II. Типы, переменные, управляющие инструкции

1. Управляющие инструкции

	Управляющие инструкции включают условные инструкции if, if else, switch циклы for, while, do while и инструкции перехода break, continue, return.

Условные инструкции

Условная инструкция if

```
if (condition)
    true-statement
```

```
if (condition) {
    true-statement1
    true-statement2
    . . .
}
```

Условная инструкция if

```
public class IfDemo {

   public static void main(String[] args) {

      Scanner in = new Scanner(System.in);

      System.out.println("Enter your sales:");
      double yourSales = in.nextDouble();

      System.out.println("Enter your target:");
      double target = in.nextDouble();

      if (yourSales >= target) {

         double bonus = 10 + 0.05 * (yourSales - target);

         System.out.println("Your performance is Satifactory\n"
               + "Your bonus: " + bonus);
      }
   }
}
```

```
Enter your sales:
100
Enter your target:
50
Your performance is Satifactory
Your bonus: 12.5
```

Условная инструкция if else

```
if (condition) statement1 else statement2
```

```
if (condition) {

    statement_sequence1
}
else {

    statement_sequence2
}
```

Условная инструкция if else

```
public class IfElseDemo {

   public static void main(String[] args) {

      Scanner in = new Scanner(System.in);

      System.out.println("Enter your sales:");
      double yourSales = in.nextDouble();

      System.out.println("Enter your target:");
      double target = in.nextDouble();

      String performance;
      double bonus;

      if (yourSales >= target) {
         performance = "Satisfactory";
         bonus = 10 + 0.05 * (yourSales - target);
      } else {
         performance = "Unsatisfactory";
         bonus = 0;
      }
      System.out.println("Your performance is " + performance
            + "\nYour bonus: " + bonus);
   }
}
```

```
Enter your sales:
100
Enter your target:
200
Your performance is Unsatisfactory
Your bonus: 0.0
```

Тернарный оператор if else

```
condition ? expression1 : expression2
```

Тернарный оператор if else

```java
public class TernaryDemo {

   public static void main(String[] args) {

      Scanner in = new Scanner(System.in);

      System.out.println("Enter your sales:");
      double yourSales = in.nextDouble();

      System.out.println("Enter your target:");
      double target = in.nextDouble();

      String performance = yourSales >= target ? "Satisfactory" : "Unsatisfactory";
      double bonus = yourSales >= target ? 10 + 0.05 * (yourSales - target) : 0;

      System.out.println("Your performance is " + performance
            + "\nYour bonus: " + bonus);
   }
}
```

```
Enter your sales:
100
Enter your target:
50
Your performance is Satisfactory
Your bonus: 12.5
```

Инструкция множественного выбора switch

```
switch (expression) {

    case value1:
        statement_sequence1
        break;

    case value2:
        statement_sequence2
        break;
    .
    .
    .
    case valueN:
        statement_sequenceN
        break;

    [default:
        default_statement_sequence]
}
```

Инструкция множественного выбора switch

```
public class SwitchDemo {

   public static void main(String[] args) throws IOException {

      System.out.println("Enter your grade:");
      char grade = (char) System.in.read();

      switch (grade) {
      case 'A':
         System.out.println("Excellent!");
         break;
      case 'B':
         System.out.println("Well done");
         break;
      case 'C':
         System.out.println("You need to improve your grade");
         break;
      default:
         System.out.println("Invalid grade");
      }
      System.out.println("Your grade is " + grade);
   }
}
```

```
Enter your grade:
B
Well done
Your grade is B
```

Циклы

Цикл for

```
for ( initialization ; expression ; update ){

    statement1
    statement2
    . . .
}
```

Цикл for

```
public class ForDemo {

   public static void main(String[] args) {

      Scanner in = new Scanner(System.in);

      System.out.println("Enter the number of years till retirement:");
      int years = in.nextInt();

      System.out.println("Enter your retirement payment:");
      double payment = in.nextDouble();

      System.out.println("Enter interest rate:");
      double interestRate = in.nextDouble();

      double balance = 0;

      for(int y = 0; y < years ; y++) {

         balance += payment;
         double interest = balance * interestRate / 100;
         balance += interest;
         System.out.println("After year " + (y+1) + " your balance is: " + balance);
      }
   }
}
```

Цикл for

```
Enter the number of years till retirement:
10
Enter your retirement payment:
100
Enter interest rate:
10
After year 1 your balance is: 110.0
After year 2 your balance is: 231.0
After year 3 your balance is: 364.1
After year 4 your balance is: 510.51
After year 5 your balance is: 671.561
After year 6 your balance is: 848.7171000000001
After year 7 your balance is: 1043.5888100000002
After year 8 your balance is: 1257.9476910000003
After year 9 your balance is: 1493.7424601000002
After year 10 your balance is: 1753.1167061100002
```

Цикл “for each” или “enhanced for”

```
for ( Type element : collectionOfType ) {

    statement1
    statement2
    . . .
}
```

