



ОНЛАЙН-ОБРАЗОВАНИЕ

17 – Using Loop Constructs (Часть 3)

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Как меня слышно и видно?



Если нет – напишите, если слышите – смайлик в чат.



Цели :

- **Рассмотрим бесконечные циклы**
- **Определим, когда код недоступен**
- **Поупражняемся вдоволь**





Начинаем?

Темы экзамена

- ☐ Java Basics
- ☐ Working with Java Data Types
- ☐ Using Operators and Decision Constructs
- ☐ Creating and Using Arrays
- ☐ **Using Loop Constructs**
- ☐ Working with Methods and Encapsulation
- ☐ Working with Inheritance
- ☐ Handling Exceptions
- ☐ Working with Selected classes from the Java API

Подтемы экзамена

Using Loop Constructs

- Create and use while loops
- Create and use for loops including the enhanced for loop
- Create and use do/while loops
- Compare loop constructs
- Use break and continue



Команда return

Где и как

Form of return statement	In void method/ constructor	In non-void method
return;	Optional	Not allowed
return <i>expression</i> ;	Not allowed	Mandatory, if the method is not terminated explicitly

Реализация

```
public class ReturnDemo {

    public static void main (String[] args) { // (1) void method can use
return.
        if (args.length == 0) return;
        output(checkValue(args.length));
    }

    static void output(int value) { // (2) void method need not use return.
        System.out.println(value);
        return 'a';                // Not OK. Cannot return a value.
    }

    static int checkValue(int i) { // (3) Non-void method: Any return
statement
                                   //      must return a value.

        if (i > 3)
            return i;              // OK.
        else
            return 2.0;            // Not OK. double not assignable to int.
    }

    static int absentMinded() { // (4) Non-void method.
        throw new RuntimeException(); // OK: No return statement provided, but
// method terminates by throwing an
exception.
    }
}
```

Вспоминаем

```
public class FindInMatrix {  
    public static void main(String[] args) {  
        int[][] list = {{1,13},{5,2},{2,2}};  
        int searchValue = 2;  
        int positionX = -1;  
        int positionY = -1;  
  
        PARENT_LOOP: for(int i=0; i<list.length; i++) {  
            for(int j=0; j<list[i].length; j++) {  
                if(list[i][j]==searchValue) {  
                    positionX = i;  
                    positionY = j;  
                    break PARENT_LOOP;  
                }  
            }  
        }  
  
        if(positionX==-1 || positionY==-1) {  
            System.out.println("Value "+searchValue+" not found");  
        } else {  
            System.out.println("Value "+searchValue+" found at: " +  
                "("+positionX+","+positionY+")");  
        }  
    }  
}
```

Value 2 found at: (1,1)

Замена break и меток

```
public class FindInMatrixUsingReturn {
    private static int[] searchForValue(int[][] list, int v) {
        for (int i = 0; i < list.length; i++) {
            for (int j = 0; j < list[i].length; j++) {
                if (list[i][j] == v) {
                    return new int[] {i,j};
                }
            }
        }
        return null;
    }

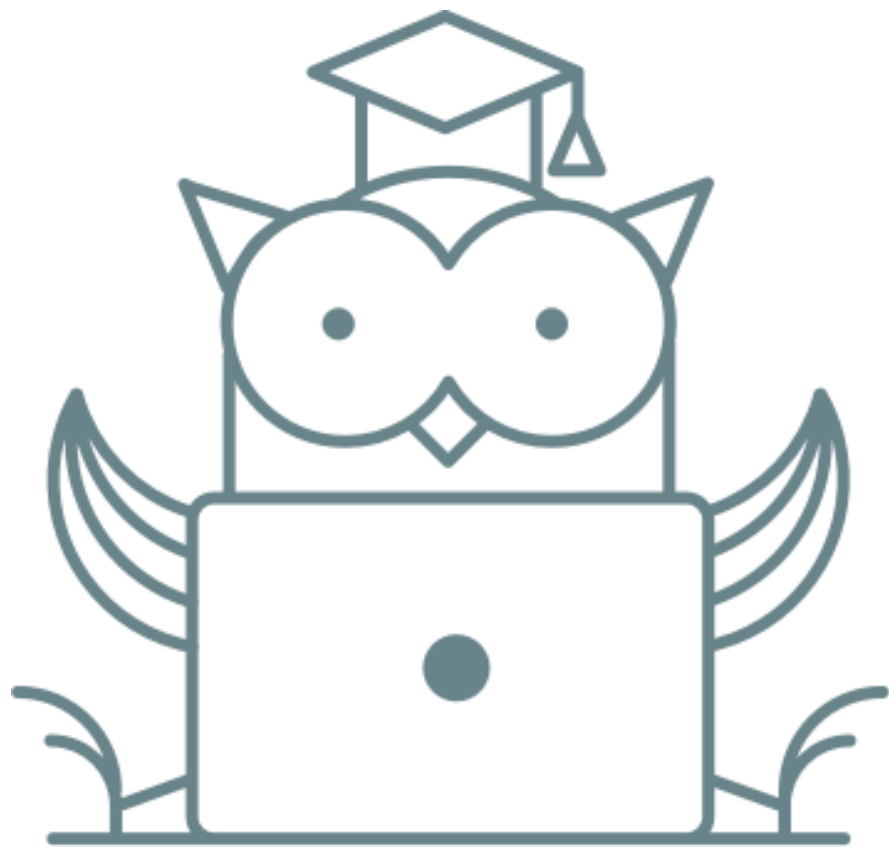
    public static void main(String[] args) {
        int[][] list = { { 1, 13 }, { 5, 2 }, { 2, 2 } };
        int searchValue = 2;
        int[] results = searchForValue(list,searchValue);

        if (results == null) {
            System.out.println("Value " + searchValue + " not found");
        } else {
            System.out.println("Value " + searchValue + " found at: " +
                "(" + results[0] + "," + results[1] + ")");
        }
    }
}
```

