



CSE143

Introduction to Computer Programming for IE Lab Sessions

Session 01

Res. Asst. M. Umut İZER

Java

- A popular, object-oriented programming language
- Java Standard Edition (J2SE)
- Java IDEs:
 - NetBeans
 - Eclipse (*)



Java Eclipse

- To add a new project:
 - File->New->Java Project
 - Give a name to the project (i.e. FirstProject)
 - Finish
- Adding a class:
 - Package Explorer->FirstProject (double-click)
 - src (right-click)->New Class
 - Give a name (i.e. FirstProgram)

Java Eclipse

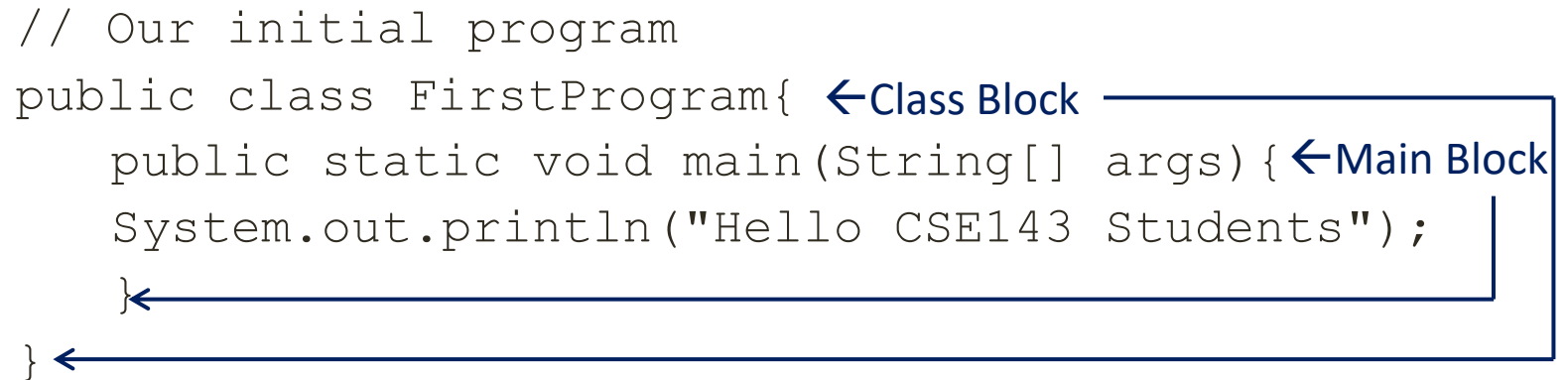
- Double-click on the class to write the following code:

```
public class FirstProgram{  
    public static void main(String[] args) {  
        System.out.println("Hello CSE143 Students");  
    }  
}
```

- Click on the Run button (with play symbol on it) to view the output on the console.

Anatomy of a Java Program

```
// Our initial program
public class FirstProgram{ ←Class Block
    public static void main(String[] args){ ←Main Block
        System.out.println("Hello CSE143 Students");
    }
}
```

A diagram illustrating the structure of a Java program. The code is shown with blue arrows pointing to specific parts. An arrow points from the text '←Class Block' to the opening curly brace of the class definition. Another arrow points from '←Main Block' to the opening curly brace of the main method. A third arrow points from the closing curly brace of the main method back to the closing curly brace of the class definition, indicating the scope of the main block.

