```java
//Professor Ziegler
//HW6
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import java.util.Scanner;    //needed to use Scanner
import java.io.*;            //needed to use PrintWriter

//program 6 allows the user to perform simple tasks on a calculator
public class pgm6{
    public static void main(String[] args) throws IOException{
        char type;        //to store the input

        File myFile = new File("c:/myfile.txt");    //create a file object
        //Scanner input = new Scanner(System.in);
        Scanner input = new Scanner(myFile);         //read from file

        //PrintWriter output = new PrintWriter(System.out);
        PrintWriter output = new PrintWriter("c:/myoutput.txt"); //output to file

        do{
            displayMenu();        //call method to display menu
            type = input.next().charAt(0);        //assign input to type
            classify(type, input, output);        //call method to classify input
            output.println();
            output.flush();       //flush the buffer
        }while(type != 'Q');

        System.out.println("\nThe program has completed");
        output.close();     //close output file
        input.close();      //close input file
    }

    /* method displayMenu()
    * Input: None
    * Process: Prints the menu to screen
    * Output: Prints the menu to screen
    */
    public static void displayMenu(){
        System.out.println("Please enter the one of the following type:");
        System.out.println(" + to get the sum of two integers");
        System.out.println(" - to get the difference of the 1st integer "
                + "minus the 2nd integer");
        System.out.println(" * to get the product of two integers");
        System.out.println(" / to get the quotient of the 1st integer "
                + "divided by the 2nd integer");
        System.out.println(" % to get the remainder of the 1st integer "
                + "divided by the 2nd integer");
        System.out.println(" A to get the average of two integers");
        System.out.println(" X to get the maximum of two integers");
        System.out.println(" M to get the minimum of two integers");
        System.out.println(" S to get the square of a number");
        System.out.println(" Q to quit the program");
        System.out.print("type: ");
    }

    /* method classify()
    * Input: A char variable type that is the input, a Scanner object and a PrintWriter object
    * Process: Use switch to decide which case to execute basing on the input type
    * Output: If the input is not on the menu, output an Error message on the screen
    *         Otherwise, None
    */
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public static void classify(char type, Scanner input, PrintWriter output){
    switch(type){
        case 'Q':
            break;
        case '+':
            Add(input, output);
            break;
        case '-':
            Minus(input, output);
            break;
        case '*':
            Times(input, output);
            break;
        case '/':
            Divide(input, output);
            break;
        case '%':
            Mod(input, output);
            break;
        case 'A':
            Average(input, output);
            break;
        case 'X':
            Max(input, output);
            break;
        case 'M':
            Min(input, output);
            break;
        case 'S':
            Sqrt(input, output);
            break;
        default:
            output.println("Error: " + type + " is not one of the choices in menu");
            break;
    }
}

/* method Add()
* Input: A Scanner object and a PrintWriter object
* Process: Hint the user to input the 1st and 2nd integers
*          Assign the inputs to integer type variables num1 and num2
*          Prints operation is addition, user's original input and the sum
* Output: Prints operation type is addition, user's original input and the sum
*/
public static void Add(Scanner input, PrintWriter output){
    int num1, num2;
    System.out.print("Please enter the 1st integer: ");
    num1 = input.nextInt();
    System.out.print("Please enter the 2nd integer: ");
    num2 = input.nextInt();
    output.println("Operation: addition");
    output.println("augend: " + num1);
    output.println("addend: " + num2);
    output.println("sum: " + (num1 + num2));
}

/* method Minus()
* Input: A Scanner object and a PrintWriter object
* Process: Hint the user to input the 1st and 2nd integers
*          Assign the inputs to integer type variables num1 and num2
*          Prints operation is subtraction, user's original input and the difference
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 * Output: Prints operation type is subtraction, user's original input and the difference
 */
public static void Minus(Scanner input, PrintWriter output){
    int num1, num2;
    System.out.print("Please enter the 1st integer: ");
    num1 = input.nextInt();
    System.out.print("Please enter the 2nd integer: ");
    num2 = input.nextInt();
    output.println("Operation: Subtraction");
    output.println("Minuend: " + num1);
    output.println("Subtrahend: " + num2);
    output.println("Difference: " + (num1 - num2));
}

/* method Times()
 * Input: A Scanner object and a PrintWriter object
 * Process: Hint the user to input the 1st and 2nd integers
 *          Assign the inputs to integer type variables num1 and num2
 *          Prints operation is Multiplication, user's original input and the product
 * Output: Prints operation type is Multiplication, user's original input and the product