Value 2 found at: (1,1)



Вопросы?



Недоступный код

break continue return

```
int checkDate = 0;
while(checkDate<10) {
    checkDate++;
    if(checkDate>100) {
        break;
        checkDate++; // DOES NOT COMPILE
    }
}

int minute = 1;
WATCH: while(minute>2) {
    if(minute++>2) {
        continue WATCH;
        System.out.print(minute); // DOES NOT COMPILE
    }
}

int hour = 2;
switch(hour) {
    case 1: return; hour++; // DOES NOT COMPILE
    case 2:
}
```

Вилка break-continue

```
for (int i = 0; i < 2; i++) {  
    if (i==1) break;  
    else continue;  
    System.out.println("Недоступен");  
}
```


Бесконечный цикл

✓ Чтобы случилась ошибка компиляции, надо чтобы:

- 1) условие цикла было очевидно (константой) на этапе компиляции;
- 2) из цикла не было «запасного выхода».

```
1 class Looping {  
2     public static void main(String[] args) {  
3         for(;;) {}  
4         for(;;) if (args.length > 0) break;    // недоступно  
5         try { for(;;) {} }  
6         catch(Throwable t) { System.out.println("Caught!"); }  
7         finally {}  
8         System.out.println("Out!");  
9     }  
10 }
```

do-while с false

```
do {  
    int x = 1; // Код в фигурных скобках достигим  
}  
while (false);
```

Циклы с false

```
boolean x = false;
do { }
    while (false);                // VALID
// while(false)) { }            // INVALID
// while(!true) { }             // INVALID

while(!(x=true)) { }             // VALID, но цикл не выполняется
// for (int i=0;false;i++){ }   // INVALID
// for (int i=0;!true;i++){ }    // INVALID
for (int i=0;!(x=true);i++){ }   // VALID, но цикл не выполняется
```

Упражнение

```
class Test{  
    public static void main(String[] args) {  
        int i = 0;  
        for(;;) i++;                                // line 1  
        if (i == Integer.MAX_VALUE)                // line 2  
            System.out.println("Done! " + ++i);  
    }  
}
```

What is the result?

- A. Done! 2147483647
- B. Done! -2147483648
- C. Compilation fails on line 1.
- D. Compilation fails on line 2.
- E. Code throws a run-time exception.



Ответ: D

Упражнение

```
List<Integer> myFavoriteNumbers = new ArrayList<>();  
myFavoriteNumbers.add(10);  
myFavoriteNumbers.add(14);  
for (var a : myFavoriteNumbers) {  
    System.out.print(a + ", ");  
    break;  
}  
  
for (int b : myFavoriteNumbers) {  
    continue;  
    System.out.print(b + ", ");  
}  
  
for (Object c : myFavoriteNumbers)  
    System.out.print(c + ", ");
```

- A.** It compiles and runs without issue but does not produce any output.
- B.** 10, 14,
- C.** 10, 10, 14,
- D.** 10, 10, 14, 10, 14,
- E.** Exactly one line of code does not compile.
- F.** Exactly two lines of code do not compile.
- G.** Three or more lines of code do not compile.
- H.** The code contains an infinite loop and does not terminate.



