A computer-based computer music tool

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May 2011

Individual Project

Submitted in part fulfilment for the degree of
B.Sc. (Hons) Computing
School of Informatics and Engineering,
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Dublin, Ireland

Declaration

I herby certify that this material, which I now submit for assessment on the programme of study leading to the award of Degree of **Honours B.Sc. in Computer Science** in the Institute of Technology Blanchardstown, is entirely my own work except where otherwise stated, and has not been submitted for assessment for an academic purpose at this or any other academic institution other than in partial fulfilment of the requirements of that stated above.

Signed:_____   Dated: ____/_____/_____

Abstract

GUIDE TO STUDENTS: An abstract is a brief overview of the project. Ideally it should fit onto a single page.

This project tackled the problem of creating a computer-based tool to model and manipulate music. The problem to be solved was how to create a computer tool that is easy to use but that also allows for non-trivial musical actions to be made on the computer. In this report a description is presented of the specification and analysis of the problem, the review of relevant research conducted, and the life cycle of the system that was developed to solve the problem.

Key features of the developed system, called "Pitch Circles", including its basis in a respected music theory, its development in an object-oriented programming language – Java 2, and the evaluation of the system from an HCI (Human Computer Interaction) perspective, in additional to more traditional functional testing.

The result is a simple, but powerful tool for basic musical tasks, that is easy to learn while elegantly modelling the symmetric and asymmetric features of the Western Diatonic music system. With the Pitch Circles tool novices users can identify the relationship between triadic chords and different regions (scales), and use simple rules for movement around the tonal circles to derive and apply fundamental musical principles including the chromatic and diatonic circles of fifths.

Contents

Chapter 1: Introduction

1.1 GUIDE

The first chapter of a computing project report

1.2 sdfsd

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1.3 Sources of information

In addition to the list of references, it is important to indicate which parts of your academic document are been supported by which referenced source. For example, below an article from the Financial Mail on Sunday is referenced in an extract from a argument about "teleworking".

Teleworking (people working from home, usually using electronic communications to support their work), is becoming more and more a possible for smaller businesses, with the arrival of affordable, high quality communications systems such as FAXs, computer modems and high speed ISDN data transmission telephone lines. Sunderland (1997) describes recent reports from BT about their expectations for a potential £3 billion video-conferencing market.

This format is usual, with the author's surname given first, and the year of publication given in parentheses (round brackets). If is important that this format is followed in the list of references, so a reader can easily flick to the back of the document to see the details of the source being cited. Notice that for an article within a larger publication (e.g. a newspaper, a chapter of a book, a paper in a journal), both the title of the article and the title of the overall publication are given. Page numbers can also be given, if many citations are from different parts of the same source, or to identify a specific quotation.

Chapter 2: Literature Review

2.1 Overview of fields reviewed and sources consulted

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2.2 Review of XXX

thsehdfkjds hfkjsd hfkjsdfjkhdskf kshdf sdhfksf ksfkdsfkjdskfhs kdfksdfk hskdhf kfdkjhs dkhfkshd fkhsdkfh skdhfksfksdkfh sdkfh sdkhf kdf ksdf kjf ksf ksf kdsfjshdfksdfkj hsdkf sdf ksjdhf ksdhf fds sdkjhf kjf fd dsf hsdkjhf dsf.

2.3 Conclusions of review

thsehdfkjds hfkjsd hfkjsdfjkhdskf kshdf sdhfksf ksfkdsfkjdskfhs kdfksdfk hskdhf kfdkjhs dkhfkshd fkhsdkfh skdhfksfksdkfh sdkfh sdkhf kdf ksdf kjf ksf ksf kdsfjshdfksdfkj hsdkf sdf ksjdhf ksdhf fds sdkjhf kjf fd dsf hsdkjhf dsf.

