



**RV College
of
Engineering**

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Course Name: Principles of Programming using C

Course Code: 22CS23

Unit I

Department of Computer Science and Engineering RVCE

Unit 1- Logical Reasoning and Algorithmic Problem Solving

Skill development – Examples related to Arithmetical Reasoning and Analytical Reasoning

ARITHMETIC REASONING

- ☐ Arithmetic reasoning helps us to select the required information from a given question and solve that question using some mathematical concepts.
- ☐ Arithmetic operations are carried out when there is a requirement of solving with mathematical operations such as addition, subtraction, multiplication and division.
- ☐ It primarily deals with converting the word problem and transforming it into equations in order to reach a solution.

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Arithmetic reasoning questions are asked from a number of areas:

- Algebra
- Ages
- Ratio & proportion
- Sequences & patterns
- Percentages
- HCF & LCM, Fractions
- Games & Tournaments

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Example 1:

Nikhil is 2 times as old as Abhay. In the next 3 years, the sum of their respective ages will be 66.
How old are they presently?

Let the age of Abhay = x . As, Nikhil is twice as old as Abhay, his age can be represented as $2x$.
After 3 years, Abhay's age will be $x + 3$, and Nikhil's age will be $2x + 3$. The sum of their ages will be 66.

So, the equation becomes:

$$x + 3 + 2x + 3 = 66$$

$x = 20$, so their respective ages will be : 20 years and 40 years.

So, we can solve the equation using one or two variables as per the question requires.



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Example 2:

Joseph is now $\frac{1}{4}$ th times as old as his mother Ketty. Four years hence, his mother will be three times as old as her son. The age of his mother Ketty (in years) is

Let Joseph's mother Ketty age be $4x$ years. Then, Joseph's age = x years.

Four years hence, Joseph's age = $(x + 4)$ years and Joseph's mother Ketty age = $(4x + 4)$ years. So, $4x + 4 = 3(x + 4)$

$$4x - 3x = 12 - 4;$$

$$x = 8.$$

$$\text{Joseph's mother Ketty age} = 4x = 4 \times 8 = 32 \text{ years}$$



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Example 3:

Rina & Rohit are playing a game, Rina writes down all the natural numbers from 1 to 100, then Rohit has to calculate how many times does she write four?

From 1 to 100, there are exactly 10 numbers with 4 as their tens digit – 40, 41, 42, 43, 44, 45, 46, 47, 48, 49 ; and 10 numbers with 4 as their unit digit: 4, 14, 24, 34, 44, 54, 64, 74, 84, 94

So, the required number of numbers = $10 + 10 = 20$

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ANALYTICAL REASONING

- ☐ It refers to the ability to look at information, be it qualitative or quantitative in nature, and discern patterns within the information.
- ☐ Analytical reasoning measure one's critical thinking and problem-solving skills.

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ANALYTICAL REASONING

- Data may be presented in the form of written passages, graphs, tables or shapes.
- Where questions are based on a series of images, they have much in common with inductive reasoning and non-verbal reasoning tests.
- Written analytical reasoning questions assess many of the same skills as verbal reasoning tests.



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Skill development – Examples related to Arithmetical Reasoning and Analytical Reasoning

ANALYTICAL REASONING

Topics under analytical reasoning are-

- Direction
- Conditions
- Grouping
- Blood relations questions
- Simple and coded inequalities
- Ranking and time sequence

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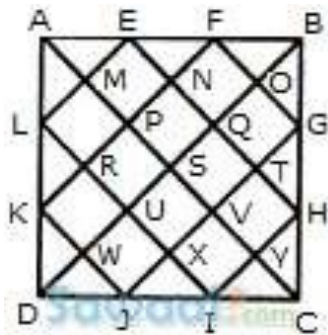
Skill development – Examples related to Arithmetical Reasoning and Analytical Reasoning

Example 1:

Find the number of triangles in the given figure.



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Unit 1- Logical Reasoning and Algorithmic Problem Solving

Skill development – Examples related to Arithmetical Reasoning and Analytical Reasoning

Example 2:

What resembles the water image of ADVANCE

Example 3:

What will be the next term in the following series

$\Omega \leq \textcircled{R}$	$\textcircled{R} \Omega \geq$	$\Omega < \textcircled{R}$?
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A	B	C	D
$\Omega \textcircled{R} >$	$\textcircled{R} > \Omega$	$\textcircled{R} \Omega >$	$\textcircled{R} < \Omega$



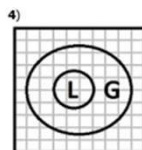
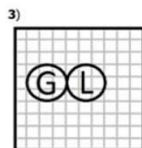
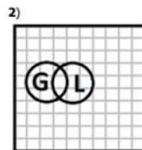
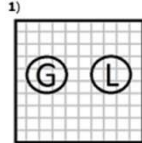
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Example 4:

In a village some of the goldsmiths are literates. Which diagram shows literate goldsmiths?

Options:





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Example 5:

What does this symbol mean '&'?

