Ubiquitous Computing in Education

UCE-Server and -Tools

1. Installation

Just unzip the contents of the archive "UCE_PC.zip" to the destination directory. Make sure that the Java 2 run-time environment (v1.4 or higher) is installed on your system.

2. Running the software

Server:
Launch "start_server.bat" in the installation directory. It will run the server with default parameters. The easiest way to change these parameters is to edit the batch file:

```
java -cp UCE_PC.jar server.UCE_Server <lclIP> <port> Quiz,SMS,Feedback <debuglvl> [nogui]
```

<lclIP>	specifies the local IP address by which the server should accept incoming connections. Only useful if the server host has more than one network adapter. "def" means, that the server host will accept all connections. (default: def)
<port>	the server port. (default: 2904)
<debuglvl>	the detail level of debug messages, ranging from 0 (errors only) to 3 (very detailed). (default: 3)
[nogui]	optional parameter. If set, no GUI will be shown; all messages will be sent to the console instead. Since the GUI tends to slow down the server severely it is advised to use the GUI only in small groups or for demonstrations.

After a few seconds the server is ready to accept connections. To close the server, type "Ctrl-C" in its console or close the GUI.

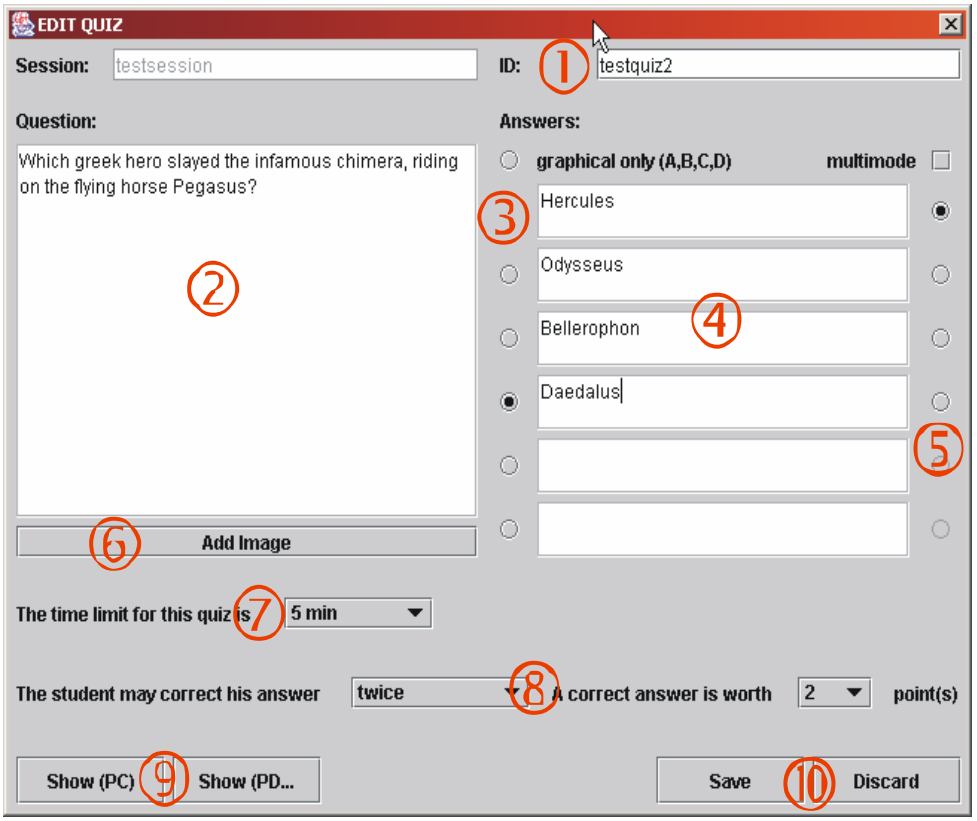
QuizMaster/Feedback:
Just launch "start_feedback.bat" and/or "start_quiz.bat".

3. Using the QuizMaster

The QuizMaster is used to create, edit and send quiz-type questions. After start up, a login window will appear where you have to enter username, password, server IP and port and a session name. The session name determines the file in which existing questions can be found and in which new questions will be saved.
If you want to activate quizzes (send the questions to the students) you have to log in using a super user/administrator account. As long as the password tables have not been changed (see Chapter 5), you can use "teacher1" - "teacher4" as user name to get administrator privileges (password = username).

