

COMSATS UNIVERSITY, ISLAMABAD



## **Programming Fundamentals**

--CSC103--

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**Section:** B

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1. Make a program that generates random numbers from 0 to 1000. Use class `java.util.Random` or `java.util.Math` for random number generation.

```
package com.company;

import java.util.Random;

class randomNumber {

    public static void main(String args[]) {

        Random randNumber = new Random();
        int randomNumber = randNumber.nextInt(1001);
        System.out.print(randomNumber);

    }

}
```

2. Calculate area of circle. Input radius from user. Define PI (3.14) as constant in your program. Display your answer in console.

```
package com.company;

import java.util.Scanner;

public class circleArea {
    public static void main (String args[]){
        Scanner scanner = new Scanner(System.in);
        System.out.print("Enter radius:");
        int radius = scanner.nextInt();
        final float pi = 3.14f;
        System.out.print("\nArea of circle is: " + pi*radius*radius);

    }

}
```

3. Do above task but display your answer in a dialog box.

```
package com.company;

import javax.swing.*;

public class dialogBoxCircleArea {
    public static void main (String args[]){
        final float pi = 3.14f;
```

```

        int radius = Integer.parseInt(JOptionPane.showInputDialog("Enter
Radius of circle"));
        JOptionPane.showMessageDialog(null , "Area of Circle is: "+
pi*radius*radius);
    }
}

```

4. Write a program that uses all methods for Scanner objects (listed in Table 2.1 of your book). Display the values on screen.

```

package com.company;

import java.util.Scanner;

public class methodsOfScannerObjects {
    public static void main (String args[]){
        Scanner scan = new Scanner(System.in);
        System.out.print("Enter Byte number: ");
        Byte numByte = scan.nextByte();
        System.out.print("\nEnter Short number: ");
        Short numShort = scan.nextShort();
        System.out.print("\nEnter Int number: ");
        int numInt = scan.nextInt();
        System.out.print("\nEnter Long number: ");
        long numLong = scan.nextLong();
        System.out.print("\nEnter float number: ");
        float numFloat = scan.nextFloat();
        System.out.print("\nEnter Double number: ");
        double numDouble = scan.nextDouble();

    }
}

```

5. Input three fractional numbers. Calculate their average. Display result in a dialog box.

```

package com.company;

import javax.swing.*;

public class DialogBoxThreeNumbersAverage {
    public static void main (String args[]){
        String firstFraction = JOptionPane.showInputDialog("Enter First
Fraction:");
        int numerator;
        int denominator;
        String[] fractionPart_1 = firstFraction.split("/");
    }
}

```

```

        numerator = Integer.parseInt(fractionPart_1[0]);
        denominator = Integer.parseInt(fractionPart_1[1]);
        float firstNumberInFloat = numerator / denominator;
        String secondFraction = JOptionPane.showInputDialog("Enter Second
Fraction:");
        String[] fractionPart_2 = secondFraction.split("/");
        numerator = Integer.parseInt(fractionPart_2[0]);
        denominator = Integer.parseInt(fractionPart_2[1]);
        float secondNumberInFloat = numerator / denominator;
        String thirdFraction = JOptionPane.showInputDialog("Enter Third
Fraction:");
        String[] fractionPart_3 = thirdFraction.split("/");
        numerator = Integer.parseInt(fractionPart_3[0]);
        denominator = Integer.parseInt(fractionPart_3[1]);
        float thirdNumberInFloat = numerator / denominator;
        JOptionPane.showMessageDialog(null,"Average of three fractional
numbers is " + (firstNumberInFloat + secondNumberInFloat +
thirdNumberInFloat)/3);
    }
}

```

6.Input three whole numbers (integers). Calculate their average.  
Your result should be a decimal value.

```

package com.company;

import java.util.Scanner;

public class wholeNumbersAverage {
    public static void main(String args[]){
        Scanner scan = new Scanner(System.in);
        System.out.print("Enter The first Whole Number: ");
        int firstWholeNumber = scan.nextInt();
        System.out.print("Enter The second Whole Number: ");
        int secondWholeNumber = scan.nextInt();
        System.out.print("Enter The third Whole Number: ");
        int thirdWholeNumber = scan.nextInt();
        int sum = firstWholeNumber + secondWholeNumber + thirdWholeNumber;
        float average = (float) sum/3;
        System.out.printf("Average of three whole numbers is: " + average);
    }
}