Example 6:

How many lines of symmetry does a Pentagon have?

A regular Pentagon have 5 sides and 5 lines of symmetry.

- The number of lines of symmetry in a regular polygon is equal to the number of sides.



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Skill development – Examples related to Arithmetical Reasoning and Analytical Reasoning

Example 7:

Pankaj is taller than Vinod, who is shorter than Pramod. Usha is taller than priyanka but shorter than Vinod. Pramod is shorter than Pankaj. Who is the tallest?

Pankaj

Fundamentals of algorithms, flowcharts

Program= Algorithm +Data

- An algorithm is a part of the plan for the computer program.
- An algorithm is ‘an effective procedure for solving a problem in a finite number of steps’.
- An algorithm is defined as **unambiguous, step by step procedure** (instructions) to solve a given problem in **finite** number of steps by **accepting a set of inputs** and **producing the desired output**.
After producing the result, the algorithm should terminate.
- Algorithms are written in simple English like statements along with simple mathematical expressions.

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Algorithms and Flowchart.

Example 1:

Algorithm for finding the sum of any two numbers.

1. *START*
2. *PRINT “ENTER TWO NUMBERS”*
3. *INPUT A, B*
4. $C \leftarrow A + B$ *Add values assigned to A and B and assign this value to C*
5. *PRINT C*
6. *STOP*

Algorithms and Flowchart.

Example 2:

Algorithm for determining the remainder of a division operation where the dividend and divisor are both integers.

1. *START*
2. *PRINT “ENTER DIVIDEND”*
3. *INPUT N*
4. *PRINT “ENTER DIVISOR”*
5. *INPUT D*
6. $Q \leftarrow N/D$ (*Integer division*)
7. $R \leftarrow N - Q * D$
8. *PRINT R*
9. *STOP*

Algorithms and Flowchart.

Example 3:

Algorithm for interchanging the numeric values of two variables.

1. *START*
2. *PRINT “ENTER THE VALUE OF A & B”*
3. *INPUT A, B*
4. $C \leftarrow A$
5. $A \leftarrow B$
6. $B \leftarrow C$
7. *PRINT A, B*
8. *END*

Algorithms and Flowchart.

Flowchart:

- A flowchart is a pictorial representation of an algorithm.
- All the steps are drawn in the form of different shapes of boxes, circle and connecting arrows.
- Flowcharts are mainly used to help programmer to understand the logic/the flow of the program.
- The various types of geometric shapes, arrows and symbols used while drawing the flow chart are called flowchart symbols.
- The symbols used and the meaning associated with each symbol are shown in fig 1.

Algorithms and Flowchart.

Flowchart:



An oval is used to indicate the beginning or end of an algorithm.



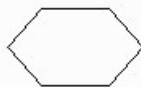
A parallelogram indicates the input or output of information.



A rectangle indicates a computation, with the result of the computation assigned to a variable.



A diamond indicates a point where a decision is made.



A hexagon indicates the beginning of the repetition structure.



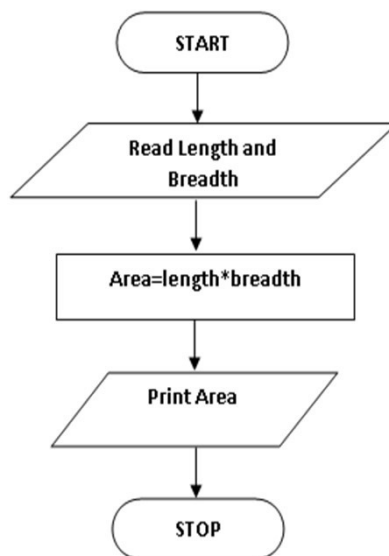
A double lined rectangle is used at a point where a subprogram is used.



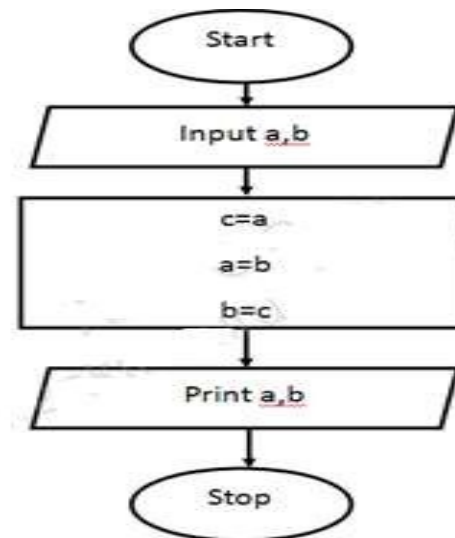
An arrow indicates the direction of flow of the algorithm. Circles with arrows connect the flowchart between pages.

Algorithms and Flowchart.

Flow chart to find the area of rectangle



Flowchart to swap 2 numbers



Algorithms and Flowchart.

Algorithm to find the Largest of given three numbers:

Step 1: Start

Step 2: Read three numbers A, B, C

Step 3: Compare A with B

Step 4: If A is larger compare it with C

Step 5: If A is larger than C then A is the largest otherwise C is the largest.

