Programming Fundamentals

Flowcharts

Week 5 | Prasan Yapa

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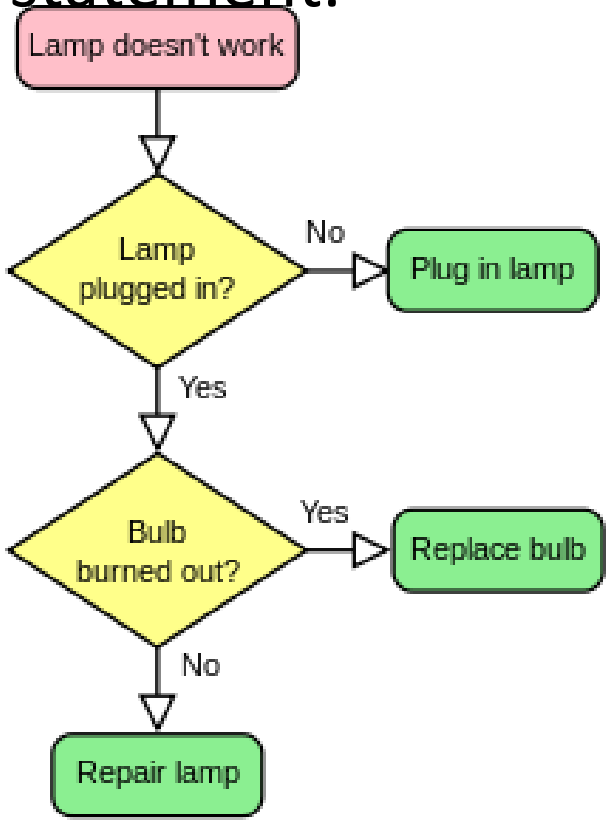
Learning Outcomes

- Covers part of LO1 & LO2 for Module
- On completion of this lecture, students are expected to be able to:
  - Identify the use of Flow Charts in program design.
  - Demonstrate competence in designing FlowCharts in program design to solve problems.

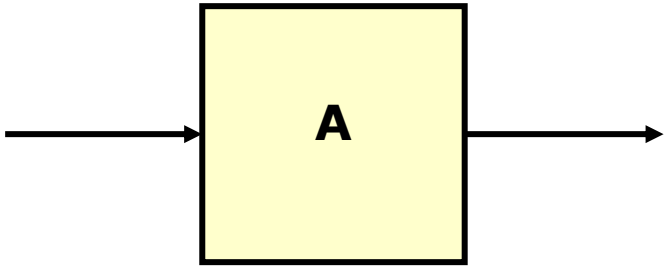
Flow Charts

- A symbol-oriented design system that identifies the type of statement by the shape of the symbol containing the statement.



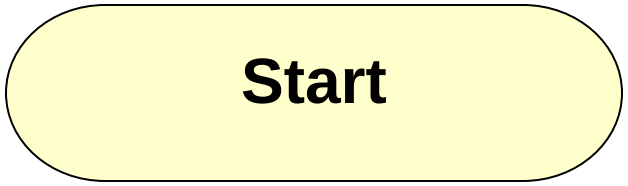
Symbols used in Flow Charts

- Process Box
  - This symbol represents an operation that is to be performed. It consists of a rectangle with one control path leading into it and one leading out.



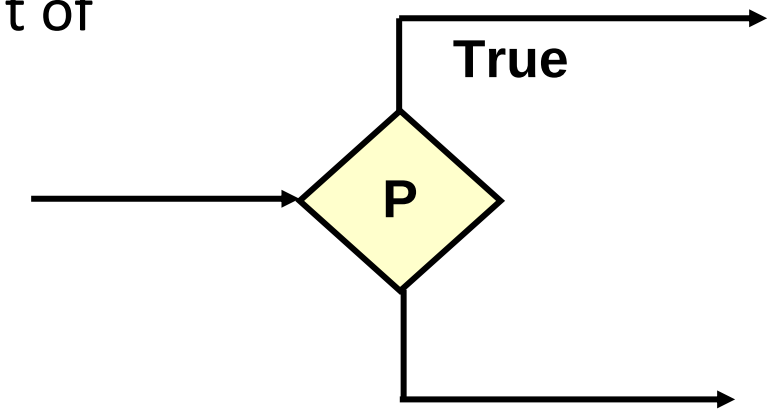
Symbols used in Flow Charts

- Terminal Symbol
  - This oval always begins and ends the flowchart. It can also be used to indicate the beginning and end of a subsection within the flowchart, known as a module.
  - The terminal symbol will have only one flow line.



