PROBLEM SOLVING AND PYTHON PROGRAMMING

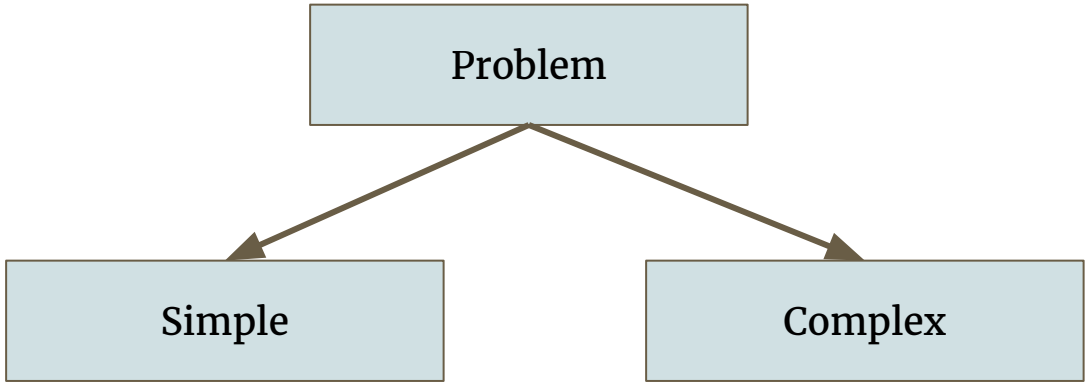
Rajasekaran AP/IT

Introduction to Problem

Rajasekaran AP/IT

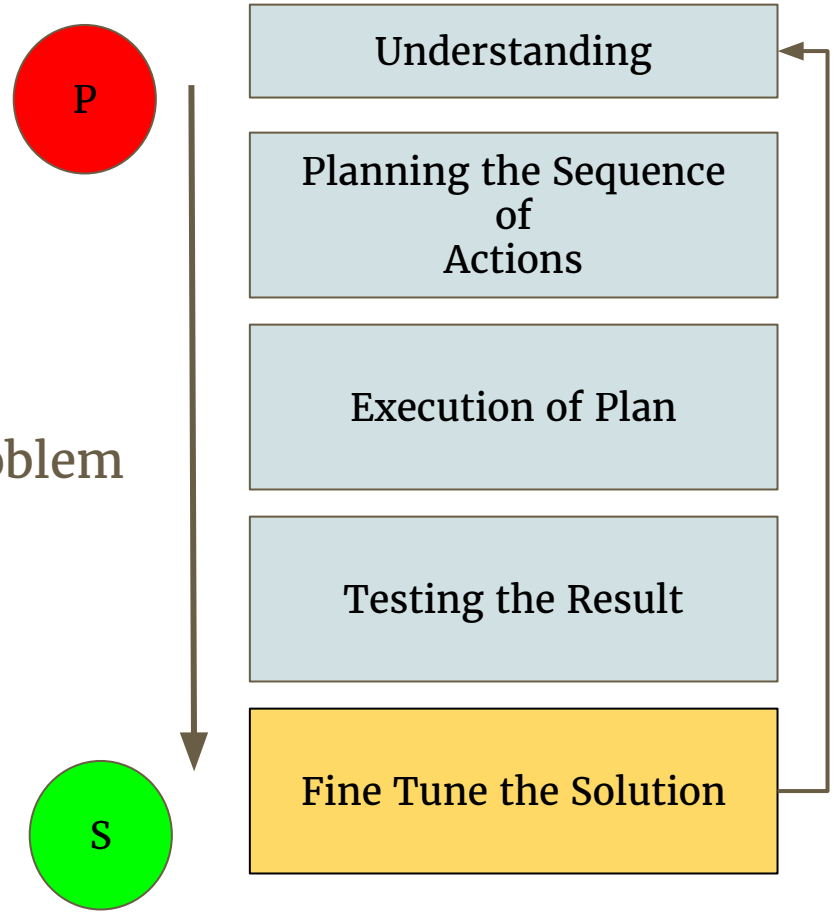
Problem Solving

The process of finding solutions to difficult or complex issues.

