmosphere forms clouds under certain conditions. When these clouds have more water vapour than they can hold, precipitation occurs and the water is returned back to the earth as rain;' hail, dew or snow. This process of moving water from the earth into the atmosphere and back to the earth is called the water cycle.

The inputs are the heat from the sun, and water from oceans, lakes, rivers and plants. The process consists of actions such as evaporation, transpiration and precipitation. The output is the circulation of the water between the earth and its atmosphere.

THE SHOP

A shop is a retail system designed by people; its purpose is to allow customers to purchase goods or items. The inputs are the goods to be sold. The process consists of actions such as

receiving goods from the warehouse, packing the goods into the shop and selling the goods at the counter. The output is the *goods* sold to the customers.

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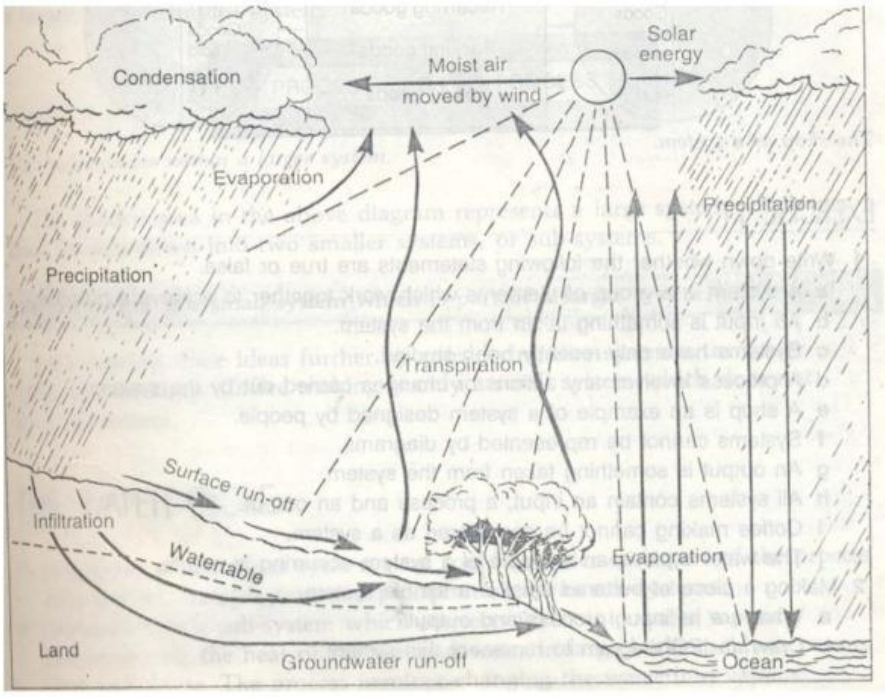

1. Write down whether the following statements are true or false.

a. A system is a group of elements which work together to achieve a purpose.

b. An input is something taken from the system.

c. Systems have only recently been studied.

d. A process involves any actions or changes carried out by the system.

e. A shop is an example of a. system designed by people.

f. Systems cannot be represented by diagrams.

g. An output is something taken from the system.

h. All systems contain an input, a process and an output.

i. Coffee making cannot be considered as a system.

j. The water cycle is an example of a system occurring in nature.

2. Making a piece of buttered toast is a simple system.

a What are its input, process and output?

b Draw an IPO diagram to represent this system.

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3. Planting a tree bought from the nursery can be considered a system.

a What are its input, process and output?

b Draw an IPO diagram to represent this system.

4. A recorded music system involves using a record, cassette or compact disc to listen to music.

a What are its input, process and output?

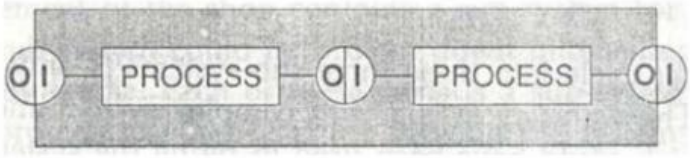
b Draw an IPO diagram to represent this system.

5. Every action we take can be considered as a system. Do you agree?

Câu 2: Refinement and synthesis

Refining a system means analysing it in more detail and breaking it down into smaller components. Each part of the process may be considered either as a system in itself, or as a *sub-system.* A sub-system is a small system which is part of a larger system. It also contains a group of elements which work together to achieve a purpose.

Synthesis is the reverse process; it involves combining simple sub-systems into a larger, more complex system.



The shaded area in the above diagram represents a large system which has been broken down into two smaller systems, or sub-systems.

THE WATER CYCLE

A refinement of the water cycle system could consider each part of the process - evaporation, transpiration and precipitation - as sub-systems.

