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// Authour: Samuele Joshi, Exercise 9 - Recursion  |
// Description: A program that recursively parses expressions and calculates whatever the user enters.
import java.util.*;
//change var and method names
public class Main {
   /* main method - Asks the user to enter in an expression. Expression data is then returned and passed into the variable "expressValue".
      "expressValue" data is passed to the method "expressDecider" which checks for what the user has asked to calculate.
      Whatever happens in expressDecider, data is stored in a variable called output which that data is then printed out. */
   public static void main(String[] args) {
      String expressValue = enterExpression();
      int output = expressDecider(expressValue);
      System.out.println(output);
   }
   // User enters an expression from a digit, a plus or a s. That data is then returned and passed to "expressValue".
   public static String enterExpression(){
      Scanner userInput = new Scanner(System.in);
      System.out.println("Enter expression: ");
      String enteredExpress = userInput.nextLine();
      return enteredExpress;
   }
   // Based on whatever the user has entered gets executed if it meets the boolean expression conditions.
   public static int expressDecider(String enteredExpress){
      int output = 0;
      // If user has a plus, this code is executed.
      if(enteredExpress.substring(0,1).equals("+")){
         output = addition(enteredExpress);
      }// If user has a S, this code is executed.
      else if(enteredExpress.substring(0,1).equals("S")){
         output = sum(enteredExpress);
      }
      else{ //If user enters a digit, this code is executed.
         output = digit(enteredExpress);
      }
      return output; // Data is returned to another variable outside this method.
   }
   // Based on the expression entered, it will gather the values of the digit and the expression decider.
   // It will then add the values and return the value to another variable in a different method.
   public static int addition(String expressValue){
      int digitValue = digit(expressValue.substring(1,2));
      int charValue = expressDecider(expressValue.substring(2));
      int output = digitValue + charValue;
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        return output;
    }
    // If the user enters S, whatever is also in the expression is stored in a variable "storeExInput".
    // Then any value from the expressDecider is passed into storeValidExpress. This value is passed in the method first_Ndigit to calculate the first sum digit.
    // Once completed, data is then returned to a variable outside this method.
    public static int sum(String expressValue){
        String storeExInput = expressValue.substring(1);
        int storeValidExpress = expressDecider(storeExInput);
        int output = first_Ndigit(storeValidExpress);
        return output;
    }
    // Converts A to 10 so that the user can enter letters which have a numerical value. (Example Hex to Dec).
    // Once entered the letter or numerical value, data is passed to another variable outside the method.
    public static int digit(String expressValue){
        int decimal = Integer.parseInt(expressValue, 16);
        return decimal;
    }
    // If the nValue does not meet 0, nValue will be deducted by 1. Once 0, it will return 0 as a value.
    public static int first_Ndigit(int nValue){
        if(nValue == 0){
            return 0;
        }
        else{
            return (nValue + first_Ndigit(nValue-1));
        }
    }
}
```