

Tennis Scoreboard Simulator on Pt-51

1. [20 points] In this project, you will be writing a program to simulate a scoreboard for a tennis match in the best-of-three tiebreak set format.¹ The inputs of the scorer will be obtained using key presses on a keyboard connected to Pt-51 using UART.

- The match will consist of three sets. Each set consists of 6 to 13 games. Each game consists of 4 to an unlimited number of points. The latter is true for a tiebreak game. See the section titled “Scoring a Tiebreak Game” in the USTA page linked in the footnote.
- The scorer indicates the winner of a point by pressing either 1 or 2. The character 1 indicates that Player 1 has won the point and the character 2 indicates Player 2 has won the point
- On the first line, the LCD should always display the number of games won by each player in each set completed so far. Consider the following examples:
 - If the first set is in progress where Player 1 has won 3 games and Player 2 has won 1 game, then the first line of the LCD should display 3-1.
 - Suppose the first set was won by Player 2 who won 6 games while Player 1 won 4 games. If the second set is in progress where Player 1 has won 2 games and Player 2 has won no games, then the first line of the LCD should display 4-6 2-0.
- On the second line, the LCD should display the score of the current game in the format X-Y where X is Player 1’s points and Y is Player 2’s points. The values X and Y can take and the scoring system depends on whether the game is a tiebreak game or not. The tiebreak game scoring is used only when the score in a set reaches 6-6.
 - **Non-Tiebreak Game Scoring**
 - * The values X and Y can take are 0, 15, 30, 40, or Ad where the last option denotes advantage after deuce (the score of 40-40).
 - * Initially, the score in a game is displayed as 0-0.
 - * If Player 1 wins the next point, the score is displayed as 15-0. Instead, if Player 2 wins the point, the score is displayed as 0-15.
 - * After winning a point, a player’s score advances through the sequence 15, 30, 40.
 - * If a player has 40 in a game and the other player has 0, 15, or 30, then the first player wins the game if she wins the next point.
 - * If the game score is 40-40, then the score should advance to Ad-40 or 40-Ad depending on whether Player 1 or Player 2 wins the next point.
 - * If player with Ad in a game wins the next point, she wins the game. If she loses the next point, the score goes back to 40-40.
 - **Tiebreak Game Scoring**
 - * Tiebreak game scoring is applicable only when the score in a set reaches 6-6.

¹For more information about tiebreak sets, see <https://www.usta.com/en/home/improve/tips-and-instruction/national/tennis-scoring-rules.html>.

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- * In a tiebreak game, **X** and **Y** can take values in the non-negative integers. For simplicity, we will assume that these values are both less than 100.
 - * The first player to win 7 or more points with a lead of 2 points over the other player wins the tiebreak game. So the winning score in a tiebreak game can be as high as **99-97** and as low as **7-0**.
 - When a player wins a game, the set score on the first line should be updated.
 - A player wins a set if one of the following conditions hold.
 - * If a player wins her 6th game in the set when the other player has won 4 or less games in the set, she wins the set.
 - * If the set score is **6-5** or **5-6** and the player with 6 games wins the next game, she wins the set. This makes the score **7-5** or **5-7**.
 - * If the set score is **6-6** and a player wins the subsequent tiebreak game, she wins the set. This makes the score **7-6** or **6-7**.
 - If winning the game results in the player winning a set but not the match, the next set score of **0-0** should appear to the right of the current set scores on the first line.
 - If winning the game results in the player winning the match, the string **P1 wins** or the string **P2 wins** should appear on the second line for 5 seconds and after that the LCD state should reset to the beginning of the next match.