



NGHIÊN CỨU VÀ XÂY DỰNG BỘ ĐỀ THI TRẮC NGHIỆM ĐỒ HỌA TRỰC TUYẾN HỌC PHẦN KIẾN TRÚC MÁY TÍNH

Research and development a set of multiple choice questions in online graphic for computer architecture module

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Đến tòa soạn: 21/06/2017; Chấp nhận đăng: 19/08/2017

Abstract. Objective tests in assessments have been used in most undergraduate courses. Many issues arise in the development of multiple sets of tests such as difficulty, multiple choice type and multiple choice form. Graphical tests are a matter of concern for enhancing virtual interoperability and enhancing teaching quality. This paper introduces how to use Macromedia Flash software in creating multiple-choice graphic questions in a number of different forms. On that basis, we have used to build a graphic problem set for Computer Architecture.

Keywords: Graphical tests; Computer architecture; Computer architecture tests; Online quizzes, Macromedia flash software

Tóm tắt. Trắc nghiệm khách quan trong kiểm tra đánh giá đã và đang được sử dụng trong hầu hết các môn học ở Đại học. Nhiều vấn đề đặt ra trong việc xây dựng các bộ đề trắc nghiệm như độ khó, dạng trắc nghiệm và hình thức trắc nghiệm. Trắc nghiệm dạng đồ họa đang là một vấn đề được quan tâm nhằm nâng cao khả năng tương tác ảo và nâng cao chất lượng dạy học. Bài báo này giới thiệu cách thức sử dụng phần mềm Macromedia Flash trong việc tạo các câu hỏi trắc nghiệm đồ họa với một số hình thức khác nhau. Trên cơ sở đó, chúng tôi đã vận dụng để xây dựng bộ đề trắc nghiệm đồ họa cho học phần Kiến trúc máy tính.

Từ khóa: Trắc nghiệm đồ họa; Kiến trúc máy tính; Trắc nghiệm kiến trúc máy tính; Trắc nghiệm trực tuyến; Phần mềm Macromedia flash

1. SET THE PROBLEM

Computer architecture is an important discipline in the specialized training of information technology, its main research subject being computer and computer functions. This subject is both abstract and concrete, both theoretical and practical, and the subject is highly valued in practical application.

Specificity and abstractly

* Specificity: Course content includes the knowledge of computers, computer components. Specifically, the structure of the equipment, operating procedures, skills, techniques in assembly and operation.

* Abstraction: the content also has the knowledge of algorithms, algorithms inside the computer. This is highly abstract knowledge. To acquire this knowledge requires not only direct interaction with the computer but also requires that the teacher needs to have a simulation, visual model is highly interactive for students, use Right on the computer to describe the algorithm taking place inside it.

Theoretical and practical

* Theoretical: Structures, algorithms in the programming of computing requires logic and optimization.

* Practicality: The subject knowledge is applied in real life such as design, production, assembly and use of computers.

With the above characteristics required to test the subject assessment of this subject in online training are:

- **Firstly: Check the knowledge components, basic technical parameters of components, processes, principles**

of operation:

This section may use multiple choice questions. We have built a series of 400 questions to test online reviews [5].

- **The second is: Test knowledge such as: device identification, device assembly, distinguishing components on a system:**

To test this part effectively, it is best to do it on a real device in the lab, but this is difficult because it is an online learning environment (virtual learning environment). There is no practical room with visual equipment as in traditional training. And this section can not use the text-based questionnaire for effective assessment as it is a visual assessment test.

In order to be able to effectively assess and evaluate this content, we propose a solution that uses a graphical set of questions in the online assessment of Computer Architecture.

2. RESEARCH CONTENT

2.1 Objective testing

According to [1,2,3,4], the Test is an activity to measure certain subjectivity for specific purposes. Test is a form where a test consists of a series of questions, each with a question, with the necessary information so that the learner can respond only briefly to each question.

