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Java Core

Arrays
Loops

IT Academy
04/2016

Agenda

- Arrays
- While
- For
- Break, continue
- Search item in the array
- Sorting
- Practical tasks

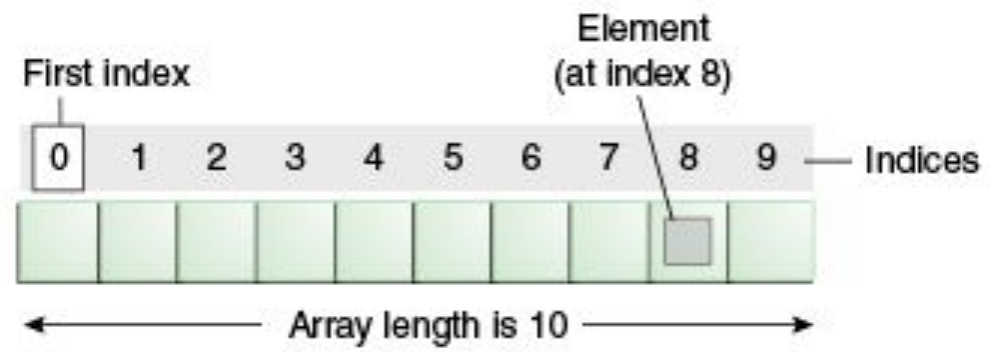
Array

An *array* is a container object that holds a fixed number of values of a single type. The length of an array is established when the array is created. After creation, its length is fixed.

```
String dayWeek[]= new String[7];
String[] month;
month = new String[12];
```

Each item in an array is called an *element*, and each element is accessed by its numerical *index*. As shown in the preceding illustration, numbering begins with 0.

```
dayWeek[0] = “Monday”;
month[11] = “December”;
```



Array

```
int month_days[ ]  = {31, 28, 31, 30, 31, 30,
            31, 31, 30, 31, 30, 31} ;

int month_days[ ]  = new int[12];
month_days[0] = 31;
month_days[1] = 28;
// . . .
month_days[11] = 31;

int n = month_days.length;    // n = 12
System.out.println(month);    //[I@659e0bfd
```

Need override `toString();`
or use `Arrays.toString(month);`

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Array

```
char twod1[ ][ ]= new char[3][4];
char[ ][ ] twod2= new char[3][4];
double m[ ][ ]=  {{0, 1, 2, 3},
    {4, 5, 6, 7},
    {8, 9, 10, 11},
    {12, 13, 14, 15}};
int twoD[ ][ ]= new int [4][ ];
twoD[0]= new int [1];
twoD[1]= new int [2];
twoD[2]= new int [3];
twoD[3]= new int [4];
int[ ][ ] irregular={{1},{2,3,4},{5},{6,7}}; // Rows not equal
```

```
double m[4][4];  // Error;
```

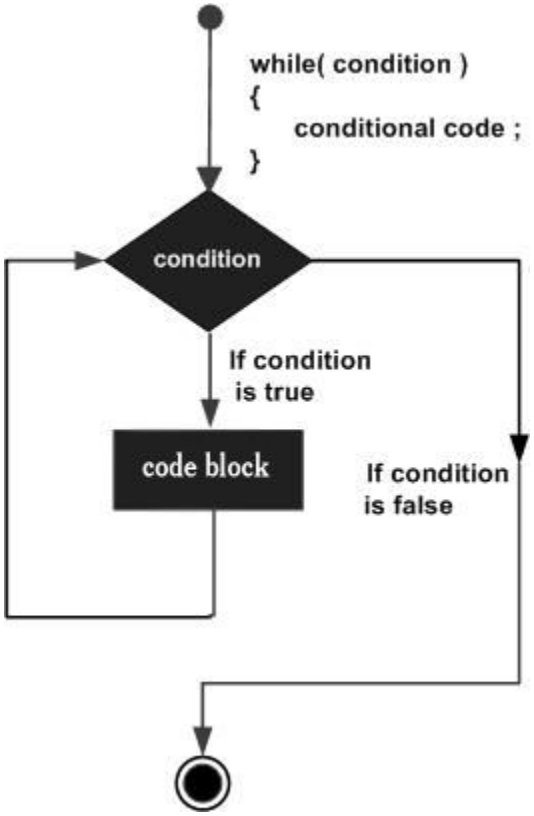
while

A **while** loop statement repeatedly executes a target statement as long as a given condition is true.

```
while (condition){
 statements;
}
```