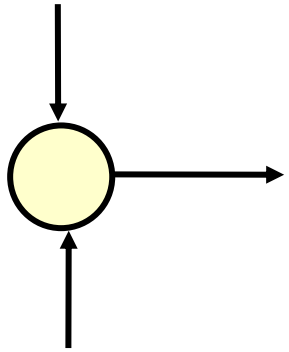
Symbols used in Flow Charts

- Decision Symbol
  - This symbol specifies a test operation and consists of the standard decision box and is characterized by one control path leading in and two paths leading out.
  - The specification P represents a test to be performed. One or the other output path is taken as a result of the test.



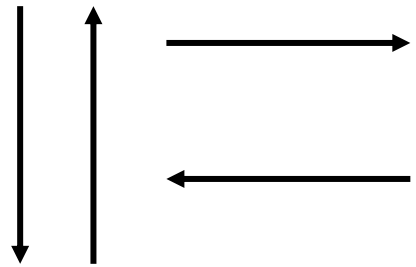
Symbols used in Flow Charts

- Connector Symbol
  - This symbol is represented by a circle where control paths lead towards a common point.
  - There are no operations incorporated with this symbol. The symbol is simply a junction that typically has two entries and one exit.



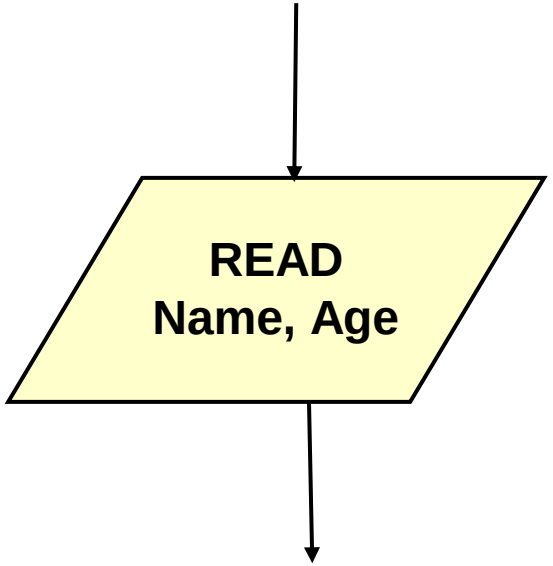
Symbols used in Flow Charts

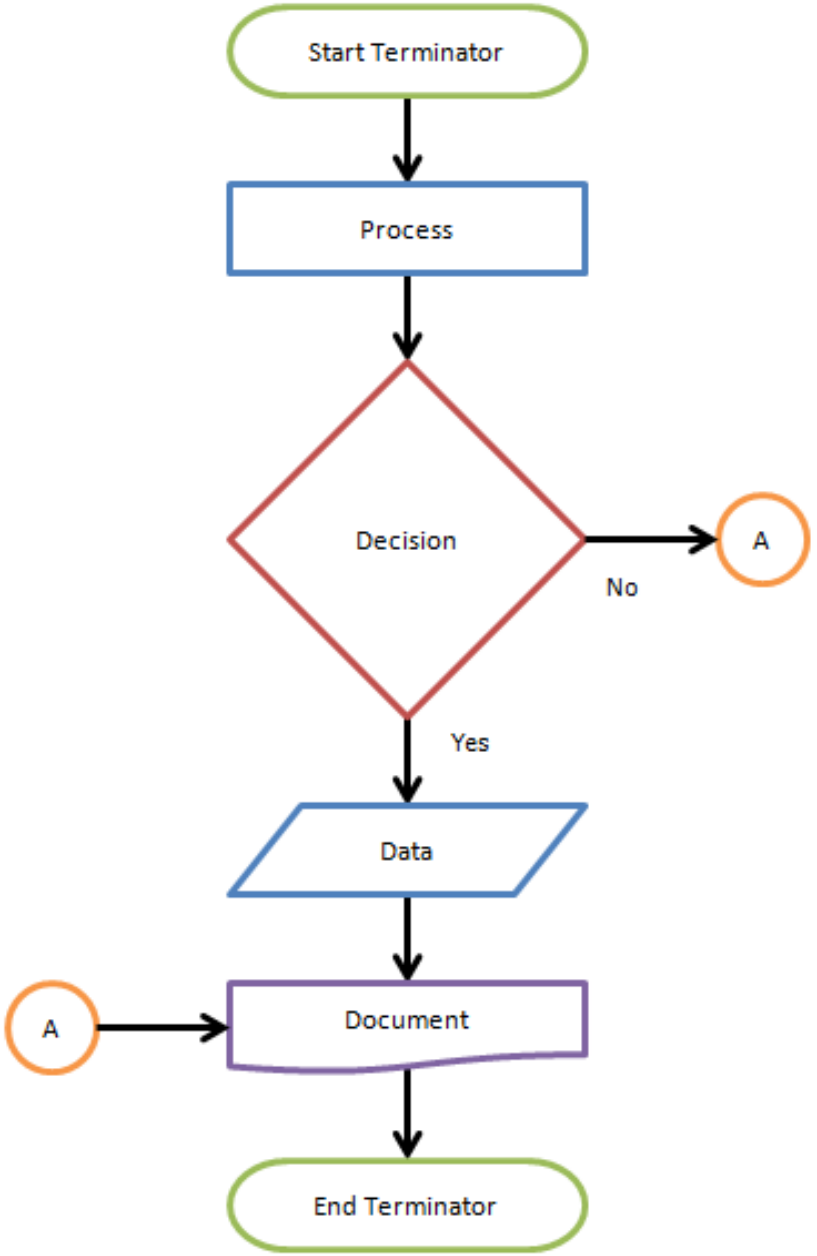
- Flow Lines
  - These lines represent the passing of control from one of the symbols (Process Box, Decision symbol, or Connector symbol) to another in the direction of the arrow.



Symbols used in Flow Charts

- Input/Output Symbol
  - This parallelogram is used for both input (Read, Get) and output (Write, Put). So the particular use must be labeled.



