COMPUTER SCIENCE 105
SUMMER SCHOOL 2006

ASSIGNMENT 1

Assignment 1:

This assignment covers everything taught in the first 7 lectures.

Question 1.

OLAP.java

An OLAP cube takes linear dimensional data and caches it into a cube. The data in the cube is some function of the data in each of the elements of the dimensions.

For this question, our function will be the sum.

You must take 3 arrays of data from the command line and create a cube that stores the sum of the data.

As an example, consider 2 arrays x={2,3} and y={3,4}. We construct a 2D array c, where c[i][j] = x[i]+y[j]. You must do this for three dimensions.

The code to parse the arguments into dimensional arrays has been done for you.

Question 2.

Language.java

We are going to compare the language of various classical authors to see how they differ from modern English.

We will provide you with a modern English dictionary, and three excerpts (from Chaucer, Shakespeare and Dickens).

Dict.txt	-	**dictionary file (one word per line)**
Chaucer.txt	-	**an excerpt from "Troilus and Criseyde"**
Shakespeare.txt	-	**act 1, scene 2 from "Macbeth"**

Dickens.txt - the foreword to "bleak house"

The program must load the dictionary file into memory. Once that is done, it must read the text from the file (specified on the command line), and write all the words that aren't in our dictionary of modern English to a file with the suffix ".diff" e.g.: **dickens.diff,** you must write words to this file one per line.

Additionally, your program must print the number of words that are not in the dictionary to the console (System.out).

Please ensure that your program works right, and uses command line arguments as specified!

Question 3.

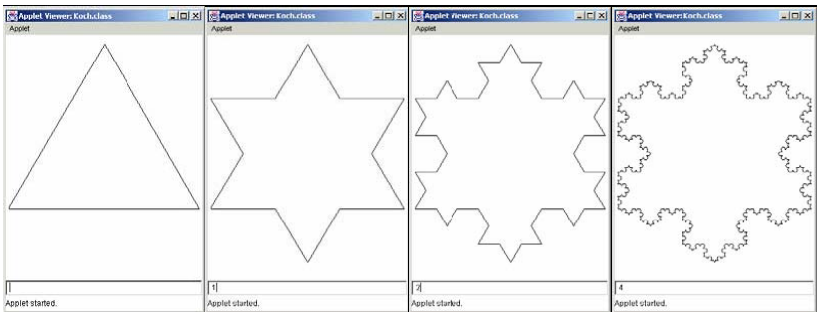
Shape.java
Widget.java
Circle.java
Rectangle.java
testShapes.java

You must implement the shapes "circle" and "rectangle", these shapes are subclasses of "shape" and are "widgets" as well. The shape class defines methods "area" and "perimiter" (bringing back memories of your early mathematics) you must implement these. The widget interface implements a method "clickInside" that returns true if a point is inside the shape and false otherwise.
You have been given a testShapes.java file to test your shapes.

Question 4.

Koch.java

Using the Turtle class provided (on the web), write a java program that will draw a Koch snowflake of a given order. Your program should contain a single TextField that is used to enter the order of the Koch snowflake triangle that you are required to draw. Use a height of 400 and a width of 300 for the applet. Start drawing the snowflake from the bottom left corner, which is located at 2/3 of the height and indented by 5 pixels from the side (e.g. start at the co-ordinate (5, HEIGHTx2/3)). The length of a side is equal to the width -10 (which allows a gap of 5 pixels on each side of the snowflake). I have made the code to display the program for you (built using NetBeans 4.1).



Question 5.

QuickSort.java

You have been provided with a working quicksort program. You must change it to use the new java 'generic' feature. Your program must compile without the unsafe operations flag appearing.

This assignment must be submitted by the webdropbox (see web for help).
Due: **12:00 on Sunday January 15th.**

Total marks: 100.

MARKING SCHEDULE

Q1

- **10 marks**
  - **3 marks for generating something**
  - **5 marks for correctness**
  - **2 marks for style**

Q2

- **30 marks**
  - **10 marks for opening the right files and using the command line**
  - **25 marks for correct output**
    - **-15 marks if it doesn't deal with spaces, commas etc.**
  - **5 marks for style**

Q3

- **20 marks**
  - **8 marks for correct implementation of Circle.java**
  - **8 marks for correct implementation of Rectangle.java**
  - **4 marks for style.**

Q4

- **30 marks**
  - **25 marks for generating a koch curve of the correct order**
  - **5 marks for style**

Q5

- **10 marks**
  - **10 marks for**
    - **-1 mark per missing change**