

Information

An algorithm is an explicit set of instructions on how to do things. Algorithms breaks down the key stages of a task into steps. It's the ability to break down how we do things into step by step procedures that form an Algorithm. A common method to present algorithms in a readable, easy to follow format are flowcharts. Flowcharts use plain English to show and organise the execution of an algorithm. In its most simple form, an algorithm is just a linear sequence of steps. However for more complex tasks the next step is conditional to the outcome of the previous task. This will make the flowchart take on a non-linear format as all the possible outcomes need to be documented. Flowcharts allow the user to follow the direction of the algorithms and monitor and validate there outputs. This method assists to reduce error rate.

Test cases create scenarios to ensure the correct input and output is delivered through the algorithm. Test cases create different scenarios that ensure the all options and possibilities have been considered to ensure the algorithms are correct. This helps to deduce errors and bugs. For example - testing the cases of an error that could occur when putting in user name or password. There are multiple options that need to be tested to ensure all possibilities are coded correctly. This can include entering an incorrect user name, entering an incorrect password, entering the correct details and entering incorrect details after a certain number of attempts.

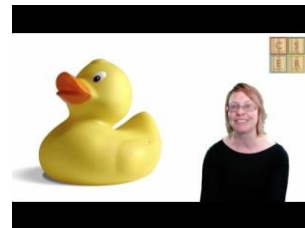
As algorithms become complex and detailed with multiple entities and components, modular programming allows the user to break the programming into smaller parts. This allows the user to manage smaller programs rather than one large one. It allows ease of testing to test smaller components and find and debug errors. Object oriented programming is a concept that focuses on the objects that are part of the algorithms. Each attribute will contain sets of characteristics and properties that will help develop algorithms specific to the object. The home button on a mobile phone is an example of this. Untouched, the button does not do any task but once you press it a series of actions are initiated.

Curriculum Expectation

Students will present algorithms as structured English by creating flowcharts. Students will perform test cases to ensure errors and bugs are rectified. Students will use Modular programming to bundle their code into smaller modules to manage larger projects. They will use object oriented programming to hold information about characteristics of the functions to be programmed.

Video Resources

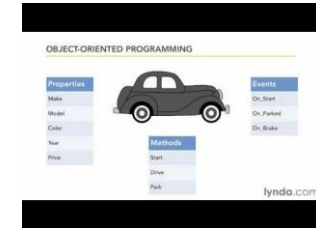
Click the images to open the videos



Video Source: Computer Science Research Group (CSER)



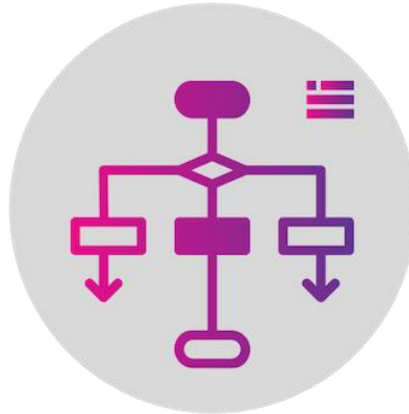
Video Source: Guru99



Video Source: LinkedIn Learning

ALGORITHMS

Algorithms are explicit sequenced steps to solve a problem or complete a task



FLOWCHARTS

Algorithms can be graphically organised as flowcharts.

Flowcharts use plain English to show and organise the execution of an algorithm.

TRACING & TEST CASES

Create scenarios to ensure correct input and output is delivered through the algorithm.

This helps to deduce errors and bugs.

OBJECT ORIENTED PROGRAMMING LANGUAGES

A concept that focuses on the objects that are part of the algorithms.

Modular programs break the program into smaller parts.