

Homework Four

A201/A597/I210
Spring Semester 2005

Due in writing at the end of lecture on Feb. 24

Abstract

Answer the questions below, in writing and turn your answers to Adrian, on Thursday, February 24, before or after the lecture. You're encouraged to work in groups and discuss the problems but you need to write the programs and prepare the write-up all by yourself. The Computer Science Department¹ and the School of Informatics² clearly specify the rules of academic honesty and academic integrity, so please read the documents and make sure you understand them and comply with them.

Also posting solutions or major hints on the bulletin board is not allowed. For each of the questions below we need an answer and a justification, explanation, flowchart, whatever works best for you, as to why the answer is what you say it is.

1 The Questions

1. What does the following program's output look like?

```
public class One {
    public static void main(String[] args) {
        int i = 0;
        for (i = 0; i < 10; i++) {
            System.out.println(" " + i);
        }
    }
}
```

- a line of 10 numbers
- a column of 10 numbers
- a line of 9 numbers
- a column of 9 numbers

¹<http://www.cs.indiana.edu/Academics/integrity.html>

²<http://www.informatics.indiana.edu/courses/honesty.asp>

2. What does the following program's output look like?

```
public class Two {
    public static void main(String[] args) {
        int i = 0;
        for (i = 0; i < 10; i++) {
            System.out.print(" " + i);
        }
    }
}
```

- a line of 10 numbers
- a column of 10 numbers
- a line of 9 numbers
- a column of 9 numbers

3. What does the following program's output look like?

```
public class Three {
    public static void main(String[] args) {
        int i = 0;
        int j = 0;
        for (j = 0; j < 4; j++) {
            for (i = 0; i < 10; i++) {
                System.out.print(" " + i);
            }
        }
    }
}
```

- 4 lines of 10 numbers each
- 10 lines of 4 numbers each
- 1 line with 40 numbers on it
- 40 lines of 1 number each

4. What does the following program's output look like?

```
public class Four {
    public static void main(String[] args) {
        int i = 0;
        int j = 0;
        for (j = 0; j < 4; j++) {
            for (i = 0; i < 10; i++) {
                System.out.println(" " + i);
            }
        }
    }
}
```

- 4 lines of 10 numbers each
- 10 lines of 4 numbers each
- 1 line with 40 numbers on it
- 40 lines of 1 number each

5. What does the following program's output look like?

```
public class Five {
    public static void main(String[] args) {
        int i = 0;
        int j = 0;
        for (j = 0; j < 4; j++) {
            for (i = 0; i < 10; i++) {
                System.out.print(" " + i);
            }
            System.out.println();
        }
    }
}
```

- 4 lines of 10 numbers each
- 10 lines of 4 numbers each
- 1 line with 40 numbers on it
- 40 lines of 1 number each

6. What does the following program's output look like?

```
public class Six {
    public static void main(String[] args) {
        int i = 0;
        int j = 0;
        for (j = 0; j < 10; j++) {
            for (i = 0; i < 4; i++) {
                System.out.print(" " + i);
            }
            System.out.println();
        }
    }
}
```

- 4 lines of 10 numbers each
- 10 lines of 4 numbers each
- 1 line with 40 numbers on it
- 40 lines of 1 number each

7. What does the following program's output look like?

```
public class Seven {
    public static void main(String[] args) {
        int i = 0;
        int j = 0;
        for (j = 0; j < 4; j++) {
            for (i = 0; i < 10; i++) {
                System.out.print(" " + j);
            }
            System.out.println();
        }
    }
}
```

- 4 lines of 10 numbers each (which count the columns)
- 10 lines of 4 numbers each (which count the columns)
- 4 lines of 10 numbers each (that count the lines)
- 10 lines of 4 numbers each (that count the lines)

8. What does the following program's output look like?

```
public class Eight {
    public static void main(String[] args) {
        int i = 0;
        int j = 0;
        for (i = 0; i < 4; i++) {
            for (j = 0; j < 10; j++) {
                System.out.print(" " + j);
            }
            System.out.println();
        }
    }
}
```

- 4 lines of 10 numbers each (which count the columns)
- 10 lines of 4 numbers each (which count the columns)
- 4 lines of 10 numbers each (that count the lines)
- 10 lines of 4 numbers each (that count the lines)

9. What does the following program's output look like?

```
public class Nine {
    public static void main(String[] args) {
        int i = 0;
        int j = 0;
        for (i = 0; i < 10; i++) {
            for (j = 0; j < 10; j++) {
                if (i == 0 || j == 0 || i == j) {
                    System.out.print(" " + j);
                } else {
                    System.out.print(" ");
                }
            }
            System.out.println();
        }
    }
}
```

- numbers organized in an "X" sign
- numbers organized in a square (full of numbers)
- numbers in the shape of an arrow
- an empty square whose contour (border) is made out of numbers

10. What does the following program's output look like?

```
public class Ten {
    public static void main(String[] args) {
        int i = 0;
        int j = 0;
        for (i = 0; i < 10; i++) {
            for (j = 0; j < 10; j++) {
                if ((i == j) || (i + j == 10)) {
                    System.out.print(" " + j);
                } else {
                    System.out.print(" ");
                }
            }
            System.out.println();
        }
    }
}
```

- numbers organized in an “X” sign
- numbers organized in a square (full of numbers)
- numbers in the shape of an arrow
- an empty square whose contour (border) is made out of numbers

11. What does the following program's output look like?

```
public class Eleven {
    public static void main(String[] args) {
        int i = 0;
        int j = 0;
        for (i = 0; i < 10; i++) {
            for (j = 0; j < 10; j++) {
                if ((i == j) && (i + j == 10)) {
                    System.out.print(" " + j);
                } else {
                    System.out.print(" ");
                }
            }
            System.out.println();
        }
    }
}
```

- a long line of numbers
- a long column of numbers
- a single number will be printed, the number 5
- numbers organized in a pattern other than those listed above

12. Which one of the for loops presented below is NOT equivalent to this while loop:

```
i = 0;
sum = 0;
while (i < 100) {
    sum += i;
    i += 2;
}
```

Assume that `i` and `sum` have been declared already.

- `for (i = sum = 0; i < 100; sum += i) i += 2;`
- `for (i = sum = 0; i < 100; i += 2) sum += i;`
- `for (i = sum = 0; i < 100; sum += i, i += 2);`
- `for (i = 0, sum = 0; i < 100; i += 2) sum += i;`
- `for (i = sum = 0; (i += 2) < 100 ;) sum += i;`

13. Describe in a few words what the loop above does.

- calculates the sum of all even integers in the interval $[0, 100]$
- calculates the sum of all odd integers in the interval $[0, 100]$
- calculates the sum of all odd integers in the interval $[0, 100)$
- calculates the sum of all even integers in the interval $[0, 100)$
- none of the above, but `i` does take 100 different values

14. Assume two integer variables `n` and `m`. Write a boolean expression that reads like this:

`m` is greater than `n` or `(m + n)` is divisible by 19

Hint: assume `m` has a value of 1 and `n` a value of 1899 for testing.

- `(m > n) || (m + n % 19) == 0`
- `((m > n) || (m + n % 19 == 0))`
- `((m > n) || m + n % 19 == 0)`
- `((m > n) || (m + n) % 19 == 0)`
- none of the above