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# ΑΝΤΙΚΕΙΜΕΝΟΣΤΡΑΦΗΣ ΠΡΟΓΡΑΜΜΑΤΙΣΜΟΣ

# ΓΛΩΣΣΑ Java

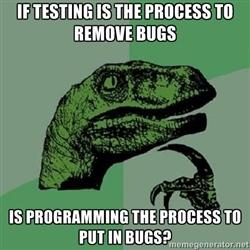
# ΑΠΛΑ ΠΡΟΓΡΑΜΜΑΤΑ

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ΕΚΔΟΣΗ v27: ΜΑΡ. 2019

ΣΥΛΛΟΓΗ ΑΠΛΩΝ ΠΡΟΓΡΑΜΜΑΤΩΝ

ΜΕΡΟΣ A: ΤΕΛΕΣΤΕΣ, ΕΝΤΟΛΕΣ ΕΛΕΓΧΟΥ, ΕΠΑΝΑΛΗΨΕΙΣ, ΠΙΝΑΚΕΣ ΚΑΙ ΚΛΑΣΕΙΣ



Πρόγραμμα A-1: Διαιρέτες

Σχόλια: Η επανάληψη μπορεί να βελτιωθεί (2..a/2) εφόσον τα 1, a είναι γνωστοί διαιρέτες

import java.util.Scanner;

class Diairetes

{

public static void main(String args[])

{

Scanner input = new Scanner( System.in);

int a;

int i,y;

System.out.println("Eishgage enan arithmo: ");

a= input.nextInt();

System.out.println("Oi diairetes tou " + a + " einai:");

for(i=1; i<=a; i++)

{

y=a%i;

if (y==0)

{

System.out.println( i);

}

}

}

}

Πρόγραμμα A-2: Ρίψεις ζαριού

Σχόλια:

import java.util.Random;

public class RollDie

{

public static void main ( String [] args )

{

Random randomNumbers = new Random();

int frequency1 = 0;

int frequency2 = 0;

int frequency3 = 0;

int frequency4 = 0;

int frequency5 = 0;

int frequency6 = 0;

int i, x;

for(i =1; i<=600; i++)

{

x= 1 + randomNumbers.nextInt( 6);

if (x==1)

{

frequency1++;

}

else if (x==2)

{

frequency2++;

}

else if (x==3)

{

frequency3++;

}

else if (x==4)

{

frequency4++;

}

else if (x==5)

{

frequency5++;

}

else if (x==6)

{

frequency6++;

}

} // end for

System.out.println("Apotelesmata se 600 ripseis enos 6-pleurou zariou:");

System.out.println("1: " + frequency1 );

System.out.println("2: " + frequency2 );

System.out.println("3: " + frequency3 );

System.out.println("4: " + frequency4 );

System.out.println("5: " + frequency5 );

System.out.println("6: " + frequency6 );

} // end main

}

Πρόγραμμα A-3: Λύση δευτεροβάθμιας εξίσωσης

Σχόλια:

import java.util.Scanner;

class Deut\_Test

{

public static void main(String[] args)

{

Scanner input = new Scanner( System.in);

double a, b, c;

double d,x1,x2;

a= input.nextFloat();

b= input.nextFloat();

c= input.nextFloat();

d=b\*b-4\*a\*c;

if (d>=0)

{ x1=(-b+Math.sqrt(d))/(2\*a);

x2=(-b-Math.sqrt(d))/(2\*a);

System.out.println(x1);

System.out.println(x2);

}

else

{

System.out.println("adunato");

}

}

}

Πρόγραμμα A-4: Υπολογισμός μέσης τιμής και διασποράς

Σχόλια:

import java.util.Scanner;

class MesiTimi\_Test

{

public static void main(String[] args)

{

double[] x= new double[100];

double s, xm, ss;

int i, n;

Scanner input;

input= new Scanner( System.in);

n=input.nextInt();

for(i=0;i<n;i++)

{

x[i]=input.nextFloat();

}

s=0;

for(i=0;i<n;i++)

{

s=s+x[i];

}

xm=s/n;

System.out.println("mesi timi "+xm);

s=0;

for(i=0;i<n;i++)

{

s=s+(x[i]-xm)\*(x[i]-xm);

}

ss=Math.sqrt(s/(n-1));

System.out.println("typikn apoklisi"+ss);

}

}

Πρόγραμμα A-5: Εμβαδό πολυγώνου

Σχόλια:

import java.util.Scanner;

class Trig\_Test

{

public static void main(String[] args)

{

double[] x= new double[40];

double[] y= new double[40];

double s;

int n,i;

Scanner input = new Scanner( System.in);

n= input.nextInt();

for(i=0; i<n; i++)

{

x[i]=input.nextFloat();

y[i]=input.nextFloat();

}

s=0;

for (i=1;i<n-1;i++)

{

s= s + etrig(x[0],y[0],x[i],y[i],x[i+1],y[i+1]);

}

System.out.println("Embado polygonou "+s);

}

public static double dist(double x1, double y1,double x2,double y2)

{double d;

d=Math.sqrt((x2-x1)\*(x2-x1)+(y2-y1)\*(y2-y1));

return d;

}

public static double etrig (double x1,double y1,double x2,double y2,double x3,double y3)

{

double a,b,c,t,e;

a= dist(x1,y1,x2,y2);

b= dist(x2,y2,x3,y3);

c= dist(x1,y1,x3,y3);

t=(a+b+c)/2;

e=Math.sqrt(t\*(t-a)\*(t-b)\*(t-c));

return e;

}

}

Πρόγραμμα A-6: Αριθμητικός υπολογισμός της i(t) από την διαφορική εξίσωση L\*di/dt + R\*i = E κυκλώματος RL

Σχόλια: Αναλυτική λύση icc=(E/R)\*(1-exp((-R/L)\*t))

import java.util.Scanner;

class DiffEqTest

{

public static void main (String[] args)

{

Scanner input = new Scanner(System.in);

int N;

int i;

double L, R, E;

double dt;

double ic;

double t;

double di;

L = input.nextFloat ();

R = input.nextFloat ();

E = input.nextFloat ();

dt = 0.00001;

N = 1000;

ic = 0;

t = 0;

for (i=0;i<N;i++)

{

t=t+dt;

di=((E-R\*ic)\*dt)/L;

ic=ic+di;

//System.out.println (t + " " + ic);

System.out.printf("t=%12.6f i=%12.6f\n", t, ic);

}

}

}

Πρόγραμμα A-7: Εύρεση του ζεύγους σημείων με την ελάχιστη απόσταση

Σχόλια:

class Point

{

double x;

double y;

public Point( double xx, double yy)

{

x=xx;

y=yy;

}

}

import java.util.Scanner;

class PointsTest

{

public static void main( String[] args)

{

Point[] a = new Point[10];

double x, xmin;

int i,j,imin,jmin;

double xx, yy;

Scanner inp = new Scanner( System.in);

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

{

System.out.printf("Enter point %d\n",i);

xx= inp.nextDouble();

yy= inp.nextDouble();

a[i]= new Point( xx, yy);

}

xmin=dist (a[0], a[1]);

imin=0;

jmin=1;

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

{

for (j=i+1; j<10;j++)

{

x=dist( a[i], a[j]);

System.out.printf ("%d %d %f\n",i,j,x);

if (x<xmin)

{

xmin=x;

imin=i;

jmin=j;

}

}

}

System.out.printf("min distance=%f between point %d and point %d \n", xmin,imin,jmin);

}

public static double dist( Point a, Point b)

{

double d;

d=Math.sqrt((a.x-b.x)\*(a.x-b.x)+(a.y-b.y)\*(a.y-b.y));

return d;

}

}

Πρόγραμμα A-8: Τυχαία σειρά βάσεων του DNA

Σχόλια:

class DnaTest

{

public static void main( String[] args)

{

int[] a = new int[100];

int i;

for (i=0; i<100;i++)

{

a[i]= (int) (Math.random()\*4);

}

for(i=0;i<100;i++)

{

if (a[i]==0)

System.out.printf("A");

else if (a[i]==1)

System.out.printf("C");

else if (a[i]==2)

System.out.printf("G");

else if (a[i]==3)

System.out.printf("T");

else

System.out.printf("?");

}

System.out.println();

}

}

Πρόγραμμα A-9: Κρυπτογράφηση κειμένου

Σχόλια:

/\*

Test: VAGGELIS -> CQUUTSOL

\*/

import java.util.Scanner;

class CryptoTest

{

static String alphabet= "ABCDEFGHIJKLMNOPQRSTUVWXYZ";

static String cryptoalphabet="QWERTYUIOPASDFGHJKLZXCVBNM";

public static void main(String[]args)

{

String s, ss, sss;

Scanner inp =new Scanner (System.in);

s= inp.nextLine();

ss= encrypt( s);

System.out.println( ss);

sss= decrypt( ss);

System.out.println( sss);

}

public static String encrypt( String s)

{

String ss;

int j, i;

ss="";

for(i=0; i<s.length(); i++)

{

for(j=0; j<26; j++)

{

if( s.charAt( i ) == alphabet.charAt( j ) )

{

ss= ss + cryptoalphabet.charAt(j);

break;

}

}

}

return ss;

}

public static String decrypt( String s)

{

String ss;

int j, i;

ss="";

for(i=0; i<s.length(); i++)

{

for(j=0; j<26; j++)

{

if( s.charAt( i ) == cryptoalphabet.charAt( j ) )

{

ss= ss + alphabet.charAt(j);

break;

}

}

}

return ss;

}

}

Πρόγραμμα A-10: Παράδειγμα κλάσεων Student, StudentsList

Σχόλια:

class Student

{

int id;

String firstname;

String lastname;

double grade;

public Student()

{

this.id= 0;

this.firstname= "";

this.lastname= "";

this.grade= 0;

}

public Student( int id, String fname, String lname, double grade)

{

this.id= id;

this.firstname= fname;

this.lastname= lname;

this.grade= grade;

}

public void print( )

{

System.out.printf("%4d %12s %12s %3.1f\n", id, firstname, lastname, grade);

}

public void copyFrom( Student s2)

{

this.id= s2.id;

this.firstname= s2.firstname;

this.lastname= s2.lastname;

this.grade= s2.grade;

}

}

import java.util.Scanner;

class StudentsList

{

Student[] students;

int nStudents;

public StudentsList( int maxNStudents)

{

students= new Student[ maxNStudents];

nStudents= 0;

}

public void addStudent( int id, String fname, String lname, double grade)

{

students[ nStudents]= new Student( id, fname, lname, grade);

nStudents= nStudents + 1;

}

public void printStudents()

{

int i;

for(i=0; i<nStudents; i++)

{

students[ i].print();

}

} // end printStudents

public void readStudents( int n)

{

Scanner inp = new Scanner( System.in);

int id;

String fname;

String lname;

double grade;

int i;

for(i=0; i<n; i++)

{

System.out.println("Eisagete kwdiko");

id= inp.nextInt(); inp.nextLine();

System.out.println("Eisagete onoma");

fname= inp.nextLine();

System.out.println("Eisagete epwnymo");

lname= inp.nextLine();

System.out.println("Eisagete bathmo");

grade= inp.nextDouble();

students[ i]= new Student( id, fname, lname, grade);

System.out.println("Kataxwrhthhke o mathitis:");

students[ i].print();

nStudents= n;

}

} // end readStudents

public void sortStudentsById()

{

Student temp;

int i, j;

for(i=0; i<nStudents-1; i++)

{

for(j=i+1; j<nStudents; j++)

{

if( students[j].id < students[i].id)

{

temp= students[j];

students[j]= students[i];

students[i]= temp;

}

}

}

} // end sortStudentsById

public void sortStudentsByGrade()

{

Student temp;

int i, j;

for(i=0; i<nStudents-1; i++)

{

for(j=i+1; j<nStudents; j++)

{

if( students[j].grade > students[i].grade)

{

temp= students[j];

students[j]= students[i];

students[i]= temp;

}

}

}

} // end sortStudentsByGrade

public void sortStudentsByLastName()

{

Student temp;

int i, j;

for(i=0; i<nStudents-1; i++)

{

for(j=i+1; j<nStudents; j++)

{

if( students[j].lastname.compareTo( students[i].lastname) < 0)

{

temp= students[j];

students[j]= students[i];

students[i]= temp;

}

}

}

} // end sortStudentsByLastName

}

import java.util.Scanner;

class TestStudents

{

public static void main( String[] args)

{

Scanner inp = new Scanner( System.in);

StudentsList studentsList= new StudentsList( 100);

int n;

System.out.println("Eisagete plhthos mathhtwn:");

n= inp.nextInt(); inp.nextLine();

studentsList.readStudents( n);

System.out.println();

System.out.println("Lista mathhtwn:");

studentsList.printStudents();

System.out.println("Lista mathhtwn sorted by id:");

studentsList.sortStudentsById();

studentsList.printStudents();

