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DepED
DEPARTMENT OF EDUCATION

SELF-LEARNING PACKAGE IN

ICT 9

Quarter 1 | Week 5

Algorithm and Programming

Learning Competency:

Describe algorithm through varied examples

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Ready to Launch!

An algorithm is a list of instructions for accomplishing a task. We follow algorithms everyday when it comes to activities like making the bed, making breakfast, or even getting dressed in the morning.

Algorithms resemble recipes. Recipes tell you how to accomplish a task by performing a number of steps. For example, to bake a cake the steps are: preheat the oven; mix flour, sugar, and eggs thoroughly; pour into a baking pan; and so forth.

In this lesson, we will solve various problems using Algorithm.

Aim at the Target!

At the end of this module you are expected to:

1. *Explain what is algorithm .*
2. Solve problems using algorithm.

Try This!

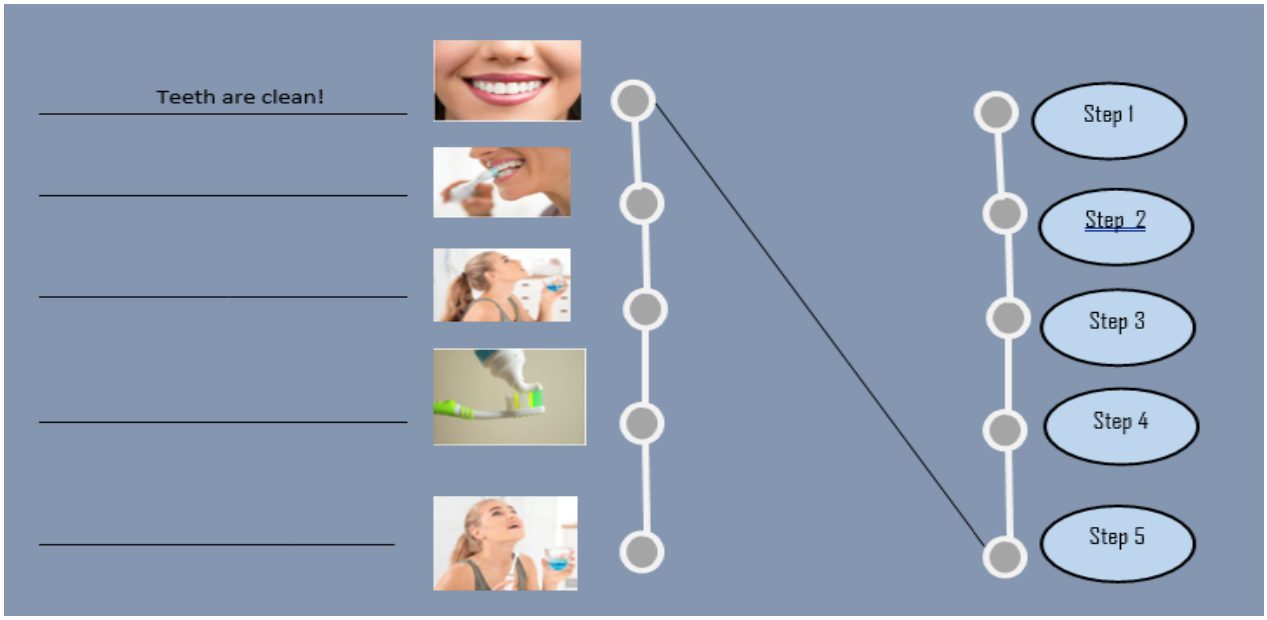
Direction. Unscramble the following words.

WORD	CLUE
1. UTPNI	A data sent to the computer for processing.
2. TPOTUU	Data generated by a computer or result of calculation.
3. MAHLTGIOR	List of instruction in accomplishing a task.
4. GUNUOSIBMAU	Clear, precise, not open to more than one interpretation.
5. ETINIF QUCEESNE	List of items in a specific order having specific bounds.

Keep This in Mind!

Direction. Answer the questions given below.

Activity. Everyday algorithm



Analysis.

The images above are not arranged in order.

1. Describe what is happening in the picture on the line to its left,
2. Match the action to its order in the algorithm.

The first one is done for you as an example.

Abstraction and Generalization

Algorithm

Algorithm can be defined as: “A sequence of activities to be processed for getting desired output from a given input.” Webopedia defines an algorithm as: “A formula or set of steps for solving a particular problem. To be an algorithm, a set of rules must be **unambiguous** and have a clear **stopping point**”. There may be more than one way to solve a problem, so there may be more than one algorithm for a problem. Now, if we take definition of algorithm as: “A sequence of activities to be processed for getting desired output from a given input.” Then we can say that:

1. Getting specified **output** is essential after algorithm is executed.
2. One will get output only if algorithm stops after finite time.
3. Activities in an algorithm to be clearly defined in other words for it to be unambiguous.

