CSE18R272-LAB MANUAL

KALASALINGAM ACADEMY OF RESEARCH AND EDUCATION

COMPUTER SCIENCE AND EDUCATION

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**1.Find mean and standard deviation.**

import java.util.\*;

class Test

{

public static void main (String [] args)

{

System.out.println("Enter 10 numbers ");

Scanner in = new Scanner (System.in);

double[] arr= new double [10];

double sum=0, mean=0;

for (int i=0; i<10; i++)

{

System.out.print("Enter a number : ");

arr[i]=in.nextDouble();

sum+=arr[i];

}

mean=sum/10;

sum=0;

System.out.println("Mean : "+mean);

double [] temp= new double[10];

for (inti=0; i<10; i++)

{

temp[i]=Math.pow((arr[i]-mean),2);

sum+=temp[i];

}

mean=sum/10;

double deviation=Math.sqrt(mean);

System.out.println("Deviation : "+ deviation);

}

}

**2.Find the nCr and nPr.**

import java.util.Scanner;

class ncr{

public static void main(String args[]){

Scanner s=new Scanner(System.in);

int r,n;

float npr,ncr;

n=s.nextInt();

r=s.nextInt();

ncr=fact(n)/(fact(r)\*fact(n-r));

npr=fact(n)/fact(n-r);

System.out.println("ncr:"+ncr + "npr:"+npr):

//code

}

public int fact(int num)

{

int f=1;

for(int i=1;i<=num;i++)

{

f=f\*i;

}

}

}

**3. Print all prime numbers in the given range.**

import java.util.Scanner;

class Main\_9919004113{

public static void main(String args[]){

//code

Scanner sc=new Scanner(System.in);

int n;

System.out.println("enter a number:");

n=sc.nextInt();

for(int i=2;i<n;i++)

{

while(n%i==0)

{

System.out.println(" "+i);

n=n/i;

}

}

if(n>2)

{

System.out.println(n);

}

}

}

**4. Find sum of the digits.**

import java.util.Scanner;

class SumOfDigits

{

public static void main(String arg[])

{

    int n,sum;

                 Scanner sc=new Scanner(System.in);

    System.out.println("Enter a number ");

                   n=sc.nextInt();

    for(sum=0 ;n!=0 ;n/=10)

    {

sum+=n%10;

    }

    System.out.println("Sum of digits of a number is "+sum);

}

}

**5. Check whether a given number is palindrome or not.**

class Palindrome

{

public static void main(String arg[])

{

int num,t,s,rem;

Scanner sc=new Scanner(System.in);

System.out.println("Enter any number ");

num=sc.nextInt();

t=num;

for(s=0;num>0;num/=10)

{

rem=num%10;

s=(s\*10)+rem;

}

if(s==t)

System.out.println(t+" is a palindrome number ");

else

System.out.println(t+" is not a palindrome number ");

