Intro. to Java Programming

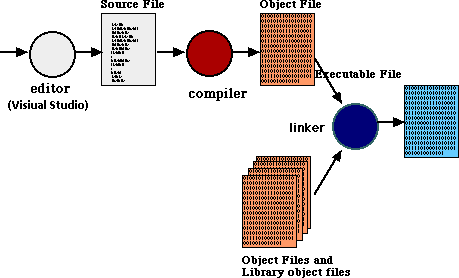
Programming - The process

* Understand the problem and requirements
* Design or select an algorithm to solve it
* Express (code) the algorithm in a programming language (e.g., C, Java)
* Test and debug the program until it works and meets the requirements

Hats I will wear this semester

|  |  |
| --- | --- |
| **You** | **Me** |
|  |  |

Programming - The mechanics



Learning the setup of a program

* the setup is the same for many of your programs
* the setup must be in the SAME order as shown as below

|  |  |
| --- | --- |
| **Setup Example** | |
|  | Place name here  Place what the program is going to be done  Place all imports here  Create class header here  Setup Scanner here  Create main here  \*\*Where most of your code goes!!\*\* |

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| --- | --- |
| **Description of Setup** | |
| Import | Some commands and features require other “packages or libraries” |
| Class | Every program needs a class name, think of it as a program name. The name must be one word. (Or combined with a \_) |
| Main | where most of your code will be placed. Starts from top to bottom. |

Data types

|  |  |
| --- | --- |
| **Type** | **Examples/Definitions** |
| **int** | **int yards = 202;** |
|  | *a WHOLE number, ranging from -2147483647 to 2147483647* |
| **short** | **short coordinate = -12;** |
|  | *a WHOLE number, ranging from -32767 to 32767* |
| **long** | **long debit = 10000000000;** |
|  | *a WHOLE number, ranging from -2^63 to 2^63-1* |
| **float** | **float GPA = 3.99;** |
|  | *a real number in a floating point representation* |
| **double** | **double mole = 1.2336483;** |
|  | *a double-precision real number in a floating point representation* |
| **long double** | **long double weight = 7.7493343658792749;** |
|  | *a extended-precision real number in a floating point representation* |
| **char** | **char choice = 'x';** |
|  | *ONE character, or a small INTEGER in the range from -128 to 127* |
| **boolean** | **bool found = true;** |
|  | *a Boolean value can either AND ONLY be true(1) or false(0)* |
| **String** | **String name = “Mr. Lupoli”; // yes a capital S** |
|  | *Holds a number of character together* |

Input and Output

I/O stream

keyboard

🡨 stream 🡪

Computer

sc.nextDouble( ) System.out.println( )

sc.nextInt( ) System.out.print( )

Printing a Line of Text

|  |
| --- |
| **Print Example** |
| // Mr. Lupoli  // 1st program    public class Hello  {  public static void main(String args[])  {  System.out.print("Hello Class, ");  System.out.println("I am Mr. Lupoli"); // what is the difference between  System.out.println("We will learn JAVA!!"); // println and print??  }  }  Draw a sizeable square on your paper. If it was a monitor what would it look like after the code above completed. |

Use the code above to display YOUR name on line ONE, and your town and state on line TWO

Using System.out.println( ) with variables

int x = 0; // MUST DECLARE ALL VARIABLE BEFORE USING

int y = 8;

|  |  |
| --- | --- |
| **Match the output** | |
| (A) System.out.println(**“**X is: **“** + x + **“** and Y is: **“** + y ); | (1 or 2) |
| (B) System.out.println(**“**X is: + x + and Y is: + y**”** ); | (1 or 2) |

Options:

1. X is + x + and Y is + y
2. X is 0 and Y is 8

literal escape constants/command constants

|  |  |
| --- | --- |
| **JAVA Escape Sequences** | |
| Escape Sequence | Description |
| \t | tab |
| \r | carriage return, go to beg. of next line |
| \\ | backslash |
| \” | double quote |
| \’ | single quote |
| \n | new line |
| \b | back space |
| \f | form feed |

What will these statements below display??

