Ramaiah Institute of Technology
(Autonomous Institute, Affiliated to VTU)
Department of Computer Science & Engineering

Object Oriented Programming Laboratory (CSL37)

Semester:III   **Week #: 02**   **Section:A,B,C**

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Arrays and Control Structures

Create a File *Sales.java that should contain a* Java program that prompts for and reads in the sales for each of 5 salespeople in a company. It should then prints out the id and amount of sales for each salesperson and the total sales. Now modify the program as follows:

1. Compute and print the average sale. (You can compute this directly from the total; no loop is necessary.)

2. Find and print the maximum sale. Print both the id of the salesperson with the max sale and the amount of the sale, e.g., "Salesperson 3 had the highest sale with $4500." Note that you don't need another loop for this; you can do it in the same loop where the values are read and the sum is computed.

3. Do the same for the minimum sale.

4. After the list, sum, average, max and min have been printed, ask the user to enter a value. Then print the id of each salesperson who exceeded that amount, and the amount of their sales. Also print the total number of salespeople whose sales exceeded the value entered.

5. The salespeople are objecting to having an id of 0—no one wants that designation. Modify your program so that the ids run from 1–5 instead of 0–4. Do not modify the array—just make the information for salesperson 1 resides in array location 0, and so on.

6. Instead of always reading in 5 sales amounts, at the beginning ask the user for the number of sales people and then create an array that is just the right size. The program can then proceed as before.

```
// ****************************************************************
// Sales.java
// Reads in and stores sales for each of 5 salespeople. Displays
// sales entered by salesperson id and total sales for all salespeople.
// ****************************************************************
import java.util.Scanner;
public class Sales
{
    public static void main(String[] args)
    {
        final int SALESPEOPLE = 5;
        int[] sales = new int[SALESPEOPLE];
```

```java
        int sum;
        Scanner scan = new Scanner(System.in);
        for (int i=0; i<sales.length; i++)
        {
                System.out.print("Enter sales for salesperson"+i+":");
                sales[i] = scan.nextInt();

        }
        System.out.println("\nSalesperson Sales");
        System.out.println("                            ");
        sum = 0;
        for (int i=0; i<sales.length; i++)
        {
                System.out.println(" " + i + " " + sales[i]);
                sum += sales[i];
        }
        System.out.println("\nTotal sales: " + sum);
    }
```

Grading Quizzes

Write a program that grades arithmetic quizzes as follows:

1. Ask the user how many questions are in the quiz.

2. Ask the user to enter the key (that is, the correct answers). There should be one answer for each question in the quiz, and each answer should be an integer. They can be entered on a single line, e.g., 34 7 13 100 81 3 9 10 321 12 might be the key for a 10-question quiz. You will need to store the key in an array.

3. Ask the user to enter the answers for the quiz to be graded. As for the key, these can be entered on a single line. Again there needs to be one for each question. Note that these answers do not need to be stored; each answer can simply be compared to the key as it is entered.

4. When the user has entered all of the answers to be graded, print the number correct and the percent correct. When this works, add a loop so that the user can grade any number of quizzes with a single key. After the results have been printed for each quiz, ask "Grade another quiz? (y/n)."

Reversing an Array

Write a program that prompts the user for an integer, then asks the user to enter that many values. Store these values in an array and print the array. Then reverse the array elements so that the first element becomes the last element, the second element becomes the second to last element, and so on, with the old last element now first. Do not just reverse the order in which they are printed; actually change the way they are stored in the array. Do not create a second array; just rearrange the elements within the array you have.

(Hint: Swap elements that need to change places.) When the elements have been reversed, print the array again.