}

}

**6. Check whether a given number is prime factor or not.**

|  |
| --- |
| import java.util.Scanner;  class PrimeFactors  {  public static void main(String args[])   {  Scanner sc=new Scanner(System.in);  System.out.println("Enter any Number to find Prime Factors ");  int number=sc.nextInt();  System.out.print("Prime Factors are : " );          for (int i = 2; i <= number; i++)  {                while (number % i == 0) {                  System.out.print(i + " ");                  number = number / i;              }          }            if (number < 1)  System.out.println(number);      }    } |
| **7. Check whether a given number is perfect number or not.**  import java.util.Scanner;  class Perfect{  public static void main(String args[]){  Scanner sc=new Scanner(System.in);  int n,i,sum=0;  System.out.println("enter a number:");  n=sc.nextInt();  for(i=1;i<n;i++)  {  if(n%i==0)  {  sum=sum+i;  }  }  if(sum==n)  {  System.out.println("The given number %d is perfect number"+n);  }  else  {  System.out.println("the given number is not perfect number");  }  }  }  9. **Apply any one of the sorting algorithm.**   |  | | --- | | import java.io.\*; | |  | import java.util.Scanner; | |  | public class Binary\_search{ | |  | public static void main(String[] args) { | |  | int n; | |  | System.out.printf("Binary\_search Algorithm\n"); | |  | Scanner sc =new Scanner(System.in); | |  |  | |  | int first, last, middle, search; | |  | int[] array=new int[100]; | |  |  | |  | System.out.printf("Enter number of elements\n"); | |  | n= sc.nextInt(); | |  |  | |  | System.out.printf("Enter %d integers\n", n); | |  |  | |  | for (int c = 0; c < n; c++) | |  | array[c]=sc.nextInt(); | |  |  | |  | System.out.printf("Enter value to find\n"); | |  | search=v.nextInt(); | |  | first = 0; | |  | last = n - 1; | |  | middle = (first+last)/2; | |  |  | |  | while (first <= last) { | |  | if (array[middle] < search) | |  | first = middle + 1; | |  | else if (array[middle] == search) { | |  | System.out.printf("%d found at location %d.\n", search, middle+1); | |  | break; | |  | } | |  | else | |  | last = middle - 1; | |  |  | |  | middle = (first + last)/2; | |  | } | |  | if (first > last) | |  | System.out.printf("Not found! %d isn't present in the list.\n", search); | |  |  | |  |  | |  | } | |  | } |   **10. Number conversion from decimal to binary.**  import java.util.Scanner;    public class Binary {  public static void main(String args[]){  int n;  Scanner sc = new Scanner(System.in);    System.out.println("Enter a decimal number: ");  n = sc.nextInt();    System.out.println("Binary number is " + Integer.toString(n, 2));  }  }  **12. Program to compute row sum, column sum and trace of a matrix**  import java.util.Scanner;  class matrix  {  int row,col;  int a[][];  Matrix(){rows=3,col=3;a=newInt[row][col];}  Matrix(int r,int c)  {  row=r;col=c;a=newInt[row][col];  }  void print()  {  for(int i=0;i<row;i++)  {  for(int j=0;j<col;j++)  {  System.out.println(a[i][j]+"\t");  System.out.println();  }  }  void read()  {  Scanner sc=new Scanner(System.in);  for(int i=0;i<row;i++)  {  for(int j=0;j<col;j++)  {  a[i][j]=sc.nextInt();  }  }  }  public Matrix add(Matrix b)  {  Matrix c=new Matrix(row,col)  for(int i=0;i<row;i++)  {  for(int j=0;j<col;j++)  {  c.a[i][j]=a[i][j]+b[i][j];  }  }  }  public Matrix add(Matrix b)  {  Matrix d=new Matrix(row,col)  for(int i=0;i<row;i++)  {  for(int j=0;j<col;j++)  {  d.a[i][j]=a[i][j]+b[i][j];  }  }  }  **13. Write a program to encrypt a code in Caesar's code**   |  | | --- | | Import java.io.\*; | |  | import java.util.