Properties of Algorithms: True or False Activity

This activity will help you assess your knowledge regarding the five properties that an algorithm must satisfy.

Directions

Based on the given pseudocode, determine whether the following statements are TRUE or FALSE. To do this, print or copy this page on a blank paper and underline or circle the answer.

The Gerchberg-Saxton (GS) approach is an iterative/cyclic process employed for laser beam shaping applications. There are two planes wherein the phase is measured: the image plane and diffraction plane, respectively.

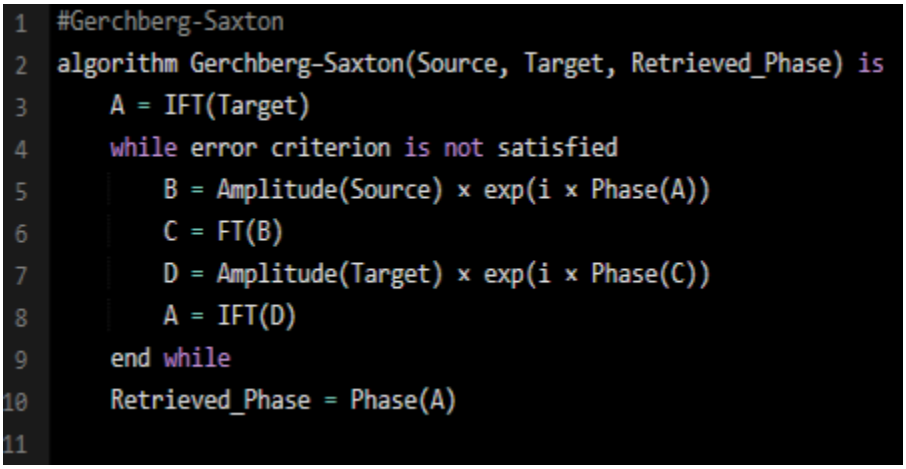
(1) In the pseudocode below, the process sets an initial phase for the image plane and source amplitude

(2) The phase and source amplitude undergo Fourier transform.

(3) The phase value is linked with the target amplitude to match the diffraction plane.

(4) If the value does meet the condition, another Fourier transform is applied.

(5) The program repeats until the desired phase is obtained.



```
1  #Gerchberg-Saxton
2  algorithm Gerchberg-Saxton(Source, Target, Retrieved_Phase) is
3      A = IFT(Target)
4      while error criterion is not satisfied
5          B = Amplitude(Source) x exp(i x Phase(A))
6          C = FT(B)
7          D = Amplitude(Target) x exp(i x Phase(C))
8          A = IFT(D)
9      end while
10     Retrieved_Phase = Phase(A)
11
```

True | False *1. The GS approach is an example of a well-established algorithm.*

True | False *2. The retrieved phase in line 10 is known as an input.*

True | False *3. An Iterative process, such as above, ensures that the code is efficient.*

True | False *4. The GS algorithm outlined above shows definiteness.*

True | False *5. Line 10 of the pseudocode indicates that the program must come to an end after meeting the criterion.*

True | False *6. The target amplitude is classified as an output.*

True | False *7. An algorithm is effective when its steps are defined and detailed.*

True | False *8. The algorithm is finite since it stops after meeting the given condition.*

Answer Key

1. True
2. False, because the correct statement is: The retrieved phase in line 10 is known as an **output**.
3. True
4. True
5. False, because the correct statement is: **Line 9** of the pseudocode indicates that the program must come to an end after meeting the criterion.
6. False, because the correct statement is: The target amplitude is classified as an **input**.
7. False, because the correct statement is: An algorithm is effective when its steps are **doable**.
8. True

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