. Evaporation is a sub-system which converts water into water vapour. The inputs are the heat of the sun and water in large' bodies such as oceans, lakes and rivers. The process involves changing the water into vapour.The output is the water vapour.

. Transpiration is a sub-system which converts moisture in plants and other bodies into water vapour. The inputs are the heat of the sun, and plants and other bodies. The process involves changing the moisture from plants into vapour. The output is the water vapour.

. Precipitation is a sub-system which converts water vapour into water in the form of rain, hail, dew and snow. The input is the water vapour in the form of clouds. The process involves changing the water vapour into water. The output is rain, hail, dew and snow.

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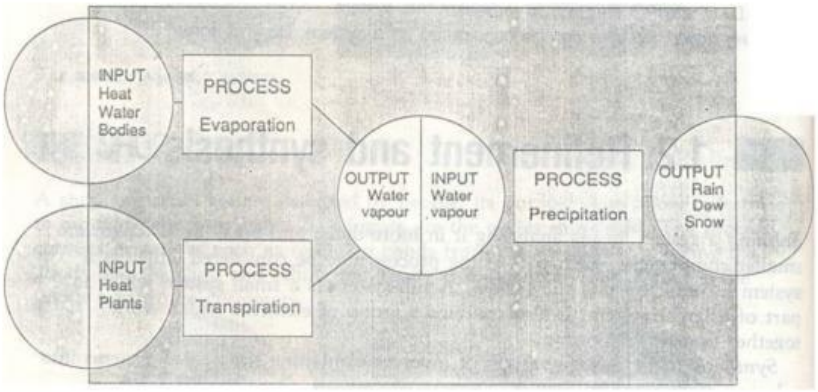


Refining the water cycle into these three sub-systems is only one way of understanding it. The water cycle is a very complex system and contains many other processes which could have been used to refine the system.

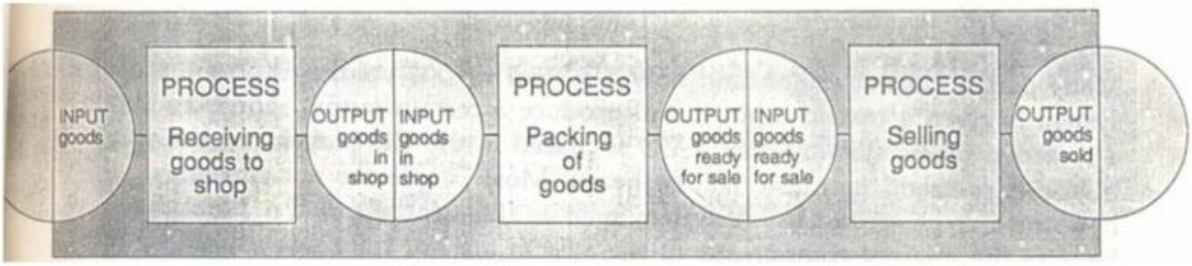
THE SHOP

A shop could be refined by considering each part of the process - receiving goods, packing goods and selling goods - as sub-systems.

. Receiving goods is a sub-system whose purpose is to prepare goods for placement in the shop. The input is the goods on trucks from the warehouse. The process involves off-loading the goods from the trucks. The output is the goods in the storage area. .

. Packing goods is a sub-system whose purpose. is to prepare goods for sale. The input is the goods in the storage area. The process involves unpacking the goods and placing them on shelves and display racks. The output is the goods ready for sale.

. Selling goods is a sub-system whose purpose is to exchange the goods for cash or credit. The input is the goods ready for sale on the shelves. The process involves customers buying the goods at the counter. The output is the goods sold.



Here the refinement of the shop has involved three sub-systems all linked together so that the output from one sub-system is the input into another sub-system. This is just one way of explaining the shop as a system.

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Systems are refined they are broken down into sub-systems, giving one level. If these sub-systems are broken down into smaller sub-systems, another level can be seen. For example, the refinement of the shop contains a sub-system for selling goods at the counter. This sub-system could be broken down into selling goods by cash and selling goods by credit. Each of these parts is a sub-system of the subsystem, and they provide another level for viewing the system of the shop.

1. Copy and complete the following sentences.

a A.....is a small system which is part of a larger system.

b Systems can be viewed at different.....

c Combining sub-systems to form a larger system is called.....

d A.....is a group of elements which work together to achieve a purpose.

e An.....is something put into the system.

f Breaking down large systems into smaller sub-systems is called.....

g The.....is an example of a system occurring in nature.

h A shop is an example of a system designed by.....

i An output is something taken.....the system.

j The.....involves the actions carried out by the system.

2. What is a sub-system?

3. Explain the difference between, refinement and synthesis.

4. 'Systems can be viewed at different levels.' Explain this statement.

5. Refine your system for planting a tree bought from the nursery into sub-systems. List these sub-systems.

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