```

7.Input two numbers. Perform all arithmetic operations on them.  
Display results.

```

package com.company;

```

```

import java.util.Scanner;
import java.util.SortedMap;

public class arithmeticOperations {
    public static void main(String args[]){
        Scanner scan = new Scanner(System.in);
        System.out.print("Enter First number: ");
        int firstNumber = scan.nextInt();
        System.out.print("Enter Second number: ");
        int secondNumber = scan.nextInt();

        //Addition

        System.out.print("\nSum: " + (firstNumber + secondNumber));

        //Subtraction

        System.out.print("\nSubtraction: " + (firstNumber-secondNumber));

        // Multiplication

        System.out.print("\nMutltiplication: " + (firstNumber *
secondNumber));

        // Division

        System.out.print("\nDivision: " + ((float) firstNumber /
secondNumber));

        //Modulus

        System.out.print("\nReminder: " + (firstNumber % secondNumber));

    }
}

```

8.Input number of seconds. Convert them  
into:•Minutes•Hours•Days•Months•Years

```

package com.company;

import java.util.Scanner;

public class secondsConversion {
    public static void main(String args[]){
        Scanner scan = new Scanner(System.in);
        System.out.print("Enter Seconds for conversion: ");
        long seconds = scan.nextLong();
        System.out.print("\nSeconds In Minutes: " + ((float) seconds / 60 ));
        System.out.printf("\nSeconds In Hours: " + ((float) seconds / 3600
));
    }
}

```

```

        System.out.printf("\nSeconds In Days: " + ((float) seconds / 86400
));
        System.out.printf("\nSecond In Months: " + ((float) seconds / 2592000
));
        System.out.printf("\nSecond In Years: "+ ((float) seconds / 31104000
));
    }
}

```

9.Input number of years. Convert them  
into:•Months•Days•Hours•Minutes•Seconds

```

package com.company;

import java.util.Scanner;

public class yearConversion {
    public static void main(String args[]){

        Scanner scan = new Scanner(System.in);
        System.out.print("Enter Seconds for conversion: ");
        float years = scan.nextFloat();
        System.out.printf("\nYears In Months: " + ( years * 12 ));
        System.out.printf("\nYears In Days: " + ( years * 360 ));
        System.out.printf("\nYears In Hours: " + ( years / 86400 ));
        System.out.printf("\nYears In Minutes: " + ( years / 5184000 ));
        System.out.printf("\nYears In Seconds: " + ( years / 31104000 ));

    }
}

```

10.Input a five-digit whole number from user. Calculate sum of its  
digits. Display the result.

```

package com.company;

import java.util.Scanner;

public class fiveDigitAddition {
    public static void main(String args[]){
        Scanner scan = new Scanner(System.in);
        System.out.print("Enter 5 Digit Number only: ");
        int number = scan.nextInt();
        int remainder;
        int sum;
        remainder = number % 10;        // Gets the Last digit
        sum = remainder;                // Sum the last digit in Sum variable
        number = number / 10;           // Delete the Last digit
    }
}

```

```

        reminder = number % 10;
        sum = sum + reminder;
        number = number / 10;
        reminder = number % 10;
        sum = sum + reminder;
        number = number / 10;
        reminder = number % 10;
        sum = sum + reminder;
        number = number / 10;
        reminder = number % 10;
        sum = sum + reminder;
        number = number / 10;
        sum = sum + number;
        System.out.print("Sum of digits of 5 numbers is: " + sum);
    }
}