System.out.println("Lista mathhtwn sorted by lastname:");

studentsList.sortStudentsByLastName();

studentsList.printStudents();

}

}

Πρόγραμμα A-11: Υπολογισμός ορίζουσας n x n (με recursive function)

Σχόλια:

/\*

Ypologismos orizousas n x n, recursive functions

Dokimh:

4

1 2 -1 4

0 1 2 1

1 1 -3 1

4 1 0 1

d=36

\*/

import java.util.Scanner;

class TestDeterminant

{

public static void main( String[] args)

{

Scanner inp = new Scanner( System.in);

double[][] a = new double[20][20];

int i, j, n;

double d;

n = inp.nextInt(); inp.nextLine();

for(i=0; i<n; i++)

{

for(j=0; j<n; j++)

{

a[i][j]= inp.nextDouble();

}

}

d= determinant( a, n);

System.out.println( d);

}

/\*

synarthsh ypologismou orizousas size x size, recursive function

\*/

public static double determinant(double matrix[][], int size)

{

double s=1;

double det=0;

double[][] m\_minor = new double[20][20];

int i, j, m, n, c;

if (size==1)

{

return (matrix[0][0]);

}

else

{

det=0;

for (c=0;c<size;c++)

{

m=0;

for (i=0;i<size;i++)

{

if (i != 0)

{

n=0;

for (j=0;j<size;j++)

{

if (j != c)

{

m\_minor[m][n]=matrix[i][j];

n= n + 1;

}

} // end for j

m= m + 1;

} // end if i!=0

} // end for i

det=det + s \* (matrix[0][c] \* determinant(m\_minor,size-1));

s=-1 \* s;

} // end for

} // end else

return det;

} // end function

}

Πρόγραμμα A-12: Εύρεση βρόγχων σε γράφο

Σχόλια:

class Branch

{

int a;

int b;

public Branch( int x, int y)

{

a= x;

b= y;

}

}

-----------------------------------------

class Loop

{

int p[];

int pk;

public Loop()

{

p= new int[40];

pk= 0;

}

public void print()

{

int i;

for( i=0; i<pk; i++)

{

System.out.printf("%3d", p[i]);

}

System.out.printf("\n");

}

public void addNode( int x)

{

p[ pk]= x;

pk= pk + 1;

}

public void removeNode()

{

pk= pk - 1;

}

public void copyFrom( Loop x)

{

int i;

for(i=0; i<x.pk; i++)

{

p[i]= x.p[i];

}

pk= x.pk;

}

public int findNode(int x)

{

int i;

for(i=0; i<pk; i++)

{

if (p[i]==x)

return i;

}

return -1;

}

}

---------------------------------------

class ArrLoops

{

Loop[] loops;

int nLoops;

public ArrLoops()

{

loops= new Loop[80];

nLoops= 0;

}

public void addLoop( Loop x)

{

loops[ nLoops]= x;

nLoops= nLoops + 1;

}

public void print()

{

int i;

for(i=0; i<nLoops; i++)

{

System.out.printf("%3d:",i);

loops[i].print();

}

}

}

----------------------------------------------

/\*

Find loops in graph

Test data

# branches: 7

list of branches:

0: 0 1

1: 1 2

2: 2 3

3: 3 4

4: 0 3

5: 0 4

6: 2 4

# nodes: 5

list of loops:

0: 0 1 2 3 0

1: 0 1 2 3 4 0

2: 0 1 2 4 0

3: 0 1 2 4 3 0

4: 0 3 2 1 0

5: 0 3 2 4 0

6: 0 3 4 0

7: 0 3 4 2 1 0

8: 0 4 2 1 0

9: 0 4 2 3 0

10: 0 4 3 0

11: 0 4 3 2 1 0

\*/

class TestLoops

{

public static void main(String[] args)

{

Branch[] a = new Branch[80];

int nb;

int i;

int[][] netw = new int[40][40];

int nn, maxn;

Loop p;

ArrLoops iloops;

//input a test graph

a[0]= new Branch( 0, 1);

a[1]= new Branch( 1, 2);

a[2]= new Branch( 2, 3);

a[3]= new Branch( 3, 4);

a[4]= new Branch( 0, 3);

a[5]= new Branch( 0, 4);

a[6]= new Branch( 2, 4);

nb= 7;

System.out.printf("\n");

System.out.printf("Processing ..\n");

System.out.printf("# branches: %d\n", nb);

System.out.printf("list of branches:\n");

for( i=0; i<nb; i++)

{

System.out.printf("%3d: %3d %3d\n", i, a[i].a, a[i].b);

}

maxn=0;

for(i=0; i<nb; i++)

{

netw[a[i].a][a[i].b]= 1;

netw[a[i].b][a[i].a]= 1;

if (a[i].a > maxn)

maxn=a[i].a;

if (a[i].b > maxn)

maxn=a[i].b;

}

nn= maxn + 1;

System.out.printf("# nodes: %d\n", nn);

p= new Loop();

iloops= new ArrLoops();

findpath( 0, netw, nn, p, iloops);

System.out.printf("list of loops:\n");

iloops.print();

} // end main

private static void findpath( int n0, int[][] a, int n, Loop path, ArrLoops iloops)

{

int i, jj;

Loop newLoop;

path.addNode( n0);

for(i=0; i<n; i++)

{

if (a[n0][i] != 0)

{

if (i==path.p[0])

{

if (path.pk>2)

{

newLoop= new Loop();

newLoop.copyFrom( path);

newLoop.addNode( path.p[0]);

System.out.printf("debug: find loop ");

newLoop.print();

iloops.addLoop( newLoop);

}

}

else

{

if (path.findNode( i) == -1 )

{

findpath( i, a, n, path, iloops);

path.removeNode();

}

}

} // end if (a[n0][i] != 0)

} // end for i

} // end findpath

}

Πρόγραμμα A-13: Αλγόριθμος εύρεσης συντομότερης διαδρομής Dijkstra

Σχόλια:

/\* Single-source shortest path problem, Dijkstra algorithm

Test

Processing ..

# branches: 15

list of branches:

0: 0 1 w= 16

1: 0 2 w= 10

2: 0 3 w= 5

3: 1 2 w= 2

4: 1 5 w= 4

5: 1 6 w= 6

6: 2 3 w= 4

7: 2 4 w= 10

8: 2 5 w= 12

9: 3 4 w= 15

10: 4 5 w= 3

11: 4 7 w= 5

12: 5 6 w= 8

13: 5 7 w= 16

14: 6 7 w= 7

# nodes: 8

Results

Node 0: dist= 0 prNode= 0

Node 3: dist= 5 prNode= 0

Node 2: dist= 9 prNode= 3

Node 1: dist= 11 prNode= 2

Node 5: dist= 15 prNode= 1

Node 6: dist= 17 prNode= 1

Node 4: dist= 18 prNode= 5

Node 7: dist= 23 prNode= 4

\*/

class FindPathDist

{

public static void main(String[] args)

{

WBranch[] a= new WBranch[40];

int nb;

int i;

int[][] netw = new int[40][40];

int nn, maxn;

//input a test graph

a[0]= new WBranch( 0, 1, 16);

a[1]= new WBranch( 0, 2, 10);

a[2]= new WBranch( 0, 3, 5);

a[3]= new WBranch( 1, 2, 2);

a[4]= new WBranch( 1, 5, 4);

a[5]= new WBranch( 1, 6, 6);

a[6]= new WBranch( 2, 3, 4);

a[7]= new WBranch( 2, 4, 10);

a[8]= new WBranch( 2, 5, 12);

a[9]= new WBranch( 3, 4, 15);

a[10]= new WBranch( 4, 5, 3);

a[11]= new WBranch( 4, 7, 5);

a[12]= new WBranch( 5, 6, 8);

a[13]= new WBranch( 5, 7, 16);

a[14]= new WBranch( 6, 7, 7);

nb=15;

System.out.printf("\n");

System.out.printf("Processing ..\n");

System.out.printf("# branches: %d\n", nb);

System.out.printf("list of branches:\n");

for( i=0; i<nb; i++)

{

System.out.printf("%3d: %3d %3d w=%3d\n", i, a[i].a, a[i].b, a[i].w);

}

maxn=0;

for(i=0; i<nb; i++)

{

netw[a[i].a][a[i].b]= a[i].w;

netw[a[i].b][a[i].a]= a[i].w;

if (a[i].a > maxn)

maxn=a[i].a;

if (a[i].b > maxn)

maxn=a[i].b;

}

nn= maxn + 1;

System.out.printf("# nodes: %d\n", nn);

ListNodes sNodes=new ListNodes();

ListNodes qNodes=new ListNodes();

Node sn;

int d;

for(i=0; i<nn; i++)

qNodes.addNode( i, 1000, 1000);

qNodes.nodes[0].dist= 0;

qNodes.nodes[0].prNodeId= 0;

while (qNodes.nn > 0)

{

sn= qNodes.removeFirstNode();

sNodes.addNode( sn);

for(i=0; i<qNodes.nn; i++)

{

d= netw[ sNodes.nodes[ sNodes.nn-1].nodeId] [ qNodes.nodes[i].nodeId ];

if (d !=0 )

{

if ( sNodes.nodes[ sNodes.nn-1].dist + d < qNodes.nodes[i].dist )

{

qNodes.nodes[i].dist = sNodes.nodes[ sNodes.nn-1].dist + d;

qNodes.nodes[i].prNodeId = sNodes.nodes[ sNodes.nn-1].nodeId;

}

}

}

qNodes.sortNodes();

}

System.out.println();

System.out.println("Results\n");

for(i=0; i<nn; i++)

System.out.printf( "Node %3d: dist=%3d prNode=%3d\n", sNodes.nodes[i].nodeId, sNodes.nodes[i].dist, sNodes.nodes[i].prNodeId);

}

}

----------------------------------------------

class ListNodes

{

Node[] nodes;

int nn;

public ListNodes()

{

nodes= new Node[40];

nn= 0;

}

public void addNode( int nx, int wx, int prx)

{

Node n;

n= new Node( nx, wx, prx);

nodes[ nn]= n;

nn= nn + 1;

}

public void addNode( Node x)

{

nodes[ nn]= x;

nn= nn + 1;

}

public void sortNodes()

{

Node t;

int i, j, jmin;

for(i=0; i<nn-1; i++)

{

jmin= i;

for(j=i+1; j<nn; j++)

{

if (nodes[j].dist < nodes[jmin].dist)

jmin=j;

}

t= nodes[jmin];

nodes[jmin]= nodes[i];

nodes[i]= t;

}

}

public Node removeFirstNode()

{

Node x;

int i;

x= nodes[0];

for(i=0; i<nn-1; i++)

{

nodes[i]= nodes[i+1];

}

nn= nn - 1;

return x;

}

}

---------------------------------------------

class Node

{

int nodeId;

int dist;

int prNodeId;

public Node( int id, int d, int pr)

{

nodeId= id;

dist= d;

prNodeId= pr;

}

}

---------------------------------------------

class WBranch

{

int a;

int b;

int w;

public WBranch( int x, int y, int w)

{

this.a= x;

this.b= y;

this.w= w;

}

}

Πρόγραμμα A-14: Πίνακας από αισθητήρες

Σχόλια: private data

class Sensor

{

private double[] temps= new double[24];

private String name;

public double getMaxTemp()

{

double max= temps[0];

for(int i=1; i<24; i++)

{

if (temps[i] > max)

max= temps[i];

}

return max;

}

public double getMinTemp()

{

double min= temps[0];

for(int i=1; i<24; i++)

{

if (temps[i] < min)

min= temps[i];

}

return min;

}

public double getTempAtH( int x)

{

return temps[ x];

}

public void setTempAtH( int x, double t)

{

temps[ x]= t;

}

public void setName( String s)

{

name= s;

}

public String getName()

{

return name;

}

}

-------------------------------------

import java.util.Scanner;

class TestSensors

{

static int NSensors = 5;

static Scanner inp = new Scanner( System.in);

static Sensor[] sensors= new Sensor[NSensors];

public static void readSensors()

{

String s;

double x;

int i, j;

for(i=0; i<NSensors; i++)

{

sensors[i]= new Sensor();

s= inp.nextLine();

sensors[i].setName( s);

for(j=0; j<24; j++)

{

x= inp.nextDouble();

{

sensors[i].setTempAtH( j, x);

}

}

inp.nextLine();

}

}

public static void printSensorsMinMaxTemps()

{

int i;

for(i=0; i<NSensors; i++)

{

System.out.println( sensors[i].getName() + ": " + sensors[i].getMinTemp() + " .. " + sensors[i].getMaxTemp());

}

} // end printSensorsMinMaxTemps

public static void main( String[] args)

{

readSensors();

printSensorsMinMaxTemps();

} // end main

}

Πρόγραμμα A-15: Ισομοίρασμα τυχαίων βαρών σε καλάθια

Σχόλια:

class Stone

{

int w;

int b;

public Stone( int w, int b)

{

this.w= w;

this.b= b;