Ответ: Е



Вопросы?



Практикум

Упражнение

```
public static void main(String[] args) {  
    String[] moons = {"Luna", "Phobos", "Deimos"};  
    byte b = 0;  
    do while (b < moons.length)  
        System.out.print(b++);  
    while (b < moons.length);  
}
```

What is the result?

- A. 0
- B. 012
- C. 012012012
- D. Compilation fails



Ответ: В

Упражнение

Assuming `weather` is a well-formed nonempty array, which code snippet, when inserted independently into the blank in the following code, prints all of the elements of `weather`? (Choose all that apply.)

```
private void print(int[] weather) {  
    for(_____) {  
        System.out.println(weather[i]);  
    }  
}
```

- A.** `int i=weather.length; i>0; i--`
- B.** `int i=0; i<=weather.length-1; ++i`
- C.** `var w : weather`
- D.** `int i=weather.length-1; i>=0; i--`
- E.** `int i=0, int j=3; i<weather.length; ++i`
- F.** `int i=0; ++i<10 && i<weather.length;`
- G.** None of the above



Ответ: BD

Упражнение

What distinct numbers are printed when the following method is executed? (Choose all that apply.)

```
private void countAttendees() {  
    int participants = 4, animals = 2, performers = -1;  
  
    while((participants = participants+1) < 10) {}  
    do {} while (animals++ <= 1);  
    for( ; performers<2; performers+=2) {}  
  
    System.out.println(participants);  
    System.out.println(animals);  
    System.out.println(performers);  
}
```

- A.** 6
- B.** 3
- C.** 4
- D.** 5
- E.** 10
- F.** 9
- G.** The code does not compile.
- H.** None of the above



Ответ: ВЕ

Упражнение

```
class Counter {  
    private int i;  
    public void count() {  
        while (i <= 1) {  
            for (int i = 0; i <= 4; ) {  
                System.out.print(i + " ");  
                i++;  
            }  
            i++;  
        }  
    }  
}  
  
public class Caller{  
    public static void main (String args[]) {  
        new Counter().count();  
    }  
}
```

What is the result?

- A. The sequence 0 1 2 3 4 is printed once
- B. The sequence 0 1 2 3 4 is printed twice
- C. The sequence 0 1 2 3 4 5 is printed once
- D. The sequence 0 1 2 3 4 5 is printed twice



Ответ: В

Упражнение

```
public class Java8 {  
    public static void main(String[] args) {  
        String[] starr = {"J", "a", "v", "a", "8"};  
  
        for (int i = 0; i < starr.length; i++) {  
            switch (starr[i]) {  
                case "J": System.out.print("J"); continue;  
                case "a": System.out.print("a"); continue;  
                case "v": System.out.print("v"); continue;  
                case "8": System.out.print("8"); break;  
            }  
        }  
    }  
}
```

What is the output?

