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CSE110 Lecture Notes

Version 1.0

To Jennifer

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1   Introduction

Authors wishing to code their contribution with LaTeX, as well as those who have already coded with LaTeX, will be provided with a document class that will give the text the desired layout. Authors are requested to adhere strictly to these instructions; *the class file must not be changed.*

The text output area is automatically set within an area of 12.2 cm horizontally and 19.3 cm vertically.

If you are already familiar with LaTeX, then the LLNCS class should not give you any major difficulties. It will change the layout to the required LLNCS style (it will for instance define the layout of `\section`). We had to invent some extra commands, which are not provided by LaTeX (e.g. `\institute`, see also Sect. **??**)

For the main body of the paper (the text) you should use the commands of the standard LaTeX "article" class. Even if you are familiar with those commands, we urge you to read this entire documentation thoroughly. It contains many suggestions on how to use our commands properly; thus your paper will be formatted exactly to LLNCS standard. For the input of the references at the end of your contribution, please follow our instructions given in Sect. **??** References.

The majority of these hints are not specific for LLNCS; they may improve your use of LaTeX in general. Furthermore, the documentation provides suggestions about the proper editing and use of the input files (capitalization, abbreviation etc.) (see Sect. **??** How to Edit Your Input File).

2   Computers

The package consists of the following files:

`history.txt`	the version history of the package
`llncs.cls`	class file for LaTeX
`llncs.dem`	an example showing how to code the text
`llncs.doc`	general instructions (source of this document), `llncs.doc` means *l*atex *doc*umentation for *L*ecture *N*otes in *C*omputer *S*cience
`llncsdoc.pdf`	the documentation of the class (PDF version),
`llncs.doc`	general instructions (source of this document),
`llncsdoc.sty`	class modifications to help for the instructions
`llncs.ind`	an external (faked) author index file
`subjidx.ind`	subject index demo from the Springer book package
`llncs.dvi`	the resultig DVI file (remember to use binary transfer!)
`sprmindx.sty`	supplementary style file for MakeIndex (usage: `makeindex -s sprmindx.sty <yourfile.idx>`)

2.1   Written Exercises

1. What does a compiler do?
2. Consider the following Java Program:

```java
public class VendingMachine {
    public static void main(String[] args) {
        System.out.println("Please insert 25c");
    }
}
```

   By what name would you save this program on your hard disk?
3. Is Java a functional language, procedural language, object-oriented language, or logic language?
4. What is a plain text file?
5. How is a text file different than a .doc file?
6. What is a source program?
7. What is Java bytecode?
8. What is the program that translates Java bytecode instructions into machine-language instructions?
9. Is Java case-sensitive?

2.2   Programming Exercises

3   Data Types

3.1   Written Exercises

1. Give the output of the following program:

```java
public class Example {
    public static void main(String[] args) {
        int y = 2, z = 1;
        z = y * 2;
        System.out.print(y + z);
    }
}
```

2. Consider the following program:

```java
public class Example {
    public static void main(String[] args) {
        String str = new String("Arizona state university");
        char ch1 = str.toLowerCase().toUpperCase().charAt(0);
        char ch2 = str.toUpperCase().charAt(8);
        char ch3 = str.toUpperCase().charAt(str.length() - 1);
        System.out.println("character 1 is: " + ch1);
        System.out.println("character 2 is: " + ch2);
        System.out.println("character 3 is: " + ch3);
    }
}
```

What will be the output?

3. Consider the following program:

```java
public class Example {
    public static void main(String[] args) {
        int num1 = 4, num2 = 5;
        System.out.println("4" + "5");
        System.out.println(num1 + num2);
        System.out.println("num1" + "num2");
        System.out.println(4+5);
    }
}
```

What will be the output?

