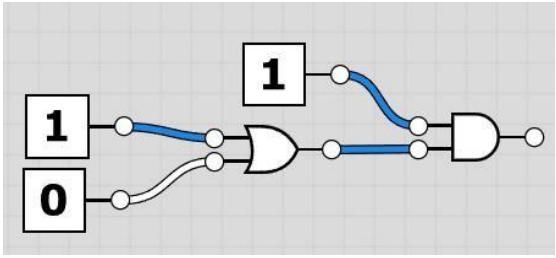
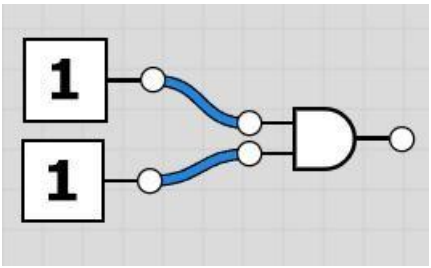
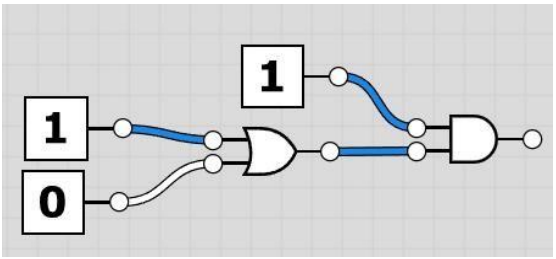
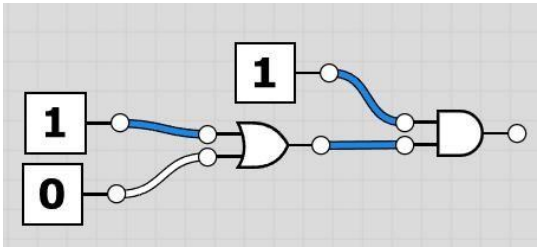
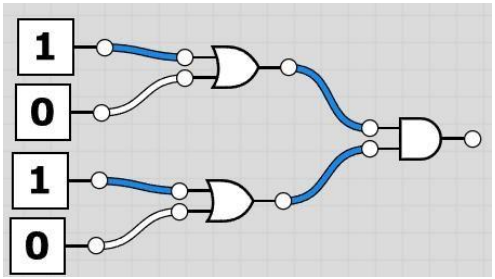
Project Description:

- A Logic gate is an elementary building block of any digital circuits. It takes one or two inputs and produces output based on those inputs. Outputs may behigh (1) or low (0).
- Well, in most logic circuits are usually mixed types of gates connected together.
- You are required to write a C++ program designed to solve logic circuits based on user-defined input. The program takes input as a string representation of a logic circuit and provides the corresponding output as a high (1) or low (0) digit. This project aims to provide a reliable and efficient solution for evaluating logic circuits.
- For example, the user input: **AND 1 OR 1 0 e e** describes the following circuit:



- Your application should provide the following features:
  1. Enable user to input logic circuit configurations using a string representation.
  2. Implement logic gate operations (AND, OR,NOT,NAND,NOR, XOR) to process the circuit inputs.
  3. Establish a systematic approach to evaluate the circuit and generate the desired output.
  4. Offer a user-friendly interface to enhance the program's accessibility and ease of use.

- The Logic Circuit Solver must handle **a parent logic gate** that has 2 inputs; eachinput can be a high (1) digit or low (0) digit or **another logic gate**.
- Logic gates that must be supported (AND, OR, NOT, XOR, NAND, NOR).
- The user will enter a string that describes at first the Parent logic gate type followed by the 2 inputs separated by one space.
- It is guaranteed that each connection will end by **e** (ex: AND 1 1 **e**)
- Different Test cases that program can handle:

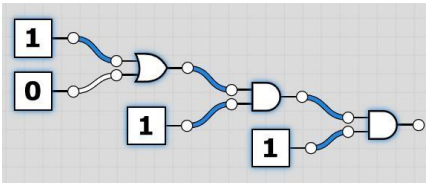
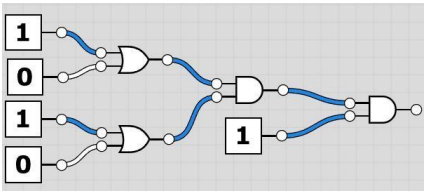
AND 1 1 e  	AND 1 OR 1 0 e e 
AND OR 0 0 e 1 e  	AND OR 1 0 e OR 0 0 e e 

- **<u>Error handling</u>**:

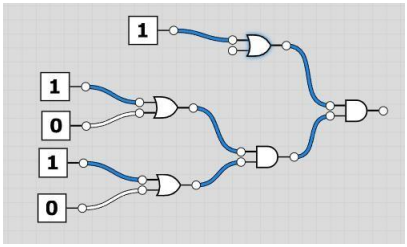
  1. if the user entered another type of logic gate that is not known (Ex: OND) then you must print **"Wrong Logic Circuit Description"** and end the program.
  2. If the user forgets to enter an input for a logic gate (ex: AND 1 e) then you must print **"result: BAD input: missing input number"** and end the program.

- Your program must support variable characters so you can ask him to enter their values "**x variables are missing please enter them in separate lines**",
  The user will enter them in separate lines (Ex: a=1), replace each a by 1 then continue your program.
  NOTE: (variable characters can be any letter between a-z, A-Z)

- Different Test cases that program must handle:

<table>
<tr>
<td>AND 1 AND 1 OR 1 0 e e e
 
</td>
<td>AND 1 AND OR 1 0 e OR 1 0 e e e
 
</td>
</tr>
<tr>
<td>AND OR a b e AND OR 1 0 e OR 1 0 e e e
2 variables are missing please enter them in separate lines
a=1
b=0

<u>Where your code printed :</u>

2 variables are missing please enter them in separate lines
<u>and the user entered</u>
a=1
b=0</td>
<td>AND OR 1 e AND OR 1 0 e OR 1 0 e e e
 

result : BAD input : missing input number</td>
</tr>
</table>

Helpful Insights:

- **Truth table**

AND	OR	NAND	NOR	XOR