Before writing an algorithm for a problem, one should find out what is/are the **inputs** to the algorithm and what is/are expected output after running the algorithm. Now let us take some exercises to develop an algorithm for some simple problems: While writing algorithms we will use following symbol for different operations:

'+' for Addition

'-' for Subtraction

'*' for Multiplication

'/' for Division and

' ←' for assignment. For example A X*3 means A will have a value of X*3.

Examples of Algorithm

Problem 1: Find the area of a Circle of radius r.

Inputs to the algorithm:
Radius r of the Circle.
Expected output:
Area of the Circle

Algorithm

Step1: Read\input the Radius r of the Circle
Step2: Area ← PI*r*r // calculation of area
Step3: Print Area

Problem 2: Write an algorithm to read two numbers and find their sum.

Inputs to the algorithm:
First num1
Second num2
Expected output:
Sum of the two numbers

Algorithm:

Step 1: start
Step 2: Read \ input the first num1.
Step 3: Read \ input the first num2.
Step 4: Sum ← num 1 + num2 //calculation of the sum
Step 5: Print Sum
Step 6: End

Problem 3: Convert temperature Fahrenheit to Celsius

Inputs to the algorithm:
Temperature in Fahrenheit
Expected output:
Temperature in Celsius

Algorithm:

Step 1: start
Step 2: Read \ input Temperature in Fahrenheit F
Step 3: C ← 5 / 9*(F-32)
Step 4: Print Temperature in Celsius C
Step 5: End

Problem 4: Write algorithm to find the greater number between two numbers.

Inputs to the algorithm:

Two numbers

Expected

Greater number among the two.

Algorithm:

Step1: Start
Step2: Read/input A and B
Step3: If A greater than B then C=A
Step4: if B greater than A then C=B
Step5: Print C
Step6: End

Problem 6: An algorithm to calculate even numbers between 0 and 99.

Algorithm:

1. Start
2. I ← 0
3. Write I in standard output
4. I ← I+2
5. If (I <= 98) then go to line 3
6. End

Application.

Activity. Ordering algorithm

Direction. Read carefully the given problem. Inside box are scrambled algorithm of the given problem. Arranged and number the instruction in correct sequence . Include START and END to complete the instructions.

Problem: Design an algorithm which generates even numbers between 1000 and 2000 and then prints them in the standard output. It should also print total sum:

Algorithm

I ← 1000 and S ← 0
Write I
Write S
I ← I + 2
else go to line 7
S ← S + I
If (I <= 2000) then go to line 3

Reflect

1. Did you find algorithm technique difficult in solving a problem? Why or Why not?
2. How do this activity help you understand algorithm in solving problems?

Reinforcement & Enrichment

Complete the statements below.

I understand _____

I don't understand _____

I need more information about _____

Assess Your Learning

I. Multiple Choice. Read each question carefully and select the correct answer. Choose the letter of your choice.

1. What is algorithm?
   A. A chart showing the flow of a series of events.
   B. A decision arrived at by following instructions.
   C. Step-by-step instructions used to solve a problem.
   D. A computer program that follow a chart.
2. What algorithm do we use when we're looking for the Post Office?
   A. A set of direction. B. A list of instruction C. a recipe
3. We can show the sequence of steps in an algorithm in a structural diagram called a flow chart.
   A. True B. False
4. Only top software programmers can write an algorithm.
   A. True B. False
5. When you write an algorithm the order of the instructions is very important.
   A. True B. False
6. What algorithm do we use when we're making a cake ?
   A. A set of direction. B. A list of instruction C. a recipe
7. When can algorithm be used?
   A. Only with computers. C. Only when programming.
   B. Only with flowcharts D. Any time to design solution to problems.
8. An algorithm
   A. must have an input C. must end after a series of process
   B. must produced an output d. All of the above
9. What algorithm do we use when we assemble a computer table?
   A. A set of direction. B. A list of instruction C. a recipe
10. Which is NOT true about algorithm?
    A. An algorithm contains ambiguous description that makes clear what has to be implemented.
    B. An algorithm produces a defined set of outputs even without inputs.
    C. An algorithm could potentially run forever.
    D. All of the above

References & Photo Credits

https://bmci.edu.pk/wp-content/uploads/2020/05/Algorithm-and-Flow-Chart-notes-for-10th-class.pdf
https://www.womenshealthmag.com/health/a28724303/salt-water-gargle-sore-throat/
https://smileconcepts.co.uk/dos-donts-toothbrushing/
https://www.dreamstime.com/photos-images/mouth-rinsing.html
https://depositphotos.com/stock-photos/showing-teeth.html
https://app.quizalize.com/view/quiz/computational-thinking-pattern-recognition-95c55b94-f117-422e-9d89-e908ab52eb2d
https://quizizz.com/admin/quiz/5835cc51d5a0b11d742e961e/algorithms-quiz
https://fiftyexamples.readthedocs.io/en/latest/algorithms.html