 */
public static void Times(Scanner input, PrintWriter output){
    int num1, num2;
    System.out.print("Please enter the 1st integer: ");
    num1 = input.nextInt();
    System.out.print("Please enter the 2nd integer: ");
    num2 = input.nextInt();
    output.println("Operation: Multiplication");
    output.println("Multiplicand: " + num1);
    output.println("Multiplier: " + num2);
    output.println("Product: " + (num1 * num2));
}

/* method Divide()
 * Input: A Scanner object and a PrintWriter object
 * Process: Hint the user to input the 1st and 2nd integers
 *          Assign the inputs to integer type variables num1 and num2
 *          Prints operation is division, user's original input and the quotient
 * Output: Prints operation type is division, user's original input and the quotient
 */
public static void Divide(Scanner input, PrintWriter output){
    int num1, num2;
    System.out.print("Please enter the 1st integer: ");
    num1 = input.nextInt();
    System.out.print("Please enter the 2nd integer: ");
    num2 = input.nextInt();
    output.println("Operation: Division");
    output.println("Dividend: " + num1);
    output.println("Divisor: " + num2);
    output.println("Quotient: " + (num1 / num2));
}

/* method Mod()
 * Input: A Scanner object and a PrintWriter object
 * Process: Hint the user to input the 1st and 2nd integers
 *          Assign the inputs to integer type variables num1 and num2
 *          Prints operation is modulation, user's original input and the remainder
 * Output: Prints operation type is modulation, user's original input and the remainder
 */
public static void Mod(Scanner input, PrintWriter output){
    int num1, num2;
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        System.out.print("Please enter the 1st integer: ");
        num1 = input.nextInt();
        System.out.print("Please enter the 2nd integer: ");
        num2 = input.nextInt();
        output.println("Operation: Modulation");
        output.println("Dividend: " + num1);
        output.println("Divisor: " + num2);
        output.println("Remainder: " + (num1 % num2));
    }

    /* method Average()
    * Input: A Scanner object and a PrintWriter object
    * Process: Hint the user to input the 1st and 2nd integers
    *          Assign the inputs to integer type variables num1 and num2
    *          Prints operation is average, user's original input and the average
    * Output: Prints operation type is average, user's original input and the average
    */
    public static void Average(Scanner input, PrintWriter output){
        int num1, num2;
        System.out.print("Please enter the 1st integer: ");
        num1 = input.nextInt();
        System.out.print("Please enter the 2nd integer: ");
        num2 = input.nextInt();
        output.println("Operation: Average");
        output.println("Number 1: " + num1);
        output.println("Number 2: " + num2);
        output.println("Average: " + (num1 + num2)/2);
    }

    /* method Max()
    * Input: A Scanner object and a PrintWriter object
    * Process: Hint the user to input the 1st and 2nd integers
    *          Assign the inputs to integer type variables num1 and num2
    *          Prints operation is maximum, user's original input and the
    *          greater number of the two
    * Output: Prints operation is maximum, user's original input and the
    *          greater number of the two
    */
    public static void Max(Scanner input, PrintWriter output){
        int num1, num2;
        System.out.print("Please enter the 1st integer: ");
        num1 = input.nextInt();
        System.out.print("Please enter the 2nd integer: ");
        num2 = input.nextInt();
        output.println("Operation: Maximum");
        output.println("Number 1: " + num1);
        output.println("Number 2: " + num2);
        output.println("Max number: " + ((num1 > num2) ? num1 : num2));
    }

    /* method Min()
    * Input: A Scanner object and a PrintWriter object
    * Process: Hint the user to input the 1st and 2nd integers
    *          Assign the inputs to integer type variables num1 and num2
    *          Prints operation is minimum, user's original input and the
    *          smaller number of the two
    * Output: Prints operation is minimum, user's original input and the
    *          smaller number of the two
    */
    public static void Min(Scanner input, PrintWriter output){
        int num1, num2;
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        System.out.print("Please enter the 1st integer: ");
        num1 = input.nextInt();
        System.out.print("Please enter the 2nd integer: ");
        num2 = input.nextInt();
        output.println("Operation: Minimum");
        output.println("Number 1: " + num1);
        output.println("Number 2: " + num2);
        output.println("Min number: " + ((num1 > num2) ? num2 : num1));
    }


    /* method Sqrt()
    * Input: A Scanner object and a PrintWriter object
    * Process: Hint the user to input an integer
    *          Assign the inputs to integer type variable num
    *          Prints operation is Square, user's original input and the Square of num
    * Output: Prints operation is Square, user's original input and the Square of num
    */
    public static void Sqrt(Scanner input, PrintWriter output){
        int num;
        System.out.print("Please enter an integer: ");
        num = input.nextInt();
        output.println("Operation: Square");
        output.println("Number: " + num);
        output.println("Square: " + num * num);
    }
}
```