4 – Prototype

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4.1 Justification of Prototype

#	Area of System	Feature	Included / Omitted	Justification
1	Login	Username and password validation	Omitted	This would complicate the testing process as the username and password would have to be entered every start-up of the system. Additionally, validation of usernames and password is not essential.
2		Login facilities	Included	The ability to log the attendance of, and store information about, multiple users is one of the main requirements of the system. In addition, when the system is used in practice it's important that multiple users are able to use it. Therefore, a login system is essential because it allows multiple different user accounts to log in. This means that, the features of the system that rely on multiple user accounts can be fully prototyped and tested.
3		Automatic attendance tracking	Included	This feature will require little time to prototype and is a useful feature of the final system. I will include this feature because it's important for the attendance of the user to be automatically tracked to save time during the lessons.
4		Automatic determination of the reason for a user missing a session	Omitted	This feature is not essential to the system. It would also complicate the testing process. This is because every time a user logged in, the dialog asking whether the last session was running or not would open. For these reasons I will not be including this feature.
5		Levels of access	Omitted	Although, in the final system, there will be different levels of access, adding different levels of access to the prototype would just complicate the testing process as care would have to be taken to ensure a user that had access to the admin functions was logged in if the admin functions needed testing. It would also take additional time to program the functionality to restrict access to different areas of the system based on which user was logged in.
6	View Questions	View	Included	This is an essential feature of the system as the user needs to be able to view the questions that are currently in the system in order to choose one to attempt. Therefore, I will be including it.
7		Sort, filter	Included	It's important that the users are able to find questions in the system that they want to attempt. This feature needs to be well implemented in the final system so that it is as easy as possible for the users to find the questions in the system. By including it in the prototype, the sorts and searches will be able to be fully tested and evaluated and so improvements that can be made for the final system would be able to be found.
8		Delete	Included	This feature is important to make the testing process easier. If the question creation system goes wrong and creates a malformed question it would be much easier to remove it using a built in feature rather than cleaning the databases of

				it by hand. Therefore, including this feature will make the prototyping process easier. It's also a useful feature of the final system.
9		Attempt	Included	Attempting questions is a major feature of the final system therefore it is important that this feature is fully prototyped and tested.
10	View Forms	View	Included	This is an essential feature of the system as the user needs to be able to view the forms that are currently in the system in order to choose one to attempt. Therefore, I will be including it.
11		Sort, filter	Included	It's important that the users are able to find forms in the system that they want to attempt. This feature needs to be well implemented in the final system so that it is as easy as possible for the users to find the forms in the system. By including it in the prototype, the sorts and searches will be able to be fully tested and evaluated and so improvements that can be made for the final system would be able to be found.
12		Delete	Included	This feature is important to make the testing process easier. If the form creation system goes wrong and creates a malformed form it would be much easier to remove it using a built in feature rather than cleaning the databases of it by hand. Therefore, including this feature will make the prototyping process easier. It's also a useful feature of the final system.
13		Create form from user weaknesses	Included	This is a difficult feature to implement because it will be difficult to find which data about a user's attempt of each question should be used to determine which questions that they struggle with the most (It's the questions that they struggle with the most that would be added to the form). By prototyping this feature, I will be able to gather feedback (from the end user and third parties) to determine the how effective the system is at identifying these questions. This feedback would be used to refine the system's ability to determine the questions that the user struggles with.
14		Attempt	Included	Attempting forms is a major feature of the system therefore I will include it. See the attempt form breakdown further down.
15	Create questions	Add components	Included	I will include the feature to add all types of components that are detailed in the design (with the exception of calendar entry which is detailed below). It's important to prototype adding all of the types of components as it's likely that there will be some issues in adding certain components to questions. Prototyping this feature will allow me to work out these issues before the final system and means that when I program the final system I will be able to focus on making the feature as good as possible rather than just getting it to work.
16		Calendar entry	Omitted	I will omit this feature because I anticipate that it will take a large amount of time to implement. This is because creating a calendar would be very complex