}

}

------------------------------------------------

class Stones

{

Stone[] stonesArr= new Stone[100];

int nStones;

public Stones( int n, int maxW)

{

int i, w;

for(i=0; i<n; i++)

{

w= (int)(Math.random()\*maxW) + 1;

stonesArr[i]= new Stone( w, -1);

}

nStones= n;

}

public int findAvailStoneMaxW()

{

int i, maxw, imaxw;

maxw= -1;

imaxw= -1;

for(i=0; i<nStones; i++)

{

if (stonesArr[i].b == -1)

{

if (stonesArr[i].w > maxw)

{

maxw= stonesArr[i].w;

imaxw= i;

}

}

}

return imaxw;

}

public int calcBasketW(int x)

{

int i;

int bw;

bw= 0;

for(i=0; i<nStones; i++)

{

if (stonesArr[i].b == x)

{

bw= bw + stonesArr[i].w;

}

}

return bw;

}

public int findBasketMinW(int nb)

{

int i;

int minbw;

int iminbw;

minbw= calcBasketW( 0);

iminbw= 0;

for(i=0+1; i<nb; i++)

{

if ( calcBasketW( i) < minbw)

{

minbw= calcBasketW( i);

iminbw= i;

}

}

return iminbw;

}

public int findBasketMaxW(int nb)

{

int i;

int maxbw;

int imaxbw;

maxbw= calcBasketW( 0);

imaxbw= 0;

for(i=0+1; i<nb; i++)

{

if ( calcBasketW( i) > maxbw)

{

maxbw= calcBasketW( i);

imaxbw= i;

}

}

return imaxbw;

}

public void setStoneBasket( int x, int b)

{

stonesArr[x].b= b;

}

public void printBasket( int x)

{

int i;

System.out.printf("Basket %3d sum=%3d:", x, calcBasketW( x));

for(i=0; i<nStones; i++)

{

if (stonesArr[i].b == x)

{

System.out.printf("%3d", stonesArr[i].w);

}

}

System.out.printf("\n");

}

}

------------------------------------------------

class TestStones

{

public static void main( String[] args)

{

Stones stones= new Stones(20, 5);

int nBaskets= 3;

int i, ias, iminb;

do

{

ias= stones.findAvailStoneMaxW();

iminb= stones.findBasketMinW( nBaskets);

if (ias != -1)

{

stones.setStoneBasket( ias, iminb);

}

} while (ias != -1);

for(i=0; i<nBaskets; i++)

{

stones.printBasket( i);

}

}

}

Πρόγραμμα A-16: Pathfinder RPG character generation basics

Σχόλια:

class SixAbScores

{

int[] abArr= new int[ 6];

public void rollAb()

{

int i, xx;

for(i=0;i<6;i++)

{

abArr[i]= roll4d6Keep3();

}

sort();

}

private int roll4d6Keep3()

{

int[] dice = new int[4];

int i,x,j,t;

for(i=0; i<4; i++)

{

dice[i]= (int)(Math.random()\*6) + 1;

}

for(i=0;i<4-1;i++)

{

for(j=i+1;j<4;j++)

{

if(dice[i]<dice[j])

{

t=dice[i];

dice[i]=dice[j];

dice[j]=t;

} // end if

}// end for

}

x= dice[0]+dice[1]+dice[2];

return x;

}

private void sort()

{

int i, j, t;

for(i=0; i<6-1; i++)

{

for(j=i+1; j<6; j++)

{

if (abArr[i]<abArr[j])

{

t= abArr[i];

abArr[i]= abArr[j];

abArr[j]= t;

}

}

}

} // end sort

}

----------------------------------------------

class Archetype

{

String name;

int[] prefAb= new int[6];

int race;

int rclass1;

int level1;

int[] prefFeats= new int[10];

int nPrefFeats;

public Archetype( String s)

{

name= s;

race= 0;

rclass1= 0;

level1= 1;

nPrefFeats= 0;

}

public void setPrefAb( int a0, int a1, int a2, int a3, int a4, int a5)

{

prefAb[0]= a0;

prefAb[1]= a1;

prefAb[2]= a2;

prefAb[3]= a3;

prefAb[4]= a4;

prefAb[5]= a5;

}

}

----------------------------------------------

class Archetypes

{

public static final int IFIGHTER1= 0;

public static final int IFIGHTER2= 1;

public static final int IWIZARD1= 2;

Archetype[] aArr= new Archetype[3];

int nArchetypes;

public Archetypes()

{

Archetype a;

a= new Archetype( "fighter\_1");

a.setPrefAb( Abilities.ISTR,

Abilities.ICON,

Abilities.IDEX,

Abilities.IINT,

Abilities.IWIS,

Abilities.ICHA);

aArr[0]= a;

nArchetypes= 1;

a= new Archetype( "fighter\_2");

a.setPrefAb( Abilities.IDEX,

Abilities.ISTR,

Abilities.ICON,

Abilities.IINT,

Abilities.IWIS,

Abilities.ICHA);

aArr[1]= a;

nArchetypes= 2;

a= new Archetype( "wizard\_1");

a.setPrefAb( Abilities.IINT,

Abilities.IDEX,

Abilities.ICON,

Abilities.ISTR,

Abilities.IWIS,

Abilities.ICHA);

aArr[2]= a;

nArchetypes= 3;

}

}

----------------------------------------------

class Race

{

String name;

int[] abChanges= new int[ 6];

public Race( String s)

{

name= s;

}

public void setAbChanges( int a0, int a1, int a2, int a3, int a4, int a5)

{

abChanges[0]= a0;

abChanges[1]= a1;

abChanges[2]= a2;

abChanges[3]= a3;

abChanges[4]= a4;

abChanges[5]= a5;

}

}

----------------------------------------------

class Races

{

public static final int IHUMAN=0;

public static final int IDWARF=1;

Race[] racesArr= new Race[2];

int nRaces= 2;

public Races()

{

Race r;

r= new Race( "human");

// +2 to one ability

r.setAbChanges( 0, 0, 0, 0, 0, 0);

racesArr[ IHUMAN]= r;

r= new Race( "dwarf");

// +2 CON +2 WIS -2 CHA

r.setAbChanges( 0, 0, 2, 0, 2, -2);

racesArr[ IDWARF]= r;

}

}

----------------------------------------------

class Abilities

{

public static final int ISTR=0;

public static final int IDEX=1;

public static final int ICON=2;

public static final int IINT=3;

public static final int IWIS=4;

public static final int ICHA=5;

int[] abArr= new int[6];

public void set( SixAbScores a)

{

for(int i=0; i<6; i++)

{

abArr[ i]= a.abArr[i];

}

}

public void arrange( SixAbScores a, Archetype arche)

{

for(int i=0; i<6; i++)

{

abArr[ arche.prefAb[ i] ]= a.abArr[i];

}

}

public void print()

{

System.out.println( "STR: " + abArr[ISTR]);

System.out.println( "DEX: " + abArr[IDEX]);

System.out.println( "CON: " + abArr[ICON]);

System.out.println( "INT: " + abArr[IINT]);

System.out.println( "WIS: " + abArr[IWIS]);

System.out.println( "CHA: " + abArr[ICHA]);

}

public void applyRaceAbChanges( Race race)

{

int i;

for(i=0; i<6; i++)

{

abArr[i]= abArr[i] + race.abChanges[i];

}

}

public void applyRaceHumanAbChanges( int iab)

{

abArr[iab]= abArr[iab] + 2;

}

public int calcAbMod( int a)

{

int b, c;

b= (a - 10);

if (b >= 0)

c= b/2;

else

c= (b-1)/2;

return c;

}

public void printAbMod()

{

System.out.println( "STR: " + abArr[ISTR] + " " + calcAbMod(abArr[ISTR]) );

System.out.println( "DEX: " + abArr[IDEX] + " " + calcAbMod(abArr[IDEX]) );

System.out.println( "CON: " + abArr[ICON] + " " + calcAbMod(abArr[ICON]) );

System.out.println( "INT: " + abArr[IINT] + " " + calcAbMod(abArr[IINT]) );

System.out.println( "WIS: " + abArr[IWIS] + " " + calcAbMod(abArr[IWIS]) );

System.out.println( "CHA: " + abArr[ICHA] + " " + calcAbMod(abArr[ICHA]) );

}

}

----------------------------------------------

class Character

{

static Abilities ab= new Abilities();

static int iarchetype= Archetypes.IWIZARD1;

static int irace= Races.IDWARF;

public static void main( String[] args)

{

SixAbScores tempAb= new SixAbScores();

Archetypes archetypes= new Archetypes();

Races races= new Races();

System.out.println("Roll 4d6 keep 3");

tempAb.rollAb();

ab.set( tempAb);

ab.print();

System.out.println();

System.out.println("Apply Archetype: " + archetypes.aArr[ iarchetype].name );

ab.arrange( tempAb, archetypes.aArr[ iarchetype]);

ab.print();

System.out.println();

System.out.println("Apply race: " + races.racesArr[ irace].name);

if (irace != Races.IHUMAN)

{

ab.applyRaceAbChanges( races.racesArr[ irace]);

}

else

{

ab.applyRaceHumanAbChanges( archetypes.aArr[ iarchetype].prefAb[0]);

}

ab.print();

System.out.println();

System.out.println("Abilities and modifiers");

ab.printAbMod();

}

}

Πρόγραμμα A-17: Λύση τριωνύμου με Complex

Σχόλια:

class Complex

{

double real;

double imag;

public Complex( double re, double im)

{

real= re;

imag= im;

}

public Complex()

{

real= 0;

imag= 0;

}

public void set( double re, double im)

{

real= re;

imag= im;

}

public void copyFrom( Complex b)

{

real= b.real;

imag= b.imag;

}

public void print()

{

System.out.printf("(%5.2f, %5.2f)\n", real, imag);

}

public void add( Complex b)

{

real= real + b.real;

imag= imag + b.imag;

}

public void sub( Complex b)

{

real= real - b.real;

imag= imag - b.imag;

}

public void mult( Complex b)

{

real= real \* b.real - imag \* b.imag;

imag= imag \* b.real + real \* b.imag;

}

public void div( Complex b)

{

double d;

d= b.real \* b.real + b.imag \* b.imag;

real= (real \* b.real + imag \* b.imag) / d;

imag= (imag \* b.real - real \* b.imag) / d;

}

}

--------------------------------------------

import java.util.Scanner;

class Test\_Deut\_Complex

{

public static void main(String[] args)

{

Scanner input = new Scanner( System.in);

double a, b, c;

double d;

Complex r1= new Complex();

Complex r2= new Complex();

a= input.nextFloat();

b= input.nextFloat();

c= input.nextFloat();

deyt( a, b, c, r1, r2);

System.out.println("Lyseis:");

r1.print();

r2.print();

} // end main

public static void deyt( double a, double b, double c, Complex r1, Complex r2)

{

double d;

double x1, x2, y1, y2;

d= b\*b-4\*a\*c;

if (d>=0)

{

x1= (-b+Math.sqrt(d))/(2\*a);

x2= (-b-Math.sqrt(d))/(2\*a);

r1.set( x1, 0);

r2.set( x2, 0);

}

else

{

x1= -b/(2\*a);

y1= Math.sqrt(-d)/(2\*a);

x2= x1;

y2= -y1;

r1.set( x1, y1);

r2.set( x2, y2);

}

} // end deyt

}

Πρόγραμμα A-18: Μετατροπή σε binary

Σχόλια:

import java.util.Scanner;

class Test

{

public static void main(String[] args)

{

int [] a=new int[16];

int i,m;

Scanner input=new Scanner(System.in);

int p=input.nextInt();

for (i=0;i<=15;i++)

a[i]=0;

m=p%2;

p=p/2;

a[0]=m;

i=1;

while (p!=0)

{

m=p%2;

p=p/2;

a[i]=m;

i++;

}

for (i=15;i>=0;i--)

System.out.printf("%d",a[i]);

System.out.printf("\n");

}

}

Πρόγραμμα A-19: Αριθμοί Fibonacci

Σχόλια:

class Test\_1

{

public static void main(String[] args)

{

int[]f=new int[40];

int i;

f[0]=1;

f[1]=1;

for(i=2 ; i<40;i++)

{

f[i]=f[i-1]+f[i-2];

}

for(i=0; i<40;i++)

{

System.out.println(f[i]);

}

}

}

Πρόγραμμα A-20: Εύρεση ΜΚΔ δύο αριθμών

Σχόλια:

import java.util.Scanner;

class Test\_2

{

public static void main(String[] args)

{

Scanner inp=new Scanner( System.in);

int a,b,i,y1,y2,m;

a=inp.nextInt();

b=inp.nextInt();

m=1;

for(i=1; i<=a; i++)

{

y1=a%i;

y2=b%i;

if((y1==0)&&(y2==0))

{ m=i;

}

}

System.out.println(m);

inp.close();