Chapter 3: Method

3.1 Overview of method

dfjdfkljldfjglk fdjg ld fglk dfg lkd fjg ldkfglkdfgld jfg dfjg dlfkjg dlfjg ldfg df glkdjf glkd jfglkjdf jg dflkjgldfkg lkdfjglkdfj glkfjdglkdfjgfdg. fdjg ld fglk dfg lkd fjg ldkfglkdfgld jfg dfjg fdjg ld fglk dfg lkd fjg ldkfglkdfgld jfg dfjg.

fdjg ld fglk dfg lkd fjg ldkfglkdfgld jfg dfjg fdjg ld fglk dfg lkd fjg ldkfglkdfgld jfg dfjg fdjg ld fglk dfg lkd fjg ldkfglkdfgld jfg dfjg fdjg ld fglk dfg lkd fjg ldkfglkdfgld jfg dfjg.

3.2 Stage 1: Review of existing work

dfjdfkljldfjglk fdjg ld fglk dfg lkd fjg ldkfglkdfgld jfg dfjg dlfkjg dlfjg ldfg df glkdjf glkd jfglkjdf jg dflkjgldfkg lkdfjglkdfj glkfjdglkdfjgfdg. fdjg ld fglk dfg lkd fjg ldkfglkdfgld jfg dfjg fdjg ld fglk dfg lkd fjg ldkfglkdfgld jfg dfjg.

fdjg ld fglk dfg lkd fjg ldkfglkdfgld jfg dfjg fdjg ld fglk dfg lkd fjg ldkfglkdfgld jfg dfjg fdjg ld fglk dfg lkd fjg ldkfglkdfgld jfg dfjg fdjg ld fglk dfg lkd fjg ldkfglkdfgld jfg dfjg.

3.3 Stage 2: Requirements specification

dfjdfkljldfjglk fdjg ld fglk dfg lkd fjg ldkfglkdfgld jfg dfjg dlfkjg dlfjg ldfg df glkdjf glkd jfglkjdf jg dflkjgldfkg lkdfjglkdfj glkfjdglkdfjgfdg. fdjg ld fglk dfg lkd fjg ldkfglkdfgld jfg dfjg fdjg ld fglk dfg lkd fjg ldkfglkdfgld jfg dfjg.

fdjg ld fglk dfg lkd fjg ldkfglkdfgld jfg dfjg fdjg ld fglk dfg lkd fjg ldkfglkdfgld jfg dfjg fdjg ld fglk dfg lkd fjg ldkfglkdfgld jfg dfjg fdjg ld fglk dfg lkd fjg ldkfglkdfgld jfg dfjg.

fdjg ld fglk dfg lkd fjg ldkfglkdfgld jfg dfjg fdjg ld fglk dfg lkd fjg ldkfglkdfgld jfg dfjg fdjg ld fglk dfg lkd fjg ldkfglkdfgld jfg dfjg fdjg ld fglk dfg lkd fjg ldkfglkdfgld jfg dfjg fdjg ld fglk dfg lkd fjg ldkfglkdfgld jfg dfjg fdjg ld fglk dfg lkd fjg ldkfglkdfgld jfg dfjg fdjg ld fglk dfg lkd fjg ldkfglkdfgld jfg dfjg.

Chapter 4: System Requirements and Specification

4.1 XXX

dfjdfkljldfjglk fdjg ld fglk dfg lkd fjg ldkfglkdfgld jfg dfjg dlfkjg dlfjg ldfg df glkdjf glkd jfglkjdf jg dflkjgldfkg lkdfjglkdfj glkfjdglkdfjgfdg. fdjg ld fglk dfg lkd fjg ldkfglkdfgld jfg dfjg fdjg ld fglk dfg lkd fjg ldkfglkdfgld jfg dfjg.

Chapter 5: System Design

5.1 XXX

dfjdfkljldfjglk fdjg ld fglk dfg lkd fjg ldkfglkdfgld jfg dfjg dlfkjg dlfjg ldfg df glkdjf glkd jfglkjdf jg dflkjgldfkg lkdfjglkdfj glkfjdglkdfjgfdg. fdjg ld fglk dfg lkd fjg ldkfglkdfgld jfg dfjg fdjg ld fglk dfg lkd fjg ldkfglkdfgld jfg dfjg.

Chapter 6: Implementation of Prototype

6.1 XXX

dfjdfkljldfjglk fdjg ld fglk dfg lkd fjg ldkfglkdfgld jfg dfjg dlfkjg dlfjg ldfg df glkdjf glkd jfglkjdf jg dflkjgldfkg lkdfjglkdfj glkfjdglkdfjgfdg. fdjg ld fglk dfg lkd fjg ldkfglkdfgld jfg dfjg fdjg ld fglk dfg lkd fjg ldkfglkdfgld jfg dfjg.