				and would not be of much improvement to the system. The calendar entry is one of the least important types of components that can be added to questions. Despite this, however, I will implement a simple calendar entry that uses dropdowns to select the dates as a proof of concept.
17		Drag and drop	Omitted	Implementing a drag and drop system to add components to questions could potentially be a more user friendly way of adding components to questions compared just pressing buttons. However, I will not include it because it would take a large amount of time to implement as it is a complex feature. It would also slow down the process of creating questions as rather than just pressing buttons the components would have to be accurately dragged onto the question. This would complicate the prototyping and testing process and so I will not be including it.
18		Add basic information	Included	It's important that basic information is stored about each question. This is essential to searching and sorting the questions, and also in finding particular questions in the system. It's important that the user is able to easily find the questions that they want in the system so that they can attempt them it's also important that the user can easily find questions when creating forms. This makes the basic information stored about each question essential for good operation of the system therefore I will be including it.
19	Create forms	Add questions	Included	Adding questions to the form is how forms are created therefore this feature is essential as without it forms would not be able to be created. Allowing the admin to create new forms a major feature of the system therefore it's important that it is fully tested and prototyped so that it is as refined as possible in the final system.
20		Add basic information	Included	It's important that the admin is able to enter a description of the form and its difficulty into the system after creating a form. This is so that the user can easily find the forms that they want to attempt in the system because this data is needed in order to perform the sorts and searches. This feature will not take a large amount of time to develop therefore I will be including it.
21	Edit forms	Rearrange questions	Included	If an error is made creating a form in the system being able to edit forms allows the error to be corrected easily without having to recreate the entire form. This will make testing form creation easier, and therefore I will be including this feature.
22		Remove questions	Included	Removing questions from a form is an important feature of editing the forms of the system and means that errors can be corrected if a question is mistakenly added to the form. Implementing this feature will save time during the testing

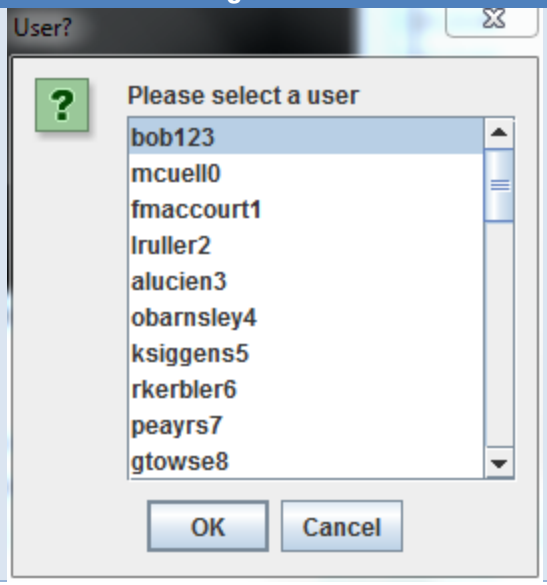
				process as it means that if a question is mistakenly added to a form it can be easily removed without having to recreate the entire form.
23	Users	Add	Included	It's important that the admin is able to add new users to the system. Prototyping this feature means that it will be able to be fully refined, before implementing into the final system, as feedback can be gathered.
24		Edit	Included	Editing the stored details of a user is an important feature of the system that needs to be fully tested even though it would be an infrequent action.
25		View	Included	There is a large amount of data that is stored about the users. Including the facility to view the users in the prototype means that feedback can be gathered and the best way to display the information can be determined.
26		Search	Included	Because there will be a large amount of users in the system, it's important that the users are able to be searched. This feature is relatively simple to implement because it's only a linear search therefore it will not take a large amount of development time.
27		Delete	Included	This feature is important to make the testing process easier. If the user creation system goes wrong and creates a malformed form it would be much easier to remove it using a built in feature rather than cleaning the databases of it by hand. Therefore, including this feature will make the prototyping process easier. It's also a useful feature of the final system.
28		Take register	Included	It's important that the take register feature is included so that it can be fully refined and streamlined. This is important because Steph will take a register at the start of every session. The faster that she can complete the register, the more time that is able to be spent teaching the users.
29		Encryption	Omitted	Although the final system will store sensitive information about the users, encryption is not important for the prototype. This is because the prototype will only use fake 'dummy' data and so there is no risk of sensitive information being leaked.
30	Statistics	Produce report	Included	Progress tracking is a major feature of the system and a large part of this feature is being able to produce reports on each user's progress therefore it is important that it is included in the prototype. Producing printable reports is also a unique area of the system as no other areas of the system print anything so it's important that it's prototyped to ensure that any issues are worked out before it is implemented in the final system.
31		Produce multiple reports	Omitted	This feature is only a small addition to the produce report feature and doesn't play a major role in the system. Therefore I will not be including it.