What will be displayed?

```
int number = 0;
while (number <= 5) {
    System.out.println(number);
    number++;
}
```



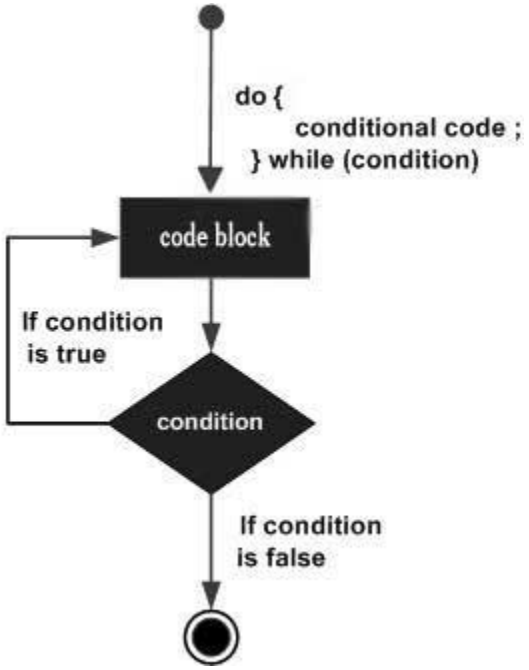
do while

The difference between **do-while** and **while** is that do-while evaluates its expression at the bottom of the loop instead of the top. Therefore, the statements within the do block are always executed at least once

```
do {
 statements;
} while (condition);
```

What will be displayed?

```
int i = 0;
do {
    System.out.print(++i);
} while (i < 5);
```



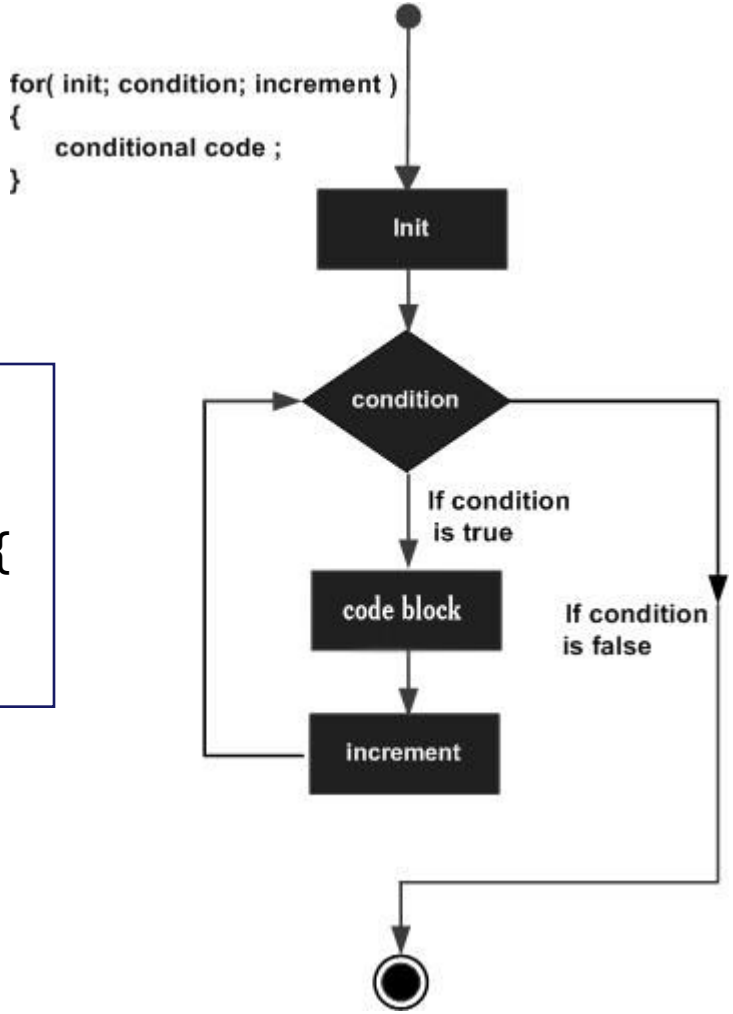
for

The **for** statement provides a compact way to iterate over a range of values.

```
for (init; condition ; increment) {
    statement(s);
}
```

What will be displayed?

```
int[] month = {5, 6, 8, 3, 5, 7, 9};
for(int i = 0; i < month.length; i++){
    System.out.println(month[i]);
}
```



for

Another representation of statement **for**

```
for (type variable : collection) {
    statement(s);
}
```

```
int[] workHours = { 8, 6, 8, 7, 7 };
for (int h = 0; h < workHours.length; h++) {
    System.out.println(workHours[h]);
}
```

or

```
for (int h : workHours) {
    System.out.println(h);
}
```

break

The **break** statement terminates the for, while and do-while loop.