System.out.println(“Hi Class!”);

System.out.println(“Good Luck!!! \n”);

System.out.println(“\t \t You’ll need it!!!”);

Introduction to the Scanner Class

## Thanks to Mike McCoy and Jordan Clark

## How to gather INPUT from the keyboard

## The scanner class is a STANDARDIZED class that uses different methods for READING in values from either the KEYBOARD or a FILE.

## Must import

### java.util.Scanner;

* Must “start” the Scanner (look at setup)

Intro. To Methods in Scanner class

## Just remember to first

## IDENTIFY what exactly you wish to read in (or get from the user!!)

## HOW you want to use it.

### Remember a numeric value CAN be read in as a String!!

## Methods in the class are broken down into two categories

### next() (reads value)

|  |  |
| --- | --- |
| [String](http://java.sun.com/j2se/1.5.0/docs/api/java/lang/String.html) | [next](http://java.sun.com/j2se/1.5.0/docs/api/java/util/Scanner.html#next())()            Finds and returns the next complete token from this scanner. |
| **// to read in a SINGLE char**  **char** letter;  letter = *sc*.next().charAt(0);  String name;  name = sc.next();  **sc.reset(); // use after next since it might look for more** | |
| double | [nextDouble](http://java.sun.com/j2se/1.5.0/docs/api/java/util/Scanner.html#nextDouble())()            Scans the next token of the input as a double. |
| double price;  price = sc.nextDouble(); | |

Proper setup for input

* Remember, the user is probably not smart
* Help them and yourself out

|  |  |
| --- | --- |
| **Setup for input** | |
| Bad | |
| **import** java.util.Scanner;  **public** **class** HelloWorld {  **static** Scanner *sc* = **new** Scanner(System.***in***);    **public** **static** **void** main(String[] args)  {  System.***out***.println("hello all");    **int** integerValue = *sc*.nextInt();    }  } |  |
| Good | |
| **import** java.util.Scanner;  **public** **class** HelloWorld {  **static** Scanner *sc* = **new** Scanner(System.***in***);    **public** **static** **void** main(String[] args)  {  System.***out***.println("hello all");  // tell user what they need to input  System.***out***.println("Please enter an integer value");    // grab input and store in a variable  **int** integerValue = *sc*.nextInt();    // confirm input by displaying variable  System.***out***.println("you entered " + integerValue);    }  } |  |

What is a token??

See if you can figure it out from these examples??

|  |  |
| --- | --- |
|  | Token count |
| Lupoli | 1 |
| 98 | 1 |
| Prof. Lupoli! | 2 |
| 123.012 | 1 |
| Lupoli needs a vacation | 4 |
| ! ! ! | 3 |

Rest of Scanner Methods

|  |  |
| --- | --- |
| float | [nextFloat](http://java.sun.com/j2se/1.5.0/docs/api/java/util/Scanner.html#nextFloat())()            Scans the next token of the input as a float. |
| float amount;  amount = sc.nextFloat(); | |
| int | [nextInt](http://java.sun.com/j2se/1.5.0/docs/api/java/util/Scanner.html#nextInt())()            Scans the next token of the input as an int. |
| **int score;**  **score = sc.nextInt();** | |
| [String](http://java.sun.com/j2se/1.5.0/docs/api/java/lang/String.html) | [nextLine](http://java.sun.com/j2se/1.5.0/docs/api/java/util/Scanner.html#nextLine())()            Advances this scanner past the current line and returns the input that was skipped.  THIS IGNORES SPACES WITHIN A USER INPUT!!!! |
| String entireName;  entireName = sc.nextLine(); | |

Complete the exercise below

|  |
| --- |
| Which Scanner method would you use? |

|  |  |  |
| --- | --- | --- |
|  | Input is of what Datatype? | Scanner method needed |
| Lupoli |  |  |
| 98 |  |  |
| Prof. Lupoli! |  |  |
| 123.012 |  |  |
| Lupoli needs a vacation |  |  |
| ! ! ! |  |  |

REMEMBER WE HAVE NO IDEA WHAT VALUE THE USER WILL ENTER!!!