32		View stats for individual question	Included	Implementing this feature means that the automatic progress tracking features can be fully tested because the data that they produce can be easily viewed. For this reason it's important that this feature is included.
33		Graphing	Omitted	Although the final system will make use of graphs to display the progress, I will not be including this feature in the final system. This is because they would be complex to program and do not affect other areas of the system.
34	Import	Import questions	Included	This is an important feature of the system because the admin needs to be able transfer questions and forms to different instances of the system otherwise the club would not be able to run because it's essential that the users have the same forms to practice. In addition, it would take a large amount of time to recreate each form and question by hand on different instances of the system. Therefore it's incredibly important that all these features are included in the prototype
35		Import forms	Included	See above
36	Export	Export questions	Included	See above
37		Export forms	Included	See above
38	Component validation	Email address	Included	Email address validation will be a fairly simple feature to implement and it's important that the validation routine works well. Therefore, I will be including it so that it can be refined before it is added to the final system.
39		Date	Included	Date validation will be a fairly simple feature to implement and it's important that the validation routine works well. Therefore, I will be including it so that it can be refined before it is added to the final system.
40		Phone number	Included	Phone number validation will be a fairly simple feature to implement and it's important that the validation routine works well .Therefore, I will be including it so that it can be refined before it is added to the final system.
41		Address lookup via google maps	Omitted	Although this will be an important feature of the final system, because it will make address entry as accurate as possible, I will not be including it. This is because it would be very complex to program and its omission doesn't affect other areas of the system. It would also complicate the testing process as there are a large number of ways that it could fail (e.g. no internet connection, api request limit exceeded etc.) and it also limits development only to places that have a working internet connection.
42		Presence	Included	It's important that all of the fields of a question have presence checks. This is because presence checks are a major part of online forms. Presence checks will also be quick to implement and not take much development time.
43		Double entry verification	Included	Without double entry verification, the password entry questions would not be very accurate. This feature will be quick to implement and require little development time therefore I will include it.

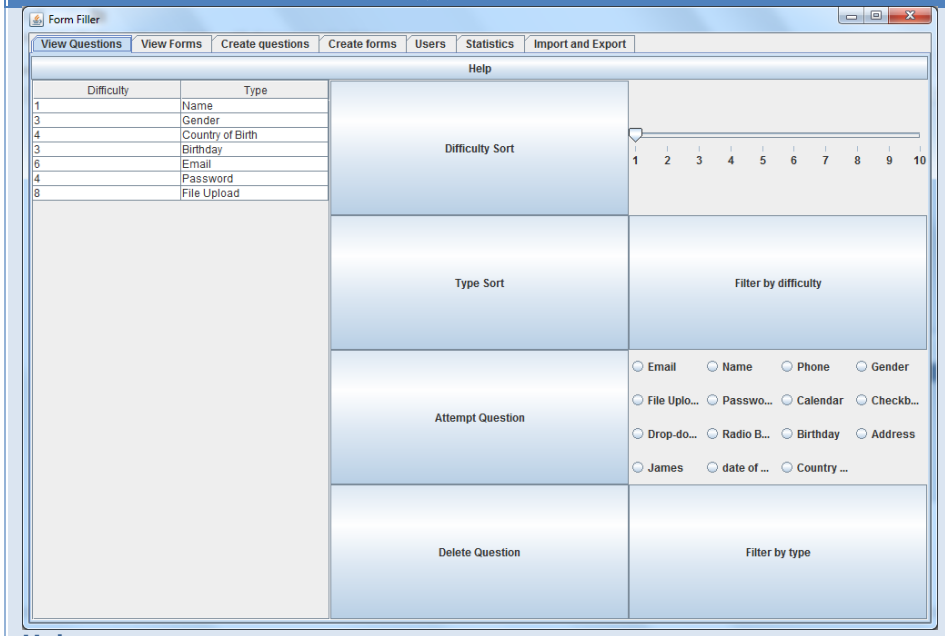
44		Document upload fields	Included	Steph mentioned in her interview that this would be an important feature of the system and that currently she doesn't have much of a way of letting the users practice uploading documents to forms. Therefore. this feature is an important feature of the system. Including it in the prototype means that it can be refined before the final system and so it can be ensured that it will work well in the final system.
45	Attempt form	Save progress	Included	This will be a difficult feature to implement but it's important that it works for the final system. This is because users often don't have time to complete an entire form in one session therefore it's essential that they are able to save their progress between sessions.
46		Validate answers	Included	This is the most important feature of the system because the system's purpose is to teach the users how to fill forms in correctly so that their answers pass the validation checks. Without this feature the system would not be able to do this therefore the feature must be included.
47		Track statistics	Included	This is a major feature of the system. It will also be complex to implement as there are many different statistics that can be gathered. Implementing it in the prototype will allow me to be able to refine the feature and gather feedback to determine which statistics are most important and should be tracked and so will make the feature in the final system better.
48	Interface	Context sensitive help for every screen	Omitted	While this is an important feature in the final system, no actual users will be using to the prototype - only competent third parties. This means that, a help feature for every screen is unnecessary. A small help dialog will implemented in a few key screens, however, so that the location of the help button and the help available can be refined.
49		Main menu screen	Omitted	This screen is not essential to the system as it mainly contains buttons to navigate to the other areas of the system. These buttons are not necessary as the tabs at the top of the program can just be clicked instead. Therefore, I will not be including this in the prototype.