```

11. Input a five-digit amount of money. Determine different number of notes required for that amount.

```

package com.company;

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

public class numberOfNotes {
    public static void main(String args[]){
        Scanner scan = new Scanner(System.in);
        int amount, num_5000, num_1000, num_500 , num_100 , num_50 , num_10
, num_5 , num_1;
        System.out.println("Enter total amount of 5 digits only");
        amount = scan.nextInt();
        num_5000 = amount/5000;
        int temp = amount - (num_5000 * 5000) ;
        System.out.println("Number of 5000 notes: " + num_5000);
        if (temp >= 1000){
            num_1000 = temp/1000;
            temp = temp - (num_1000 * 1000 );
            System.out.println("Number of 1000 notes: " + num_1000);
        }
        if (temp >= 500){
            num_500 = temp/500;
            temp = temp - (num_500 * 500) ;
            System.out.println("Number of 500 notes: " + num_500);
        }
        if (temp >= 100){
            num_100 = temp/100;
            temp = temp - (num_100 * 100);
        }
    }
}

```

```

        System.out.println("Number of 100 notes: " + num_100);
    }
    if (temp >= 50){
        num_50 = temp/50;
        temp = temp - (num_50 * 50);
        System.out.println("Number of 50 notes: " + num_50);
    }
    if (temp >= 10){
        num_10 = temp/10;
        temp = temp - (num_10 * 10);
        System.out.println("Number of 10 notes: " + num_10);
    }
    if (temp >= 5){
        num_5 = temp/5;
        temp = temp - (num_5 * 5);
        System.out.println("Number of 5 notes: " + num_5);
    }
    if (temp >= 1){
        num_1 = temp;
        System.out.println("Number of 1 notes: " + num_1);
    }
}
}

```

12. Explore Math class in Java. Use its various functions (such as min(), max(), avg(), sin(), cos(), round(), etc.) in your program.

```

package task1;
import java.util.*;

public class Task1 {

    public static void main(String[] args) {

        Scanner scan = new Scanner(System.in);
        System.out.println("Enter your numbers: ");
        int number = scan.nextInt();
        System.out.println("Enter 1 to sin() "
            + "\nEnter 2 to cos() "
            + "\nEnter 3 to tan() "
            + "\nEnter 4 to sqr() "
            + "\nEnter 5 to sqrt() "
            + "\nEnter 6 to ln() "
            + "\nEnter 7 to log() "
            + "\nEnter 8 to cube() "
            + "\nEnter 9 to abs() "
            + "\nEnter 10 to find x^-1");
        int choice = scan.nextInt();
    }
}

```



```

        switch (choice) {
            case 1:
                System.out.println("Sin of the number is :"+Math.sin(number));
                break;
            case 2:
                System.out.println("cos of the number is :"+Math.cos(number));
                break;
            case 3:
                System.out.println("tan of the number is :"+Math.tan(number));
                break;
            case 4:
                System.out.println("sqr of the number is :"+Math.pow(number,number));
                break;
            case 5:
                System.out.println("sqrt of the number is :"+Math.sqrt(number));
                break;
            case 6:
                System.out.println("ln of the number is :"+Math.log10(number));
                break;
            case 7:
                System.out.println("log of the number is :"+Math.log(number));
                break;
            case 8:
                System.out.println("cube of the number is :"+Math.pow(number,3));
                break;
            case 9:
                System.out.println("abs of the number is :"+Math.abs(number));
                break;
            case 10:
                System.out.println("x^-1 of the number is :"+Math.pow(number,-1));
                break;
        }
    }
}

```

13. Write a program that would determine the name of 100th day if today is Thursday.

Using Decision Structure:

```
package com.company;
```

```

import java.time.DayOfWeek;
import java.util.Scanner;

public class day_100 {
    public static void main(String args[]){
        Scanner scan = new Scanner(System.in);
        System.out.println(" Enter Current day: 1Mon 2Tue 3wed 4thurs 5fri
6sat 7sun");
        int day = scan.nextInt();
        DayOfWeek weekday = DayOfWeek.of(day);

        if (day == 7) {
            day = 2;
            DayOfWeek day_100 = DayOfWeek.of(day);
            System.out.println("Day after 100th day of " + weekday + " is "+
day_100);
        }
        else if (day == 6){
            day = 1;
            DayOfWeek day_100 = DayOfWeek.of(day);
            System.out.println("Day after 100th day of " + weekday + " is "+
day_100);
        }
        else if (day >=1 && day<=5) {
            day = day;
            DayOfWeek day_100 = DayOfWeek.of(day + 2);
            System.out.println("Day after 100th day of " + weekday + " is "+
day_100);
        }
        else
            System.out.println("Invalid day input");

    }
}