The main screen shows a list of questions on the left side (which may be initially blank) and several command buttons on the right. If you have successfully logged on as super user, the window title should show a "[2]" or "[3]" at the end; if not close the QuizMaster and try again using another name (you can not use a username twice).

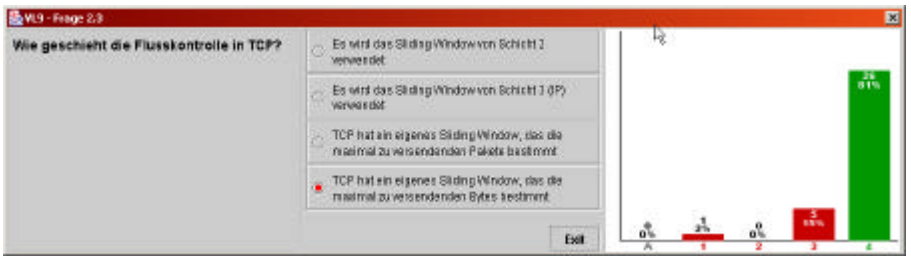
The "Add"-button and the "Edit"-button (only usable if a question is selected) will open an editor window in which you can create or change a multiple-choice question:



1. Choose a unique ID for this question, e.g. by enumerating the quizzes. This ID is shown in the question list on the left side of the QuizMaster.
2. Enter the text of the question
3. Choose the number of alternative statements between 2 or 6 (just click on the radio button left to the last statement field you want to use). If you intend to use a picture instead of text statements (e.g. 4 diagrams from which the student has to choose the correct one(s)), mark "graphical only".
4. If you have not selected "graphical only" in step 3, enter the correct and wrong statements in the desired order in these text fields.
5. Select the correct statement. If more than one statement is correct or you want to leave the student uncertain how many statements are correct, check "multimode" above. You may then select/deselect each alternate statement independently.
6. If you want to add an image to clarify the question or to depict the answers, push this button and select the image you want to use in the file dialog. To remove the image, push this button again.
7. Here you may set a time limit for the question.
8. On the left you may set a limit to how often a student may change his answer (unlimited, never, once, twice ...). On the right you can set the amount of credits the student will get for the correct answer.
9. With these buttons you can get a preview of how the question will look like on the students client ("Show PDA") or in the result screen ("Show PC")
10. To save the question or changes to the question, hit "Save". "Discard" deletes the question (if you are adding a new one) or discards the changes (when editing an existing question)

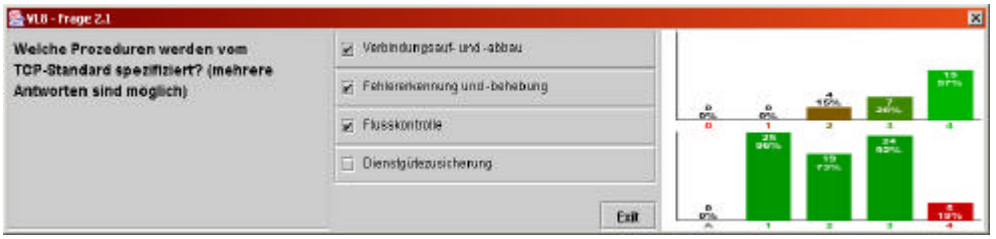
To activate a question (i.e. send the question to the students' computers), select the question and hit the "Activate" button. The entry of the question should then show a "(2) [x/y]" at the end, where "y" is the number of logged on students and "x" is the number of students, who have answered this question already. If you have set a time limit, you can simply wait until the time is over. Then the question will automatically be deactivated, which is symbolized by a "(3)" at the end of its entry. At any time you may select an activated question and deactivate it manually using the "Deactivate" button. There is a short period of time in which the server gathers all unsent information, so it will take about 5-10 seconds until the question is marked as deactivated ("(3)").
You can send multiple questions at the same time, simply by repeating the select-activate-procedure for each question you want to use.

After a question has been deactivated, you can retrieve the results by selecting the question and clicking on the "Quiz Results" button. A new window will appear showing the question, the alternative statements (the correct ones are marked) and a bar graph showing the students' results:



"How does TCP handle the flow control?" - A: "The sliding window of layer 2 is used", B: "The sliding window of layer 3 (IP) is used", C: "TCP has its own sliding window, determining the amount of packets that may be sent", D: "TCP has its own sliding window, determining the amount of bytes that may be sent".