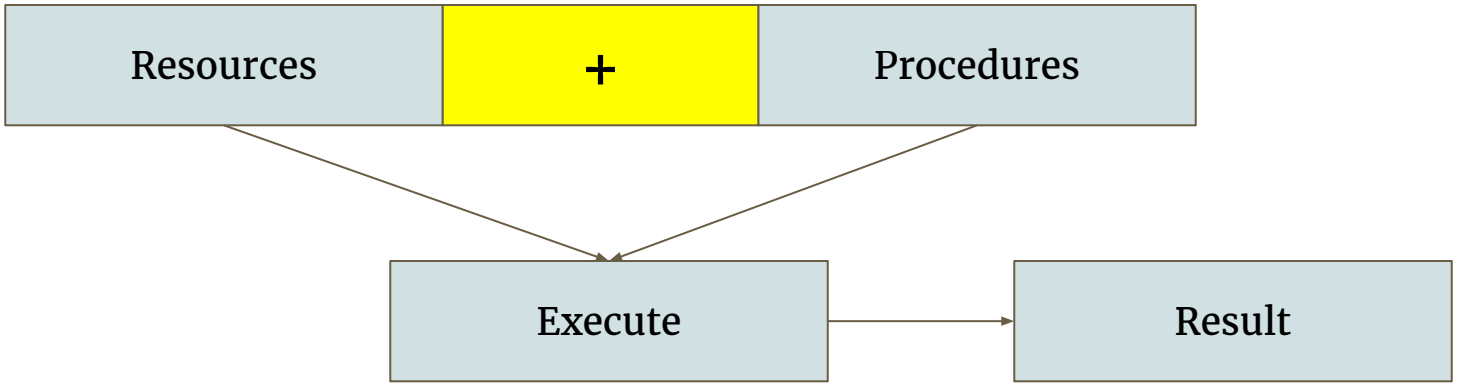


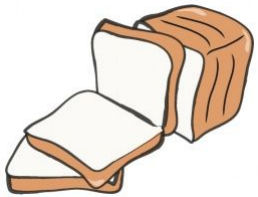
Solution to the problem

Steps involved when solving the problem



Recipe to the Solution



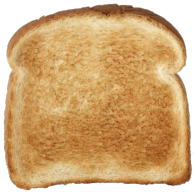


Cook a Crunchy Bread Toast for You

Frying Pan
A Slice of Bread
A Spoon of Oil
3 Minutes of Heat Source

+

Bread Toast Recipe



Do Cooking → Get Your Bread Toast

Procedure to Make Bread Toast

Step 1 : Grab a loaf of bread.

Step 2 : Get a pan and place it on the stove let it heat.

Step 3 : Pour some oil on the pan and wait for oil to be heated.

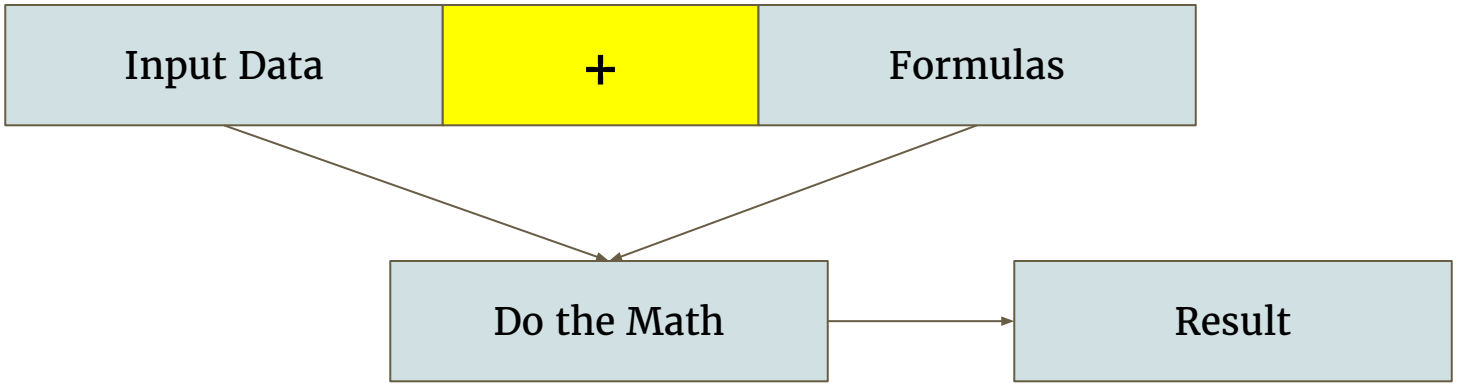
Step 4 : Put a slice on the pan and roast until it become brown in shade.