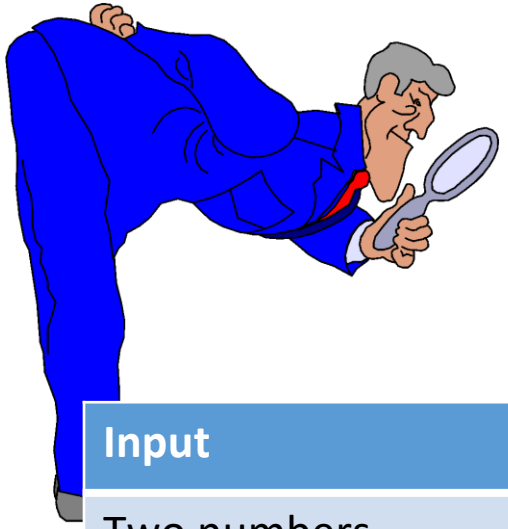

Start Terminator
Process
Decision
No
A
Yes
Data
A
Document
End Terminator

Interactive Flowcharts

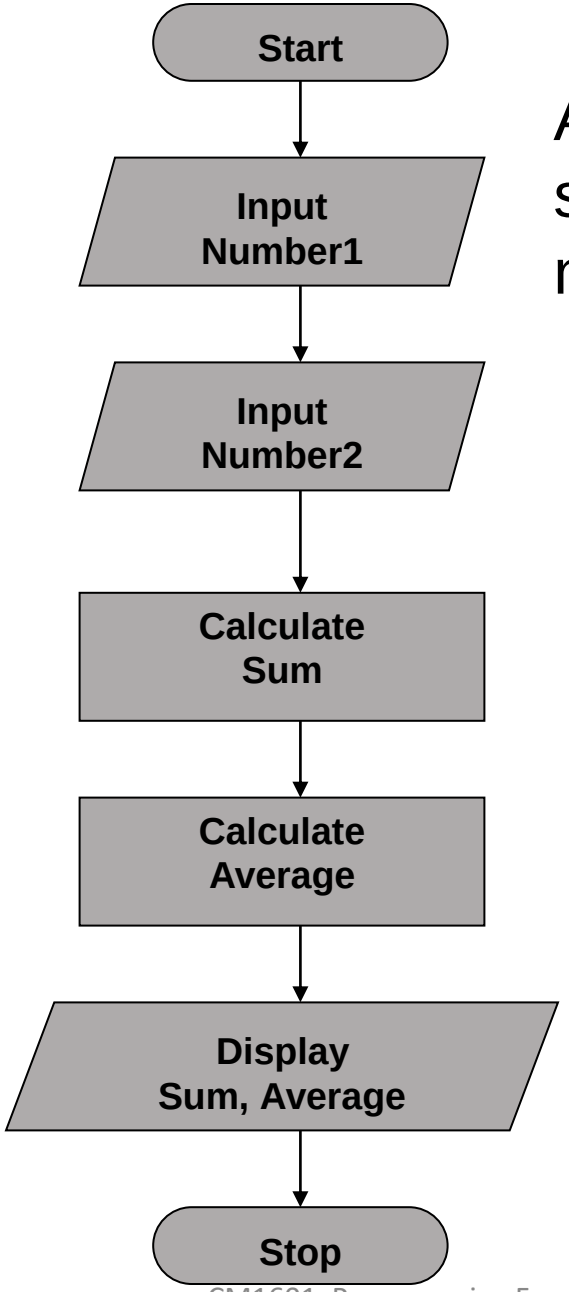
- Go to https://www.lucidchart.com/
- Create an Account in LucidChart

Example

- Write an algorithm to find the sum and average of two numbers



Input	Processing	Output
Two numbers	Read two numbers	Print sum
	Calculate sum	Print average
	Calculate average	