|  |  |
| --- | --- |
| First Scanner Example | |
| // Prf. Lupoli  // Tests inputs  **import** java.util.Scanner; // must import for Scanner usage  **public** **class** firstScan  {  **static** Scanner sc = **new** Scanner(System.in); // start Scanner    **public** **static** **void** main(String[] args)  {  **int** age = -1; // set a DEFAULT value    System.out.println("How old are you?");  age = sc.nextInt(); // grab value from keyboard (user)    **int** dogAge = age \* 7;    System.out.println("You are " + dogAge + " years old in DOG YEARS");  }  }   1. Identify where the import statement is located 2. Identify where the scanner command is located 3. Identify type of data (float, String, int) is being read in 4. Identify where the output is taking place | |
| **Inputting a Number** | How old are you?  25  You are 175 years old in DOG YEARS |
| **Inputting a Decimal** | How old are you?  5.75  Exception in thread "main" java.util.InputMismatchException  at java.util.Scanner.throwFor(Unknown Source)  at java.util.Scanner.next(Unknown Source)  at java.util.Scanner.nextInt(Unknown Source)  at java.util.Scanner.nextInt(Unknown Source)  at firstScan.main(firstScan.java:12) |
| **Inputting a String** | How old are you?  Emily  Exception in thread "main" java.util.InputMismatchException  at java.util.Scanner.throwFor(Unknown Source)  at java.util.Scanner.next(Unknown Source)  at java.util.Scanner.nextInt(Unknown Source)  at java.util.Scanner.nextInt(Unknown Source)  at firstScan.main(firstScan.java:12) |

Why did entering a decimal (float) or String break the program??

|  |
| --- |
| Input/Output Exercise |
| // First Program - Learning the Setup  **import** java.util.Scanner;  **public** **class** helloWorld  {  **static** Scanner *sc* = **new** Scanner(System.*in*);  **public** **static** **void** main(String[] args)  {    String name, address;    // 1. ) Create the CODE to LITERALLY display YOUR name, and address (No variables yet.)  // 2.) Create the CODE to ask AND ACCEPTS the user’s name and address, USE THE VARIABLES DECLARED FOR // YOU ALREADY!! Hint: Which scanner functions will you need?  // 3.) Create the code to display their name and address that THEY type in. NOT yours!!      }  } |

Use of Comments

|  |  |
| --- | --- |
| **//** | **/\* … code … \*/** |
| // Mr. Lupoli  // Project 1  // 6/22/03  // Period 1  // 🡪 “//”reserves ***REST of line*** for a // comment  // used for ONE line comments  public static void main(String args[])  {  int counterValue;**// sentinel value** | /\*  Mr. Lupoli  Project 1  6/23/03  Period 1  \*/  /\*  “ /\* ” reserves whole block until you end it with a “ \*/ “  used for MULTIPLE lined comments  \*/ |

Why use comments?

* For notes
  + to yourself
  + to me!!
* For commenting out unfinished lines of code
  + skipping unfinished functions
* To understand what the code is doing!!
* watch where you put them!!

Reserved Words

* case sensitive
* can not be used as variable or function names
* ex

**auto break case char**

**const continue default do**

**double else enum extern**

**float for if**

**int long register return**

**short signed sizeof static**

**struct switch typedef union**

**unsigned void volatile while**

Coding Penmanship

* nested blocks
  + used for
    - compound statements
    - iteration (repeating loops of code)
    - conditional (if (x < 10)…)

|  |
| --- |
| **Style and a COMPLETE example w/ Scanner** |
| import java.util.Scanner;  class Example  {  public static void main(String [] args)  {  Scanner sc = new Scanner(System.in);  // variables  char user;  System.out.println(“Will I do my work in Mr. Lupoli’s Class??”);    // have user press “Y” or “N”  user = sc.nextChar(); // reads what user typed    if(user == ‘Y’) // will pass  { System.out.println(“Then I will pass JAVA, and take JAVA AB next year!”); }  // ONE LINE    if(user == ‘N’) // will fail  {  System.out.println(“Then I will not pass Mr. Lupoli’s class.”);  System.out.println(“And my parents will be upset!”);  // TWO LINES OR MORE  }  }  } |