Step 5 : Turn the slice and roast until it become brown in shade.

Step 5 : Get the toasted bread from the pan and serve it.

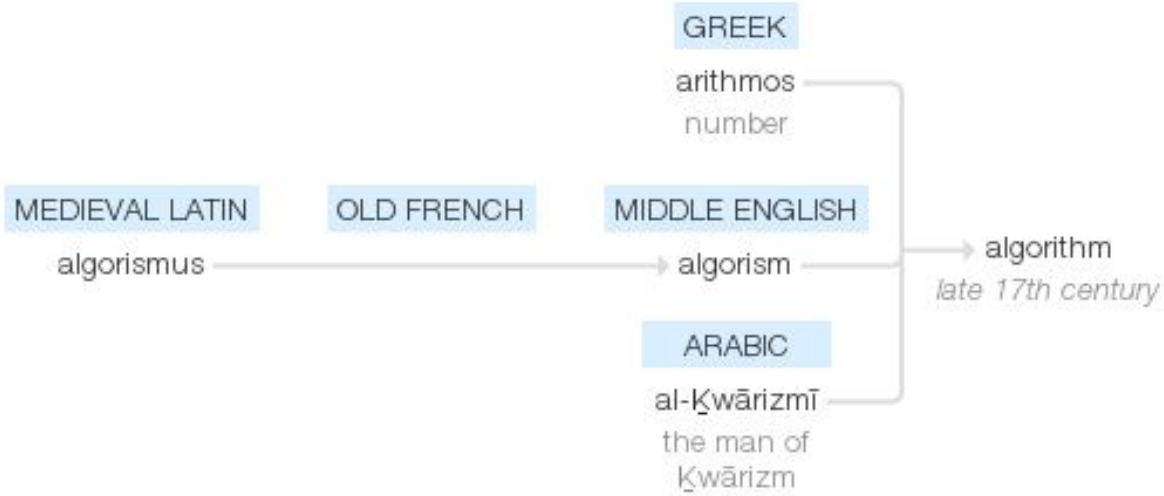
Step 6: Turn off the heat source.

If a problem comes from mathematics then what we need to do?