```

## Using Loops:

```

package com.company;

import java.time.DayOfWeek;
import java.util.Scanner;

public class day_100 {
    public static void main(String args[]){

```

```

        Scanner scan = new Scanner(System.in);
        System.out.println(" Enter Current day: 1Mon 2Tue 3wed 4thurs 5fri
6sat 7sun");
        int day = scan.nextInt();
        int req_day = day;
        for (int i = 1; i<=100 ; i++){
            req_day = req_day + 1;
            if (req_day >= 8){
                req_day = 1;
            }

        }

        DayOfWeek week_day = DayOfWeek.of(req_day);
        System.out.println("Day after 100th day of " + DayOfWeek.of(day) + "
is "+ week_day);
    }
}

```

14. Make a program that takes in temperature value in Fahrenheit and converts it into Celsius value.

```

package com.company;

import java.util.Scanner;

public class FtoC {
    public static void main (String args[]){
        Scanner scan = new Scanner(System.in);
        System.out.println("Enter temperature in fahrenheit°: ");
        float tempF = scan.nextFloat();
        float tempCel = (tempF - 32) * 5/9;
        System.out.println(tempF + "° Fahrenheit to Celsius is " + tempCel
+"°");
    }
}

```

15. Redo the above task, but convert Celsius value into Fahrenheit.

```

package com.company;

```

```
import java.util.Scanner;

public class CtoF {
    public static void main (String args[]){
        Scanner scan = new Scanner(System.in);
        System.out.println("Enter temperature in Celsius°: ");
        float tempCel = scan.nextFloat();
        float tempF = (tempCel * 9/5) + 32;
        System.out.println(tempCel + "° Celsius to Fahrenheit is " + tempF +
"°");
    }
}
```

16. Write a program to solve the given expression:

```
package com.company;

import java.util.Scanner;

public class solveExpression {
    public static void main (String args[]){
        Scanner scan = new Scanner(System.in);
        int a,b,c,d,r;
        System.out.println("Enter values of a,b,c,d and r to solve the
equation:");
        a = scan.nextInt();
        b = scan.nextInt();
        c = scan.nextInt();
        d = scan.nextInt();
        r = scan.nextInt();
        float sol;
        sol = (float) 4 / (3 * (r + 34)) - 9 * (a + b * c) + (3 + d * (2 +
a)) / (a + (b * d));
        System.out.println("Solution of the expression is: " + sol);
    }
}
```

17. You can use `System.currentTimeMillis()` to know the number of milliseconds in current time. Use this value to obtain current second, minute, and hour. Please refer to page 51 of the book for help.

```
package com.company;

public class currentTimeMili {
    public static void main (String args[]){
        long miliSec = System.currentTimeMillis();
        System.out.println("Time in milisecond is: " + miliSec);
        long second = miliSec / 1000;
        long curtSecond = second % 60;
        long minute = second / 60;
        int curtMinute = (int) minute % 60;
        long hours = minute / 60;
    }
}
```

```

        int curthours = (int) hours % 24;
        System.out.println("Current time from " + miliSec + " MilliSeconds to
Hour:Minute:Second is " + curthours + ":" + curtMinute + ":" + curtSecond);
    }
}

```

18. Take 2 integers (let's say num1 and num2) from user. Take another two values (e.g. ival, dval). Increment num1 by ival and decrement num2 by dval, by using increment and decrement operators respectively. Your program should show the difference between the use of