\*; | |  |  | |  | class Caeser{ | |  | String plain; | |  | int key; | |  | Ceaser(String t,int k){ | |  | plain=t; | |  | key=k; | |  | } | |  | String encrypt(){ | |  | String out=""; | |  | char ch; | |  | for(int i=0;i<plain.length();i++){ | |  | if(Character.isUpperCase(plain.charAt(i))) | |  | ch=(char)(((int)plain.charAt(i) + key - 65) % 26 + 65); | |  | else | |  | ch=(char)(((int)plain.charAt(i) + key - 97) % 26 + 97); | |  |  | |  | out=out+ch; | |  | } | |  | return out; | |  | } | |  |  | |  | String decrypt(){ | |  | String in=""; | |  | char ch; | |  | for(int i=0;i<plain.length();i++){ | |  | if(Character.isUpperCase(plain.charAt(i))) | |  | ch=(char)(((int)plain.charAt(i) + key - 65) % 26 + 65); | |  | else | |  | ch=(char)(((int)plain.charAt(i) + key - 97) % 26 + 97); | |  |  | |  | in=in+ch; | |  | } | |  | return in; | |  |  | |  | } | |  |  | |  | public static void main(String[] args)throws IndexOutOfBoundsException{ | |  | Scanner s = new Scanner(System.in); | |  | System.out.println("Enter no of KEY:\n"); | |  | int r = s.nextInt(); | |  | System.out.println("Enter your msg \n"); | |  | String o=s.next(); | |  | Caeser c=new Caeser(o,r); | |  | String out=c.encrypt(); | |  | System.out.println("encrypted msg: "+out); | |  | Caeser d=new Caeser(out,26-r); | |  | String in=d.decrypt(); | |  | System.out.println("decrypted msg: "+in); | |  | } | |  | } |   **Vignere cipher**   |  | | --- | | import java.io.\*; | |  | import java.util.Scanner; | |  | class Vignere{ | |  |  | |  | String plain; | |  | String key; | |  | public Vignere(String text, String k) | |  | { | |  | plain = text; | |  | key = k; | |  | } | |  | String encrypt() | |  | { | |  | String alpha ="abcdefghijklmnopqrstuvwxyz"; | |  | int num\_key[] = new int[key.length()]; | |  | String out=""; char ch; int shift; | |  | for (int i=0; i<key.length(); i++) | |  | num\_key[i] = alpha.indexOf(key.charAt(i)) + 1; | |  | int j=0; | |  | for (int i=0; i<plain.length(); i++) | |  | { | |  | if ( j < num\_key.length) | |  | shift= num\_key[j++]; | |  | else { | |  | j = 0; | |  | shift= num\_key[j++]; | |  | } | |  |  | |  | //System.out.print(shift +" "); | |  | ch = (char) ((int) (plain.charAt(i) -97+shift) % 26 +97); | |  |  | |  | out = out + ch; | |  | } | |  | return out; | |  | } | |  | String decrypt() | |  | { | |  | String alpha ="abcdefghijklmnopqrstuvwxyz"; | |  | int num\_key[] = new int[key.length()]; | |  | String in=""; char ch; int shift; | |  | for (int i=0; i<key.length(); i++) | |  | num\_key[i] = alpha.indexOf(key.charAt(i)) + 1; | |  | int j=0; | |  | for (int i=0; i<plain.length(); i++) | |  | { | |  | if ( j < num\_key.length) | |  | shift= num\_key[j++]; | |  | else { | |  | j = 0; | |  | shift= num\_key[j++]; | |  | } | |  |  | |  | //System.out.print(shift +" "); | |  | ch = (char) ((int) (plain.charAt(i) -97-shift+26) % 26 +97); | |  | //de=(en-key+26)%26 i.e. | |  | in = in + ch; | |  | } | |  | return in; | |  | } | |  |  | |  | public static void main(String a[]){ | |  | Scanner s = new Scanner(System.in); | |  | System.out.println("Enter shift String ie KEY:\n"); | |  | String r = s.next(); | |  | System.out.println("Enter your msg \n"); | |  | String o=s.next(); | |  | Vignere c = new Vignere(o, r); | |  | String out = c.encrypt(); | |  | System.out.println("\nEncrpted msg :"+out+"\n"); | |  |  | |  | Vignere d=new Vignere(out,r); | |  | String in=d.decrypt(); | |  | System.out.println("Decrypted msg :"+in); | |  |  | |  | } | |  | } |   **16. Write a program Java Program for XOR Cipher.**      class xor{  String plain;  char key;  char cc;    public xor(String text,char k){  plain=text;  key=k;    }  String encrypt(){  String out="";char ch;  for (int i=0; i<plain.length(); i++){    ch=(char)((int)plain.charAt(i)^(int)key);  out+=ch;    }  return out;  }  public static void main(String[] args) {  xor c = new xor("cybersecurity", 'S');  String out = c.encrypt();  System.out.println(out);        }  }  **17. substitution cipher**   |  | | --- | | import java.io.