Mathematically the Procedures is

Algorithm



Algorithm

- A finite set of unambiguous instructions performed in a prescribed sequence to achieve a goal, especially a mathematical rule or procedure used to compute a desired result.
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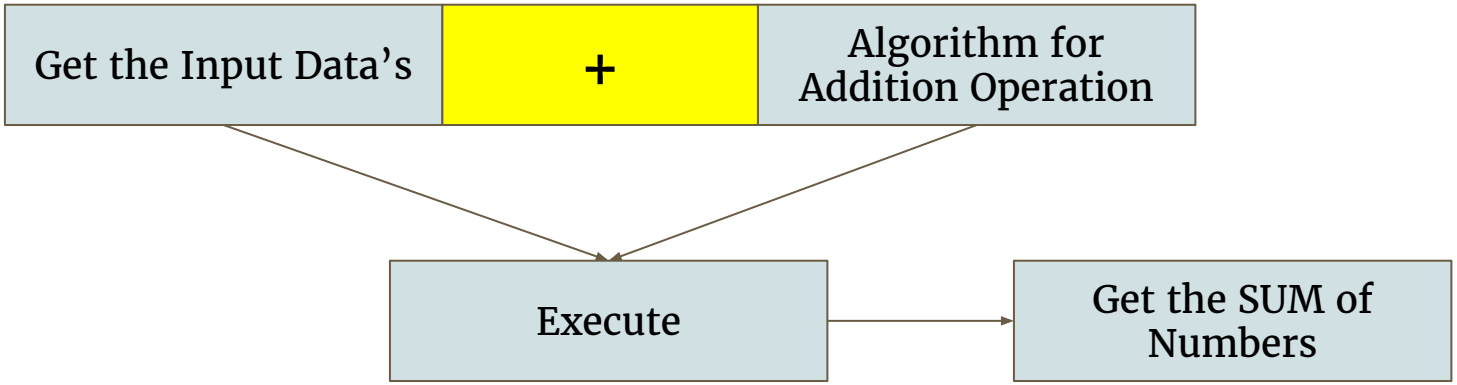
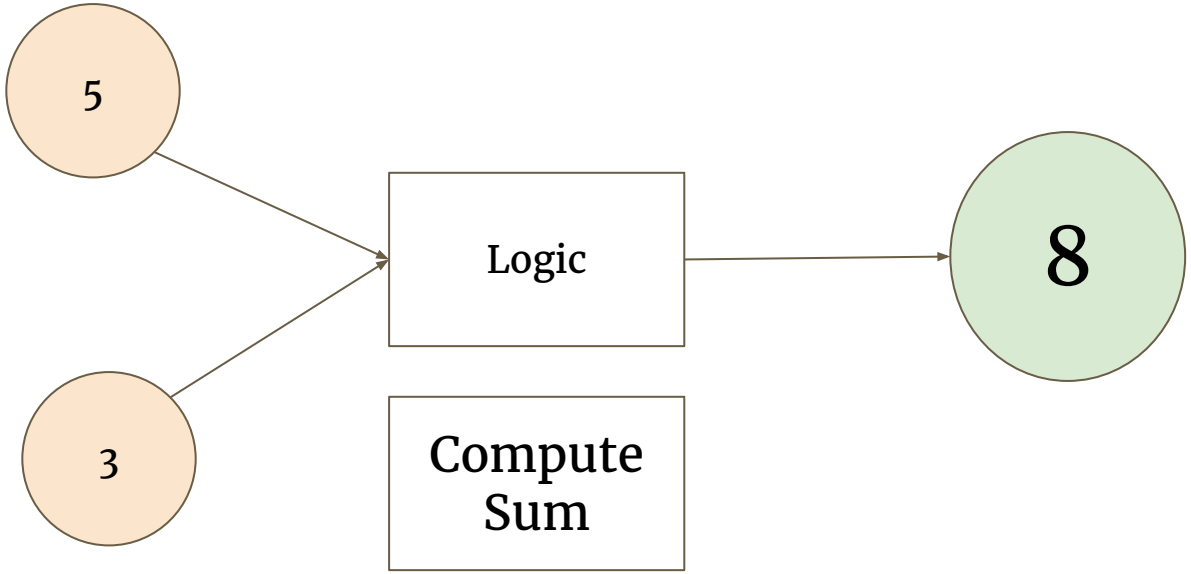
- Algorithms are the basis for most computer programming.

Simple Mathematical Problem



Simple Mathematical Problem



Addition Algorithm Human Version

Step 1 : Get 2 inputs.

Step 2 :Perform addition.

Step 3 : Get the Result.

Addition Algorithm Computer Version

Step 1 : Get 1st Input and store.

Step 2 : Get 2nd Input and store.

Step 3 : Grab the stored value and perform the addition logic.

Step 4 : Compute the result.

Step 5 : Store the result.

Step 6 : Display the result and exit

Need of Algorithm

1. Efficiency
2. Abstraction
3. Reusability

Basic Building Blocks of Algorithm

- ***Instructions/ Statements***
- ***State***
- ***Control Flow***
- ***Functions***

Instruction/Statement

In computer programming, a statement is the **smallest standalone element** of an imperative programming language that expresses some action to be carried out.

It is an instruction written in a high-level language that commands the computer to perform a specified action.

1. Simple Statement [Assertion, Assignment, Call]
2. Compound Statement [block, loops, conditions, jumps]

Simple Statements

- Get and Store the inputs
- Perform [addition, subtraction, multiplication, division] any one this operation.
- Display any type Text
- Display the stored value from the memory locations.
- Assert the answer is right or wrong.

