Java Programming
Chapter 5

Array

Arrays

- We use variables to store values.
  - int number =1 ;
  - 2 value
    - int num1 =10, num2=20;
  - if 10 values
    - int num1, num2 ….. num10; ?
  - if 100 values
    - =?

Arrays

- Arrays are used to store multiple values in a single variable, instead of declaring separate variables for each value.
- To declare an array, define the variable type with square brackets [ ] :
  - String[] cars = {"Volvo", "BMW", "Ford", "Mazda"};
- Access the Elements of an Array
  - You can access an array element by referring to the index number.
  - This statement accesses the value of the first element in cars:

```
1 String[] cars = {"Volvo", "BMW", "Ford", "Mazda"};
2 System.out.println(cars[0]);
```

- Change an Array Element
  - cars[0] = "Opel";
- Array Length
  - To find out how many elements an array has, use the length property:

```
1 String[] cars = {"Volvo", "BMW", "Ford", "Mazda"};
2 System.out.println(cars.length);
3 // Outputs 4
```

- The **new** Keyword
  - You can also create an array by specifying its size with new. This makes an empty array with space for a fixed number of elements, which you can fill later:

```
String[] cars = new String[4]; // size is 4

cars[0] = "Volvo";
cars[1] = "BMW";
cars[2] = "Ford";
cars[3] = "Mazda";

System.out.println(cars[0]); // Outputs Volvo
```

- Loop Through an Array
  - You can loop through the array elements with the for loop, and use the length property to specify how many times the loop should run.

  - This example creates an array of strings and then uses a for loop to print each element, one by one:

```
String[] cars = {"Volvo", "BMW", "Ford", "Mazda"};

for (int i = 0; i < cars.length; i++) {
  System.out.println(cars[i]);
}
```

- there is a similar example with numbers. We create an array of integers and use a for loop to print each value:

```java
int[] numbers = {10, 20, 30, 40};

for (int i = 0; i < numbers.length; i++) {
  System.out.println(numbers[i]);
}
```

- let's create a program that calculates the average of different ages:
- code0510.java

```java
public class Main {
  public static void main(String[] args) {
    // An array storing different ages
    int ages[] = {20, 22, 18, 35, 48, 26, 87, 70};

    float avg, sum = 0;

    // Get the length of the array
    int length = ages.length;

    // Loop through the elements of the array
    for (int age : ages) {
      sum += age;
    }

    // Calculate the average by dividing the sum by the length
    avg = sum / length;

    // Print the average
    System.out.println("The average age is: " + avg);
  }
}

```

- we create a program that finds the lowest age among different ages:

```java
public class Main {
  public static void main(String[] args) {
    // An array storing different ages
    int ages[] = {20, 22, 18, 35, 48, 26, 87, 70};

    // Get the length of the array
    int length = ages.length;

    // Create a 'lowest age' variable and assign the first array element of ages to it
    int lowestAge = ages[0];

    // Loop through the elements of the ages array to find the lowest age
    for (int age : ages) {
      // Check if the current age is smaller than the current 'lowest age'
      if (lowestAge > age) {
        // If the smaller age is found, update 'lowest age' with that element
        lowestAge = age;
      }
    }

    // Output the value of the lowest age
    System.out.println("The lowest age in the array is: " + lowestAge);
  }
}
```