EXPERIMENT : 03

DEMONSTRATE LOGICAL AND and OR

AIM : Write a program to demonstrate logical operators(logical AND, logical OR)

LEARNING OBJECTIVE :

- Understand the concept and purpose of logical operators in C programming.
- Learn how to apply Logical AND (&&) and Logical OR (||) operators in conditional statements.
- Identify the difference between AND, OR, and NOT operations in controlling program flow
- Develop the ability to construct compound conditions in decision-making statements like if and if-else

TOOLS :

Sr. No.	Name Of Resources	Specification	Quantity	Remarks
1.	Hardware	Computer (I3-I5) Ram (Min 2gb)	1	For All Practical
2.	Software	Turbo C/C++	1	For All Practical

THEORY :

In C programming, logical operators are used to combine two or more conditions to form compound conditions. These operators help evaluate complex decision-making expressions and return a boolean value: true or false.The Logical AND (&&) operator returns true only when both conditions are true. For example, (a > 0 && b > 0) evaluates true if both a and b are greater than zero.

The Logical OR (||) operator returns true if at least one of the conditions is true. For instance, (a > 0 || b > 0) is true if either a or b (or both) are greater than zero.The Logical NOT (!) operator is used to reverse the logical state of a condition; true becomes false, and false becomes true. For example, !(a > b) is true if a is not greater than b.

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Logical operators support short-circuit evaluation, which means the second condition is evaluated only if necessary. This property makes code efficient by preventing unnecessary checks.Logical operators are essential for controlling program flow and decision-making, especially within if, while, and for statements. Using these operators properly helps write clearer and more concise programs.This version balances detail and brevity for your lab. If needed, the entire lab content can be provided with this included.

ALGORITHM:

Step 1: Start the program.

Step 2: Declare integer variables a and b.

Step 3: Prompt the user to enter two numbers.

Step 4: Read the input values using the scanf() function.

Step 5: Use the Logical AND operator (&&) to check if both numbers are positive.

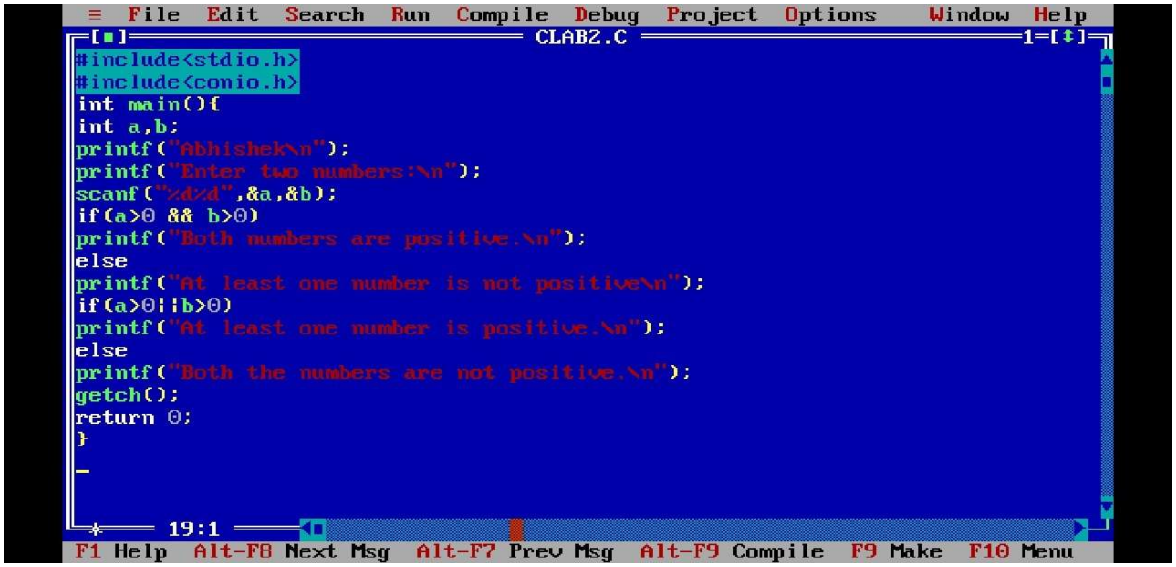
Step 6: Display the result of the Logical AND operation.

Step 7: Use the Logical OR operator (||) to check if at least one number is positive.

Step 8: Display the result of the Logical OR operation.

Step 9: End the program.

Source Code:



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Output:

```
Abhishek
Enter two numbers:
1
2
Both numbers are positive.
At least one number is positive.
```

Result and Discussion:

The program was compiled and executed without errors.
It correctly demonstrated the use of Logical AND (&&) and Logical OR (||) operators.
The AND operator returned true only when both conditions were true, while the OR operator returned true when at least one condition was true.
This lab enhanced understanding of logical operator behavior and conditional evaluation in C.

Learning Outcomes:

- Understood the functionality and importance of logical operators in decision-making.
- Learned how to combine multiple conditional statements using && and ||.
- Gained practical experience in controlling program flow based on compound conditions.
- Improved debugging and reasoning skills related to logical evaluations.

Course Outcomes:

- Develop the ability to apply logical and relational operators in programs.
- Understand the precedence and short-circuit behavior of logical operators.
- Identify use cases for compound conditional statements.
- Enhance problem-solving efficiency using conditional logic.

CONCLUSION :

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The program was compiled and executed successfully, demonstrating the use of logical operators in evaluating multiple conditions. It showed how Logical AND (&&) requires both conditions to be true for a true result, while Logical OR (||) requires only one condition to be true.

This experiment helped in understanding how logical operators control program flow in decision-making. It also improved confidence in writing logical expressions and handling compound conditions in C programming.

VIVA QUESTIONS :

1. **What is the use of logical operators in C?**
   - They are used to combine multiple conditions in decision-making.
2. **Name all the logical operators in C.**
   - Logical AND (&&), Logical OR (||), Logical NOT (!).
3. **What is the difference between && and ||?**
   - && returns true only if both conditions are true, whereas || returns true if at least one condition is true.
4. **What does the NOT (!) operator do?**
   - It reverses the logical value of a condition (true becomes false, false becomes true).
5. **Can logical operators be used with non-boolean expressions?**
   - Yes, in C any non-zero value is considered true and zero is false.

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FOR FACULTY USE ONLY :

Correction Parameters	Formative Assessment [40%]	Timely completion of practical [40%]	Attendance/ Learning Attitude [20%]	
Marks Obtained				