ADD A and B

SUB D from C

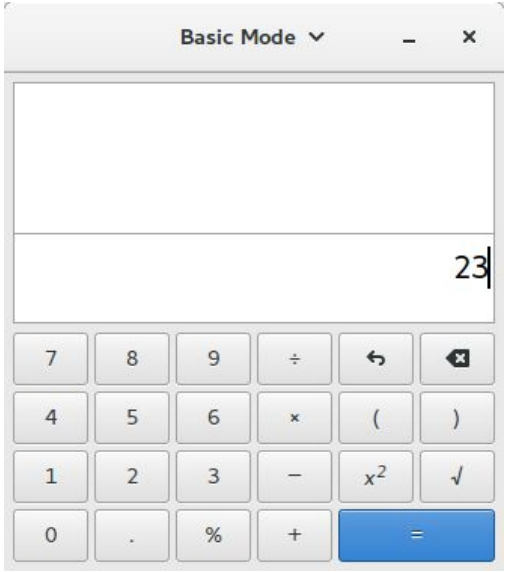
Examples

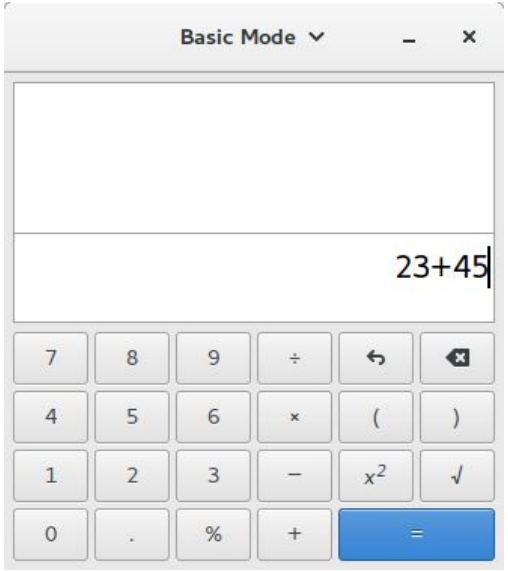
- Assertion:
  - Assert (A ! = B)
- Assignment
  - A = 10
- Call:
  - Display(10)

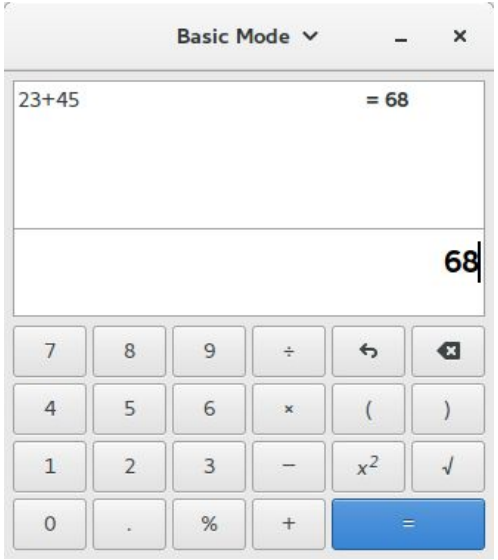
Compound Statements

- The Compound statements are used to represent a collective operations for final result.
- When we put together in a right order it make sense otherwise it won't.
- Eg:
  - Performing factorial of given number.
  - Performing power operation.
  - Finding the given word is palindrome or not.
  - Finding that given number is odd or even.
  - Printing number from 1 to 100.
- These problems requires compound statements