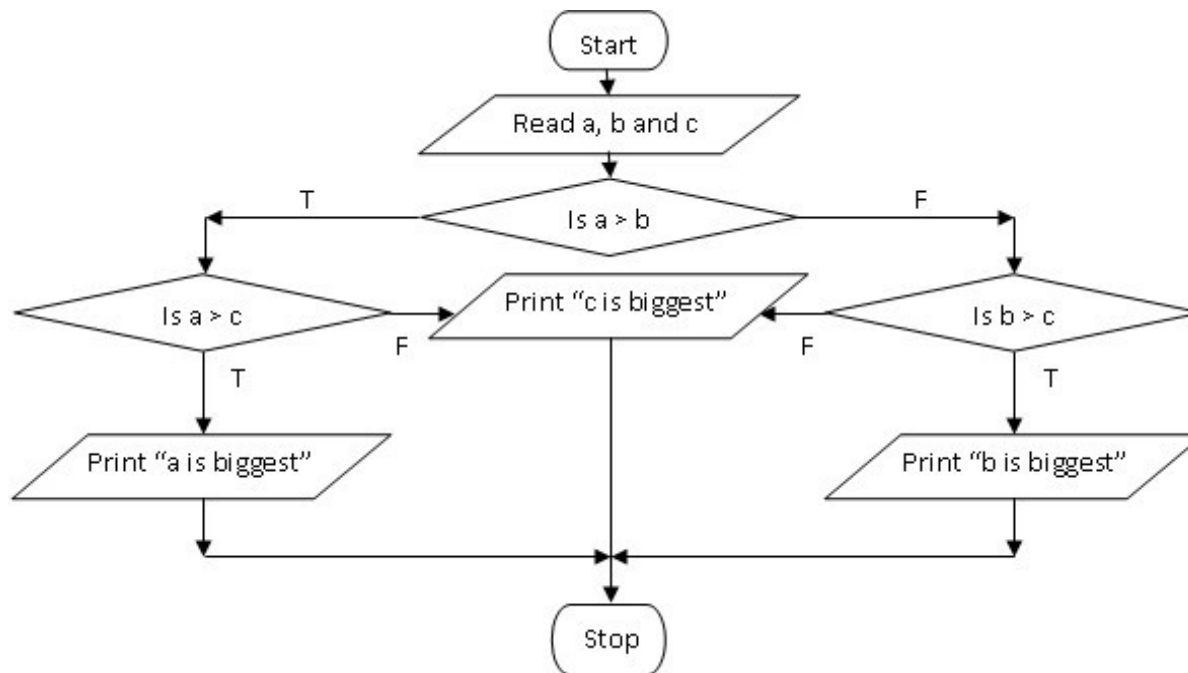
Step 6: If A is smaller than or equal to B in the first step then B is compared with C.

Step 7: If B is larger than C then B is the largest number otherwise C is the largest number.

Step 8: Stop

Algorithms and Flowchart.

Flowchart to find the Largest of given three numbers:





Algorithmic Problem Solving: Arithmetic and Algebraic problems, Sorting and Searching problems, Games.

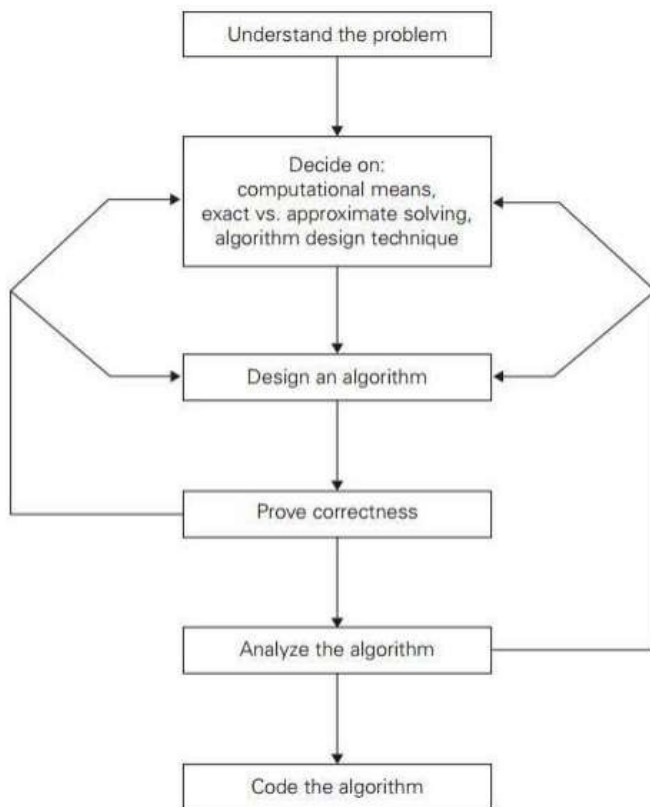


FIGURE 1.2 Algorithm design and analysis process.

Src:https://www.brainkart.com/article/Algorithmic-problem-solving_35898