Exercise 04 - Boolean Logic

Create a C++ file named '`exercises04.cpp`' that only includes the libraries '`iostream`', '`string`', '`cstdlib`', and '`ctime`', and defines and tests the following functions.

1. Define a Boolean function named `AND()` that takes two Boolean parameters and returns true only if both parameters are true; otherwise, it returns false.

2. Define a Boolean function named `OR()` that takes two Boolean parameters and returns false only if both parameters are false; otherwise, it returns true.

3. Define a Boolean function named `NOT()` that takes a Boolean parameter and returns the opposite value of the parameter.

4. Define a Boolean function named `IMP()` that takes two Boolean parameters and returns false only if the first parameter is true and the second is false; otherwise, it returns true.

5. Define a Boolean function named `XOR()` that takes two Boolean parameters and returns true only if the parameters have different values; otherwise, it returns false.

6. Define a Boolean function named `EQU()` that takes two Boolean parameters and returns true only if the parameters have the same value; otherwise, it returns false.

7. Define a Boolean function named `E1()` that takes three Boolean parameters and returns the truth value of the expression
$$(A \wedge B) \vee C'$$
where A, B, and C are the first, second, and third parameters, respectively.

8. Define a Boolean function named `E2()` that takes three Boolean parameters and returns the truth value of the expression
$$(A \vee B) \wedge (A' \vee C)$$
where A, B, and C are the first, second, and third parameters, respectively.

9. Define a Boolean function named `E3()` that takes three Boolean parameters and returns the truth value of the expression
$$A \wedge (B \rightarrow C)$$
where A, B, and C are the first, second, and third parameters, respectively.

10. Define a Boolean function named `E4()` that takes three Boolean parameters and returns the truth value of the expression
$$(A' \rightarrow B') \wedge B \wedge (A \rightarrow C)$$
where A, B, and C are the first, second, and third parameters, respectively.