}

}

Πρόγραμμα A-21: Εύρεση max σε ένα πίνακα και τη θέση

Σχόλια:

import java.util.Scanner;

class Test\_3

{

public static void main(String[] args)

{

Scanner inp=new Scanner(System.in);

int[]a = new int[10];

int i,max,imax;

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

{

a[i]=inp.nextInt();

}

max=a[0]; imax=0;

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

{

if (max<a[i])

{

max=a[i];

imax=i;

}

}

System.out.println("To max ="+max);

System.out.println("sth thesh "+imax);

inp.close();

}

}

Πρόγραμμα A-22: Άθροισμα κλασμάτων

Σχόλια:

import java.util.Scanner;

class Test\_4

{

public static void main(String[] args)

{

int a,b,c,d,e,f,ee,ff,m;

Scanner inp=new Scanner(System.in);

System.out.println("Dwse ta 2klasmata");

a=inp.nextInt();

b=inp.nextInt();

c=inp.nextInt();

d=inp.nextInt();

e=a\*d+c\*b;

f=b\*d;

m=mkd(e,f);

ee=e/m;

ff=f/m;

System.out.println(ee+"/"+ff);

inp.close();

}

public static int mkd(int a,int b)

{

int i,y1,y2,m;

m=1;

for(i=1; i<=a; i++)

{

y1=a%i;

y2=b%i;

if((y1==0)&&(y2==0))

{ m=i;

}

}

return m;

}

}

Πρόγραμμα A-23: Εύρεση των 100 πρώτων πρώτων αριθμών

Σχόλια:

class Test\_5

{

public static void main(String[] args)

{

int c,x,np,i;

int[] p= new int[100];

np=0;

c=1;

while(np<100)

{

x=checkPrime(c);

if (x==1)

{

p[np]=c;

np=np+1;;

}

c=c+1;

}

for(i=0;i<100;i++)

{ System.out.println(p[i]);

}

}

public static int checkPrime(int a)

{

int i,y;

if(a==1)

return 0;

for(i=2;i<=a/2;i++)

{

y=a%i;

if(y==0)

return 0;

}

return 1;

}

}

Πρόγραμμα A-24: Αντικείμενα

Σχόλια:

class Item

{

String code;

double price;

double fpa;

public Item( String code, double pr, double fpa)

{

this.code=code;

this.price=pr;

this.fpa=fpa;

}

}

-----------------------------------------------------------------

import java.util.Scanner;

class Test\_6

{

public static void main(String[] args)

{

Item[] items=new Item[10];

Scanner inp=new Scanner(System.in);

double total, totalfpa;

String c;

Item x;

int pos;

double cost, costfpa;

items[0]=new Item("k01",3.0,0.24);

items[1]=new Item("k02",4.5,0.24);

items[2]=new Item("z01",3.0,0.19);

items[3]=new Item("z02",2.0,0.1);

items[4]=new Item("w01",1.0,0.3);

items[5]=new Item("w02",6.0,0.6);

items[6]=new Item("t01",9.0,0.4);

items[7]=new Item("t02",3.0,0.6);

items[8]=new Item("g02",5.0,0.7);

items[9]=new Item("h01",1.0,0.2);

total=0;

totalfpa=0;

do

{

System.out.println("Dwse kwdiko kai posothta");

c=inp.nextLine();

if(!c.equals("0"))

{

x=findItem(items,c);

if(x != null)

{

pos=inp.nextInt(); inp.nextLine();

cost=pos\*x.price;

costfpa=cost\*x.fpa;

System.out.println("Cost: " + cost + " fpa: "+costfpa);

total=total+cost;

totalfpa=totalfpa+costfpa;

}

}

} while(!c.equals("0"));

System.out.println("Synolo: " + total + " fpa: " + totalfpa);

inp.close();

}

public static Item findItem( Item[] items, String c)

{

int i;

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

{

if(items[i].code.equals( c) )

{

return items[i];

}

}

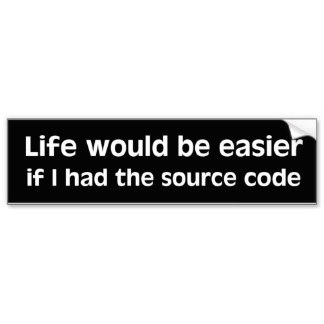
return null;

}

}

ΣΥΛΛΟΓΗ ΑΠΛΩΝ ΠΡΟΓΡΑΜΜΑΤΩΝ

ΜΕΡΟΣ B: ΓΡΑΦΙΚΑ



Πρόγραμμα B-1: Εφαρμογή Φυσικής, νόμος της παγκόσμιας έλξης

Σχόλια:

/\*\*

\* Project: Physics\_1

\*

\*/

package java\_physics\_1;

import java.awt.\*;

import javax.swing.\*;

import java.awt.image.\*;

import javax.imageio.\*;

import java.io.\*;

public class Java\_physics\_1 extends JFrame

{

static int wxsize= 800;

static int wysize= 800;

static BufferedImage buffer= new BufferedImage( wxsize, wysize, BufferedImage.TYPE\_INT\_RGB);

public static void gravforce( Vector2d fv, Obj obj1, Obj obj2)

{

Vector2d r3v= new Vector2d();

double r3, f, G;

G=1;

/\* dianysma apo m1 pros m2 \*/

r3v.setppv( obj1.rv, obj2.rv);

r3= r3v.radiald();

/\* an r3 poly mikro exoume collision opote ta akinhtopoioume pros to paron \*/

if (r3 < 0.1)

{

obj1.movable=0;

obj2.movable=0;

}

/\* metro ths F \*/

f= (G\*obj1.m\*obj2.m)/Math.pow(r3,2);

/\* monadiaio dianysma apo m1 pros m2 \*/

r3v.norm();

/\* dianysma ths F (metro epi to monadiaio dianysma m1 pros m2 \*/

fv.setkmultv( f, r3v);

}

public static void simulate( Vector2d [][] p, Obj [] objs, double dt, int n)

{

double t;

int i,j,k;

Vector2d fv= new Vector2d();

Vector2d sfv= new Vector2d();

t=0;

for( i=0; i<n; i++)

{

t= 0 + i\*dt;

for( k= 0; k<3; k++)

{

/\* ylologismos ths synistamenhs SF panw sto obj k \*/

sfv.setv( 0, 0);

for( j= 0; j<3; j++)

{

if (j != k)

{

gravforce( fv, objs[k], objs[j]);

sfv.setaddv( sfv, fv);

}

}

objs[k].move( sfv, dt);

}

for( k= 0; k<3; k++)

{

objs[k].rv.setcopyv( objs[k].nextrv);

p[k][i]= new Vector2d();

p[k][i].setcopyv( objs[k].rv);

}

}

}

public static void copyPArrFromPMArr( Vector2d [] p, Vector2d[][] pm, int k, int npoints)

{

int i;

for(i=0; i<npoints; i++)

p[i]= pm[k][i];

}

public static void plotp( PlotPoint pp,

double x, double y,

double xmin, double xmax, double ymin, double ymax,

int xsize, int ysize)

{ int xp, yp;

xp= (int) Math.round(xsize\*((x-xmin)/(xmax-xmin)) );

yp= (int) Math.round(ysize - ysize\*((y-ymin)/(ymax-ymin)) );

pp.x= xp;

pp.y= yp;

}

public static void plotOrbit( Graphics g, Vector2d [] p, Obj [] objs, Color orbitcolor, int npoints,

double xmin, double xmax, double ymin, double ymax)

{

int xp, yp;

int i;

PlotPoint pp= new PlotPoint();

PlotPoint pp2= new PlotPoint();

/\* draw the x and y axis \*/

g.setColor(Color.BLACK);

plotp( pp, xmin, 0, xmin, xmax, ymin, ymax, wxsize, wysize);

plotp( pp2, xmax, 0, xmin, xmax, ymin, ymax, wxsize, wysize);

g.drawLine( pp.x, pp.y, pp2.x, pp2.y);

plotp( pp, 0, ymin, xmin, xmax, ymin, ymax, wxsize, wysize);

plotp( pp2, 0, ymax, xmin, xmax, ymin, ymax, wxsize, wysize);

g.drawLine( pp.x, pp.y, pp2.x, pp2.y);

g.setColor(Color.RED);

for( i= 0; i<3; i++)

{

plotp( pp, objs[i].rv.x, objs[i].rv.y, xmin, xmax, ymin, ymax, wxsize, wysize);

g.drawOval( pp.x, pp.y, 4, 4);

}

g.setColor( orbitcolor);

for( i= 0; i<npoints; i++)

{

plotp( pp, p[i].x, p[i].y, xmin, xmax, ymin, ymax, wxsize, wysize);

g.drawOval( pp.x, pp.y, 4, 4);

}

}

public void paint( Graphics g)

{

super.paint( g);

g.drawImage( buffer, 0, 0, null);

}

public static void main(String[] args)

{

Java\_physics\_1 F= new Java\_physics\_1();

int i;

int NN= 60000;

Vector2d[] p= new Vector2d[ NN];

Vector2d[][] pm= new Vector2d[ 3][ NN];

Obj[] objs= new Obj[3];

double xmin= -10;

double xmax= 80;

double ymin= -30;

double ymax= 60;

F.setDefaultCloseOperation( JFrame.EXIT\_ON\_CLOSE);

F.setSize( wxsize, wysize);

F.setVisible(true);

Graphics bufferg= buffer.getGraphics();

bufferg.setColor(Color.WHITE);

bufferg.fillRect(0,0,wxsize,wysize);

bufferg.setColor(Color.BLACK);

bufferg.setFont(new Font("CourierNew", Font.PLAIN, 10));

bufferg.drawString("Physics\_1", 20, 60);

objs[0]= new Obj();

objs[1]= new Obj();

objs[2]= new Obj();

/\* peiramata me 1 movable kai 2 hlious \*/

/\*

objs[0].set( 500, 34, 5, 0, 0, 0);

objs[1].set( 1, 4, 5, 0, 7.07, 1);

objs[2].set( 500, 14, 5, 0, 0, 0);

simulate( pm, objs, 0.001, NN);

copyPArrFromPMArr( p, pm, 1, NN);

plotOrbit( bufferg, p, objs, Color.BLUE, NN, xmin, xmax, ymin, ymax);

copyPArrFromPMArr( p, pm, 2, NN);

plotOrbit( bufferg, p, objs, Color.RED, NN, xmin, xmax, ymin, ymax);

\*/

/\* peiramata me 2 movable \*/

/\*

objs[0].set( 0, 0, 0, 0, 0, 0);

objs[2].set( 500, 14, 5, 0, 0, 1);

objs[1].set( 1, 4, 5, 0, 9, 1);

simulate( pm, objs, 0.001, NN);

copyPArrFromPMArr( p, pm, 1, NN);

plotOrbit( bufferg, p, objs, Color.BLUE, NN, xmin, xmax, ymin, ymax);

copyPArrFromPMArr( p, pm, 2, NN);

plotOrbit( bufferg, p, objs, Color.RED, NN, xmin, xmax, ymin, ymax);

\*/

/\* peiramata me 4 troxies me u=(0, 9) (0, 7.07) (0, 10) (0, 4) \*/

/\*\*/

objs[0].set( 0, 0, 0, 0, 0, 0);

objs[2].set( 500, 14, 5, 0, 0, 0);

objs[1].set( 1, 4, 5, 0, 9, 1);

simulate( pm, objs, 0.001, NN);

copyPArrFromPMArr( p, pm, 1, NN);

plotOrbit( bufferg, p, objs, Color.BLUE, NN, xmin, xmax, ymin, ymax);

objs[1].set( 1, 4, 5, 0, 7.07, 1);

simulate( pm, objs, 0.001, NN);

copyPArrFromPMArr( p, pm, 1, NN);

plotOrbit( bufferg, p, objs, Color.RED, NN, xmin, xmax, ymin, ymax);

objs[1].set( 1, 4, 5, 0, 10, 1);

simulate( pm, objs, 0.001, NN);

copyPArrFromPMArr( p, pm, 1, NN);

plotOrbit( bufferg, p, objs, Color.GREEN, NN, xmin, xmax, ymin, ymax);

objs[1].set( 1, 4, 5, 0, 4, 1);

simulate( pm, objs, 0.001, NN);

copyPArrFromPMArr( p, pm, 1, NN);

plotOrbit( bufferg, p, objs, Color.YELLOW, NN, xmin, xmax, ymin, ymax);

/\*\*/

/\* write image to file \*/

File outputfile = new File("orbit2.jpg");

try {

ImageIO.write(buffer, "jpg", outputfile);

} catch (IOException ex) {}

F.repaint();

}

}

/\*\*

\* Project: Physics\_1

\*

\*/

package java\_physics\_1;

public class Obj {

double m;

Vector2d av;

Vector2d uv;

Vector2d rv;

Vector2d nextrv;

int movable;

public Obj()

{

m= 0;

rv = new Vector2d( 0, 0);

uv = new Vector2d( 0, 0);

av = new Vector2d( 0, 0);

nextrv = new Vector2d( 0, 0);

movable= 0;

