The Hong Kong Polytechnic University
Department of Electronic and Information Engineering

GUI Design and Programming Mini-project

Software Learning Kit for Mentally Retarded Children Using Java Workshop 2.0

Software Project 1: Learn to Distinguish Musical Instruments and Their Sound

Working platform: Windows 95/98

Objectives: To identify the shape and sound of different musical instruments.

Optional Features: If possible, all instructions in the kit should be in Chinese or Cantonese.

Part I – Program Design

By using Java Workshop 2.0, design a standalone Java program that performs the tasks as specified below:

<table>
<thead>
<tr>
<th>Screen Display</th>
<th>Action</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Startup</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Show the startup screen which contains the PolyU logo and two buttons to start or to quit</td>
<td>Press Start button</td>
<td>Start the next screen</td>
</tr>
<tr>
<td></td>
<td>Press Quit button</td>
<td>Quit the application</td>
</tr>
<tr>
<td>2. TextArea to allow student to type his name for login and a “Enter” button</td>
<td>Type student’s name and press enter (Each student should have a file to record down their previous results)</td>
<td>Start the next screen</td>
</tr>
<tr>
<td>3. Three buttons: (i) Introduction (ii) Exercise (iii) Previous Result</td>
<td>Press Introduction button</td>
<td>Start Introduction Phase</td>
</tr>
<tr>
<td></td>
<td>Press Exercise button</td>
<td>Start Exercise Phase</td>
</tr>
<tr>
<td></td>
<td>Press Previous Result button</td>
<td>Show previous results</td>
</tr>
</tbody>
</table>

**Introduction Phase**

1. For a group of around 12 musical instruments, randomly

Press return or press the mouse left button when pointing to

Generate the sound of every musical instrument one-by-one.
arrange them to show on the screen.

| any picture | Highlight the musical instrument when playing its sound. Show also the name of that musical instrument when playing its sound. |

2. For a group of around 12 musical instruments, randomly arrange them to show on the screen. Let the student to select any one of them.

| Press the mouse left button when pointing to a picture | Generate the sound of that particular musical instrument. Highlight that musical instrument when playing its sound. Show also the name of that musical instrument when playing its sound. |

**Exercise Phase**

1. For every exercise below, the performance of student should be logged in a file and shown when user presses the Result button on the Startup screen.

2. For each screen, there should be buttons that allow user to go from one exercise to another or back to the startup page.

| Press button 1 | Go to exercise 1 |
| Press button 2 | Go to exercise 2 |
| Press button 3 | Go to exercise 3 |
| Press button 4 | Go to exercise 4 |

**Exercise I**

1. For a group of around 12 musical instruments, randomly select any 4 of them and show on the screen. Randomly generate the sound of a particular instrument. Ask student to identify the instrument that generates that sound.

| Press the mouse left button when pointing to a picture. | For correct answer, sound is generated to congratulate the student. For wrong answer, another sound is generated and voice is then generated to ask the student to try again. |

2. Repeat 1 with another 4 musical instruments.

3. Repeat 1 with another 4 musical instruments.

**Exercise II**

1. For a group of around 12 musical instruments, randomly select any 4 of them and show on the screen. Randomly generate the sound of two instruments together. Ask student to identify the two instruments.

| Press the mouse left button when pointing to the two pictures. | For correct answer, sound is generated to congratulate the student. For wrong answer, another sound is generated and voice is then generated to ask the student to try again. |

2. Repeat 1 with another 4 musical instruments.
3. Repeat 1 with another 4 musical instruments.

**Exercise III**

1. Show the pictures of 4 musical instruments. Randomly place the name of these four musical instruments on the screen. Ask the student to draw 4 lines to link up the 4 matched pairs.

   | Press the mouse left button when pointing to a picture and drag to another picture. | For correct answer, sound is generated to congratulate the student. For wrong answer, another sound is generated and voice is then generated to ask the student to try again. |

   2. Repeat 1 with another 4 musical instruments.

   3. Repeat 1 with another 4 musical instruments.

**Exercise IV**

1. For a group of around 12 musical instruments, select 8 of them and show on the screen. The musical instruments shown should belong to the group of brass, string or percussion. Ask the student to move the pictures such that the musical instruments that belong to the same group are put together.

   | Press the mouse left button when pointing to the pictures. | For correct answer, sound is generated to congratulate the student. For wrong answer, another sound is generated and voice is then generated to ask the student to try again. |

   2. Repeat 1 with another 8 musical instruments (some may overlapped with the ones in 1).

**Exercise V (optional)**

1. A big piano keyboard is shown on the screen. Computer automatically generates the sound of a sequence of notes with the movement of piano-keys. Ask the student to repeat the same sequence by clicking on the keyboard.

   | Press the mouse left button when pointing to a piano-key of the keyboard. | For correct answer, sound is generated to congratulate the student. For wrong answer, another sound is generated and voice is then generated to ask the student to try again. |

Part II – Report

Write a report of not less than 5 pages (excluding program codes) to describe how you write this program. Detail describe all techniques you use, any technical problems you encounter and any solutions you use to solve these problems. Describe your program using flow charts with verbal explanations. Attach your program as an appendix at the end of your report.

**General Description**
a. Each group should normally comprise 3 students. Each group should hand in
   i) both soft and hard copies of the report
   ii) a soft copy of the program

   on or before 12 May 2000. A demonstration of the program to your classmate should be made on
   either one of the following dates: 16 May or 19 May.

b. It is very much preferred to use a word processing package to type your report. The contents of the
   report are most important. However, you should try your best to write clear, correct and good
   sentences.

c. Distribution of marks: Program design 65%
   Report writing 35%

d. The specification above only defines the fundamental requirements. You may add your own ideas to
   the program. But remember, your target is a group of mentally retarded children. Most of the
   programs require a certain amount of multimedia materials, such as, graphics, sound, animation, etc.
   You need to find your own way to get these materials (Try to search on the Internet before you give
   up).

e. There should be a clear and even allocation of tasks among group members. Each member will be
   individually assessed. Group member with larger contribution to the project will acquire higher
   marks. The task allocation strategy among group members should be clearly described in the report.

f. A prize will be given to the best project. Upon evaluation or modification, the program will be
   donated to a school for mentally retarded children.