Sate







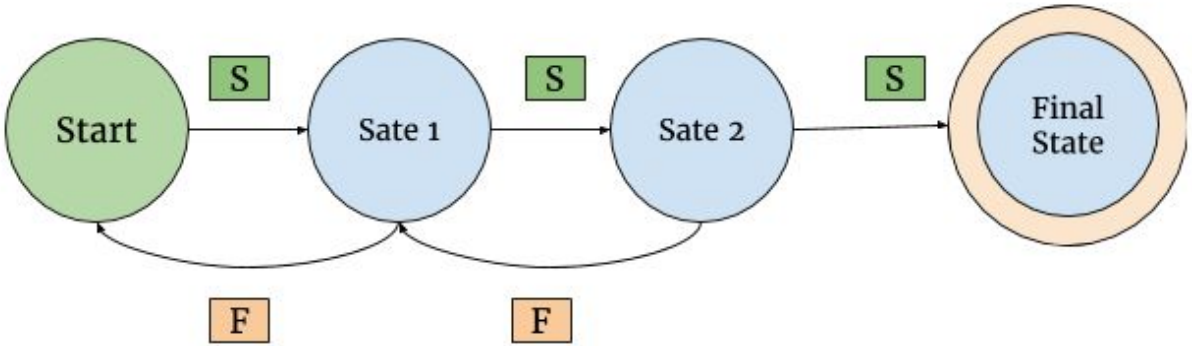
State 1

State 2

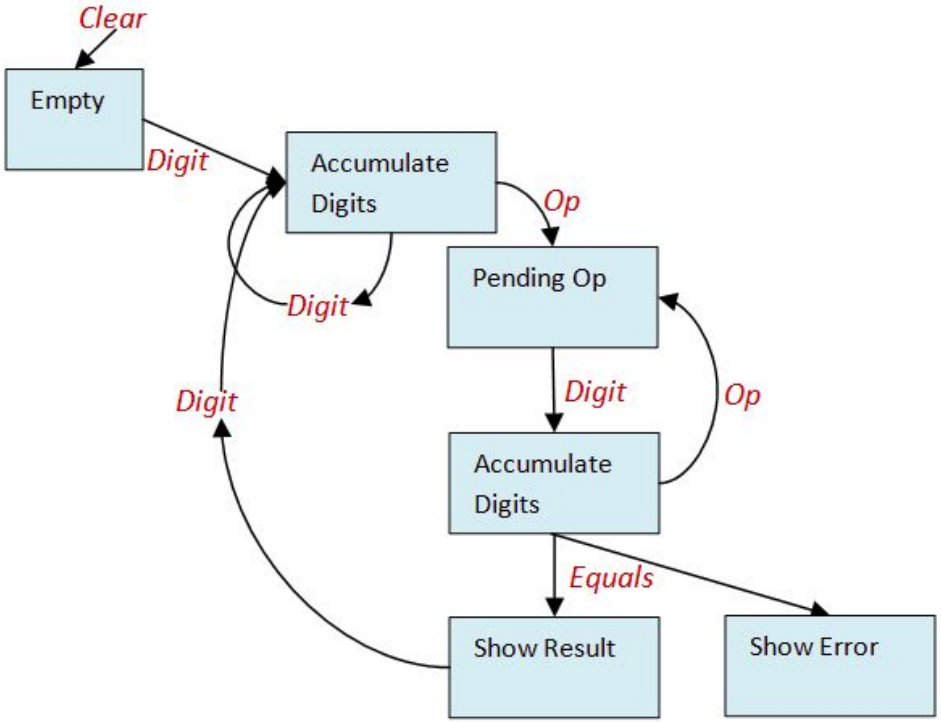
State 3

State

In information technology and computer science, a program is described as stateful if it is designed to remember preceding events or user interactions; the remembered information is called the state of the system.



States of Calculator



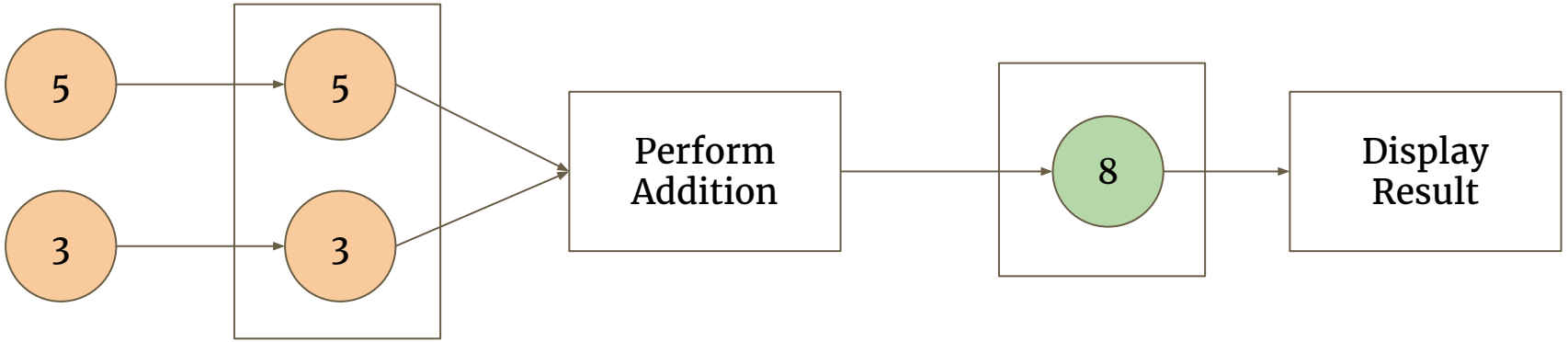
State is same for video games too...

Control Flow

What is next?

Control Flow

In computer science, control flow (or flow of control) is the order in which individual statements, instructions or function calls of an imperative program are executed or evaluated.



Control Flow Statements

Within an imperative programming language, a control flow statement is a statement which execution results in a choice being made as to which of two or more paths to follow.

- Conditional Statements [Binary Choice, Multi Choice]
- Iterations [Predictable, Unpredictable]