In simple multiple choice questions where exactly one statement is true, the graph is quite simple: for each statement there is one bar that shows the percentage of students selecting this as the true one. The bar for the correct statement is painted green, the others red (there is an additional gray bar for the students that did not answer this question).
As you can see in the example above, most students checked the correct statement (D), only 6 out of 32 students were wrong.



"Which procedures are specified by the TCP standard?" - A: "connection establishment and termination", B: "error detection and correction", C: "flow control", D: "quality of service"

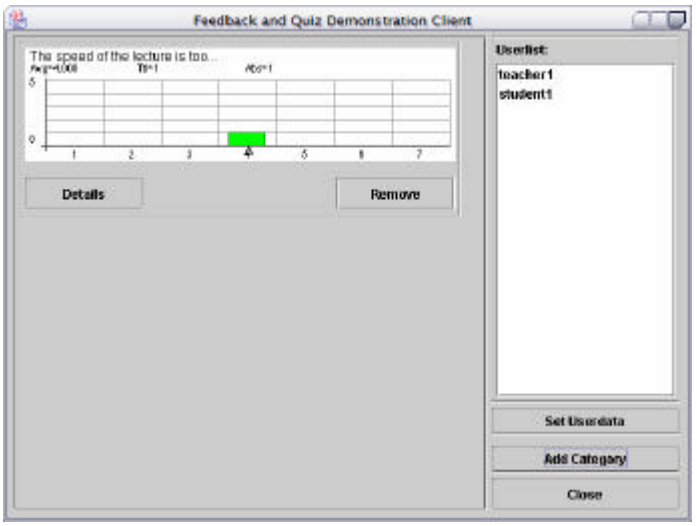
If more than one statement may be correct, two graphs are shown. The lower graph shows - similar to the simple MC-type above - the number of students marking the corresponding statement as true. Again the correct statements are painted green, wrong statements red and students that gave no answer at all are shown in the gray bar on the left. The upper graph is more interesting as it shows the distribution of credits the students would get. This is calculated by giving one point for each correctly checked (if true) or unchecked (if wrong) statement per student. E.g. if the statements A and C are true, the student would get 4 points if he checked A and C and left B and D unchecked. If he had checked A, B and C or A alone, he would get 3 points and so on.
Looking at the example above shows why this is quite important: The lower graph shows big green bars and small red bars which seems that most students answered correctly. But the upper graph indicates that actually only 57% were completely right, 26% made one mistake (e.g. by checking D or missing A, B or C; in some exams these students would get no points for this question!) and 15% made two mistakes.

You can also get a detailed view showing which user gave what answers. Select the appropriate question then push the “Detailed Results” button. A table will appear showing all participating users with their user name and the given answer as well as the real name and the location from where they are logged in (this information has to be given by the users themselves, so it might not be available).

Furthermore it is possible to let the users vote by using the quiz service. Click on the button “Quick Vote” and the quiz editor will appear with some functions disabled. Just enter your question and several alternative statements and push “Vote!” to send the voting to the student’s clients. As soon as all students have sent their answer (or the time has run out), the results are shown just like the results of a quiz.
The vote is stored in the same way as a quiz, so you can reuse the vote later.

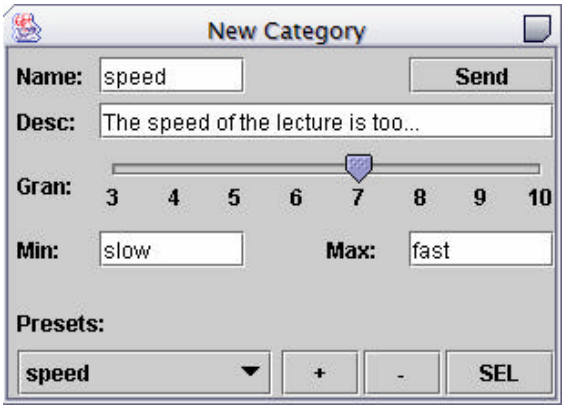
4. Using the Feedback/User management tool

After starting the Feedback client, a login window will appear where you have to enter username and password as well as server address and port. You should use a super user or administrator account (details see Chapter 3) otherwise some functions are disabled such as adding feedback categories.



On the left side a list of all logged in users is shown. You can click on any entry to view some info about that user or to send him/her a short message which will appear on his/her screen immediately. To set your own user info, click on the "Set Userdata" button.