Цикл “for each” или “enhanced for”

```
public class EnhancedDemo {

   public static void main(String[] args) {

      String[] fruitArray = { "Apple", "Grapes", "Mango", "Orange", "Melon", "Kiwi" };

      for (String a : fruitArray) {

         System.out.println(a);
      }
   }
}
```

```
Apple
Grapes
Mango
Orange
Melon
Kiwi
```

Цикл while

```
while (condition) {

    statement1
    statement2
    . . .
}
```

Цикл while

```
public class WhileDemo {

   public static void main(String[] args) {

      Scanner in = new Scanner(System.in);

      System.out.println("Enter your retirement goal:");
      double goal = in.nextDouble();

      System.out.println("Enter your retirement sallary:");
      double payment = in.nextDouble();

      System.out.println("Enter interest rate:");
      double interestRate = in.nextDouble();

      double balance = 0;
      int years = 0;

      while (balance < goal) {
         balance += payment;
         double interest = balance * interestRate / 100;
         balance += interest;
         System.out.println("Your balance is: " + balance);

         years++;
      }
      System.out.println("Your will be able to retire in " + years + " years\n");
   }
}
```

Цикл while

```
Enter your retirement goal:
1000
Enter your retirement sallary:
100
Enter interest rate:
10
Your balance is: 110.0
Your balance is: 231.0
Your balance is: 364.1
Your balance is: 510.51
Your balance is: 671.561
Your balance is: 848.7171000000001
Your balance is: 1043.5888100000002
Your will be able to retire in 7 years
```

Цикл do while

```
do {
    statement1
    statement2
    . . .
}
while (condition);
```

Цикл do while

```
public class DoWhileDemo {

   public static void main(String[] args) {

      Scanner in = new Scanner(System.in);

      System.out.println("How much money will you contribute every year? ");
      double payment = in.nextDouble();

      System.out.println("Interest rate in %: ");
      double interestRate = in.nextDouble();

      double balance = 0;
      int year = 0;

      String input;

      do {
         balance += payment;
         double interest = balance * interestRate / 100;
         balance += interest;
         year++;
         System.out.printf("After year %d, your balance is %,.2f%n", year, balance);
         System.out.println("Ready to retire? (Y/N) ");
         input = in.next();
      } while (input.equals("N"));
   }
}
```

Цикл do while

```
How much money will you contribute every year?
100
Interest rate in %:
10
After year 1, your balance is 110.00
Ready to retire? (Y/N)
N
After year 2, your balance is 231.00
Ready to retire? (Y/N)
N
After year 3, your balance is 364.10
Ready to retire? (Y/N)
N
After year 4, your balance is 510.51
Ready to retire? (Y/N)
Y
```

Инструкции перехода

Инструкция break

```
{
    statement_sequence1
    ...
    if (condition) {
        statement_sequence2
        break;
    }
    ...
    statement_sequence3
}
```

Инструкция break

```
public class BreakDemo {

   public static void main(String[] args) {

      String[] people = { "Tom", "Alice", "Bob", "John", "Harry", "Don", "Tony", "Carol" };

      for (int i = 0; i < people.length; i++) {

         System.out.println("Checking next person: " + people[i]);

         if (people[i].equals("Don")) {
            System.out.println("Found criminal Don");
            break;
         }

         if (people[i].equals("John")) {
            System.out.println("Found criminal John");
            break;
         }
      }
   }
}
```

```
Checking next person: Tom
Checking next person: Alice
Checking next person: Bob
Checking next person: John
Found criminal John
```

Инструкция continue

```
{
    statement_sequence1
    ...
    if (condition) {
        statement_sequence2
        continue;
    }

    ...
    statement_sequence3
}
```

Инструкция continue

```
public class ContinueDemo {

   public static void main(String[] args) {

      String[] people = { "Tom", "Alice", "Bob", "John", "Harry", "Don", "Tony", "Carol" };

      for (int i = 0; i < people.length; i++) {
         if (people[i].equals("Don")) {
            System.out.println("Found  criminal Don");
            continue;
         }
         if (people[i].equals("John")) {
            System.out.println("Found criminal John");
            continue;
         }
         System.out.println("Hello " + people[i] + " !");
      }
   }
}
```

```
Hello Tom !
Hello Alice !
Hello Bob !
Found criminal John
Hello Harry !
Found  criminal Don
Hello Tony !
Hello Carol !
```

Инструкция return

```
... type method{

    statement_sequence1

    if (condition) {
        statement_sequence2
        return [value];
    }

    statement_sequence3
}
```

Инструкция return

```
public class ReturnDemo {

   public static void main(String[] args) {

      String[] names = { "Tom", "Alice", "Bob", "John", "Alex", "Don", "Carol" };
      System.out.println(foundCriminal(names));
   }

   static String foundCriminal(String[] people) {
      for (int i = 0; i < people.length; i++) {
         if (people[i].equals("Don")) {
            System.out.print("Found criminal ");
            return "Don";
         }
         if (people[i].equals("John")) {
            System.out.print("Found criminal ");
            return "John";
         }
      }
      return "";
   }
}
```

```
Found criminal John
```