\*; | |  | import java.util.Scanner; | |  | class Subsitution\_code{ | |  | String plain; | |  | int key; | |  | Subsitution\_code(String t){ | |  | plain=t; | |  | } | |  | String encrypt(){ | |  | String alpha="abcedefghijklmnopkrstuvwxyz"; | |  | /\* | |  | Index Out Of Error If I am not Using Throw IndexOut Of BoundsException>>>>>>>>>>>>> | |  | \*/ | |  | //String sub="abcedefghijklmnopkrstuvwxyz"; | |  | String sub="klmnhiabkrstejpvwfoucedgxyz"; | |  | String out=""; | |  | for(int i=0;i<plain.length();i++){ | |  | char ch = plain.charAt(i); | |  | int p = alpha.indexOf(ch); | |  | char c = sub.charAt(p); | |  | out=out+c; | |  | } | |  | return out; | |  | } | |  | String decrypt(){ | |  | String sub="abcedefghijklmnopkrstuvwxyz";//logic simple reverse the aplha code for decrypt | |  | String alpha="klmnhiabkrstejpvwfoucedgxyz"; | |  | String in=""; | |  | for(int i=0;i<plain.length();i++){ | |  | char ch = plain.charAt(i); | |  | int p = alpha.indexOf(ch); | |  | char c = sub.charAt(p); | |  | in=in+c; | |  | } | |  | return in; | |  |  | |  | } | |  |  | |  | public static void main(String[] args)//throws IndexOutOfBoundsException | |  | { | |  |  | |  | Subsitution\_code y = new Subsitution\_code("cyberserurity"); | |  | String out = y.encrypt(); | |  | System.out.println(out); | |  | System.out.println("\n"); | |  | Subsitution\_code n = new Subsitution\_code(out); | |  | String in=n.decrypt(); | |  | System.out.println(in); | |  | } | |  | } |   18.write a java program to implement inheritance using super keyword.  Program:  class Box {  private double width ;  private double height ;  private double depth ;  Box ( double w , double h , double l) {  width = w;  height = h ;  depth = l;  }  Box () {  width = -1;  height = -1;  depth = -1;  }  double volume () {  return width \* height \* depth ;  }  }  class BoxWeight extends Box {  double weight ; // weight of box  BoxWeight ( double w , double h , double d , double m) {  super (w , h , d ); // call superclass constructor  weight = m;  }  BoxWeight (){  super ();  weight = -1;  }  }  public class Main  {  public static void main(String[] args) {  BoxWeight b1 = new BoxWeight(5.4,3.6,2.4,4.8);  BoxWeight b2 = new BoxWeight();  double v ;  v = b1 . volume ();  System . out . println (" Volume of mybox1 is " + v );  v = b2 . volume ();  System . out . println (" Volume of mybox3 is " + v );  }  }  Output:  volume of mybox1 is 46.656  Volume of mybox3 is -1.0  19. Create a class called Date that includes three pieces of information as instancevariables—a month (typeint), a day (typeint) and a year (typeint). Your classshould have a constructor that initializes the three instance variables andassumes that the values provided are correct. Provide a set and a get method foreach instance variable. Provide a method displayDate that displays the month,day and year separated by forward slashes(/). Write a test application namedDateTest that demonstrates cl  Program:  class Date {  int day ;  int month ;  int year ;  public Date ( int d , int m , int y) {  if(m<13 && d<31){  month = m; day=d; year=y;  }  else{  System.out.println("incorrect date");  }    }  void setMonth(int m){  if(m<13)  month=m;  else  System.out.println("incorrect format");  }  void setDay(int d){  if(d<31)  day=d;  else  System.out.println("incorrect format");  }  void setYear(int y){  if((y/10000)==0)  year=y;  else  System.out.println("incorrect format");  }  int getMonth(){  return month;  }  int getDay(){  return day;  }  int getYear(){  return year;  }  void display () {  System.out.println("The date is " + day +"/" + month + "/" + year);  }  }  public class Main  {  public static void main(String[] args) {  