Tests are a method of evaluating student learning outcomes in which the effects of subjective factors are minimized to an optimal level. The highlight of this method is the number of questions in each test, the larger the

number of questions, the greater the accuracy of the assessment. Multiple-choice questions will include a concept, content included in the program, with suggestions for participants to answer. From the suggested answer we will have many different test questions.

2.2 Compulsory graphic study of computer architecture

According to [1] the test is divided into the following five main types of questions: Multiple choice tests, "true-false" tests, pairwise tests, gap tests, . In order to construct a set of graphic tests (using images for review) appropriate for the computer architecture course, we would like to export the following three types of multiple choice questions:

Type 1: Double Test

- Questions are organized as two groups of objects (images), students need to drag and drop objects belonging to the first group to a second group object for pairing.

- This type of exercise is used to test the student's ability to assemble computer components. To accomplish this task, students must have a general knowledge of computer components such as basic technical parameters, structure characteristics, device identification, Analyzer to select the device.

Second form: Object-selection tests

- Questions are organized in the form of a group (4 or more objects), students will select one or more subjects as required by the question.

- This type of exercise is used to test the application of the learner's knowledge into practice because in order to do this exercise, the learner needs to understand the basic parameters of the device, the device identification and how to use it. Those devices are in fact.

Third form: Multiple choice test on an object

- Questions are organized in the form of a picture and the person who needs to select a position on the photo is the right answer.

- This type of exercise is used to test the ability to recognize and distinguish details in a master block. (For example, identify the socket on the motherboard, which is the CPU cache memory.) Of practitioners in practice. To do this exercise requires the student to be familiar with the composition of the computer components, how to read the specifications on the actual device.

2.3 Construct a graphic test

2.3.1 Macromedia Flash Test Builder

Now, there are many tools used to create E-learning quizzes such as Hot Potatoes, Lecture Maker, Adobe Presenter, Moodle, etc. The weakness of these software is the ability to create multiple-choice questions. Graphic format. To meet the requirements set out in the construction of the computer architecture test suite we selected the Macromedia Flash tool. This is a 2D graphic design tool, with its powerful 2D graphics capabilities, it is also used in E-learning to build electronic lecture, simulation, and problem solving. One application we mentioned in this article is to use Macromedia Flash to create a set of graphical tests.

Macromedia Flash supports six types of multiple choice questions:

- Type 1: True - False: Each question usually has two options and in which a selection is determined to be TRUE, an option is defined as SAI.

- Type 2: Multiple Choice: Each question often has many options and some of which are determined to be the correct answer.

- Type 3: Fill in the Blank: Each question has a box for the participant to enter the value of the answer.

- Type 4: Drag and Drop: Each question is usually divided into two parts. The player needs to drop and drop the objects to the appropriate positions.

- Type 5: Hot Spot: Each question is usually represented by a photo and the person to whom the photo is to be taken is chosen.

- Type 6. Hot Object: Each question usually has many objects and people to choose by clicking on one of those objects.

Forms 1, 2, 3 have been used by many authors to develop a text format. In this article we study and use: form 4, form 5, form 6 to build a specific image test as follows:

- Type 4 is used to build the double-vision image questionnaire.

- Type 5 is used to build object-oriented image choice questions.

- Type 6 is used to construct multiple choice image tests on an object.

2.3.2 Build a graphical test suite with Macromedia Flash

A. Structure a set of multiple-choice questions

A sample set based on the available test sample that the software supports includes the following components:

- Introduction page (Welcome page)

- Question page

- Result page

- The buttons to move between the questions

- Program code

B. Create a set of multiple-choice questions

Step 1. Initialize the theme from the template

- Execute File -> New -> Template

- In the Category column select Quiz. In the Template column, select one of the three templates provided.

Step 2. Set basic parameters

- Click on Quiz Options (on the left of the presentation window - Stage)

- Select Window -> Development Panels -> Component Inspector

Parameters include:

+ Randomize: If selected, the questions will be displayed in random order. So, between the different runs, there are almost as many different checks.

+ Question to Ask: Enter the number of questions to use for each test. If the value is 0, all questions in the thread will be used. Typically, this value is less than the number of questions

+ Show Result Page: If selected, the results page will appear after the test is complete, informing you how many sentences you have completed.