An algorithm to find the sum and average of two numbers

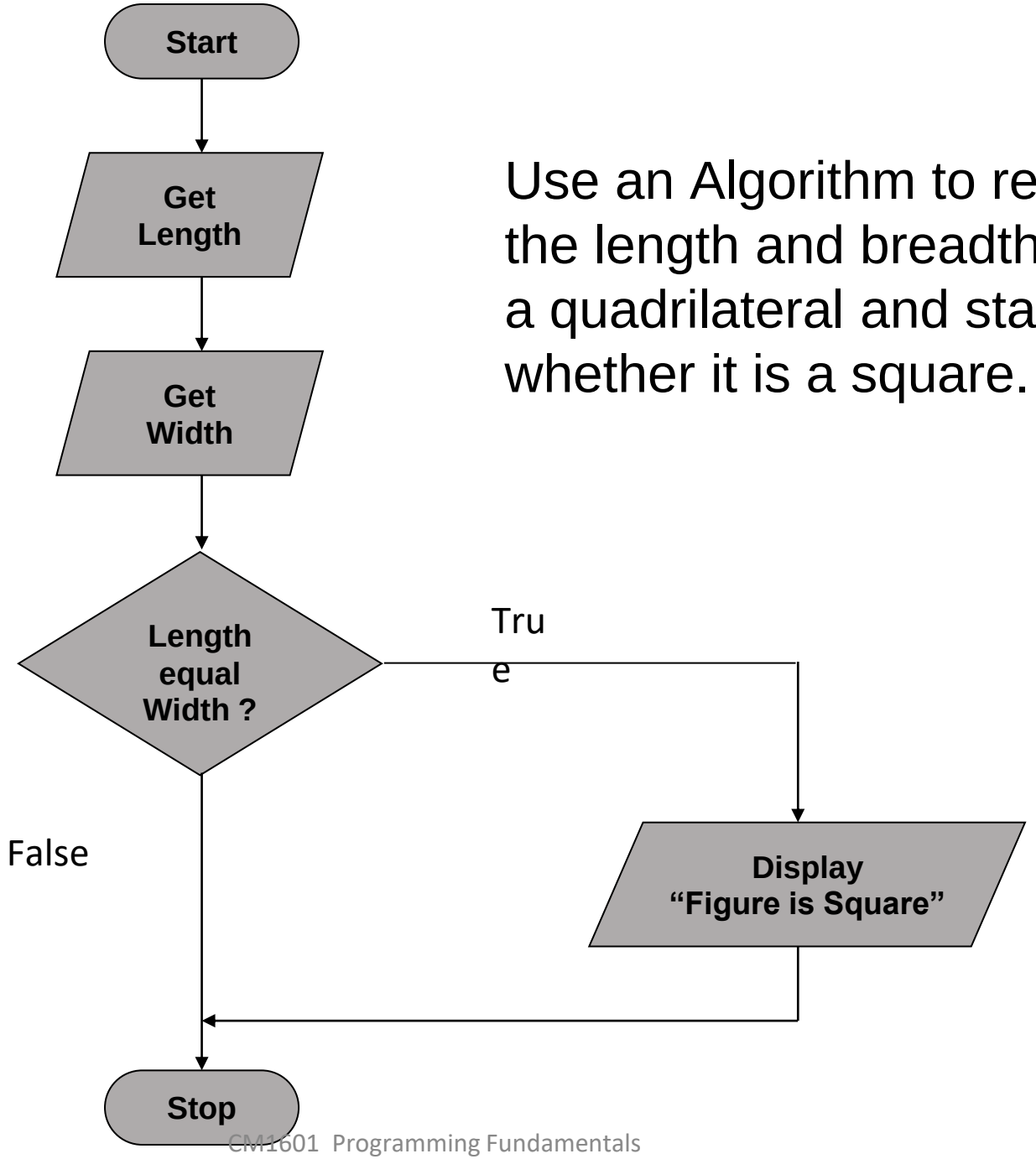
Example 2

- Use an Algorithm to read the length and breadth of a quadrilateral and state whether it is a square. (all angles are right angles).

Input	Processing	Output
Length, width	Read length, width	
	Decide the given figure a square or not	Display decision

