```
/* Name: Eshan Kiritharan
   Date: July 24, 2024
   Purpose of program:
   - Develop a user-friendly program that implements coding components (ex: variables, loops, arrays, and methods) learned through the ICS3UE course.
   - Create a probability game by simulating the roll of multiple dice at the user's discretion.
*/

// Import the Random class
import java.util.Random;
// Import the Scanner class.
import java.util.Scanner;

// Define the main class.
public class Main
  {
    // Define the rules method.
    /* rules:

       This method recieves no parameters and returns no values. It displays the rules of the game to the user when called.

       Parameters: None
       Returns: Void
    */
    public static void rules()
    {
      // Print the rules of the game.
      System.out.println("");
      System.out.println("Select two or three dice to simulate the respective number of dice when playing.");
      System.out.println("");
      System.out.println("Your goal is to have the sum of the results of your dice match a winning number.");
      System.out.println("");
      System.out.println("If you have choose two dice, your winning numbers are 7, 9, 10 and 12. If you have chosen three dice, your winning numbers are 12, 13, 16, 17, and 18.");
      System.out.println("");
    }

    // Define the twoDice method.
    /* twoDice:
```

This method recieves a constant integer and a String array, but returns no values. It simulates a probability game with two dice when called.

```
    Parameters: int, String []
    Returns: Void
  */
  public static void twoDice(int ROUNDS, String [] results)
  {
    // Create a new scanner object for user inputs.
    Scanner scanner = new Scanner(System.in);

    // Declare and initialize the variables and array for the program.
    int diceA, diceB = 0;
    int [] winNumber = {7, 9, 10, 12};
    String input = "";
    Boolean win = false;

    // Instruct the user on the winning numbers of the game
    System.out.println ("");
    System.out.println ("Your winning numbers are 7, 9, 10 and 12.");

    // Create a for loop that iterates the number of rounds the user has selected.
    for (int i = 0; i < ROUNDS; i = i + 1)
    {
      // Prompt the user to enter [R] to simulate a dice roll.
      System.out.println ("");
      System.out.println ("Press the key [R] to roll the two dice.");
      System.out.println ("");

      // Store the input in the variable "input"
      input = scanner.nextLine();

      // Give the user a message depending on the input.
      if (input.equals("R") || input.equals("r"))
      {
        // Initialize the boolean "win" to false
        win = false;

        // Generate a random number between 1 and 6 for the first dice.
        diceA = (int)(Math.random() * 6) + 1;
        // Generate a random number between 1 and 6 for the second dice.
        diceB = (int)(Math.random() * 6) + 1;

        // Print the results of the dice roll.
```

```
            System.out.println ("");
            System.out.println ("You rolled a " + diceA + " and a " + diceB + ", adding up to " +
(diceA + diceB) + ".");
            System.out.println ("");

            // Create a for loop that iterates through the winning numbers array.
            for (int j = 0; j < winNumber.length; j = j + 1)
            {
              if ((diceA + diceB) == winNumber[j])
              {
                // Output a winning message to the user.
                System.out.println ("You won the round!");
                // Input an element in the array cell results[i]
                results[i] = "Round " + (i + 1) + ": Won";
                // Set the boolean "win" to true
                win = true;
                // Break from the for loop
                break;
              }
            }
            if (!win)
            {
              // Give a losing message if the user does not win the round.
              System.out.println ("You did not win the round.");

              // Input an element in the array cell results[i]
              results[i] = "Round " + (i + 1) + ": Lost";
            }
          }
          else
          {
            // Output a losing message to the user for entering the wrong input.
            System.out.println("");
            System.out.println ("You did not press the key [R]. You automatically lose the round.");
            // Input an element in the array cell results[i]
            results[i] = "Round " + (i + 1) + ": Lost";
          }
        }
      }

      // Define the threeDice method.
      /* threeDice:
```

This method recieves a constant integer and a String array, but returns no values. It simulates a probability game with three dice when called.

