Tender Heart High School, Sector 33 B, Chandigarh

Class IX | Computer Application | 03.07.2024

Topic- Input in Java | Teacher - Prabhdeep Kaur

3 methods to Input
1. By using function argument (Bluej not in java)
2. Input stream reader class
3. Scanner class method [J.C.S.E Syllabus]

What is Scanner class?
Scanner class is also a library class which is available in utility library class package
Scanner class is used in class/program to use all the function

Functions of Scanner class -

Name	Syntax
nextShort()	Short vari = Scannerobj.nextShort();
nextFloat()	Float vari = Scannerobj.nextFloat();
nextLong()	Long vari = Scannerobj.nextLong();
nextDouble()	Double vari = Scannerobj.nextDouble();
nextInt()	String vari = Scannerobject.next();
next() → no space	String vari = Scannerobject.nextLine()
nextLine()	
next().charAt(0)	Char variable = Scannerobject.next().charAt(0)

How to use Scanner class

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

java.util.Scanner: Package | Subpackage | Library class of util pkg.

Date / /

```
import java.util.Scanner;
Class Sample
{
  Public static void main()
  {
    Scanner sc = new Scanner(System.in);
    System.out.println("Enter integer value");
    int i = sc.nextInt();
    System.out.println("Enter double value");
    double d = sc.nextDouble();
    System.out.println("Enter character value");
    char C = sc.nextCharAt(0);
    System.out.println("Enter String");
    Str S = sc.next();
    System.out.println("Enter float value");
    float f = sc.nextFloat();
    System.out.println("Enter String");
    str sr = sc.nextLine();
  }
}
```

Creation of object of class Scanner

object name

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Types of Errors

1. Syntax error / compile time error
   Syntactical
2. Run time Error / Exception
3. Logical Errror

1. Some Rules for having syntax error
   * when we don't follow the rule of language like Capital letter, Semi-colon
   * improper use of braces
   * misspell key words
   * missing Semi Colon
   * not given import Statement
   * omitting the return Statement
   * multiple declaration of same variable
   * mismatch in the datatype

   These type of error come during the execution of Program
2. Some rules for runtime error
   * Array out of bound
   * / by zero
   * Index of Array as -ve

3. Program will run but not giving the desired error the main reson for Logical error is the logic used in program is not correct

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Basics of Java Program

Each prog. is enclosed in the body of class

```
class area          (should be appropriate)
{                   (Access specific)
  public static void main()   (no return type)
  {                 (without creation of object)
```

Program always work of I-P-O

I — Basic Assign

```
    double l = 7.5;
    double b = 3.5;
```

P — Calculation

```
    double ar = l x b;        (works as operator)
```

O — Output

```
    System.out.println("Thearer of rectangle is" +ar);
  }
}
```

Program with input statement

```
import java.util.*;
class area
{
  public static void main()
  {
    Scanner sc = new Scanner(System.in);
    System.out.println("Enter length and breadth of rec");
      double l = sc.nextDouble();
      double b = sc.nextDouble();
      double ar = l x b;
  System.out.println("The area of rectangle is" +ar);
  }
}
```

AnswerKey

Name the following:

1. java.util 2. charAt() 3. java.io 4. nextDouble() 5. nextInt()

Write down the syntax with reference to Java Programming

1
```
InputStreamReader read = new InputStreamReader(System.in);
BufferedReader in = new BufferedReader(read);
int p = Integer.parseInt(in.readLine());
```

2
```
Scanner in = new Scanner(System.in);
float m = in.nextFloat();
```

3
```
InputStreamReader read = new InputStreamReader(System.in);
BufferedReader in = new BufferedReader(read);
char d = (char)in.read();
```

4
```
InputStreamReader read = new InputStreamReader(System.in);
BufferedReader in = new BufferedReader(read);
double n = Double.parseDouble(in.readLine());
```

5
```
InputStreamReader read = new InputStreamReader(System.in);
BufferedReader in = new BufferedReader(read);
String wd = in.readLine();
```

6
```
Scanner in = new Scanner(System.in);
```

Differentiate between the following

1 nextInt( ) and nextFloat( ) methods

nextInt( ): Scans the next token of input as an int

nextFloat( ): Scans the next token of input as a float

2 Syntax and logical errors

Syntax Errors

Syntax Errors occur when we violate the rules of writing the statements of the programming language.

