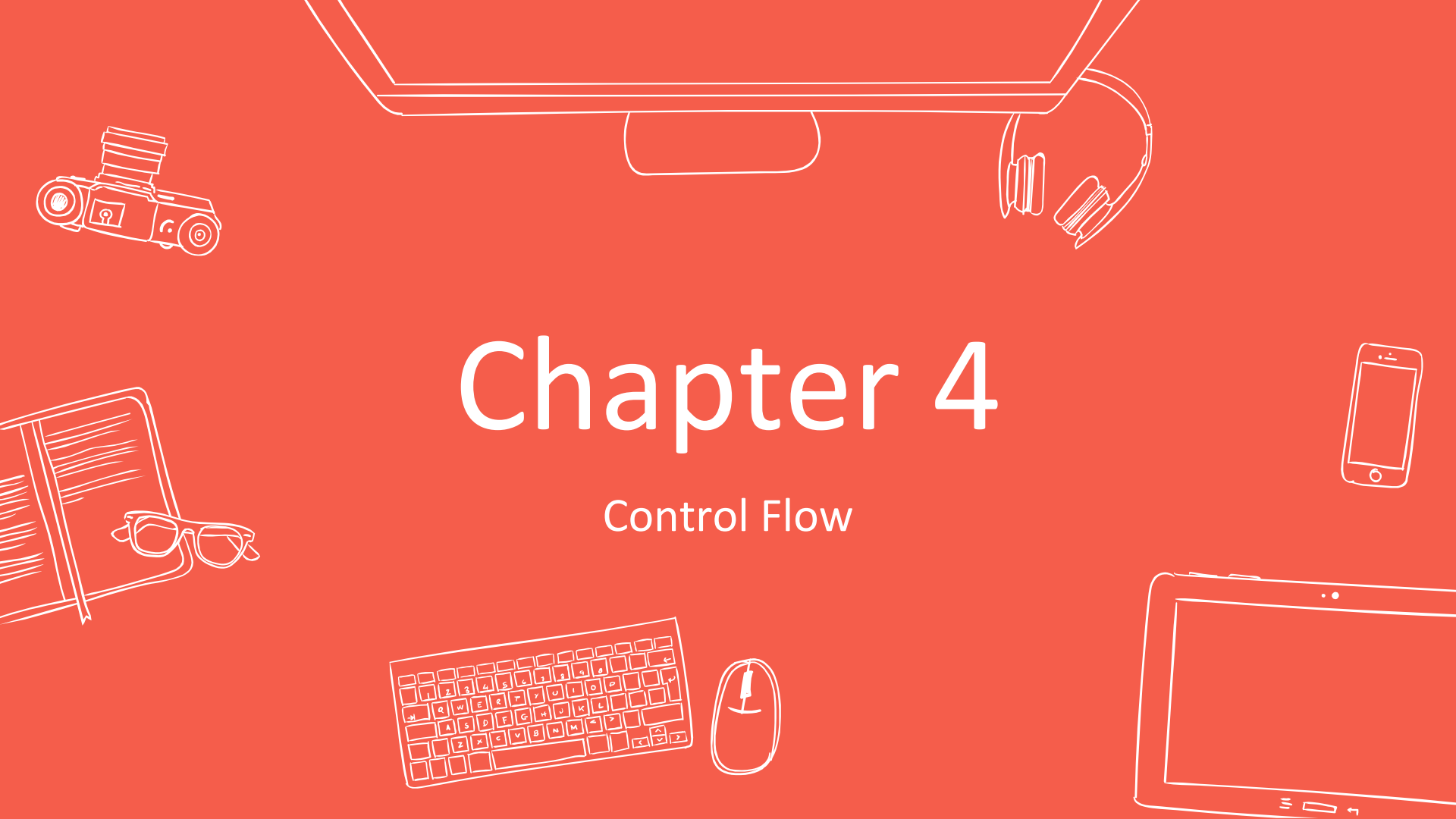


Chapter 4

Control Flow

Expressions

Expressions

Statements

Blocks

Expression

An expression has a value, computed from variables or fields, operators, method calls. An expression can be assigned to a variable, passed as parameter or returned from a method.