- **Steps**

1. Get length
2. Get breadth
3. If length = breadth then Display given figure is a square

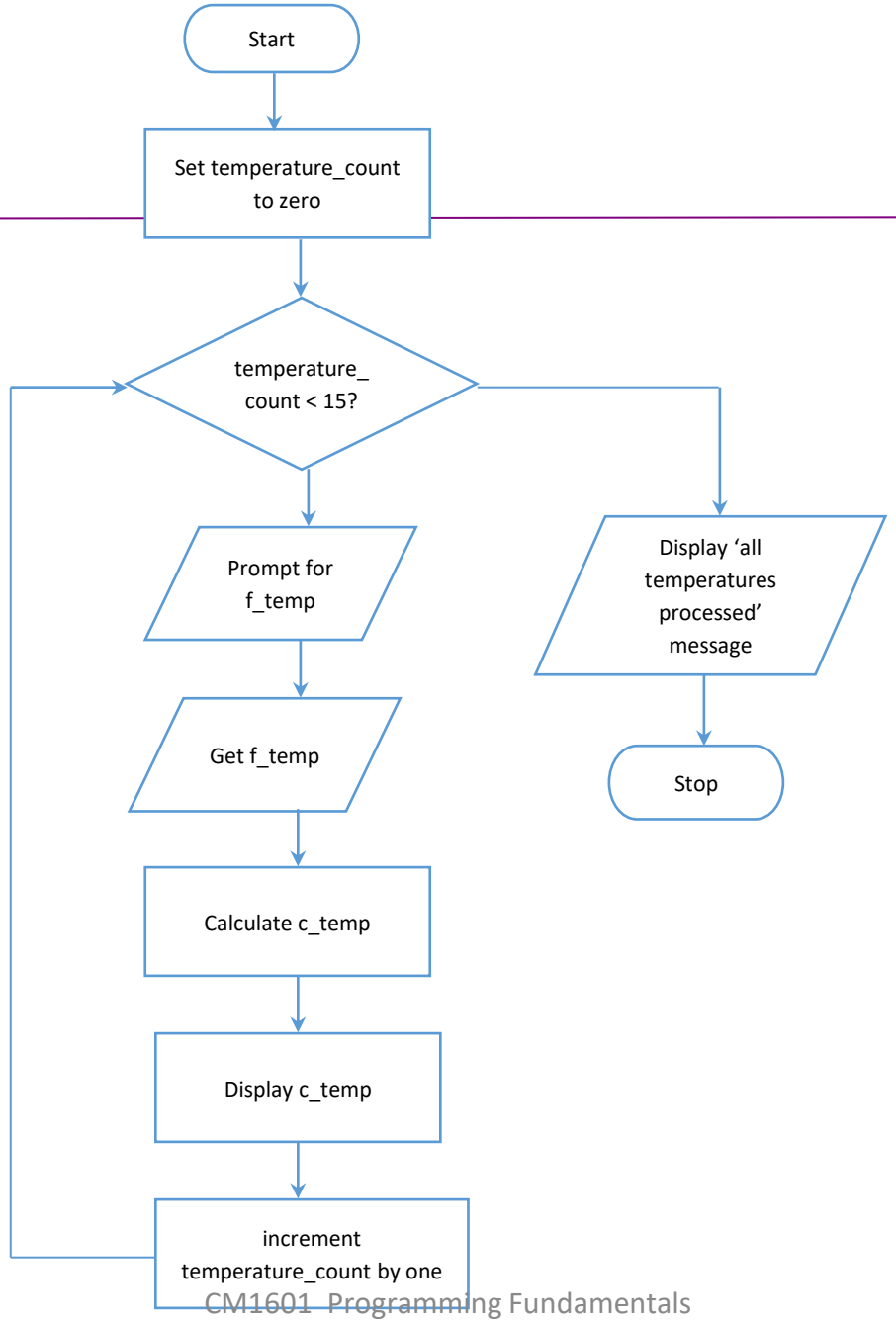


Use an Algorithm to read the length and breadth of a quadrilateral and state whether it is a square.

Example 3

- Every day, a weather station receives 15 temperatures expressed in degrees Fahrenheit. A program is to be written that will accept each Fahrenheit temperature, convert it to Celsius and display the converted temperature to the screen. After 15 temperatures have been processed, the words 'All temperatures processed' are to be displayed on the screen.

Input	Processing	Output
f_temp **(15 temperatures)**	Get Fahrenheit temperatures	c_temp (15 temperatures)
	Convert temperatures	
	Display Celsius temperatures	
	Display screen message	


Start
Set temperature_count to zero
temperature_ count < 15?
Prompt for f_temp
Get f_temp
Calculate c_temp
Display c_temp
increment temperature_count by one
Display 'all temperatures processed' message
Stop

Exercises

- Find the largest among three different numbers entered by the user.

Exercises

- The ATM machines of “Goliath National Bank” contain biometric security features besides conventional PIN control. The customers of Goliath National Bank have a choice either to use Card + PIN or Card + Biometric option. Customers of other banks can also withdraw cash from Banks’s ATM; however, they can only use Card + PIN option. A customer’s card is captured by the machine after three consecutive unsuccessful attempts.

Exercises

- An Organization intends to develop a computer program for the purpose of calculating annual performance bonus for its employees. There are two types of employees viz., permanent and contractual. All the employees have been classified into three categories A, B and C. Managerial staff is placed in category A whereas non-managerial staff are placed in either category B or category C.
- Employees in category A, contractual employees and employees whose service period is less than nine months are not eligible for the award of bonus. On a scaled score of 1 to 100, the amount of bonus for the eligible employees is determined as follows:

SCALED SCORE	NO. OF BASIC SALARIES
80 and above	2.0
65 – 79	1.5
50 – 64	1
Less than 50	0

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Summary

- Flow chats symbols are important.

Thank You !!