- **Class name:** `FirstProgram`
- **Main method:** `public static void main(String[] args) {}`
- **Statement:** `system.out.println("Hello CSE143 Students")`
- **Statement terminator:** `;`
- **Reserved words:** `public, class, static, void`
- **Comments:** `// Our initial program`
- **Blocks:** Class block, main block

Programming Errors

- Syntax Errors:

```
public class SyntaxError{  
    public static void main(String[] args) {  
        System.out.println("Hello CSE143 Students);  
    }  
}
```

or

```
public class SyntaxError{  
    public static void main(String[] args) {  
        System.out.println("Hello CSE143 Students")  
    }  
}
```

Programming Errors

- Runtime Errors:

```
public class RuntimeError{
    public static void main(String[] args){
        System.out.println(0/0);
    }
}
```

- Logic Errors:

```
public class LogicError{
    public static void main(String[] args){
        double S1=4.0;
        double S2=3.0;
        double S3=5.0;
        double S4=1.0;
        double S5=2.0;
        double AverageOf5Numbers;
        double SumOf5Numbers=S1+S2+S3+S4+S5;
        AverageOf5Numbers=SumOf5Numbers/2;
        System.out.println(AverageOf5Numbers);
    }
}
```

Example:

Computing the Area of a Triangle

```
public class AreaOfTriangle{
    public static void main(String[] args){
        double base=20.0;
        double height=110.5;
        double area=(base*height)/2;
        System.out.println("Area of Triangle is:"+area);
    }
}
```

- Execute the code and find the area of the triangle.

Example:

Computing the Area of a Triangle

```
public class AreaOfTriangle{
    public static void main(String[] args){
        double base; ← Allocates memory for the base (double type)
        base=20.0; ← Assign 20 to the base
        double height=110.5; ← Declare and initialize in one step
        double area=(base*height)/2; ← Compute area and assign
        System.out.println("Area of Triangle is:"+area);
        ↑ Print a message to the console
    }
}
```

- Execute the code and find the area of the triangle.
- The area of the triangle is: 1105.0.

Reading Input From the Console

- First, we need to create a scanner object.

```
import java.util.Scanner;
```

- Then, we use the methods `next()`, `nextByte()`, `nextShort()`, `nextInt()`, `nextLong()`, `nextFloat()`, `nextDouble()`, or `nextBoolean()` to obtain to a string, byte, short, int, long, float, double, or boolean value.

```
System.out.print("Enter a double value: ");  
Scanner input = new Scanner(System.in);  
double base = input.nextDouble();
```

Example: Reading a Number from the Console

```
import java.util.Scanner;
public class Demo {
    public static void main(String[] args) {
        Scanner scan = new Scanner(System.in);
        System.out.print("Enter any number: ");

        int num = scan.nextInt();
        // Closing Scanner after the use
        scan.close();

        System.out.println("The number entered by
user:"+num);
    }
}
```

Example: Java Program to Add Two Numbers

```
import java.util.Scanner;
public class AddTwoNumbers2 {
    public static void main(String[] args) {
        int num1, num2, sum;

        Scanner sc = new Scanner(System.in);
        System.out.println("Enter First Number: ");
        num1 = sc.nextInt();

        System.out.println("Enter Second Number: ");
        num2 = sc.nextInt();
        sc.close();
        sum = num1 + num2;
        System.out.println("Sum of these numbers: "+sum);
    }
}
```

Variable Naming Conventions

1. Variables naming cannot contain white spaces, for example: `int num ber = 100;` is invalid because the variable name has space in it.
2. Variable name can begin with special characters such as `$` and `_`
3. As per the java coding standards the variable name should begin with a lower case letter, for example `int number;` For lengthy variables names that has more than one words do it like this: `int smallNumber;` `int bigNumber;` (start the second word with capital letter).
4. Variable names are case sensitive in Java.

Example: Java Program to Multiply Two Numbers

```
import java.util.Scanner;
public class Demo {
    public static void main(String[] args) {

        Scanner scan = new Scanner(System.in);
        System.out.print("Enter first number: ");
        double num1 = scan.nextDouble();

        System.out.print("Enter second number: ");
        double num2 = scan.nextDouble();
        scan.close();
        double product = num1*num2;

        System.out.println("Output: "+product);
    }
}
```

References

- Singh, C. (2013). Introduction to Java Programming.
<https://beginnersbook.com/2013/05/java-introduction/>
- Liang, Y.D. (2011). PowerPoint Lecture Slides for Introduction to Java Programming, 8th Edition, Georgia Southern University.