On the right side all currently available Feedback topics are shown. This part of the client may be initially empty. Each topic is shown as bar graph, showing the current results. If more than two topics are available you have to access the lower categories by a scrollbar that will appear in this case.
Beneath the bar graph are two buttons. The “remove” button may be used to delete a category, the “Detail” button shows a detailed list of all users and the vote they have sent (just like the detail result option in the QuizMaster). To create a new topic, click on the "Add Category" button. A small editor window will appear where you have to enter the needed information:



Name: a short description of this topic. This will be shown in the combobox-selector on the students' devices.
Desc.: the long description or the question that is to be answered with this feedback topic.
Min:/Max: a short description for the lowest and highest value. This may be something like "too slow" and "too fast", so you want to have most votes in the middle between or something like "completely useless" and "most useful", where you want to have most votes at high values.
Gran.: the granularity between the lowest and highest value (= number of bars in the graph)
Use "Send" to activate this new feedback topic. It will be immediately shown on all connected clients.

You can store the information you entered in the above fields as presets. These presets are stored to disk so they can be used anytime later. To create a preset enter the information that you want to store and push the "+" button next to the selection box. The preset will have the same name as the category (i.e. the entry of the "name"-field) and will appear immediately in the selection box.
To delete a preset, select it in the selection box and push the "-" button. The corresponding preset will be deleted without confirmation.
To use a preset, select it in the selection box and push the "SEL"-button. All values are restored and shown in the fields above. You can then use the "send"-button to activate the category.

5. The password files

The password files are located in the root directory of the server (PC) kit. There is one file for each service (Feedback, Quiz, SMS) and an additional file for general use.
These files are simple text files which may be edited with any text editor. Each line is a single entry with the form: "username|password|access level|userdata".
The Access level may be 1 (student), 2 (super user = assistant), 3 (administrator = teacher) and -1 (disabled, may not log in).
The password is given as plain text; if an asterisk is given instead, the password is not checked when this user tries to connect (any password will do).
Userdata is either "-" (no data stored) or a list of the form "key1=value1#key2=value2#...". At the moment the following keys are defined: "Realname", "Location", "EMail", "Phone". So a typical entry could be:

```
doe|xyz|1|Realname=John Doe#Location=Sydney#EMail=john@doe.au
```

(Normally, the user data will be stored by the server itself as soon as the user provides this information.)

You can also enable a guest user account by adding the line "default|*|1|-". Every username will automatically gain access as student. Note that the user-given data (realname, phone number etc.) will not be stored for guest users.

6. Feedback log files

The teacher's feedback client creates log files for each topic that is active. These log files are named "Feedback_<topicname>.log", where <topicname> is the short name of the category. A typical log file would look like this:

```
BEG:Mon Dec 09 10:36:39 CET 2002;speed;the speed of the lecture is too…;low;high;5
INT:Mon Dec 09 10:36:40 CET 2002;2;0;0;0;0;0;0;0;0;0
UPD:Mon Dec 09 10:36:41 CET 2002;1;0;0;1;0;0;0;0;0;0
UPD:Mon Dec 09 10:36:42 CET 2002;1;0;0;0;1;0;0;0;0;0
UPD:Mon Dec 09 10:36:43 CET 2002;1;0;0;0;0;1;0;0;0;0
INT:Mon Dec 09 10:37:10 CET 2002;1;0;0;0;0;1;0;0;0;0
INT:Mon Dec 09 10:37:40 CET 2002;1;0;0;0;0;1;0;0;0;0
END:Mon Dec 09 10:37:48 CET 2002
```

The first line always starts with "BEG:", followed by a time stamp and the descriptions of the topic. This is the start of a new session. Since new data is always appended (the client never deletes log files), these introducing lines may be found multiple times in the log files (if the topic is used more than once).

A Session ends with a line starting with "END:"; if this line is missing, the client was not closed properly and some data may be lost in this log file.

All other lines contain a time stamp and 10 integer values. The first value is the number of clients that have not voted yet (abstain); the following 9 values are the number of clients voting for "1", "2", ... etc. There are always 9 values, regardless how many values you have selected for this topic; if the granularity is just 5 (default), then the last 4 values will always be zero.

These lines are appended to the log file every 30 seconds (then they start with "INT:") as well as after each change (i.e. a client changes the vote; these lines start with "UPD:"). The information therefore is somewhat redundant.