E.g.:

```
2*3
num1 > num2
5 + subOfNumber(5,4)
result = 1 + 2
```

Statement

Statement is made up of one or more expressions

These operations are done in statements, which can also be a conditional, a loop, etc. So, an expression is part of a statement.

E.g.:

```
int number1 = 10;
System.out.println(”Value of number1 is : " + number1);
int result = 1 + 2; // result is now 3
calculateInterest ((1000 * 2), tenure, (years * 12));
```

Block

A block is a group of zero or more statements between balanced braces and can be used anywhere a single statement is allowed. The following example, BlockDemo, illustrates the use of blocks:

E.g.:

```
class BlockDemo {
        public static void main(String[] args) {
                boolean condition = true;
                if (condition) { // begin block 1
                        System.out.println("Condition is true.");
                } // end block one
                else { // begin block 2
                        System.out.println("Condition is false.");
                } // end block 2
        }
}
```

Method

Method declaration

We will use this way of method declaration in our assignment

public static <returnType> <methodName> (zero or more parameters){ }

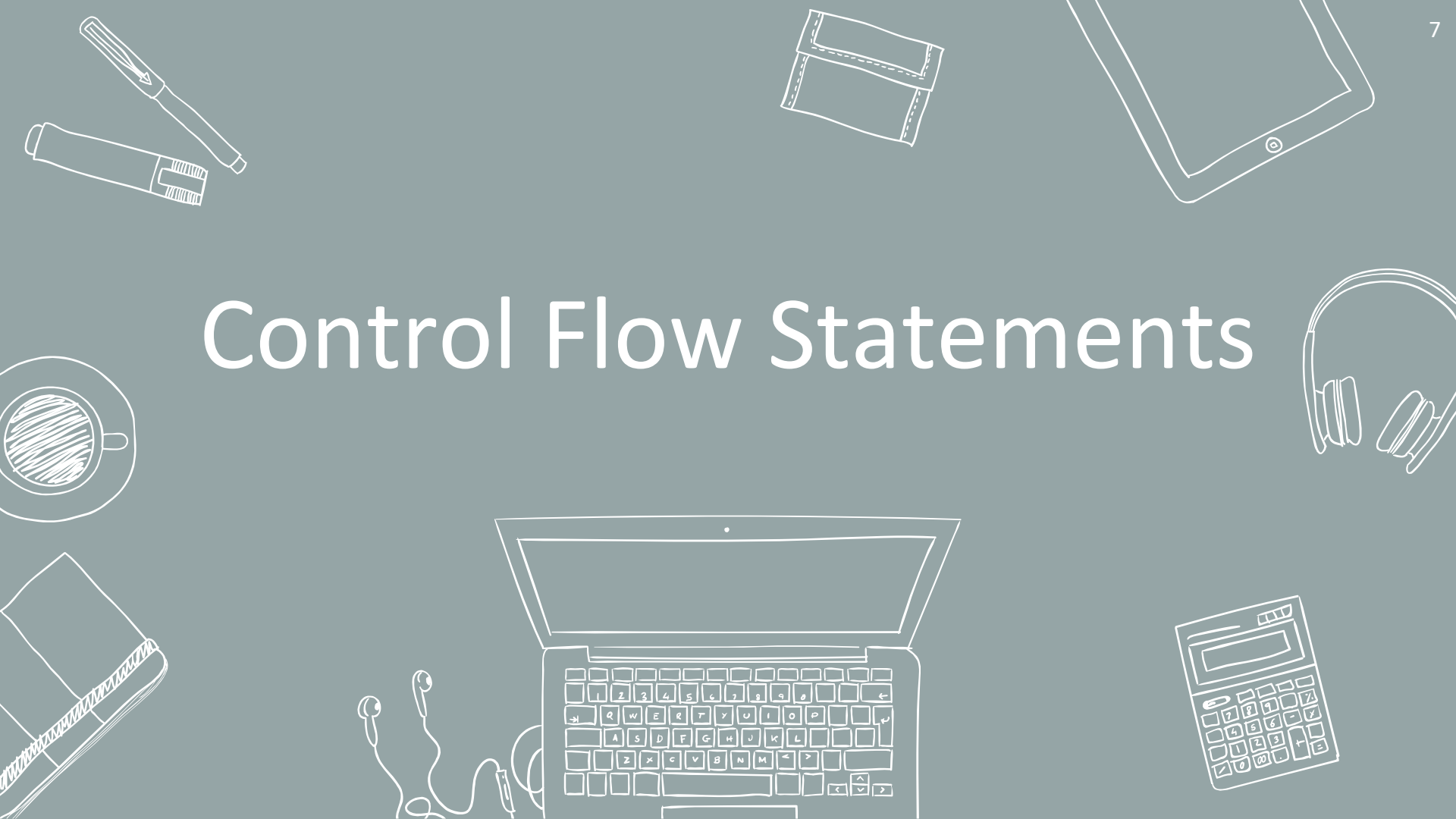
Return type can be void or some data type.