}

public void set( double m1,

double rvx, double rvy,

double uvx, double uvy,

int mov)

{

m=m1;

rv.setv( rvx, rvy);

uv.setv( uvx, uvy);

av.setv( 0, 0);

movable= mov;

}

public void move( Vector2d fv, double dt)

{

Vector2d du= new Vector2d();

Vector2d dr= new Vector2d();

if (movable == 0)

{

nextrv.setcopyv( rv);

return;

}

else

{

/\* a = F/m \*/

av.setkmultv( 1/m, fv);

/\* du = a \* dt \*/

du.setkmultv( dt, av);

uv.setaddv( uv, du);

/\* dr = u \* dt \*/

dr.setkmultv( dt, uv);

/\* r = r + dr \*/

nextrv.setaddv( rv, dr);

}

}

}

/\*\*

\* Project: Physics\_1

\*

\*/

package java\_physics\_1;

public class PlotPoint {

int x;

int y;

PlotPoint()

{ x=0;

y=0;

}

}

/\*\*

\* Project: Physics\_1

\*

\*/

package java\_physics\_1;

public class Vector2d {

double x;

double y;

public Vector2d()

{ x= 0;

y= 0;

}

public Vector2d( double xcor, double ycor)

{

x= xcor;

y= ycor;

}

public double radiald()

{ double r;

r= Math.sqrt( Math.pow(x,2) + Math.pow(y,2));

return r;

}

public void norm()

{

double r;

r= radiald();

x= x/r;

y= y/r;

}

public void setcopyv( Vector2d a)

{ x= a.x;

y= a.y;

}

public void setv( double xcor, double ycor)

{ x= xcor;

y= ycor;

}

public void setaddv( Vector2d a, Vector2d b)

{ x= a.x + b.x;

y= a.y + b.y;

}

public void setkmultv( double k, Vector2d a)

{ x= k\*a.x;

y= k\*a.y;

}

public void setppv( Vector2d r1, Vector2d r2)

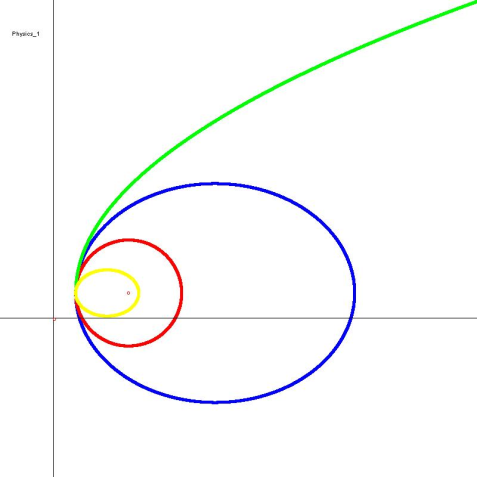
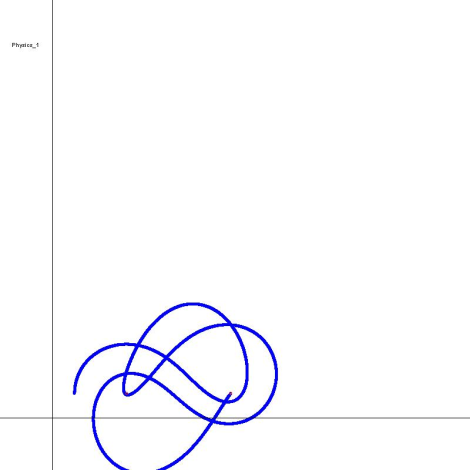
{ x= r2.x-r1.x;

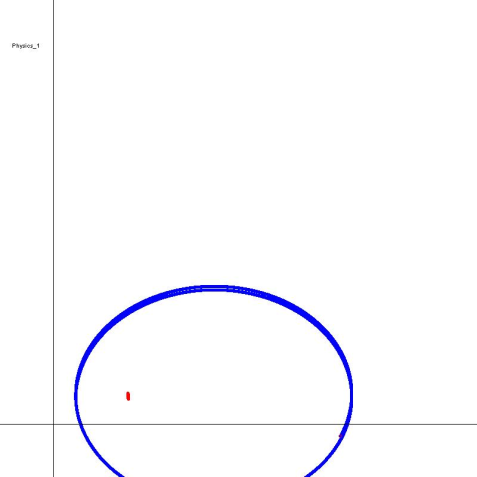
y= r2.y-r1.y;

}

}

Αποτελέσματα:



Πρόγραμμα B-2: Γραφικές παραστάσεις

Σχόλια:

/\*\*

\* Project: Plot

\*

\*/

package java\_fplot;

import java.awt.\*;

import javax.swing.\*;

import java.awt.image.\*;

import javax.imageio.\*;

import java.io.\*;

public class JavaFPlot extends JFrame

{

static int wxsize= 800;

static int wysize= 800;

static BufferedImage buffer= new BufferedImage( wxsize, wysize, BufferedImage.TYPE\_INT\_RGB);

public static void plotp( PlotPoint pp,

double x, double y,

double xmin, double ymin, double xmax, double ymax,

int xsize, int ysize)

{ int xp, yp;

xp= (int) Math.round(xsize\*((x-xmin)/(xmax-xmin)) );

yp= (int) Math.round(ysize - ysize\*((y-ymin)/(ymax-ymin)) );

pp.x= xp;

pp.y= yp;

}

public static double calcYmin( Point2d [] p, int np)

{ int i;

double ymin;

ymin= p[0].y;

for(i=0; i<np; i++)

{

if (p[i].y < ymin)

{

ymin= p[i].y;

}

}

return ymin;

}

public static double calcYmax( Point2d [] p, int np)

{ int i;

double ymax;

ymax= p[0].y;

for(i=0; i<np; i++)

{

if (p[i].y > ymax)

{

ymax= p[i].y;

}

}

return ymax;

}

public static void plot( Graphics g, Point2d [] p, int np, Color pcolor,

double xmin, double ymin, double xmax, double ymax,

int pSizex, int pSizey)

{

int xp, yp;

int i, ix, iy;

PlotPoint pp= new PlotPoint();

PlotPoint pp2= new PlotPoint();

double xx, yy;

int ixmm, iymm;

/\* draw the x and y axis \*/

g.setColor(Color.BLACK);

plotp( pp, xmin, 0, xmin, ymin, xmax, ymax, pSizex, pSizey);

plotp( pp2, xmax, 0, xmin, ymin, xmax, ymax, pSizex, pSizey);

g.drawLine( pp.x, pp.y, pp2.x, pp2.y);

plotp( pp, 0, ymin, xmin, ymin, xmax, ymax, pSizex, pSizey);

plotp( pp2, 0, ymax, xmin, ymin, xmax, ymax, pSizex, pSizey);

g.drawLine( pp.x, pp.y, pp2.x, pp2.y);

ixmm= (int)(xmax-xmin);

for(i=0; i< ixmm; i++)

{

xx= Math.round( xmin) + i;

plotp( pp, xx, 0, xmin, ymin, xmax, ymax, pSizex, pSizey);

g.drawLine( pp.x, pp.y, pp.x, pp.y-2);

if ( (int)xx%10 == 0)

{

g.drawLine( pp.x, pp.y, pp.x, pp.y-4);

}

}

iymm= (int)(ymax-ymin);

for(i=0; i< iymm; i++)

{

yy= Math.round( ymin) + i;

plotp( pp, 0, yy, xmin, ymin, xmax, ymax, pSizex, pSizey);

g.drawLine( pp.x, pp.y, pp.x+2, pp.y);

if ( (int)yy%10 == 0)

{

g.drawLine( pp.x, pp.y, pp.x+4, pp.y);

}

}

/\* draw the np points \*/

g.setColor( pcolor);

for( i= 0; i<np; i++)

{

plotp( pp, p[i].x, p[i].y, xmin, ymin, xmax, ymax, pSizex, pSizey);

g.drawOval( pp.x, pp.y, 2, 2);

}

}

public void paint( Graphics g)

{

super.paint( g);

g.drawImage( buffer, 0, 0, null);

}

static double ff( double x)

{

double y;

try {

y= (double)1/40\*(x+5)\*(x-3)\*(x-10)\*Math.cos(x)/(x-7);

} catch( ArithmeticException ex) {y=0;}

return y;

}

public static void main(String[] args)

{

JavaFPlot F= new JavaFPlot();

int i;

double x, dx;

int NN= 10000;

Point2d[] p= new Point2d[ NN];

double xmin, xmax, ymin, ymax;

F.setDefaultCloseOperation( JFrame.EXIT\_ON\_CLOSE);

F.setSize( wxsize, wysize);

F.setVisible(true);

Graphics bufferg= buffer.getGraphics();

bufferg.setColor(Color.WHITE);

bufferg.fillRect( 0, 0, wxsize, wysize);

xmin= -10;

xmax= 20;

dx= (xmax - xmin)/NN;

for(i=0; i<NN; i++)

{

x= xmin + i\*dx;

p[i]= new Point2d( x, ff(x));

}

ymin=Math.max( calcYmin( p, NN), -10.0);

ymax=Math.min( calcYmax( p, NN), 10.0);

plot( bufferg, p, NN, Color.BLUE, xmin, ymin, xmax, ymax, wxsize, wysize);

/\* write image to file \*/

File outputfile = new File("plot1.jpg");

try {

ImageIO.write(buffer, "jpg", outputfile);

} catch (IOException ex) {}

F.repaint();

}

}

/\*\*

\* Project: Plot

\*

\*/

package java\_fplot;

public class PlotPoint {

int x;

int y;

PlotPoint()

{ x=0;

y=0;

}

}

/\*\*

\* Project: Plot

\*

\*/

package java\_fplot;

public class Point2d {

double x;

double y;

public Point2d()

{ x= 0;

y= 0;

}

public Point2d( double xcor, double ycor)

{ x= xcor;

y= ycor;

}

public void setcopyv( Point2d a)

{ x= a.x;

y= a.y;

}

public void setv( double xcor, double ycor)

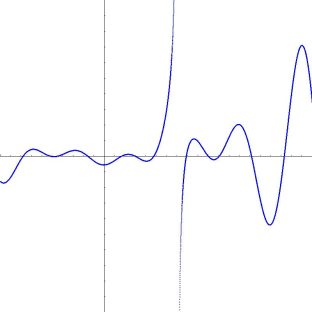
{ x= xcor;

y= ycor;

}

}

Αποτελέσματα:



Πρόγραμμα B-3: Επίδειξη χρήσης γραφικών

Σχόλια:

/\*\*

\* Project: TestDraw

\*

\*/

import java.awt.Color;

import java.awt.Graphics;

public class MyLine

{

private int x1;

private int y1;

private int x2;

private int y2;

private Color myColor;

public MyLine( int x1, int y1, int x2, int y2, Color color)

{

this.x1 = x1;

this.y1 = y1;

this.x2 = x2;

this.y2 = y2;

myColor = color ;

}

public void draw( Graphics g)

{

g.setColor( myColor);

g.drawLine( x1, y1, x2, y2);

}

}

/\*\*

\* Project: TestDraw

\*

\*/

import java.awt.Color;

import java.awt.Graphics;

import java.util.Random;

import javax.swing.JPanel;

public class DrawPanel extends JPanel

{

private Random randomNumbers = new Random();

private MyLine[] lines= new MyLine[100];

private int nlines=0;

public DrawPanel()

{

setBackground( Color.WHITE );

// 10 tyxaies grammes

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

{

int x1 = randomNumbers.nextInt( 300 );

int y1 = randomNumbers.nextInt( 300 );

int x2 = randomNumbers.nextInt( 300 );

int y2 = randomNumbers.nextInt( 300 );

Color color = new Color( randomNumbers.nextInt(10),randomNumbers.nextInt(10), randomNumbers.nextInt(10));

lines [ count ] = new MyLine( x1, y1, x2, y2, color );

}

nlines= 10;

}

public void addLine( int x1, int y1, int x2, int y2, Color c)

{

MyLine a;

a= new MyLine( x1, y1, x2, y2, c);

lines[ nlines]= a;

nlines= nlines + 1;

}

public void paintComponent(Graphics g)

{

int i;

super.paintComponent( g );

for ( i=0; i<nlines; i++)

lines[i].draw( g);

}

}

/\*\*

\* Project: TestDraw

\*

\*/

import javax.swing.JFrame;

import java.awt.Graphics;

import java.awt.Color;

public class TestDraw

{

public static void main( String[] args )

{ DrawPanel panel = new DrawPanel();

JFrame application = new JFrame();

application.setDefaultCloseOperation( JFrame.EXIT\_ON\_CLOSE );

application.add( panel );

application.setSize( 300, 300 );

application.setVisible( true );

//Note: lanthasmenos tropos ( PROSOXI h paintComponent kaleitai

//apo to OS )

/\*

Graphics g;

g= panel.getGraphics();

Color color = new Color( 255, 0, 0);