4.2 Screens and Outputs

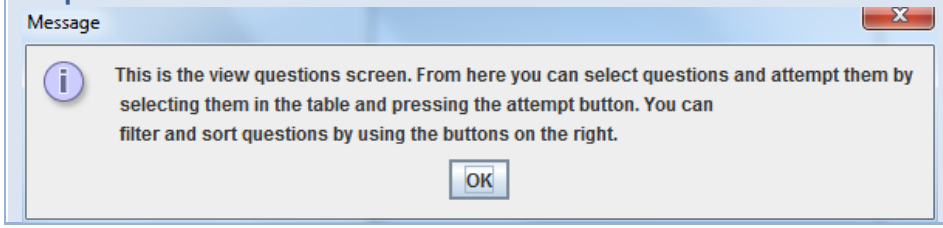
4.21 Screens (no Data)

Login screen	Features
	● Allows the selected user to login.

View Questions Screen



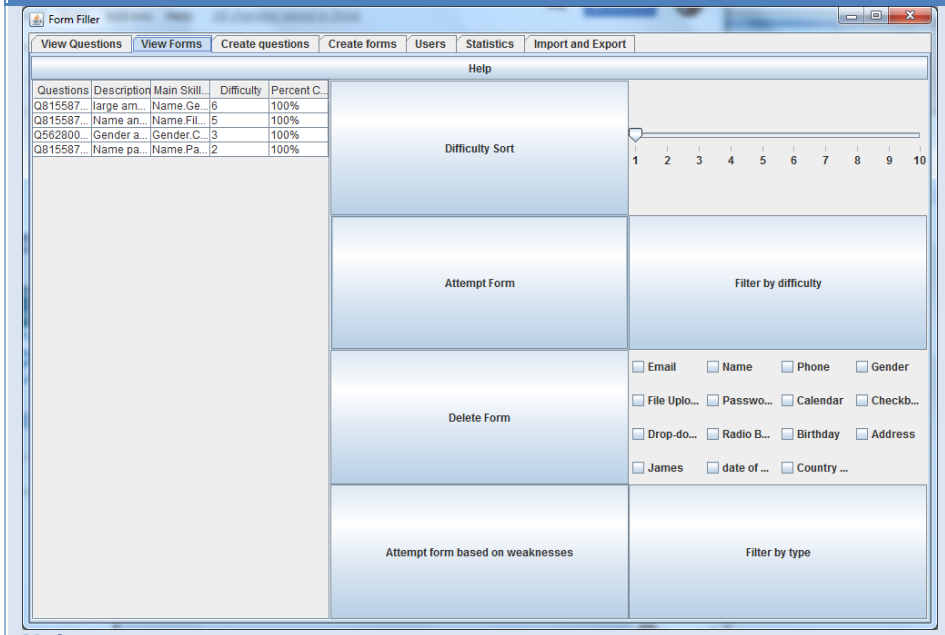
Help screen



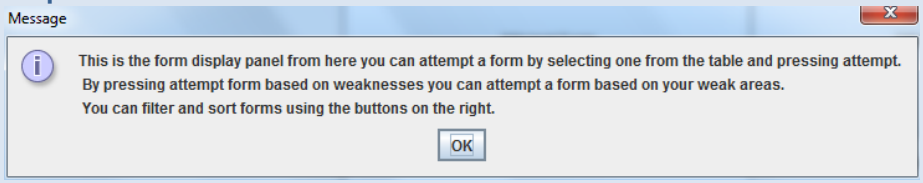
Features

- Displays the questions to the user and displays their:
  - Difficulty
  - Type
- Allows the following sorts:
  - Difficulty sort
  - Type sort
- Allows the use of a slider to select the difficulty in order to filter the questions by difficulty
- Allows the user to select a type of question using radio buttons and then to filter by this type.
- Allows the admin to delete a question from the system by selecting it in the table and pressing the delete button.
- Allows the user to attempt a question by selecting the question in the table and then pressing the attempt question button.
- The user can also get help on this screen by pressing the help button at the top of the screen.