Program fails to compile and execute.

Syntax Errors are caught by the compiler.

Logical Errors

Logical Errors occur due to our mistakes in programming logic.

Program compiles and executes but doesn't give the desired output.

Logic errors need to be found and corrected by the people working on the program.

Answer the following

1. Scanner class is used to get user input. It is present in java.util package.

2. Java provides the following ways to give input in a program:

1. Using Function Argument.
2. Using InputStreamReader class.
3. Using Scanner class.
4. Using Command Line Arguments.

3. import keyword is used to import built-in and user-defined packages into our Java program.

4. In Java, a package is used to group related classes. Packages are of 2 types:

1. Built-In packages — These are provided by Java API
2. User-Defined packages — These are created by the programmers to efficiently structure their code.
   java.util, java.lang are a couple of examples of built-in packages.

5. import keyword is used to import built-in and user-defined packages into our Java program.

```
if (a < b) {

   /*
   * All statements within this set of braces
   * form the compound statement
   */

   System.out.println("a is less than b");a
   = 10;
   b = 20;
   System.out.println("The value of a is " + a);
   System.out.println("The value of b is " + b);

}
```

6. Two or more statements can be grouped together by enclosing them between opening and closing curly braces. Such a group of statements is called a compound statement.

7 **Syntax:** char <variable name> = <Scanner Object>.next().charAt(0);

Example:

```
Scanner in = new Scanner(System.in);
char ch = in.next().charAt(0);
```

8 Errors that occur during the execution of the program primarily due to the state of the program which can only be resolved at runtime are called Run Time errors.
example:

```
import java.util.Scanner;
class RunTimeError
{
   public static void main(String args[]) {
      Scanner in = new Scanner(System.in);
      System.out.print("Enter a number: ");
      int n = in.nextInt();
      int result = 100 / n;
      System.out.println("Result = " + result);
   }
}
```

This program will work fine for all non-zero values of n entered by the user. When the user enters zero, a run-time error will occur as the program is trying to perform an illegal mathematical operation of division by 0. When we are compiling the program, we cannot say if division by 0 error will occur or not. It entirely depends on the state of the program at run-time.

9 Logical errors and Run-Time errors occur during the execution of the program.

10 Distinguish between:
(a) Testing and Debugging
Testing
In the process of Testing, we check if the program is working as expected and find out the errors if it is not giving the expected output.
Debugging
In the process of Debugging, we correct the errors that were found during testing.

(b) Syntax error and Logical error
Syntax Error
Syntax Errors occur when we violate the rules of writing the statements of the programming language.
Program fails to compile and execute.
Syntax Errors are caught by the compiler.
Logical Error
Logical Errors occur due to our mistakes in programming logic.
Program compiles and executes but doesn't give the desired output.
Logical errors need to be found and corrected by people working on the program.

Solutions to Unsolved Java Programs
1

```
import java.util.Scanner;
public class SimplePendulum
{
   public static void main(String args[]) {
      Scanner in = new Scanner(System.in);
      System.out.print("Enter length: ");
      double l = in.nextDouble();
      System.out.print("Enter g: ");
      double g = in.nextDouble();
      double t = 2 * (22.0 / 7.0) * Math.sqrt(l/g);
      System.out.println("T = " + t);
   }}
```

2

```
import java.util.Scanner;
public class Employee
{
   public static void main(String args[]) {
      Scanner in = new Scanner(System.in);
      System.out.print("Enter Basic Pay: ");
      double bp = in.nextDouble();
      double da = 0.3 * bp; double
      hra = 0.15 * bp; double pf =
      0.125 * bp; double gp = bp
      + da + hra;double np = gp -
      pf;
      System.out.println("Gross Pay = " + gp);
      System.out.println("Net Pay = " + np);
   }}
```