+ Other options to set when there is a full online test system with full server.

Each question in the series is called an Interaction. When using the Quiz Template, questions are placed sequentially

into keyframes (keyframes) between the first keyframe and the last keyframe. The first keyframe is the Welcome page, which changes the interface as you like. The final keyframe is the result page.

Keyframes are displayed on the Interactions Layer. To change a question or to write a question, go to Keyframes located between the first Keyframe and the last Keyframe. These are important keyframes to master.

C. Add and remove a question

* Add a question to the thread

Step 1. On the first layer of the Timeline, select Frame in front of where you want to insert the question. Hold Shift, select the other frames the same position on the remaining layers.

Step 2. Right-click on the frame, select Insert Frames

Step 3. On the Interactions Layer, select the Inserted Frame, select Insert -> Timeline -> Blank Keyframe

Step 4. Next do one of the following:

Option 1: Copy & Paste: Select a reusable keyframe that has the same reusable question, right-click on the timeline and select Copy Frames. Then go back to the inserted white keyframe, right click on the keyframe, select Paste Frames.

Method 2: Using the Library Tool: Enabling the Library Window by Window -> Other Panels -> Common Libraries -> Learning Interactions. Then drag the question type from this window into the Stage.

* Remove a question from the thread

Step 1. On the Interactions Layer, select Keyframe containing the question to be deleted.

Step 2. Select Edit -> Timeline -> Remove Frames

D. Configuration for the question:

Step 1. Select the question (choose the keyframe that contains the question).

Step 2. Break the group of question idioms: Execute the command Modify -> Break Apart (this command is only used once). To check whether the question has been broken, try selecting and checking an object such as text box, radio, checkbox on the Stage. If it can be selected separately, the order has been executed successfully.

Step 3. Deselect all objects on the Stage (type Control + Shift + A).

Step 4. Click on Learning Interaction (usually under Quiz Options). The word Learning Interaction will be replaced by the name of the question form. In the example below, you will click on Multiple Choice Interaction

Step 5. Select Window -> Development Panels -> Component Inspector to resize the window accordingly to read the text, fill in the values for each question type.

E. Build questions

- Double format, use Drag and drop

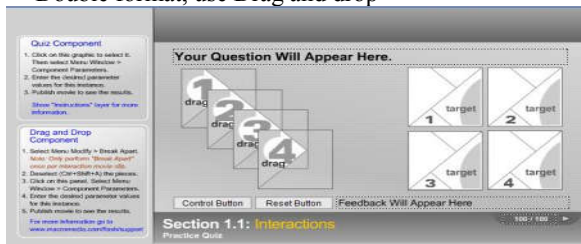


Figure 1. Multilingual Image quiz maker tool

- Select object type, use Hot Objects

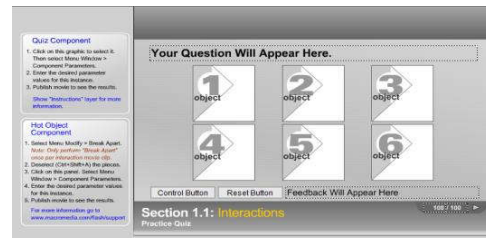


Figure 2. Image select questionnaire for object selection

- Form position selection on an object, use Hot Spot

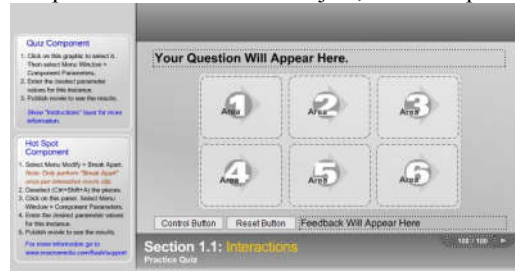


Figure 3. The tool for creating image-based multiple choice questionnaire on object

F. Test

During the thread creation process, you can run tests to check for errors using the command:

Control -> Test Movie

G. Packaged threads

The created test can be packaged in two forms:

Type 1: The type of flash file (.swf), which can be uploaded to the learning site for online testing.