MyLine a;

a= new MyLine( 0, 0, 300, 300, color);

a.draw( g);

application.repaint();

\*/

// end note

//Swstos tropos:

Color color = new Color( 255, 0, 0);

panel.addLine( 0, 0, 300, 300, color);

application.repaint();

}

}

Πρόγραμμα B-4: Επίδειξη κίνησης αντικειμένου

Σχόλια:

import java.awt.\*;

import javax.swing.\*;

import java.awt.image.\*;

public class Test\_delay extends JFrame

{

static int wxsize= 800;

static int wysize= 800;

static BufferedImage buffer= new BufferedImage( wxsize, wysize, BufferedImage.TYPE\_INT\_RGB);

public static void drawBall( Graphics g,

double x, double y,

double xmin, double xmax, double ymin, double ymax,

int xsize, int ysize)

{ int xp, yp;

xp= (int) Math.round(xsize\*((x-xmin)/(xmax-xmin)) );

yp= (int) Math.round(ysize - ysize\*((y-ymin)/(ymax-ymin)) );

g.drawOval( xp, yp, 20, 20);

}

public void paint( Graphics g)

{

super.paint( g);

g.drawImage( buffer, 0, 0, null);

}

public static void clearImage( Graphics img)

{

Color t;

t= img.getColor();

img.setColor(Color.WHITE);

img.fillRect(0,0,wxsize,wysize);

img.setColor( t);

}

public static void main(String[] args) throws InterruptedException

{

Test\_delay F= new Test\_delay();

int i;

// diko mas systhma syntetagmenwn

double xmin= -10;

double xmax= 80;

double ymin= -30;

double ymax= 60;

// metablhtes gia th troxia mas

double x, y;

double g, u, theta, ux, uy, h, t, dt;

F.setDefaultCloseOperation( JFrame.EXIT\_ON\_CLOSE);

F.setSize( wxsize, wysize);

F.setVisible(true);

Graphics bufferg= buffer.getGraphics();

bufferg.setColor(Color.BLACK);

// ypologismos gia to draw twn aksonwn

y= 0;

x=xmin;

int xp1= (int) Math.round(wxsize\*((x-xmin)/(xmax-xmin)) );

int yp1= (int) Math.round(wysize - wysize\*((y-ymin)/(ymax-ymin)) );

y= 0;

x=xmax;

int xp2= (int) Math.round(wxsize\*((x-xmin)/(xmax-xmin)) );

int yp2= (int) Math.round(wysize - wysize\*((y-ymin)/(ymax-ymin)) );

y= ymin;

x= 0;

int xp3= (int) Math.round(wxsize\*((x-xmin)/(xmax-xmin)) );

int yp3= (int) Math.round(wysize - wysize\*((y-ymin)/(ymax-ymin)) );

y= ymax;

x= 0;

int xp4= (int) Math.round(wxsize\*((x-xmin)/(xmax-xmin)) );

int yp4= (int) Math.round(wysize - wysize\*((y-ymin)/(ymax-ymin)) );

// stoixeia ths bolhs ths ball

g=9.81;

u=20;

theta=0.50;

ux=u\*Math.cos(theta);

uy=u\*Math.sin(theta);

h=20;

t=0;

dt=0.05;

do

{

x= ux\*t;

y= h + uy\*t - (g\*t\*t)/2;

t=t+dt;

clearImage( bufferg);

bufferg.drawLine( xp1, yp1, xp2, yp2);

bufferg.drawLine( xp3, yp3, xp4, yp4);

drawBall( bufferg, x, y, xmin, xmax, ymin, ymax, wxsize, wysize);

F.repaint();

Thread.sleep(200);

} while (y>0);

}

}

Πρόγραμμα B-5: Επίδειξη κίνησης αντικειμένου με το πληκτρολόγιο

Σχόλια:

import java.awt.\*;

import javax.swing.\*;

import java.awt.image.\*;

import java.awt.event.\*;

public class Test\_keyboard extends JFrame implements KeyListener

{

static int wxsize= 800;

static int wysize= 800;

// diko mas systhma syntetagmenwn

static double xmin= -10;

static double xmax= 80;

static double ymin= -30;

static double ymax= 60;

// global thesi ths ball kai taxythta

static double xb=0;

static double yb=0;

static double vball= 5;

// gia na typwnei tous aksones

static int xp1, yp1, xp2, yp2, xp3, yp3, xp4, yp4;

// buffered image

static BufferedImage buffer= new BufferedImage( wxsize, wysize, BufferedImage.TYPE\_INT\_RGB);

public Test\_keyboard()

{

super("Test Keyboard");

double x, y;

// ypologismos gia to draw twn aksonwn

y= 0;

x=xmin;

xp1= (int) Math.round(wxsize\*((x-xmin)/(xmax-xmin)) );

yp1= (int) Math.round(wysize - wysize\*((y-ymin)/(ymax-ymin)) );

y= 0;

x=xmax;

xp2= (int) Math.round(wxsize\*((x-xmin)/(xmax-xmin)) );

yp2= (int) Math.round(wysize - wysize\*((y-ymin)/(ymax-ymin)) );

y= ymin;

x= 0;

xp3= (int) Math.round(wxsize\*((x-xmin)/(xmax-xmin)) );

yp3= (int) Math.round(wysize - wysize\*((y-ymin)/(ymax-ymin)) );

y= ymax;

x= 0;

xp4= (int) Math.round(wxsize\*((x-xmin)/(xmax-xmin)) );

yp4= (int) Math.round(wysize - wysize\*((y-ymin)/(ymax-ymin)) );

addKeyListener(this);

}

public void keyPressed(KeyEvent e)

{

if (e.getKeyChar() == 'w')

{

xb= xb;

yb= yb + vball;

}

if (e.getKeyChar() == 's')

{

xb= xb;

yb= yb - vball;

}

if (e.getKeyChar() == 'a')

{

xb= xb - vball;

yb= yb;

}

if (e.getKeyChar() == 'd')

{

xb= xb + vball;

yb= yb;

}

if (e.getKeyChar() == 'x')

{

vball= vball + 1;

}

if (e.getKeyChar() == 'z')

{

if (vball>0)

vball= vball - 1;

}

Graphics bufferg= buffer.getGraphics();

clearImage( bufferg);

bufferg.setColor(Color.BLACK);

drawAxes( bufferg);

drawBall( bufferg, xb, yb);

bufferg.drawString( "("+xb+","+yb+"), v="+vball, 20, 60);

repaint();

}

public void keyReleased(KeyEvent e){}

public void keyTyped(KeyEvent e){}

public static void drawBall( Graphics g,

double x, double y)

{

int xp, yp;

xp= (int) Math.round(wxsize\*((x-xmin)/(xmax-xmin)) );

yp= (int) Math.round(wysize - wysize\*((y-ymin)/(ymax-ymin)) );

g.drawOval( xp-10, yp-10, 20, 20);

}

public static void drawAxes( Graphics g)

{

g.drawLine( xp1, yp1, xp2, yp2);

g.drawLine( xp3, yp3, xp4, yp4);

}

public void paint( Graphics g)

{

super.paint( g);

g.drawImage( buffer, 0, 0, null);

}

public static void clearImage( Graphics img)

{

Color t;

t= img.getColor();

img.setColor(Color.WHITE);

img.fillRect(0,0,wxsize,wysize);

img.setColor( t);

}

public static void main(String[] args)

{

Test\_keyboard F= new Test\_keyboard();

F.setDefaultCloseOperation( JFrame.EXIT\_ON\_CLOSE);

F.setSize( wxsize, wysize);

F.setVisible(true);

Graphics bufferg= buffer.getGraphics();

clearImage( bufferg);

bufferg.setColor(Color.BLACK);

drawAxes( bufferg);

drawBall( bufferg, xb, yb);

bufferg.drawString( "("+xb+","+yb+"), v="+vball, 20, 60);

F.repaint();

}

}

ΣΥΛΛΟΓΗ ΑΠΛΩΝ ΠΡΟΓΡΑΜΜΑΤΩΝ

ΜΕΡΟΣ C: ΣΤΟΙΧΕΙΑ GUI

Πρόγραμμα C-1: Επίδειξη χρήσης awt components

Σχόλια:

import java.awt.\*;

import java.awt.event.\*;

public class Test\_awtFrame\_Diairetes extends Frame implements WindowListener, ActionListener

{

TextField textinp= new TextField(10);

Button button1;

TextField textout = new TextField(40);

TextArea textArea = new TextArea(10, 60);

public static void main(String[] args)

{

Test\_awtFrame\_Diairetes myWindow = new Test\_awtFrame\_Diairetes("Diairetes GUI");

myWindow.setSize(600,400);

myWindow.setVisible(true);

}

public Test\_awtFrame\_Diairetes( String title)

{

super( title);

setLayout( new FlowLayout() );

addWindowListener(this);

add(textinp);

button1 = new Button("Eyresh diairetwn");

add(button1);

// kanei th forma na akousei to ActionEvenτ poy paragei to button sto onclick

button1.addActionListener(this);

add(textout);

add(textArea);

textArea.append("Apotelesmata\n");

}

// h forma ylopoiei to ActionListener interface

public void actionPerformed(ActionEvent e)

{

String s, s2;

int n, i;

s= textinp.getText();

n= Integer.parseInt( s);

s2="";

for(i=1; i<=n; i++)

{

if( n%i==0)

{

s2= s2 + " " + Integer.toString( i);

}

}

textout.setText( s2 );

textArea.append(n+":"+s2+"\n");

}

public void windowClosing(WindowEvent e)

{

dispose();

System.exit(0);

}

public void windowOpened(WindowEvent e) {}

public void windowActivated(WindowEvent e) {}

public void windowIconified(WindowEvent e) {}

public void windowDeiconified(WindowEvent e) {}

public void windowDeactivated(WindowEvent e) {}

public void windowClosed(WindowEvent e) {}

}

-----------------------------------------------------------------

Αν προσθέσουμε και ένα δεύτερο button πρέπει να ξεχωρίσουμε την πηγή

import java.awt.\*;

import java.awt.event.\*;

public class Test\_awtFrame\_DiairetesPol extends Frame implements WindowListener, ActionListener

{

TextField textinp= new TextField(10);

Button button1;

TextField textout = new TextField(40);

TextArea textArea = new TextArea(10, 80);

Button button2;

public static void main(String[] args)

{

Test\_awtFrame\_DiairetesPol myWindow = new Test\_awtFrame\_DiairetesPol("DiairetesPol GUI");

myWindow.setSize(600,400);

myWindow.setVisible(true);

}

public Test\_awtFrame\_DiairetesPol( String title)

{

super( title);

setLayout( new FlowLayout() );

addWindowListener(this);

add(textinp);

button1 = new Button("Eyresh diairetwn");

add(button1);

button1.addActionListener(this);

add(textout);

add(textArea);

textArea.append("Apotelesmata\n");

button2 = new Button("Eyresh 10 pollaplasiwn");

add(button2);

button2.addActionListener(this);

}

public void actionPerformed(ActionEvent e)

{

String s, s2;

int n, i;

if (e.getSource()==button1)

// or e.getActionCommand() == "Eyresh diairetwn"

{

s= textinp.getText();

n= Integer.parseInt( s);

s2="";

for(i=1; i<=n; i++)

{

if( n%i==0)

{

s2= s2 + " " + Integer.toString( i);

}

}

textout.setText( ":"+s2 );

textArea.append(n+":"+s2+"\n");

}

else if (e.getSource()==button2)

{

s= textinp.getText();

n= Integer.parseInt( s);

s2="";

for(i=1; i<=10; i++)

{

s2= s2 + " " + Integer.toString( n\*i);

}

textout.setText( "\*"+s2 );

textArea.append(n+"\*"+s2+"\n");

}

}

public void windowClosing(WindowEvent e)

{

dispose();

System.exit(0);

}

public void windowOpened(WindowEvent e) {}

public void windowActivated(WindowEvent e) {}

public void windowIconified(WindowEvent e) {}

public void windowDeiconified(WindowEvent e) {}

public void windowDeactivated(WindowEvent e) {}

public void windowClosed(WindowEvent e) {}

}

Πρόγραμμα C-2: Επίδειξη χρήσης awt mouse events

Σχόλια:

import java.awt.\*;

import java.awt.event.\*;

public class Test\_awtFrame\_mouse extends Frame implements WindowListener, MouseListener, MouseMotionListener

{

private String s="";

private int x, y;

public static void main( String[] args)

{

Test\_awtFrame\_mouse myWindow= new Test\_awtFrame\_mouse("MyWindow Mouse Test");

myWindow.setSize(600,400);

myWindow.setVisible(true);

}

public Test\_awtFrame\_mouse( String title)

{

super( title);

addMouseListener( this);

addMouseMotionListener( this);

addWindowListener(this);

}

public void paint( Graphics g)

{

g.drawString( s + " (" + x + "," + y + ")", x, y);

}

public void setState( String s1, int x1, int y1)