```
    Parameters: int, String []
    Returns: Void
  */
  public static void threeDice(int ROUNDS, String [] results)
  {
    // Create a new scanner object for user inputs.
    Scanner scanner = new Scanner(System.in);

    // Declare and initialize the variables and array for the program.
    int diceA, diceB, diceC = 0;
    int [] winNumber = {12, 13, 16, 17, 18};
    String input = "";
    Boolean win = false;

    // Instruct the user on the winning numbers of the game
    System.out.println ("");
    System.out.println ("Your winning numbers are 12, 13, 16, 17 and 18.");

    // Create a for loop that iterates the number of rounds the user has selected.
    for (int i = 0; i < ROUNDS; i = i + 1)
    {
      // Prompt the user to enter [R] to simulate a dice roll.
      System.out.println ("");
      System.out.println ("Press the key [R] to roll the three dice.");
      System.out.println ("");

      // Store the input in the variable "input"
      input = scanner.nextLine();

      // Give the user a message depending on the input.
      if (input.equals("R") || input.equals("r"))
      {
        // Initialize the boolean "win" to false
        win = false;

        // Generate a random integer between 1 and 6 for the first, second and third dice.
        diceA = (int)(Math.random() * 6) + 1;
        diceB = (int)(Math.random() * 6) + 1;
        diceC = (int)(Math.random() * 6) + 1;

        // Print the results of the dice roll.
```

```
            System.out.println ("");
            System.out.println ("You rolled a " + diceA + ", a " + diceB + " and a " + diceC + ",
adding up to " + (diceA + diceB + diceC) + ".");
            System.out.println ("");

            // Create a for loop that iterates through the winning numbers array.
            for (int j = 0; j < winNumber.length; j = j + 1)
            {
              if ((diceA + diceB + diceC) == winNumber[j])
              {
                // Output a winning message to the user.
                System.out.println ("You won the round!");
                // Input an element in the array cell results[i]
                results[i] = "Round " + (i + 1) + ": Won";
                // Set the boolean "win" to true
                win = true;
                // Break from the for loop
                break;
              }
            }
            if (!win)
            {
              // Give a losing message if the user does not win the round.
              System.out.println ("You did not win this round.");

              // Input an element in the array cell results[i]
              results[i] = "Round " + (i + 1) + ": Lost";
            }

          }
          else
          {
            // Output a losing message to the user for entering the wrong input.
            System.out.println("");
            System.out.println ("You did not press the key [R]. You automatically lose the round.");
            // Input an element in the array cell results[i]
            results[i] = "Round " + (i + 1) + ": Lost";
          }
        }
      }

      // Define the display method.
      /* display:
```

This method recieves a String array and a Boolean variable and returns a Boolean value. It displays the results of the game to the user when called.

```
    Parameters: String [], Boolean
    Returns: Boolean
  */
  public static Boolean display(String [] results, Boolean exit)
  {
    // Create a new scanner object for user inputs.
    Scanner scanner = new Scanner(System.in);

    // Declare variables for the method
    Boolean valid = false;
    String input = "";

    // Output a subheader for the results of the game
    System.out.println ("");
    System.out.println ("Your results for the game:");
    System.out.println ("");

    // Declare a for loop outputting the user's results
    for (int i = 0; i < results.length; i = i + 1)
    {
      System.out.println(results[i]);
    }

    // Create a do while loop that iterates until the user enters a valid input.
    do
    {
      // Prompt the user to play again or exit the program.
      System.out.println("");
      System.out.println("Would you like to play again or exit the program?");
      System.out.println("");
      System.out.println("Enter [P] to play again or [X] to exit.");
      System.out.println("");

      // Store the input in the variable "input"
      input = scanner.nextLine();

      // Give the user a message depending on the input.
      if (input.equals("P") || input.equals("p"))
      {
        // Output a welcome back message to the user.