- A. Jav8av8v8av88
- B. Jav8Jav8Jav8Jav8Jav8
- C. Java8
- D. Compilation fails



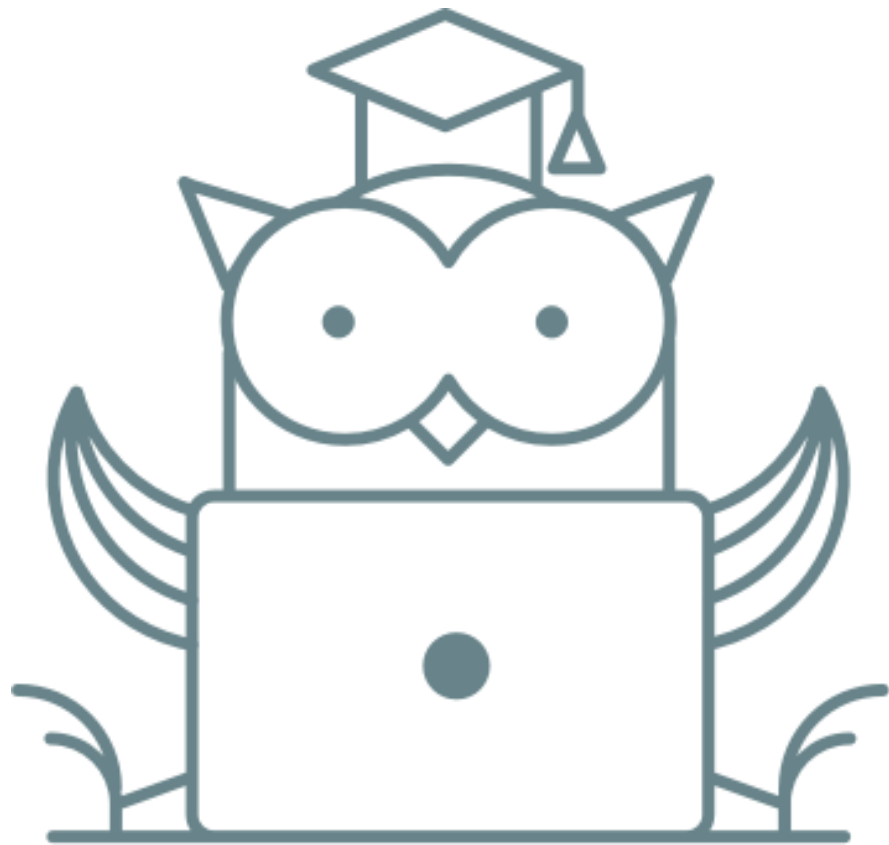
Ответ: С

Упражнение

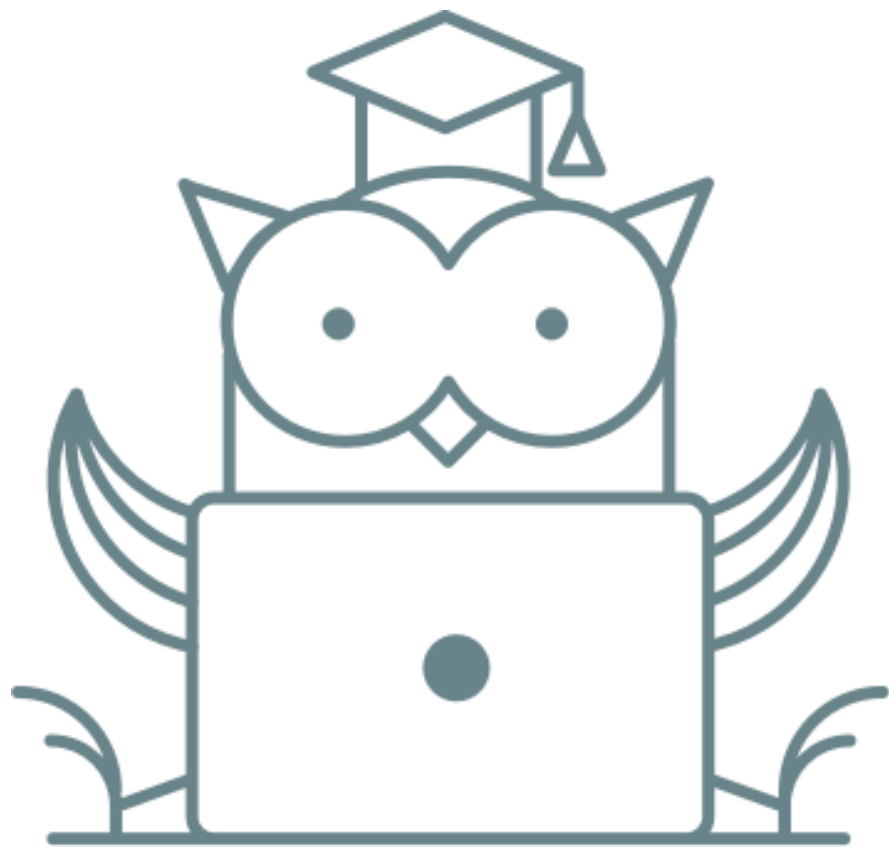
Which statements, when inserted into the following blanks, allow the code to compile and run without entering an infinite loop? (Choose all that apply.)

```
4:  int height = 1;
5:  L1: while(height++ <10) {
6:      long humidity = 12;
7:      L2: do {
8:          if(humidity-- % 12 == 0) _____;
9:          int temperature = 30;
10:         L3: for( ; ; ) {
11:             temperature++;
12:             if(temperature>50) _____;
13:         }
14:     } while (humidity > 4);
15: }
```

- A.** break L2 on line 8; continue L2 on line 12
- B.** continue on line 8; continue on line 12
- C.** break L3 on line 8; break L1 on line 12
- D.** continue L2 on line 8; continue L3 on line 12
- E.** continue L2 on line 8; continue L2 on line 12
- F.** None of the above, as the code contains a compiler error.



Ответ: АЕ



Вопросы?

Домашнее задание

Тест



Пожалуйста, пройдите опрос

<https://otus.ru/polls/17823/>



**Спасибо
за внимание!**

**Только приятных
повторений!**