4. Which of the following invokes the method length() of the object str and stores the result in val of type int?

```java
a)  int val = str.length();
b)  int val = length.str();
c)  int val = length().str;
d)  int val = length(str);
```

5. Evaluate each of the following expressions.

```
String s = "Programming is Fun";
String t = "Workshop is cool";
a) System.out.println(s.charAt(0) + t.substring(3, 4));
b) System.out.println(t.substring(7));
```

6. Evaluate each of the following expressions.

```
int j = 11;
int k = 3;
String s = "Ford Rivers";
a) j / k
b) j % k
c) s.substring(1, 5)
d) s.length()
e) s.charAt(3)
```

7. True or False? The type String is a primitive data type.
8. True or False? The type String is a primitive data type.
9. Write the output of the following program:

```
public class Question {
    public static void main(String[] args) {
        String str = "hello";
        System.out.println("abcdef".substring(1, 3));
        System.out.println("pizza".length());
        System.out.println(str.replace('h', 'm'));
        System.out.println("hamburger".substring(0, 3));
        System.out.println(str.charAt(1));
        System.out.println(str.equals("hello"));
        System.out.println("pizza".toUpperCase());
        System.out.println(Math.pow(2, 4));
        double num4 = Math.sqrt(16);
        System.out.println(num4);
    }
}
```

10. Write the output of the following program:

```
public class Question {
    public static void main(String[] args) {
        String s1 = new String("Clinton, Hillary");
        String s2 = new String("Obama, Barack");
        System.out.println(s1.charAt(2));
        System.out.println(s1.charAt(s1.length() - 1));
        System.out.println(s2.toUpperCase());
        System.out.println(s2.substring(
            s2.indexOf(",") + 2, s2.length()));
```

```
        }
}
```

11. What value is contained in the integer variable length after the following statements are executed?

```
length = 5;
length += 3;
length = length * 2;
```

12. What is the result of 2/4 when evaluated in Java? Why?

3.2   Programming Exercises

1. Write a Java program that asks the user for the radius of a circle and finds the area of the circle.
2. Write a Java program that prompts the user to enter 2 integers. Print the smaller of the 2 integers.

4   Decisions

4.1   Written Exercises

1. What is the output of the following code?

```
int depth = 8;
if (depth >= 8) {
    System.out.print("Danger: ");
    System.out.print("deep water. ");
}
System.out.println("No swimming allowed.");
```

2. What is the output of the following code?

```
int depth = 12;
int temp = 42;
System.out.print("The water is: ");
if (depth >= 8)
    System.out.print("deep ");
if (temp <= 50 && depth <= 12)
    System.out.print("cold ");
System.out.println(" wet.");
```

3. If k holds a value of the type int, then the value of the expression:

```
k <= 10 || k > 10
```

  a) must be true
  b) must be false
  c) could be either true or false
  d) is a value of type int

4. Consider the following code:

```
String str1 = "Java is fun";
String str2 = "Java is fun";
if ( /* */ )
    System.out.println("String1 and String2 are the same");
else
    System.out.println("String1 and String2 are different");
```

Fill in the missing condition to check if str1 and str2 are the same.

5. Evaluate the following expressions, assuming that x = -2 and y = 3.

```
a)  x <= y
b)  (x < 0) || (y < 0)
c)  (x <= y) && (x < 0)
d)  ((x + y) > 0) && !(y > 0)
```

6. Write the output of the following code:

```java
int grade = 45;
if (grade >= 70)
    System.out.println("passing");
if (grade < 70)
    System.out.println("dubious");
if (grade < 60)
    System.out.println("failing");
```

7. Write the output of the following code:

```java
String option = "A";
if (option.equals("A"))
    System.out.println("addRecord");
if (option.compareTo("A") == 0)
    System.out.println("deleteRecord");
```

8. Write the output of the following code:

```java
double x = -1.5;
if (x < -1.0)
    System.out.println("true");
else
    System.out.println("false");
    System.out.println("after if...else");
```

9. Write the output of the following code:

```java
int j = 8;
double x = -1.5;
if (x >= j)
    System.out.println("x is high");
else
    System.out.println("x is low");
```

10. Write the output of the following code:

```java
double x = -1.5;
if (x <= 0.0) {
    if (x < 0.0)
        System.out.println("neg");
    else
        System.out.println("zero");
}
else
    System.out.println("pos");
```

4.2   Programming Exercises

1. Write a program that asks for 3 integers and prints the median value of the three integers.
2. Write code that ensures that an int variable called number is an odd integer.

5   Loops

5.1   Written Exercises

5.2   Programming Exercises

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