1. Write a program in java to illustrate the use of for each loop by searching an element in the unsorted array.

2. Write a program in java to illustrate the use of continue, labeled continue by printing the following output.

   0

   0 1

   0 2 4

   0 3 6

Solution

Program 1

```java
import java.util.Scanner;

public class Sales {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);

        // Constants
        int numSalespeople = 5;

        // Sales array
        double[] sales = new double[numSalespeople];

        // Read in sales for each salesperson
        for (int i = 0; i < numSalespeople; i++) {
            System.out.print("Enter sales for Salesperson " + (i + 1) + ": ");
            sales[i] = scanner.nextDouble();
        }

        // Calculate total sales, average sale, max sale, and min sale
        double totalSales = 0;
        double maxSale = sales[0];
        double minSale = sales[0];

        for (int i = 0; i < numSalespeople; i++) {
            totalSales += sales[i];

            if (sales[i] > maxSale) {
                maxSale = sales[i];
            }

            if (sales[i] < minSale) {
                minSale = sales[i];
            }
        }

        // Calculate average sale
        double averageSale = totalSales / numSalespeople;

        // Print sales information
        System.out.println("\nSales information:");
        for (int i = 0; i < numSalespeople; i++) {
            System.out.println("Salesperson " + (i + 1) + ": $" + sales[i]);
        }

        // Print total, average, max, and min sales
        System.out.println("\nTotal Sales: $" + totalSales);
```

```java
            System.out.println("Average Sale: $" + averageSale);
            System.out.println("Max Sale: Salesperson " + (findSalespersonIndex(sales, maxSale)
    + 1) + " had the highest sale with $" + maxSale);
            System.out.println("Min Sale: Salesperson " + (findSalespersonIndex(sales, minSale)
    + 1) + " had the lowest sale with $" + minSale);

            // Ask the user to enter a value
            System.out.print("\nEnter a value to check exceeded sales: ");
            double enteredValue = scanner.nextDouble();

            // Print salesperson(s) who exceeded the entered value
            int countExceeded = 0;
            System.out.println("\nSalespeople who exceeded $" + enteredValue + ":");
            for (int i = 0; i < numSalespeople; i++) {
               if (sales[i] > enteredValue) {
                  System.out.println("Salesperson " + (i + 1) + ": $" + sales[i]);
                  countExceeded++;
               }
            }

            // Print total number of salespeople whose sales exceeded the value entered
            System.out.println("\nTotal number of salespeople exceeding $" + enteredValue + ": "
    + countExceeded);

            // Close the scanner
            scanner.close();
        }

        // Helper method to find the index of a value in the array
        private static int findSalespersonIndex(double[] array, double value) {
           for (int i = 0; i < array.length; i++) {
              if (array[i] == value) {
                 return i;
              }
           }
           return -1; // Value not found
        }
    }
```

Output :
Enter sales for Salesperson 1: 3000
Enter sales for Salesperson 2: 4500
Enter sales for Salesperson 3: 2000
Enter sales for Salesperson 4: 3500
Enter sales for Salesperson 5: 4000

Sales information:
Salesperson 1: $3000.0
Salesperson 2: $4500.0

Salesperson 3: $2000.0
Salesperson 4: $3500.0
Salesperson 5: $4000.0

Total Sales: $17000.0
Average Sale: $3400.0
Max Sale: Salesperson 2 had the highest sale with $4500.0
Min Sale: Salesperson 3 had the lowest sale with $2000.0

Enter a value to check exceeded sales: 3500

Salespeople who exceeded $3500.0:
Salesperson 2: $4500.0
Salesperson 5: $4000.0

Total number of salespeople exceeding $3500.0: 2

1. **(Part 2 with sales class)**

```java
import java.util.Scanner;

public class Sales {
   public static void main(String[] args) {
      Scanner scan = new Scanner(System.in);

      // Ask the user for the number of salespeople
      System.out.print("Enter the number of salespeople: ");
      int numSalespeople = scan.nextInt();

      // Create an array of the right size
      int[] sales = new int[numSalespeople];

      // Read in sales for each salesperson
      for (int i = 0; i < sales.length; i++) {
         System.out.print("Enter sales for salesperson " + i + ": ");
         sales[i] = scan.nextInt();
      }

      // Display sales entered by salesperson id and total sales
      System.out.println("\nSalesperson Sales");
      System.out.println(" ");
      int sum = 0;
      for (int i = 0; i < sales.length; i++) {
         System.out.println(" " + i + " " + sales[i]);
         sum += sales[i];
      }
      System.out.println("\nTotal sales: " + sum);

      // Close the scanner
      scan.close();
```

```
    }
}
```

Output:

Enter the number of salespeople: 3
Enter sales for salesperson 0: 2000
Enter sales for salesperson 1: 3500
Enter sales for salesperson 2: 4000