- Preincrement and postincrement
- Predecrement and postdecrement (Table 2.5, page 54). Display your answers.

```

package com.company;

import java.util.Scanner;

public class Q18 {
    public static void main (String args[]){
        Scanner scan = new Scanner(System.in);
        int num1, num2, vali , vald;
        System.out.println("Enter value 1 and value 2 to perform increment
decrement operation");
        num1 = scan.nextInt();
        num2 = scan.nextInt();
        vali = num1++;
        vald = num2--;
        System.out.println("num1 and num2 are incremented and decremented
but vali and vald will get the old value because of post increment decrement
so:");
        System.out.println("Value of vali is: "+ vali + " But value of num1
is " + num1);
        System.out.println("Value of vali is: "+ vald + " But value of num1
is " + num2);
        vali = ++num1;
        vald = --num2;
        System.out.println("num1 and num2 are incremented and decremented
and vali and vald will get the new value because of pre increment decrement
so:");
        System.out.println("Value of vali is: "+ vali + " and value of num1
is " + num1);
        System.out.println("Value of vali is: "+ vald + " and value of num1
is " + num2);
    }
}

```

```
}  
}
```

19. Read section 2.18 and 2.19 from your text book. Do the examples and exercise questions.

### Q. 2.18

```
package com.company;  
  
public class Q19 {  
    public static void main(String[] args) {  
        int a, b;  
        System.out.println("a      b      pow(a, b)");  
        a = 1;  
        b = 2;  
        System.out.println(a + "      " + b +  
            "      " + (int) Math.pow(a, b));  
        a++;  
        b++;  
        System.out.println(a + "      " + b +  
            "      " + (int) Math.pow(a, b));  
        a++;  
        b++;  
        System.out.println(a + "      " + b +  
            "      " + (int) Math.pow(a, b));  
        a++;  
        b++;  
        System.out.println(a + "      " + b +  
            "      " + (int) Math.pow(a, b));  
        a++;  
        b++;  
        System.out.println(a + "      " + b +  
            "      " + (int) Math.pow(a, b));  
    }  
}
```

### Q. 2.19

```
package com.company;  
  
import java.util.Scanner;  
  
public class Q19 {  
    public static void main(String[] args) {  
        Scanner input = new Scanner(System.in);  
  
        double x1,x2,x3,y1,y2,y3;  
        double area_1,area_2,area_3, a_sides, area;  
    }  
}
```

```

        System.out.print("Enter three points for a triangle: ");
        x1 = input.nextDouble();
        y1 = input.nextDouble();
        x2 = input.nextDouble();
        y2 = input.nextDouble();
        x3 = input.nextDouble();
        y3 = input.nextDouble();

        area_1 = Math.pow(Math.pow(x2 - x1, 2) + Math.pow(y2 - y1, 2), 1/2);
        area_2 = Math.pow(Math.pow(x3 - x2, 2) + Math.pow(y3 - y2, 2), 1/2);
        area_3 = Math.pow(Math.pow(x1 - x3, 2) + Math.pow(y1 - y3, 2), 1/2);
        a_sides= (area_1 + area_2 + area_3) / 2;
        area = Math.pow(a_sides * (a_sides - area_1) * (a_sides - area_2) *
(a_sides - area_3), 1/2);

        System.out.println("Triangle area is: " + area);
    }
}
}

```

20.Explore String class in Java. Test its various functions by using them in small programs.

### Length of string

```

package com.company;

public class string {
    public static void main(String args[]){
        String st = "Hello World";
        int len = st.length();
        System.out.println("Length of string is" + len);
    }
}

```

### Concatenation of two strings:

```

package com.company;

public class string {
    public static void main(String args[]){
        String st1 = "Hello";
        String st2 = "World";
        System.out.println("Concatenation of two strings is:" +
st1.concat(st2));
    }
}

```

## charAt function:

```
package com.company;

public class string {
    public static void main(String args[]){
        String st1 = "Hello";

        System.out.println("3th aplphabet of string is:" + st1.charAt(2));
    }
}
```

## Comparing Strings:

```
package com.company;

public class string {
    public static void main(String args[]){
        String st1 = "Hello";
        String st2 = "Hello";

        System.out.println("Comparing two strings:" + st1.compareTo(st2));
    }
}
```

## String Lowercase and Uppercase:

```
package com.company;

public class string {
    public static void main(String args[]){
        String st1 = "Hello";

        System.out.println("Lowercase string:" + st1.toLowerCase());
    }
}
```

```
package com.company;

public class string {
    public static void main(String args[]){
        String st1 = "Hello";

        System.out.println("Uppercase string:" + st1.toUpperCase());
    }
}
```