        System.out.println("");
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```
        System.out.println("You have chosen to play again. Welcome back!");
        System.out.println("");

        // Set the boolean "valid" to true to exit the loop.
        valid = true;
        // Set the boolean "exit" to false to repeat the program.
        exit = false;
      }
      else if (input.equals("X") || input.equals("x"))
      {
        // Output a farewell message to the user.
        System.out.println("");
        System.out.println("You have chosen to exit the program. Goodbye!");
        System.out.println("");

        // Set the boolean "valid" to true to exit the loop.
        valid = true;
        // Set the boolean "exit" to true to exit the program.
        exit = true;
      }
      else
      {
        // Output a message to the user for entering an invalid input.
        System.out.println("");
        System.out.println("Invalid input. Please try again.");

        // Set the boolean "valid" to false to repeat the prompt.
        valid = false;
      }
    } while (!valid);

    // Return the value of the boolean "exit".
    return (exit);
  }

  // Define the main method.
  public static void main(String[] args)
  {
    // Create a Scanner object for user inputs.
     Scanner scanner = new Scanner(System.in);

     // Declare and initialize variables, an array and a constant for the program.
    String input = "";
    int num = 0;
```

```
        Boolean exit = true;
        Boolean valid = true;
        String [ ] results = new String [5];
        final int ROUNDS = 5;

        // Give a welcome message to the user
        System.out.println("");
        System.out.println("Welcome to Double or Triple Dice!");
        System.out.println("");
        System.out.println("This game will simulate the roll of two or three dice at your
discretion.");
        System.out.println("");

        // Declare a while loop repeating until the user chooses to exit the program.
        do
        {
          // Declare a while loop repeating until the user enters a valid input.
          do
          {
            // Prompt the user to play the game immediately or view the rules
            System.out.println("Press [P] to play the game or [R] to view the rules.");
            System.out.println("");
            input = scanner.nextLine();

            // Give different outputs based on the user's input

            if (input.equals("P")||input.equals("p"))
            {
              // Prompt the user to enter the number of dice they want to roll.
              System.out.println("");
              System.out.println("Enter the number of dice you want to roll (2 or 3):");
              System.out.println("");

              // Declare a while loop repeating until the user enters a valid input.
              do
              {
                // Store the user's input in the string "input"
                input = scanner.nextLine();

                // Try to parse the user's input as an integer.
                try
                {
                  num = Integer.parseInt(input);
                }
```

```
      // Catch any exceptions and give an error message.
      catch (NumberFormatException e)
      {
        System.out.println("");
        System.out.println("Your input is not an integer. Please try again.");
        valid = false;
      }

      // Give different outputs depending on the integer inputted/
      switch (num)
        {
          case 2:
            // Call the "twoDice" method
            // Set the boolean variable "valid" to true to exit the loop.
            valid = true;
            twoDice(ROUNDS, results);
            break;
          case 3:
            // Call the "threeDice" method
            // Set the boolean variable "valid" to true to exit the loop.
            valid = true;
            threeDice(ROUNDS, results);
            break;
          default:
            // Give an error message if the user enters an invalid integer
            System.out.println("");
            System.out.println("Please enter the number 2 or 3.");
            System.out.println("");

            // Set the boolean variable "valid" to false to continue the loop.
            valid = false;
        }

    } while (!valid);
  }
  else if (input.equals("R")||input.equals("r"))
  {
    // Call the "rules" method to display the rules of the game
    rules();
    // Set the boolean "valid" to false to repeat the loop
    valid = false;
  }
  else
  {
```

```
            // Output an error message to the user.
            System.out.println("");
            System.out.println("Invalid input. Please try again");
            System.out.println("");
            // Set the boolean variable "valid" to false to continue the loop.
            valid = false;
          }
        } while (!valid);

        // Call the "display" method to display the results to the user

        exit = display(results, exit);

      } while (!exit);

    }
}
```