Salesperson Sales
 0 2000
 1 3500
 2 4000

Total sales: 9500

Program 2

```java
import java.util.Scanner;

public class QuizGrader {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);

        do {
            // Ask the user how many questions are in the quiz
            System.out.print("Enter the number of questions in the quiz: ");
            int numQuestions = scanner.nextInt();

            // Ask the user to enter the key (correct answers)
            System.out.print("Enter the key (correct answers separated by space): ");
            int[] key = new int[numQuestions];
            for (int i = 0; i < numQuestions; i++) {
                key[i] = scanner.nextInt();
            }

            // Ask the user to enter the answers for the quiz to be graded
            System.out.print("Enter the answers for the quiz (separated by space): ");
            int numCorrect = 0;
            for (int i = 0; i < numQuestions; i++) {
                int userAnswer = scanner.nextInt();
                if (userAnswer == key[i]) {
                    numCorrect++;
                }
            }

            // Print the results
            System.out.println("Number correct: " + numCorrect);
            double percentCorrect = (double) numCorrect / numQuestions * 100;
```

```
            System.out.printf("Percent correct: %.2f%%\n", percentCorrect);

            // Ask the user if they want to grade another quiz
            System.out.print("Grade another quiz? (y/n): ");
        } while (scanner.next().equalsIgnoreCase("y"));

        // Close the scanner
        scanner.close();
    }
}
```

Output:

```
Enter the number of questions in the quiz: 5
Enter the key (correct answers separated by space): 3 7 12 5 9
Enter the answers for the quiz (separated by space): 3 7 11 5 9
Number correct: 4
Percent correct: 80.00%
Grade another quiz? (y/n): y
Enter the number of questions in the quiz: 3
Enter the key (correct answers separated by space): 2 8 4
Enter the answers for the quiz (separated by space): 2 8 4
Number correct: 3
Percent correct: 100.00%
Grade another quiz? (y/n): n
```

Program 3.
3a.

```java
import java.util.Scanner;

public class ReverseArray {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);

        // Prompt the user for an integer
        System.out.print("Enter the number of values: ");
        int size = scanner.nextInt();

        // Create an array to store values
        int[] values = new int[size];

        // Ask the user to enter values
        System.out.println("Enter " + size + " values:");
        for (int i = 0; i < size; i++) {
            values[i] = scanner.nextInt();
        }

        // Print the original array
```

```java
        System.out.println("Original array:");
        printArray(values);

        // Reverse the array elements
        reverseArray(values);

        // Print the reversed array
        System.out.println("Reversed array:");
        printArray(values);

        // Close the scanner
        scanner.close();
    }

    // Method to reverse the array elements
    private static void reverseArray(int[] arr) {
        int start = 0;
        int end = arr.length - 1;

        while (start < end) {
            // Swap elements at start and end indices
            int temp = arr[start];
            arr[start] = arr[end];
            arr[end] = temp;

            // Move indices towards each other
            start++;
            end--;
        }
    }

    // Method to print the array
    private static void printArray(int[] arr) {
        for (int value : arr) {
            System.out.print(value + " ");
        }
        System.out.println();
    }
}
```

output:
Enter the number of values: 5
Enter 5 values:
1 2 3 4 5

Original array:
1 2 3 4 5
Reversed array:
5 4 3 2 1

3b.

```java
import java.util.Scanner;

public class ForEachSearch {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);

        // Prompt the user for the size of the array
        System.out.print("Enter the size of the array: ");
        int size = scanner.nextInt();

        // Create an array to store values
        int[] array = new int[size];

        // Ask the user to enter values
        System.out.println("Enter " + size + " values:");
        for (int i = 0; i < size; i++) {
            array[i] = scanner.nextInt();
        }

        // Prompt the user for the element to search
        System.out.print("Enter the element to search: ");
        int searchElement = scanner.nextInt();

        // Use for-each loop to search for the element
        boolean found = false;
        for (int value : array) {
            if (value == searchElement) {
                found = true;
                break;
            }
        }

        // Print the result
        if (found) {
            System.out.println("Element found in the array.");
        } else {
            System.out.println("Element not found in the array.");
        }

        // Close the scanner
        scanner.close();
    }
}
```

Output :

Enter the size of the array: 6

Enter 6 values:

4 7 2 9 5 1

Enter the element to search: 9

Element found in the array.

3c.

```java
public class LabeledContinueExample {
    public static void main(String[] args) {
        outerLoop:
        for (int i = 0; i < 5; i++) {
            for (int j = 0; j <= i; j++) {
                if (i == 3 && j == 2) {
                    continue outerLoop;
                }
                System.out.print(i * j + " ");
            }
            System.out.println();
        }
    }
}
```

0

0 1

0 2 4

0 3 6