If return type is not void, then method should have return statement to return value.

E.g.

```
public static int add2Numbers (int aNum1, int aNum2) {
        return (aNum1 + aNum2);
}
Public static void printMessage (String aMsg) {
       System.out.println (“Message “ + aMsg);
}
```

Control Flow Statements



Control Flow Statements

The statements inside your source files are generally executed from top to bottom, in the order that they appear. Control flow statements, however, break up the flow of execution by employing decision making, looping, and branching, enabling your program to conditionally execute particular blocks of code.

Decision-making statements

The if-then Statement

The if-then-else Statement

The switch Statement

If-then

If (expression) {

Statements;

}

E.g.

```
int num1 = 9;
if (num1 > 10) {
    System.out.println("Num1 " + num1 + " is greater then 10");
}
```

If-then-else

```
If (expression) {
        Statements;
} else {
        statements
}
E.g.
int num1 = 9;
if (num1 % 2 == 0) {
    System.out.println("Num " + num1 + " is even number");
} else {
    System.out.println("Num " + num1 + " is add number");
}
```

If-then-else ladder

```
If (expression) {
        Statements;
} else if (expression 2) {
        statements
} else {
        Statements
}
```

E.g.

```
if (num1 == 1) {
    System.out.println(”Today is Sunday”);
} else if (num2 == 2) {
    System.out.println(”Today is Monday”);
}
```

Switch Statement

Syntax:

```
switch (expression) {
    case 1:
        statement;
        break;
    case 2:
    case 3:
        statement;
        break;
    default:
         statement;
}
```

```
int day = 1;
String dayName;
switch (month) {
  case 1:
      dayName = "Sunday";
      break;
  case 2:
      dayName = "Monday";
      break;
}
```

Array

Arrays are used to store multiple values in a single variable, instead of declaring separate variables for each value.

Define array

datatype[] variableName;

E.g.

String[] cars;

Array

Initializing Array

cars = new String[10]; OR

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

Note: Once the length of the array is defined, it cannot be changed in the program.

Array

Accessing

- cars[0] = “Nissan”; // Set first element
- cars[1] = “Tesla”; // initialize second element

If the length of an array is n, the first element of the array will be arrayName[0] and the last element will be arrayName[n-1].

Array - Try out

```
int[] numbers = {1,2,3,4};
System.out.println("First element in array " + numbers[0]);
System.out.println("Number of elements in array " + numbers.length);
int arrayLength = numbers.length;
System.out.println("Last element in array " + numbers[arrayLength-1]);
//Try this:
System.out.println("Element at " + arrayLength + " index in array " + numbers[arrayLength]);
```

Thanks!

Any questions?

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