# User Manual

A) Description

The binary arithmetic game is a two-player game where each player enters a 4-bit number using designated switches. The goal is for the second player to input a number that, when added to the first player's number, equals 15 (1111 in binary). The entered numbers and their sum are displayed on three 7-segment displays. An LED on the left indicates when the sum is 15, while another LED on the right signals when it is not. The game requires a correct password entry to start and allows logging in and out using a dedicated button. A reset button is available to restart the game at any time, returning it to the login phase.

B) Board Picture
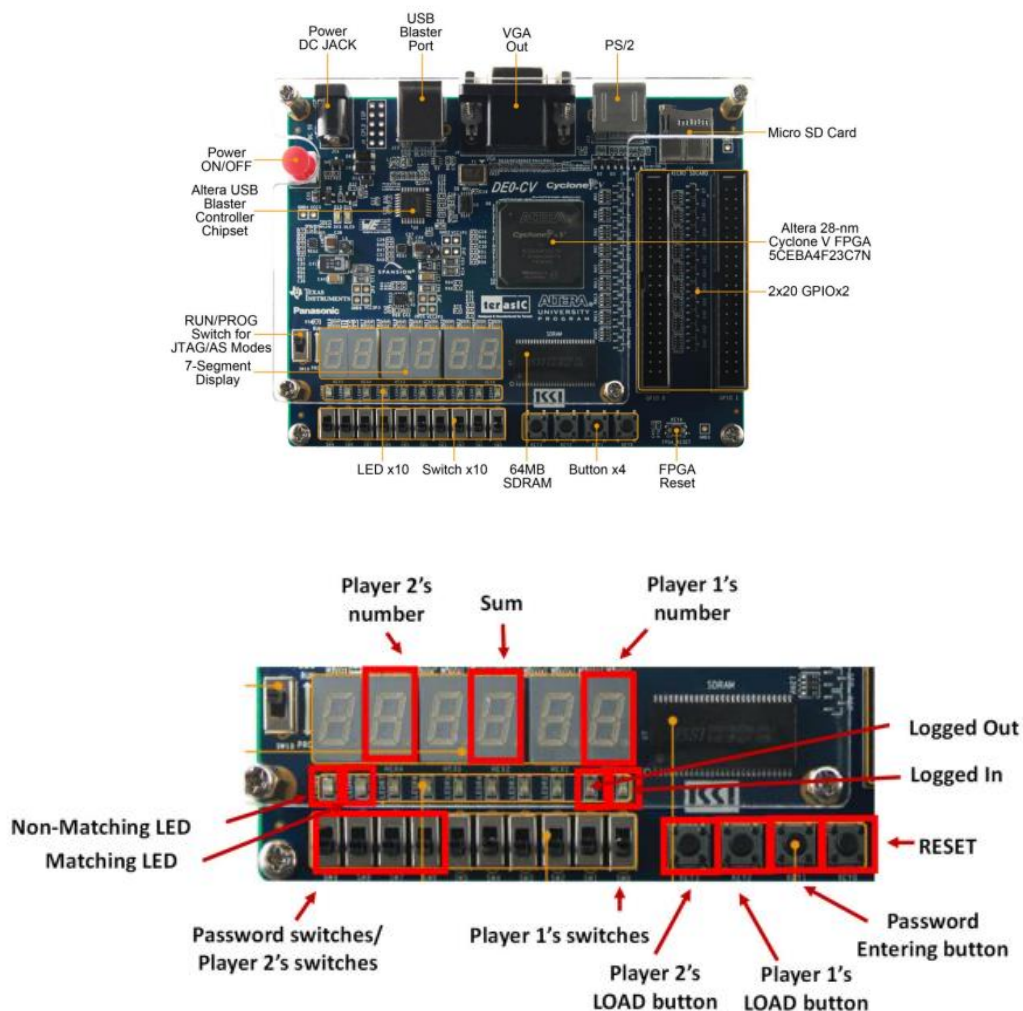
C)   Gameplay Examples

Failed Attempt (Example Round)

1. **Player 1's Turn**:
   - o   Player 1 sets (binary **0011**, decimal 3).
   - o   The **7-segment display** for the sum and player 1 updates to show **3**.

2. **Player 2's Turn**:
   - o   Player 2 sets (binary **1000**, decimal 8).
   - o   Player 2 display updates to **8**.
   - o   The sum display updates to **11 (B).**
   - o   The non-matching LED lights on, indicating a non-match.

Player 1 gains a point and then it is Player 2's turn to choose a number first.

Successful Attempt (Example Round)

1. **Player 1's Turn**:
   - o   Player 1 sets (binary **0101**, decimal 5).
   - o   The sum updates to **5**.
   - o   Player 1 display updates to 5.

2. **Player 2's Turn**:
   - o   Sets (binary **1010**, decimal 10).
   - o   Player 2 display updates to **10**.
   - o   The sum updates to **15** (target reached).
   - o   Matching LED turns on, indicating a match.

Player 2 gains a point and then it is Player 2's turn to choose a number first.

Login Attempts

Successful Login Attempt

1. **Password Entry:**

o Player 2 enters the correct password using their switches: **1001 (9), 1000 (8), 0110 (6), 0001 (1)**.

o The system verifies the password as **1111 (binary) / 15 (decimal)**.

o The **LogIn LED** turns on, indicating a successful login.

o The game proceeds to the gameplay phase, where Player 1 starts by choosing a number.

Failed Login Attempt

1. **Password Entry:**

o Player 2 enters an incorrect password using their switches: **1001 (9), 0000 (0), 0110 (6), 0001 (1)**.

o The system checks the password but it does not match **1111 (binary) / 15 (decimal)**.

o The **LogIn LED** stays off, and the **LogOut LED** stays lighted up, indicating that the system is not logged in.

o Player 2 must retry entering the correct password to log in and begin the game.

Logout Attempt

1. **Logging Out:**

o During the game, Player 1 decides to log out.

o Player 1 presses the **password entering button** to initiate the logout process.

o The **LogOut LED** turns on, confirming that the user is logged out.

o The game logs out, and Player 1 must enter the password again to log back in after pressing the password entry button again.