{

s= s1;

x= x1;

y= y1;

repaint();

}

public void mouseClicked( MouseEvent e)

{

setState("click", e.getX(), e.getY() );

}

public void mousePressed( MouseEvent e)

{

setState("pressed", e.getX(), e.getY() );

}

public void mouseReleased( MouseEvent e)

{

setState("released", e.getX(), e.getY() );

}

public void mouseEntered( MouseEvent e) {}

public void mouseExited( MouseEvent e) {}

public void mouseDragged( MouseEvent e)

{

setState("dragged", e.getX(), e.getY() );

}

public void mouseMoved( MouseEvent e)

{

setState("moved", e.getX(), e.getY() );

}

public void windowClosing(WindowEvent e)

{

dispose();

System.exit(0);

}

public void windowOpened(WindowEvent e) {}

public void windowActivated(WindowEvent e) {}

public void windowIconified(WindowEvent e) {}

public void windowDeiconified(WindowEvent e) {}

public void windowDeactivated(WindowEvent e) {}

public void windowClosed(WindowEvent e) {}

}

Πρόγραμμα C-3: Επίδειξη χρήσης awt textfields

Σχόλια:

/\* To interface ActionListener exei mono mia methodo

\* public void actionPerformed(ActionEvent e) (to e to lambanoume kai to epejergazomaste)

\*

\* tf1.addActionListener(this);

\* me to orisma "this" leme oti to Frame mas tha einai akroaths twn gegonotwn apo ayto to antikeimeno

\*

\* ActionEvent dhmiourgeite apo to pathma button, enter se textfield,

\* diplopathma se periexomeno listas h menou

\*

\*

\*/

import java.awt.\*;

import java.awt.event.\*;

public class Test\_awtFrame\_TextFields extends Frame implements WindowListener, ActionListener

{

Label lb1, lb2;

TextField tf1, tf2;

int n, sum;

String s;

public static void main(String[] args)

{

Test\_awtFrame\_TextFields myWindow = new Test\_awtFrame\_TextFields("Textfields GUI");

myWindow.setSize(400,100);

myWindow.setVisible(true);

}

public Test\_awtFrame\_TextFields( String title)

{

super( title);

setLayout( new FlowLayout() );

addWindowListener(this);

lb1= new Label("Dwste enan akeraio arithmo kai pathste enter:");

add( lb1);

tf1= new TextField(10);

add(tf1);

tf1.addActionListener(this);

lb2= new Label("To athroisma einai:");

add(lb2);

tf2= new TextField(15);

add(tf2);

sum= 0;

}

public void actionPerformed(ActionEvent e)

{

s= e.getActionCommand();

n= Integer.parseInt( s);

sum= sum + n;

tf1.setText("");

s= Integer.toString( sum);

tf2.setText(s);

}

public void windowClosing(WindowEvent e)

{

dispose();

System.exit(0);

}

public void windowOpened(WindowEvent e) {}

public void windowActivated(WindowEvent e) {}

public void windowIconified(WindowEvent e) {}

public void windowDeiconified(WindowEvent e) {}

public void windowDeactivated(WindowEvent e) {}

public void windowClosed(WindowEvent e) {}

}

Πρόγραμμα C-4: Επίδειξη χρήσης awt/swing AdjustmentListener

Σχόλια:

import java.awt.event.\*;

import javax.swing.\*;

import java.awt.\*;

public class WellAdjusted extends JFrame implements AdjustmentListener

{

JTextField value = new JTextField("50", 30);

JScrollBar bar = new JScrollBar(SwingConstants.HORIZONTAL,

50, 10, 0, 100);

public WellAdjusted()

{

super("Well Adjusted");

setSize(350, 100);

setDefaultCloseOperation(JFrame.EXIT\_ON\_CLOSE);

bar.addAdjustmentListener(this);

value.setHorizontalAlignment(SwingConstants.CENTER);

value.setEditable(false);

JPanel pane = new JPanel();

pane.setLayout(new BorderLayout());

pane.add(value, "Center");

pane.add(bar, "South");

setContentPane(pane);

}

public static void main(String[] arguments)

{

JFrame frame = new WellAdjusted();

frame.show();

}

public void adjustmentValueChanged(AdjustmentEvent evt)

{

Object source = evt.getSource();

if (source == bar)

{

int newValue = bar.getValue();

value.setText("" + newValue);

}

repaint();

}

}

Πρόγραμμα C-5: Παιχνίδι life

Σχόλια: Το «παιχνίδι» είναι ένα cellular automaton που εφευρέθηκε από τον μαθηματικό John Conway στο Cambridge.

import java.awt.\*;

import java.awt.event.\*;

public class Test\_awtFrame\_Life extends Frame implements WindowListener, ActionListener

{

Button button1;

TextArea textArea = new TextArea(25, 40);

int NN= 20;

int[][] a= new int[NN][NN];

int[][] at= new int[NN][NN];

int gen=0;

public static void main(String[] args)

{

Test\_awtFrame\_Life myWindow = new Test\_awtFrame\_Life("Life GUI");

myWindow.setSize(400,400);

myWindow.setVisible(true);

}

public Test\_awtFrame\_Life( String title)

{

super( title);

setLayout( new BorderLayout() );

addWindowListener(this);

button1 = new Button("Next generation");

add(button1, BorderLayout.SOUTH);

button1.addActionListener(this);

add(textArea, BorderLayout.NORTH);

textArea.append("Genia\n");

int i, j;

for(i=0; i<NN; i++)

{

for(j=0; j<NN; j++)

{

a[i][j]= (int)(Math.random()\*2);

/\* debug test

a[i][j]= 0;

if ((i==10) && (j>=5) && (j<15))

a[i][j]=1;

\*/

}

}

}

private int checkNeighborhood( int x, int y)

{

int nb=0;

if ( (x>0) && (y>0) )

{

if (a[x-1][y-1]==1)

nb= nb + 1;

}

if (x>0)

{

if (a[x-1][y]==1)

nb= nb + 1;

}

if ( (x>0) && (y<NN-1) )

{

if (a[x-1][y+1]==1)

nb= nb + 1;

}

if ( (x<NN-1) && (y>0) )

{

if (a[x+1][y-1]==1)

nb= nb + 1;

}

if (x<NN-1)

{

if (a[x+1][y]==1)

nb= nb + 1;

}

if ( (x<NN-1) && (y<NN-1) )

{

if (a[x+1][y+1]==1)

nb= nb + 1;

}

if ( y>0)

{

if (a[x][y-1]==1)

nb= nb + 1;

}

if ( y<NN-1)

{

if (a[x][y+1]==1)

nb= nb + 1;

}

return nb;

}

public void actionPerformed(ActionEvent e)

{

int i, j;

String s;

for(i=0; i<NN; i++)

{

for(j=0; j<NN; j++)

{

if ((a[i][j]==1) && (checkNeighborhood( i, j) <= 1))

{

at[i][j]= 0;

}

if ((a[i][j]==1) && (checkNeighborhood( i, j) >= 4))

{

at[i][j]= 0;

}

if ((a[i][j]==1) && ((checkNeighborhood( i, j) == 2) || (checkNeighborhood( i, j) == 3)))

{

at[i][j]= 1;

}

if ((a[i][j]==0) && (checkNeighborhood( i, j) == 3))

{

at[i][j]= 1;

}

}

}

for(i=0; i<NN; i++)

for(j=0; j<NN; j++)

a[i][j]= at[i][j];

gen= gen + 1;

textArea.setText("");

textArea.append("Genia " + gen +"\n");

for(i=0; i<NN; i++)

{

s="";

for(j=0; j<NN; j++)

{

if (a[i][j]==1)

s= s + " X";

else

s=s + " \_";

}

textArea.append( s + "\n");

}

}

public void windowClosing(WindowEvent e)

{

dispose();

System.exit(0);

}

public void windowOpened(WindowEvent e) {}

public void windowActivated(WindowEvent e) {}

public void windowIconified(WindowEvent e) {}

public void windowDeiconified(WindowEvent e) {}

public void windowDeactivated(WindowEvent e) {}

public void windowClosed(WindowEvent e) {}

}

Πρόγραμμα C-6: Επίδειξη χρήσης swing JTextField με σύνταξη handler

Σχόλια:

import javax.swing.JFrame;

public class TestEventHandler

{

public static void main(String[] arguments)

{

TextFieldFrame t = new TextFieldFrame();

t.setDefaultCloseOperation( JFrame.EXIT\_ON\_CLOSE);

t.setSize( 350, 100);

t.setVisible( true);

}

}

-----------------------------------------------

import java.awt.FlowLayout;

import java.awt.event.ActionListener;

import java.awt.event.ActionEvent;

import javax.swing.JFrame;

import javax.swing.JTextField;

import javax.swing.JOptionPane;

public class TextFieldFrame extends JFrame

{

private JTextField tf1;

private JTextField tf2;

public TextFieldFrame()

{

super( "Test" );

setLayout( new FlowLayout() );

tf1= new JTextField(10);

add( tf1);

tf2= new JTextField(10);

add( tf2);

TextFieldHandler handler = new TextFieldHandler();

tf1.addActionListener( handler);

tf2.addActionListener( handler);

}

// private eswterikh klash

private class TextFieldHandler implements ActionListener

{

public void actionPerformed( ActionEvent e)

{

String s="";

if ( e.getSource() == tf1 )

s= "Keimeno 1 =" + e.getActionCommand();

else if ( e.getSource() == tf2 )

s= "Keimeno 2 =" + e.getActionCommand();

JOptionPane.showMessageDialog( null, s);

}

}

}

Πρόγραμμα C-7: Επίδειξη χρήσης panel

Σχόλια:

import java.awt.\*;

import java.awt.event.\*;

public class TestPanel extends Frame implements WindowListener

{

Panel nPanel, sPanel, cPanel, ePanel, wPanel;

public TestPanel(String title)

{

super( title);

nPanel= new Panel();

sPanel= new Panel();

cPanel= new Panel();

ePanel= new Panel();

wPanel= new Panel();

nPanel.add( new Button("B-1"));

nPanel.add( new Button("B-2"));

sPanel.add( new Button("S-1"));

sPanel.add( new Button("S-2"));

sPanel.add( new Button("S-3"));

cPanel.add( new Button("C-1"));

cPanel.add( new Button("C-2"));

ePanel.add( new Button("E-1"));

wPanel.add( new Button("W-1"));

wPanel.add( new Button("W-2"));

wPanel.add( new Button("W-3"));

setLayout( new BorderLayout());

add("North", nPanel);

add("South", sPanel);

add("East", ePanel);

add("West", wPanel);

add("Center", cPanel);

addWindowListener(this);

}

public static void main(String[] args)

{

TestPanel a= new TestPanel("Test");

a.setSize(600,400);

a.setVisible(true);

}

public void windowClosing(WindowEvent e)

{

dispose();

System.exit(0);

}

public void windowOpened(WindowEvent e) {}

public void windowActivated(WindowEvent e) {}

public void windowIconified(WindowEvent e) {}

public void windowDeiconified(WindowEvent e) {}

public void windowDeactivated(WindowEvent e) {}

public void windowClosed(WindowEvent e) {}

}

ΣΥΛΛΟΓΗ ΑΠΛΩΝ ΠΡΟΓΡΑΜΜΑΤΩΝ

ΜΕΡΟΣ D: ΑΡΧΕΙΑ

Πρόγραμμα D-1: Παράδειγμα για αρχεία

Σχόλια:

import java.io.\*;

class TestPrintWriter

{

public static void main( String[] args)

{

/\* write to file \*/

PrintWriter outWriter=null;

try

{ outWriter = new PrintWriter( new BufferedWriter( new OutputStreamWriter( new FileOutputStream("test.txt"))));

}

catch (IOException e)

{ System.exit(1);

}

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

{

outWriter.println("TEST");

}

outWriter.close();

/\* read from file \*/

BufferedReader inp=null;

try

{

inp = new BufferedReader( new FileReader("test.txt"));

String line="";

while( line != null)

{

line = inp.readLine();

if (line != null)

System.out.println(line);

}

inp.close();

} // end try

catch (IOException e)

{ System.exit(1);

}

} // end main

}

Πρόγραμμα D-2: Διάβασμα στοιχείων από αρχείο και υπολογισμός μοριακού βάρους

Σχόλια:

class Element

{

String name;

double weight;

public Element( String s, double w)

{

name= s;

weight= w;

}

}

-------------------------------------------

import java.io.File;

import java.util.Scanner;

public class TestChemistryFile

{

public static void main(String[] args)

{

Scanner input;

File file = new File("elchemistry.txt");

Element[] elements= new Element[100];

int nElements= 0;

int i;

String s;

double w;

double sw;

String ss;

int nn;

/\* diabase ta stoixeia apo to arxeio \*/

try

{

input = new Scanner(file);

while (input.hasNextLine())

{

s = input.nextLine();

w= input.nextDouble(); input.nextLine();

elements[ nElements]= new Element( s, w);

nElements++;