Chapter 7: Testing and evaluation

7.1   XXX

dfjdfkljldfjglk fdjg ld fglk dfg lkd fjg ldkfglkdfgld jfg dfjg dlfkjg dlfjg ldfg df glkdjf glkd jfglkjdf jg dflkjgldfkg lkdfjglkdfj glkfjdglkdfjgfdg. fdjg ld fglk dfg lkd fjg ldkfglkdfgld jfg dfjg fdjg ld fglk dfg lkd fjg ldkfglkdfgld jfg dfjg.

Chapter 8: Conclusions and Further Work

8.1 XXX

dfjdfkljldfjglk fdjg ld fglk dfg lkd fjg ldkfglkdfgld jfg dfjg dlfkjg dlfjg ldfg df glkdjf glkd jfglkjdf jg dflkjgldfkg lkdfjglkdfj glkfjdglkdfjgfdg. fdjg ld fglk dfg lkd fjg ldkfglkdfgld jfg dfjg fdjg ld fglk dfg lkd fjg ldkfglkdfgld jfg dfjg.

Appendix A: Project Planning

8.2 XXX

dfjdfkljldfjglk fdjg ld fglk dfg lkd fjg ldkfglkdfgld jfg dfjg dlfkjg dlfjg ldfg df glkdjf glkd jfglkjdf jg dflkjgldfkg lkdfjglkdfj glkfjdglkdfjgfdg. fdjg ld fglk dfg lkd fjg ldkfglkdfgld jfg dfjg fdjg ld fglk dfg lkd fjg ldkfglkdfgld jfg dfjg.

Appendix B: Program listings

8.3   Summary of included program listings

This appendix comprises the following program listings:

- PROG1.JAVA   This class / program module is the class that presents the VIEW of the state of the XXX component of the system

- PROG2.JAVA   This class / program module is the class that presents the VIEW of the state of the XXX component of the system

8.4 PROG1.JAVA[1]

The following is a commented listing of the Java source code for the class XXX

```
//////////////////////////// your code must be well COMMENTED !!!!
import  java.awt.*;
import  Cecil;

import java.awt.event.*;
import javax.swing.*;
import java.lang.reflect.*;

class LEDPanel extends JPanel
{
        int width = 100;
        int height = 100;
        boolean ledOn[] = new boolean[10];

LEDPanel()
{
        setMinimumSize( new Dimension( width, height ) );
        setMaximumSize( new Dimension( width, height ) );

        setVisible( true );

        // set all LEDs to OFF
        int t;

        for (t=9; t>=0; t--)
        {
                ledOn[t] = false;
        }

}

public void paintComponent( Graphics g )
{
        super.paintComponent( g );

        int radius = 20;
        int xstart = 10;
        int spacer = 5;

        int t;

        for (t=9; t>=0; t--)
        {
                if( ledOn[t] )
                        g.setColor( Color.red);
                else
                        g.setColor( Color.black );

                g.fillOval( xstart + ((9-t) * (spacer + radius)), 10, radius, radius );
        }
}

public void updateLEDdisplay(int memValue)
{
        int t;

        for (t=9; t>=0; t--)
        {
                if( (memValue & (1<<t)) > 0)
                        ledOn[t] = true;
                else
                        ledOn[t] = false;
        }


        repaint();
} // method
```

---

[1] FORMAT | PARAGRAPH | Line and Page breaks - page break before … keeps it all neat

```
} // class
```

8.5 PROG2.JAVA

The following is a commented listing of the Java source code for the class XXX

Appendix C: FDFF

8.6 XXX

dfjdfkljldfjglk fdjg ld fglk dfg lkd fjg ldkfglkdfgld jfg dfjg dlfkjg dlfjg ldfg df glkdjf glkd jfglkjdf jg dflkjgldfkg lkdfjglkdfj glkfjdglkdfjgfdg. fdjg ld fglk dfg lkd fjg ldkfglkdfgld jfg dfjg fdjg ld fglk dfg lkd fjg ldkfglkdfgld jfg dfjg.

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