3

```
import java.util.Scanner;
public class CameraPrice
{
   public static void main(String args[]) {
      Scanner in = new Scanner(System.in);
      System.out.println("Enter printed price of Digital Camera:");
      double mrp = in.nextDouble();
      double disc = mrp * 10 / 100.0;
```

```
        double price = mrp - disc; double
        gst = price * 6 / 100.0; price +=
        gst;
        System.out.println("Amount to be paid: " + price);
    }
}
```

4

```
import java.util.Scanner;
public class Discounts
{
    public static void main(String args[]) {
        Scanner in = new Scanner(System.in);
        System.out.print("Enter price of article: ");
        double price = in.nextDouble();

        double d1 = price * 30 / 100.0;
        double amt1 = price - d1;
        System.out.println("30% discount = " + d1);
        System.out.println("Amount after 30% discount = " + amt1);

        double d2 = price * 20 / 100.0;
        double amt2 = price - d2; double
        d3 = amt2 * 10 / 100.0;amt2 -=
        d3;
        System.out.println("20% discount = " + d2); System.out.println("10%
        discount = " + d3); System.out.println("Amount after successive
        discounts = " + amt2);
    }}
```

5

```
import java.util.Scanner; public
class CompoundInterest
{
    public static void main(String args[]) {
        Scanner in = new Scanner(System.in);
        System.out.print("Enter sum of money: ");
        double p = in.nextDouble();
        double interest = p * 5 * 1 / 100.0;
        System.out.println("Interest for the first year = " + interest);p
        += interest;
        interest = p * 5 * 1 / 100.0;
        System.out.println("Interest for the second year = " + interest);p
        += interest;
        interest = p * 5 * 1 / 100.0;
        System.out.println("Interest for the third year = " + interest);
    }
}
```

6

```
import java.util.Scanner;
public class Shares
{
    public static void main(String args[]) {
        int sharesHeld = (2000 * 100)/(10 * 10); System.out.println("No.
        of shares held currently = "
            + sharesHeld);
        int sharesRequired = 3000 - sharesHeld;
        System.out.println("No. of shares to purchase = "
            + sharesRequired);
    }}
```

7

```
import java.util.Scanner;
public class TimeConvert
{
   public static void main(String args[]) { Scanner
      in = new Scanner(System.in);
      System.out.print("Enter time in seconds: ");
      long secs = in.nextLong();
      long hrs = secs / 3600;
      secs %= 3600;
      long mins = secs / 60;
      secs %= 60;
      System.out.println(hrs + " Hours " + mins
         + " Minutes " + secs + " Seconds");
   }}
```

8

```
import java.util.Scanner;
public class NumberSwap
{
   public static void main(String args[]) {
      Scanner in = new Scanner(System.in);
      System.out.println("Enter two unequal numbers");
      System.out.print("Enter first number: ");
      int  a =  in.nextInt(); System.out.print("Enter
      second number: ");int b = in.nextInt();
      a = a + b;b
      = a - b;
      a = a - b;
      System.out.println("a = " + a + " b = " + b);
   }}
```

9

```
import java.util.Scanner; public
class InterestDifference
{
   public static void main(String args[]) {
      Scanner in = new Scanner(System.in);
      System.out.print("Enter Amount: ");
      double p = in.nextDouble();
      double si = p * 10 * 3 / 100;
      double ciAmt = p * Math.pow(1 + (10/100.0), 3);
      double ci = ciAmt - p;
      System.out.print("Difference between CI & SI: " + (ci - si));
   }}
```

10

```
import java.util.Scanner;
public class Shopkeeper
{
   public static void main(String args[]) { Scanner
      in = new Scanner(System.in);
      System.out.print("Enter the selling price: ");
      double sp = in.nextDouble();
      double cp1 = (sp / (1 + (20 / 100.0)));
      double cp2 = (sp / (1 - (20 / 100.0)));
      double totalCP = cp1 + cp2;
      System.out.println("Total Cost Price = " + totalCP);
   }}
```