}

input.close();

}

catch (Exception ex)

{

ex.printStackTrace();

}

/\* typwse \*/

for(i=0;i<nElements;i++)

{

System.out.println(elements[i].name + " " + elements[i].weight);

}

/\* efarmogh ypologismou moriakou barous \*/

Scanner inp= new Scanner( System.in);

sw=0;

ss="";

do

{

System.out.println("Dwse onoma stoixeiou ('end' gia telos)");

s= inp.nextLine();

if (s.equals("end"))

{

System.out.println("Telos");

}

else

{

w= findWeight( s, elements, nElements);

if (w!=-1)

{

System.out.println("Dwse plhthos");

nn= inp.nextInt(); inp.nextLine();

sw= sw + w\*nn;

ss= ss + s + Integer.toString(nn);

}

else

{

System.out.println("Agnwsto stoixeio");

}

}

} while (!s.equals("end"));

System.out.println("Moriako baros ths " + ss + " = " + sw);

}

public static double findWeight(String s, Element[] e, int n)

{

int i;

for(i=0; i<n; i++)

{

if(s.equals(e[i].name))

{

return e[i].weight;

}

} // for

return-1;

}

}

-----------------------------------------------

Αρχείο κειμένου “elchemistry.txt”

C

12

H

1

N

14

O

16

Na

23

Cl

35.5

S

32

Ba

137.5

I

53

Br

80

Ca

40

Cu

63.5

Fe

56

Πρόγραμμα D-3: Βιβλία-συγγραφείς με πίνακα κλειδιών

Σχόλια:

class Book

{

private String title;

private String summary;

public Book( String title)

{

this.title= title;

summary= "";

}

public void setTitle( String t)

{

title= t;

}

public String getTitle()

{

return title;

}

public void setSummary(String s)

{

summary= s;

}

public String getSummary()

{

return summary;

}

}

------------------------------------------------------

class Author

{

private String name;

private String biography;

public Author( String name)

{

this.name= name;

biography= "";

}

public void setName( String name)

{

this.name= name;

}

public String getName()

{

return name;

}

public void setBiography(String s)

{

biography= s;

}

public String getBiography()

{

return biography;

}

}

------------------------------------------------------

import java.io.File;

import java.util.Scanner;

public class TestBooks

{

public static void main(String[] args)

{

Scanner input;

File file = new File("books.txt");

Book[] books= new Book[100];

int nBooks= 0;

Author[] authors= new Author[100];

int nAuthors= 0;

int[][] booksAuthors= new int[100][2];

int nBooksAuthors= 0;

int i, k, j;

String s;

try

{

input = new Scanner(file);

do

{

s = input.nextLine();

books[nBooks]= new Book( s);

nBooks++;

if (!s.equals("END"))

{

do

{

s = input.nextLine();

if (!s.equals("#"))

{

k= findAuthor( s, authors, nAuthors);

if (k == -1)

{

authors[nAuthors]= new Author( s);

nAuthors++;

booksAuthors[ nBooksAuthors][0]= nBooks - 1;

booksAuthors[ nBooksAuthors][1]= nAuthors - 1;

nBooksAuthors++ ;

}

else

{

booksAuthors[ nBooksAuthors][0]= nBooks - 1;

booksAuthors[ nBooksAuthors][1]= k;

nBooksAuthors++ ;

}

} // end if #

} while (!s.equals("#"));

} // end if END

} while (!s.equals("END"));

nBooks= nBooks - 1;

input.close();

}

catch (Exception ex)

{

ex.printStackTrace();

}

/\* typwse table of keys \*/

System.out.println("Demo: table of keys book-author");

for(i=0; i<nBooksAuthors; i++)

{

System.out.println( booksAuthors[i][0] + "-" + booksAuthors[i][1]);

}

/\* typwse biblia / syggrafeis \*/

System.out.println();

System.out.println("Books");

System.out.println();

for(i=0; i<nBooks; i++)

{

System.out.println( "Title:" + books[i].getTitle());

System.out.println( "Authors:");

for(j=0; j<nBooksAuthors; j++)

{

if (booksAuthors[j][0] == i)

{

System.out.println( authors[ booksAuthors[j][1] ].getName() );

}

}

} // end for i

} // end main()

public static int findAuthor(String s, Author[] authors, int n)

{

int i;

for(i=0; i<n; i++)

{

if(s.equals(authors[i].getName()))

{

return i;

}

} // for

return-1;

}

}

--------------------------------------------

Αρχείο books.txt

Introduction to Java

G. Liakeas

#

Digital Design (5th edition)

M. Morris Mano

Michael D. Ciletti

#

Digital Design (1st edition)

M. Morris Mano

#

CMOS VLSI Design (1st edition)

Neil H. E. Weste

#

CMOS VLSI Design (4th edition)

Neil H. E. Weste

David M. Harris

#

END

Πρόγραμμα D-4: Linear regression

Σχόλια:

import java.io.File;

import java.util.Scanner;

public class TestLinearRegression

{

public static void main(String[] args)

{

Scanner input;

File file = new File("data.txt");

int i,n;

double[] x= new double[100];

double[] y= new double[100];

double a, b;

double sx, sy, sxy, sx2;

n= 0;

try

{

input = new Scanner(file);

i= 0;

while (input.hasNextLine())

{

x[i] = input.nextDouble();

y[i]= input.nextDouble();

i++;

}

input.close();

n= i;

}

catch (Exception ex)

{

ex.printStackTrace();

}

for(i=0; i<n; i++)

{

System.out.printf( "%5.3f %5.3f\n", x[i], y[i]);

}

sx= 0;

sy= 0;

sx2= 0;

sxy= 0;

for(i=0; i<n; i++)

{

sx= sx + x[i];

sy= sy + y[i];

sx2= sx2 + x[i]\*x[i];

sxy= sxy + x[i]\*y[i];

}

a= (n\*sxy - sx\*sy) / (n\*sx2 - sx\*sx);

b= (sy\*sx2 - sxy\*sx) / (n\*sx2 - sx\*sx);

System.out.println();

System.out.println("y = a\*x + b");

System.out.printf( "a=%5.3f b=%5.3f\n", a, b);

}

}

-------------------------------------------------

Αρχείο data.txt

0 100

10 101.5

20 105

30 105.8

40 107.0

Πρόγραμμα D-5: Λύση Sudoku

Σχόλια:

import java.io.File;

import java.util.Scanner;

public class TestSudoku

{

public static void main(String[] args)

{

Scanner input;

File file = new File("sudoku.txt");

int[][] a= new int[9][9];

int i, j;

int cc, x;

try

{

input = new Scanner(file);

for(i=0; i<9; i++)

{

for(j=0; j<9; j++)

{

a[i][j] = input.nextInt();

}

}

input.close();

}

catch (Exception ex)

{

ex.printStackTrace();

}

printpinaka( a);

System.out.println( "Lysh tou Sudoku:");

cc= countZeros( a);

for (i=0; i<cc; i++)

{

x= steplyshpinaka( a);

if (x == -1)

{

System.out.println( "To sudoku den exei monadikh lysh");

break;

}

}

printpinaka( a);

}

public static void printpinaka( int a[][])

{

int i, j;

for(i=0; i<9; i++)

{

for(j=0; j<9; j++)

{

if (a[i][j] != 0)

System.out.printf( "%2d", a[i][j]);

else

System.out.printf(" ");

}

System.out.println();

}

}

public static int checkrow(int a[][], int ridx, int x)

{ int i;

for(i=0; i<9; i++)

{

if (a[ridx][i]==x)

{

return -1;

}

}

return 0;

}

public static int checkcol(int a[][], int cidx, int x)

{ int i;

for(i=0; i<9; i++)

{

if (a[i][cidx]==x)

{

return -1;

}

}

return 0;

}

public static int checkbox(int a[][], int lidx, int cidx, int x)

{

int i,j;

for(i=0; i<3; i++)

{

for(j=0; j<3; j++)

{

if (a[lidx\*3+i][cidx\*3+j]==x)

{

return -1;

}

}

}

return 0;

}

public static int check9( int a[][], int lidx, int cidx)

{

int n, k, x1, x2, x3, nk;

nk= -1;

n= 0;

for(k=1; k<=9; k++)

{

x1=checkbox( a, lidx/3, cidx/3, k);

if (x1==0)

{

x2=checkrow( a, lidx, k);

if (x2==0)

{

x3=checkcol( a, cidx, k);

if (x3==0)

{

n= n + 1;

nk= k;

}

}

}

}

if (n == 1)

return nk;

else

return -1;

}

public static int steplyshpinaka( int a[][])

{

int i, j, k, x;

for(i=0; i<9; i++)

{

for(j=0; j<9; j++)

{

if (a[i][j] == 0)

{

x= check9( a, i, j);

if (x != -1)

{

System.out.println("Thesh " + i + " " + j + " symperainetai oti einai " + x);

a[i][j]= x;

return 0;

}

}

} // end for j

} // end for i

// perissoteres ths mias lyshs

return -1;

}

public static int countZeros( int a[][])

{

int i, j, c;

c=0;

for(i=0; i<9; i++)

{

for(j=0; j<9; j++)

{

if (a[i][j] == 0)

c= c + 1;

}

}

return c;

}

}

------------------------------------

Sudoku.txt

0 0 0 0 0 7 0 8 2

0 0 9 0 0 3 7 0 1

0 1 0 0 8 0 4 3 0

0 0 0 0 2 0 3 0 7

0 0 1 4 6 0 0 0 0

4 2 0 0 0 9 0 0 0

0 9 2 1 0 0 0 6 0

1 0 7 0 0 0 5 0 0

8 4 0 2 0 0 0 0 0

------------------------------------

Solution step by step ..

> run TestSudoku

7 8 2

9 3 7 1

1 8 4 3

2 3 7

1 4 6

4 2 9

9 2 1 6

1 7 5

8 4 2

Lysh tou Sudoku:

Thesh 1 7 symperainetai oti einai 5

Thesh 1 3 symperainetai oti einai 6

Thesh 1 0 symperainetai oti einai 2

Thesh 1 1 symperainetai oti einai 8

Thesh 1 4 symperainetai oti einai 4

Thesh 5 7 symperainetai oti einai 1

Thesh 6 6 symperainetai oti einai 8

Thesh 5 6 symperainetai oti einai 6

Thesh 0 6 symperainetai oti einai 9

Thesh 0 3 symperainetai oti einai 5

Thesh 0 4 symperainetai oti einai 1

Thesh 2 3 symperainetai oti einai 9

Thesh 2 5 symperainetai oti einai 2

Thesh 2 8 symperainetai oti einai 6

Thesh 2 2 symperainetai oti einai 5

Thesh 2 0 symperainetai oti einai 7

Thesh 3 3 symperainetai oti einai 8

Thesh 3 2 symperainetai oti einai 6

Thesh 3 1 symperainetai oti einai 5

Thesh 3 0 symperainetai oti einai 9

Thesh 3 5 symperainetai oti einai 1

Thesh 3 7 symperainetai oti einai 4

Thesh 4 0 symperainetai oti einai 3

Thesh 0 0 symperainetai oti einai 6

Thesh 0 1 symperainetai oti einai 3

Thesh 0 2 symperainetai oti einai 4

Thesh 4 1 symperainetai oti einai 7

Thesh 4 5 symperainetai oti einai 5

Thesh 4 6 symperainetai oti einai 2

Thesh 4 7 symperainetai oti einai 9

Thesh 4 8 symperainetai oti einai 8

Thesh 5 2 symperainetai oti einai 8

Thesh 5 8 symperainetai oti einai 5

Thesh 6 0 symperainetai oti einai 5

Thesh 6 5 symperainetai oti einai 4

Thesh 6 8 symperainetai oti einai 3

Thesh 6 4 symperainetai oti einai 7

Thesh 5 4 symperainetai oti einai 3

Thesh 5 3 symperainetai oti einai 7

Thesh 7 1 symperainetai oti einai 6

Thesh 7 3 symperainetai oti einai 3

Thesh 7 4 symperainetai oti einai 9

Thesh 7 5 symperainetai oti einai 8

Thesh 7 7 symperainetai oti einai 2

Thesh 7 8 symperainetai oti einai 4

Thesh 8 2 symperainetai oti einai 3

Thesh 8 4 symperainetai oti einai 5

Thesh 8 5 symperainetai oti einai 6

Thesh 8 6 symperainetai oti einai 1

Thesh 8 7 symperainetai oti einai 7

Thesh 8 8 symperainetai oti einai 9

6 3 4 5 1 7 9 8 2

2 8 9 6 4 3 7 5 1

7 1 5 9 8 2 4 3 6

9 5 6 8 2 1 3 4 7

3 7 1 4 6 5 2 9 8

4 2 8 7 3 9 6 1 5

5 9 2 1 7 4 8 6 3

1 6 7 3 9 8 5 2 4

8 4 3 2 5 6 1 7 9

>