Lab instruction

Task – Development and Implementation of a Simple CAI Program

The use of computers in education is referred to as computer-assisted instruction (CAI). The National Council of Teachers of Mathematics (NCTM) of United States of America, believed that “Technology is an essential tool for learning mathematics in the 21st century, and all schools must ensure that all their students have access to technology”.  A lot of research also showed that CAI had positive effects on students’ achievement in mathematics. If you are interested, you can find more evidence on Internet. You may also read a doctoral thesis “The Effectiveness of Computer-Aided Instruction on Math Fact Fluency” at  [http://scholarworks.waldenu.edu/cgi/viewcontent.cgi?article=1028&context=dissertations (Links to an external site.)](http://scholarworks.waldenu.edu/cgi/viewcontent.cgi?article=1028&context=dissertations)

In this lab task, you are to develop a simple CAI program for primary school students (so the numbers involved in the program are in the range 0…100). The program should contain at least the following features and satisfy the following requirements:

1) The user could choose to do **practices**, **test** or quit the program (main menu).

2) For a **practice**

The user should be able to choose doing the practices on additions only,  subtractions only, or mixed additions with subtractions. The number of questions in a practice is fixed to be **10**. For each question, the user is asked to given the answer. If the answer is not correct, the program should continue to ask the user to give an answer, until a correct one is given. When the practice is completed, it should be back to the main menu to allow the user to choose practice, test or quit.

3) For a **test**

The user should be able to choose to do a test on additions only, subtractions only, or mixed additions with subtractions. The number of questions in the test is fixed to be **15**. When the test is completed, it should show the test result (in percentage). It should be back to the main menu to allow the user to choose practice, test or quit.

**An example scenario is given as follows.**

Enter your name:  Eric

Welcome, Eric!

*You can choose:*

* 1. do a practice
  2. complete a test
  3. quit the program

Enter your choice: 1

*Now, you can choose to do practices on:*

* 1. additions
  2. subtractions
  3. additions and subtractions

Enter your choice: 1

*Now, you will be given 10 questions to solve:*

1. 6 + 7 =

Enter your answer:  13

Very good!

1. 12 + 23 =

Enter your answer:  33

No. Please try again.

Enter your answer:  35

Very good!

 ….

4) **Responses** to the answers in a practice

This is applied to the responses in doing practices. One problem that develops in CAI environments is user fatigue. This can be reduced by **varying** the computers dialog to hold the user’s attention. Design the comments printed for each correct answer and each incorrect answer as follows:

Responses to correct answer:

Very good!

Excellent!

Nice work!

Well done!

Great!

Keep up the good work!

Responses to an incorrect answer:

No. Please try again.

Wrong. Try once again.

Don’t give up!

No. Keep trying.

5) Test result **presentation**

When a test is completed, not only the test result is shown (in percentage), but also the questions, correct answers and user’s answers are displayed.

A sample output is given below:

**Your test result is 80 (percentage)**

**Questions and answers:**

**Question       correct answer      your answer**

* 1. **6 + 7                    13                        13**
  2. **12 + 23                35                        34**
  3. **……**