Date d1 = new Date(16,9,2020);  d1.display();  d1.setDay(15);  d1.setMonth(9);  d1.setYear(2020);      }  }  Output:  The date is 16/9/2020  19. Create class SavingsAccount. Usea static variable annualInterestRate to store theannual interest rate for all account holders. Each object of the class contains aprivate instance variable savingsBalance indicating the amount the savercurrently has ondeposit. Provide method calculateMonthlyInterest to calculatethe monthly interest by multiplying the savingsBalance by annualInterestRatedivided by 12 this interest should be added to savingsBalance. Provide a staticmethod modifyInterestRate th  Provide a staticmethod modifyInterestRate that sets the annualInterestRate to a new value.Write a program to test class SavingsAccount. Instantiate two savingsAccountobjects, saver1 and saver2, with balances of $2000.00 and $3000.00, respectively.Set annualInterestRate to 4%, then calculate the monthly interest and print thenew balances for both savers. Then set the annualInterestRate to 5%, calculate the next month’s interest and print the new balances for both savers.  Program:  class SavingsAccount{  static float AnnualIntrestrate = (float)4;  private float SavingsBalance;  void caluclateMonthlyIntrest(){  float intrest = ((SavingsBalance\*AnnualIntrestrate)/12);  SavingsBalance+=intrest;  System.out.println("balance is " + SavingsBalance);  }  static void ModifyIntrestrate(float rate){  AnnualIntrestrate=rate;  }  public SavingsAccount(float balance){  SavingsBalance=balance;    }    }  public class Main  {  public static void main(String[] args) {  SavingsAccount s1 = new SavingsAccount(2000.0f);  SavingsAccount s2 = new SavingsAccount(3000.0f);  s1.caluclateMonthlyIntrest();  s2.caluclateMonthlyIntrest();  SavingsAccount.ModifyIntrestrate(5.0f);  s1.caluclateMonthlyIntrest();  s2.caluclateMonthlyIntrest();      }  }  Output:  balance is 2666.6667  balance is 4000.0  balance is 3777.7778  balance is 5666.6665  20.write a java program create a class callled book and initialize the respective details of book using class constructor and access them by creating objects and perform required operations.  Program:  import java.util.Scanner;  class Book  {  String bookName;  String author;  String ISBN, publisher;  Book(String title, String auth, String isbn, String publish)  {  bookName = title;  author =auth;  this.ISBN = isbn;  publisher = publish;  }  void setTitle(String name)  { bookName = name; }  void setAuthor(String auth)  { author = auth; }  void setISBN(String s)  { ISBN = s; }  void setPublisher(String p)  {  publisher = p;  }  String getTitle()  { return bookName; }  String getAuthor()  { return author; }  String getISBN()  { return ISBN; }  String getPublisher()  { return publisher; }  String bookInfo()  {  String info = bookName + " " + author + " " + ISBN + " " + publisher;  return info;    }  }    public class Main  {  public static void main(String[] args) {  Book b[] = new Book[30];  b[0] = new Book("Programming in Java", "Rama", "12345", "Wiley");  String title, auth, isbn, publisher;  Scanner s = new Scanner(System.in);  for (int i =1; i < 3; i++)  {  title = s.next();  auth = s.next();  isbn = s.next();  publisher = s.next();  b[i] = new Book(title,auth,isbn,publisher);  }  b[2].setTitle("Software Testing");  System.out.println(b[2].getTitle());  String info;  for (int i =0; i<3; i++) {  info = b[i].bookInfo();  System.out.println(info);  }  }  }  Sample input and output;  Head First java  Kathy sierra  987456321  Orelly  Barry burd  123456789  Learning made easy  Programming in Java Rama 12345 Wiley  Head First java kathy sierra 987456321 Orelly  Software testing Barry burd 123456789 Learning made easy |
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