What will be displayed?

```
Scanner sc = new Scanner(System.in);
int n = 0;
for (int i = 0; i < 5; i++) {
    System.out.println("Input number");
    n = Integer.parseInt(sc.nextLine());
    if (n < 0){
        n = i;
        break;
    }
}
System.out.println(n);
sc.close();
```

continue

The **continue** statement skips the current iteration the for, while and do-while loop.

What will be displayed?

```
Scanner sc = new Scanner(System.in);
int sum = 0;
int n;
for (int i = 0; i < 5; i++) {
    System.out.println("Input number");
    n = Integer.parseInt(sc.nextLine());
    if (n < 0){
        n = i;
        continue;
    }
    sum += n;
}
System.out.println(sum);
sc.close();
```

Sum, product, amount

There's an array `int[] arr = {2, -5, 7, -4, 8};`
What will results after running next code?

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

```
int product = 1;
for (int i = 0; i < 5; i++) {
    if (arr[i] > 0) {product = product * arr[i];}}
System.out.println("Product = " + product);
```

```
int amount = 0;
for (int a : arr) {
    if (a > 0 && a <= 7) { amount++; }
}
System.out.println("Amount = " + amount);
```

Minimum, maximum ...

There's an array `int[] arr = {2, -5, 7, -4, 8};`
What will results after running next code?

```
int max = arr[0];
int imax = 0;
int i = 0;
while (i < arr.length) {
    if (arr[i] > max) {
        max = arr[i];
        imax = i;
    }
    i++;
}
System.out.print("Maximum = " + max);
System.out.println(" is in " + (imax + 1) + " place");
```

Sorting

There's an array `int[] arr = {2, -5, 7, -4, 8};`
What will results after running next code?

```
int tmp;
for (int i = 0; i < arr.length - 1; i++) {
    for (int j = i + 1; j < arr.length; j++) {
        if (arr[i] < arr[j]) {
            tmp = arr[i];
            arr[i] = arr[j];
            arr[j] = tmp;
        }
    }
}
for (int i = 0; i < arr.length; i++) {
    System.out.println(arr[i]);
}
```

Practical tasks

1. Create an array of ten integers. Display

- the biggest of these numbers;
- the sum of positive numbers in the array;
- the amount of negative numbers in the array.

What values there are more: negative or positive?

2. Create a class *Employee* with fields *name*, *department number*, *salary*. Create five objects of class *Employee*. Display

- all employees of a certain department (enter department number in the console);
- arrange workers by the field *salary* in descending order.

HomeWork (online course)

- UDEMY course "Java Tutorial for Complete Beginners": https://www.udemy.com/java-tutorial/
- Complete lessons 8, 9, 12, 14 - 16:

8. While Loops

Learn Java Tutorial for Beginners (Video), Part 4: While Loops

9. For Loops

Learn Java Tutorial for Beginners (Video), Part 5: For Loops | Cave of Programming

10. "If"

Learn Java Tutorial for Beginners (Video), Part 6: If | Cave of Programming

11. Getting User Input

Learn Java Tutorial for Beginners (Video), Part 7: Getting User Input

12. Do ... While

Learn Java Tutorial for Beginners (Video), Part 8: Do ... While

13. Switch

Learn Java Tutorial for Beginners (Video), Part 9: Switch

14. Arrays

Learn Java Tutorial for Beginners (Video), Part 10: Arrays

15. Arrays of Strings

Learn Java Tutorial for Beginners (Video), Part 11: Arrays of Strings

16. Multi-Dimensional Arrays

Learn Java Tutorial for Beginners (Video), Part 12: Multi-dimensional Arrays

Homework

1. Ask user to enter the number of month. Read the value and write the amount of days in this month (create array with amount days of each month).
2. Enter 10 integer numbers. Calculate the sum of first 5 elements if they are positive or product of last 5 element in the other case.
3. Enter 5 integer numbers. Find
   - position of second positive number;
   - minimum and its position in the array.
4. Organize entering integers until the first negative number. Count the product of all entered even numbers.
5. Create class *Car* with fields type, year of production and engine capacity. Create and initialize four instances of class Car. Display cars
   - certain model year (enter year in the console);
   - ordered by the field year.

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THE END

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