Type 2. Program (.exe) file type, which runs independently as a Windows application, is used to test directly on the computer.

To package the theme, perform the following steps:

Step 1. Go to File -> Publish Settings

Step 2. In the Formats tab, select Flash (.swf) or Windows Projector (.exe) for the purpose. In the File column, enter the corresponding filename. Switch to Flash or HTML Tabs (this section is for SCORM standard tracking: Flash with SCORM 1.2 tracking, this standard uploads a learning management system) to further declare parameters for posting to the Web.

Step 3. Click the Publish button to package the title.

2.3.3 Computer graphic design

After a period of research, we have successfully built a 50-question computer-aided computer vision test, using the three types of multiple choice tests described above. This topic has been used to check the evaluation in online teaching computer architecture module for class 1d15 - Faculty of Information Technology - Viet Tri University of Industry at www.khanhmckm.com. Specific types of questions were used to construct the series:

Example 1: Double vision test

For 4 CPUs and 4 sockets, ask the students to assemble the CPU corresponding to the sockets on the mainboard

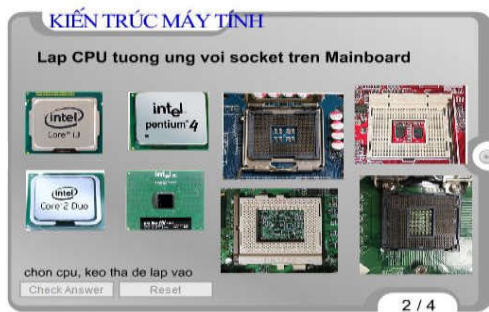


Figure 4. Double question

Students use the mouse, using drag and drop to assemble. During the assembly process, if the student wants to re-use, use the Reset button. When the student has finished selecting the Check Answer button to submit the post, the live system will report the result of the question is true or false.

Listing 2. Multiple choice questions

For 6 CPU, ask the students to choose which CPU has 3 or more cores



Figure 5. Question form choice

Students select the CPU that satisfies the requirement, select the Check Answer button to submit the post, the system reports the results of the students.

Listing 3. Multiple choice questionnaire on object

For a picture of a motherboard, ask the student to indicate on the board where the socket is.



Figure 6. Multiple Choice Questionnaire

Students select the main sockets on the drawing, select the Check Answer button to submit the post. The system reports results to students.

After the student completes all questions the system will give the assessment results including:

- + Number of correct answers

- + Number of wrong answers
- + Total points

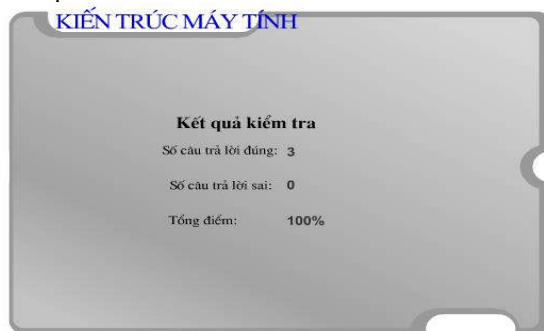


Figure 7. Student performance results

2.4. Evaluate the results of the implementation of the graphic tests

Due to the framework of the article, we do not present empirical results but qualitative assessments.

For trainees: The use of images for evaluation has attracted participants to actively participate and evaluate the ability to apply in practice, creative thinking of students. Especially limiting the disadvantages of online assessment for technology courses (due to the fact that it can not be tested on real devices).

For teachers: Through a set of image tests, the trainees assessed some criteria of technology courses that difficult text responses to online teaching. Identify equipment, read specifications, pair equipment as well as distinguish components in actual systems.

3. CONCLUSION

Along with the development of Information Technology, graphic tests are a major issue that many educators are interested in, especially in the online teaching of technology subjects. In this paper, the author introduces the use of Macromedia Flash software to give a graphical test and the use of this tool successfully builds a graphical simulator of computer architecture. The results can also be used as reference material for the development of visual tests in other subjects.

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