View Forms Screen

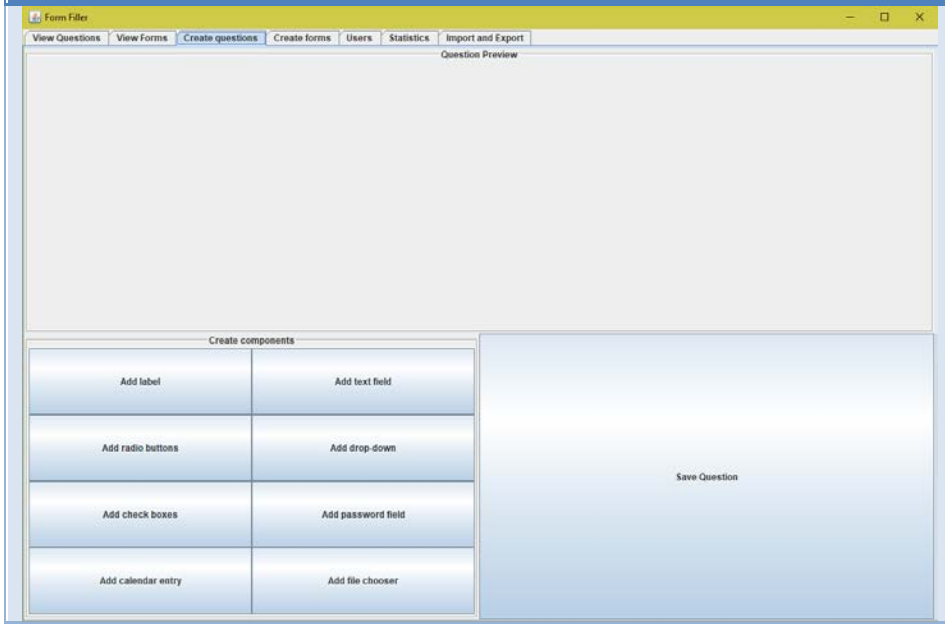


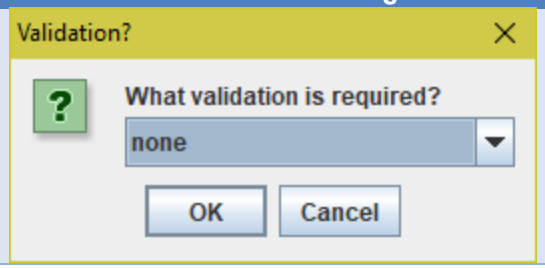
Help screen

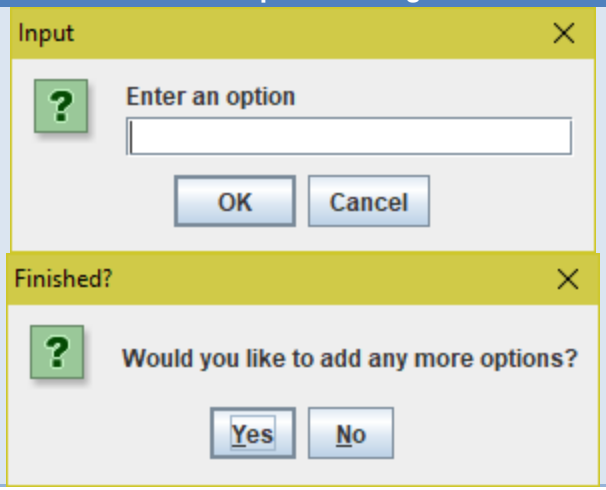


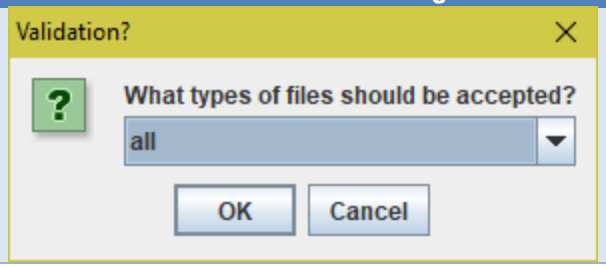
Features

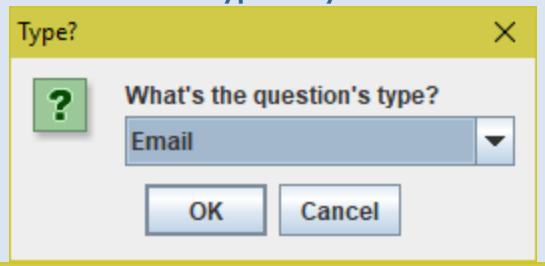
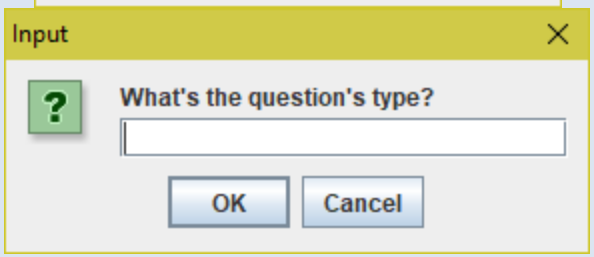
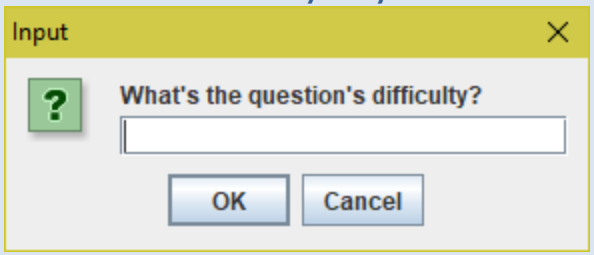
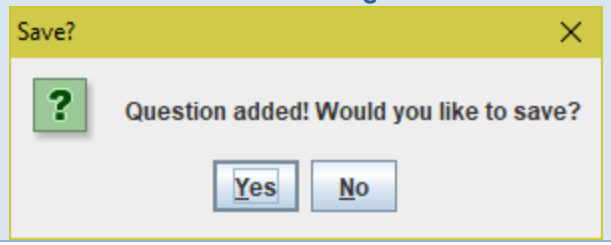
- Displays the forms to the user and displays:
  - The list of questions in the form
  - The types of questions in the form
  - The description of the form
  - The percentage of that form that the user has completed
  - The difficulty of the form
- Allows the user to sort the forms by difficulty
- Allows the use of a slider to select the difficulty in order to filter the forms by difficulty.
- Allows the user to select multiple types of question using checkboxes and then to filter the table to only show forms that contain questions of all these types.
- Allows the admin to delete a form from the system by selecting it in the table and pressing the delete button.
- Allows the user to attempt a form by selecting the form in the table and then pressing the attempt form button.
- Allows the user to have a form automatically created and opened for them to attempt which is created from the questions that they struggle with the most.
- The user can also get help on this screen by pressing the help button at the top of the screen.

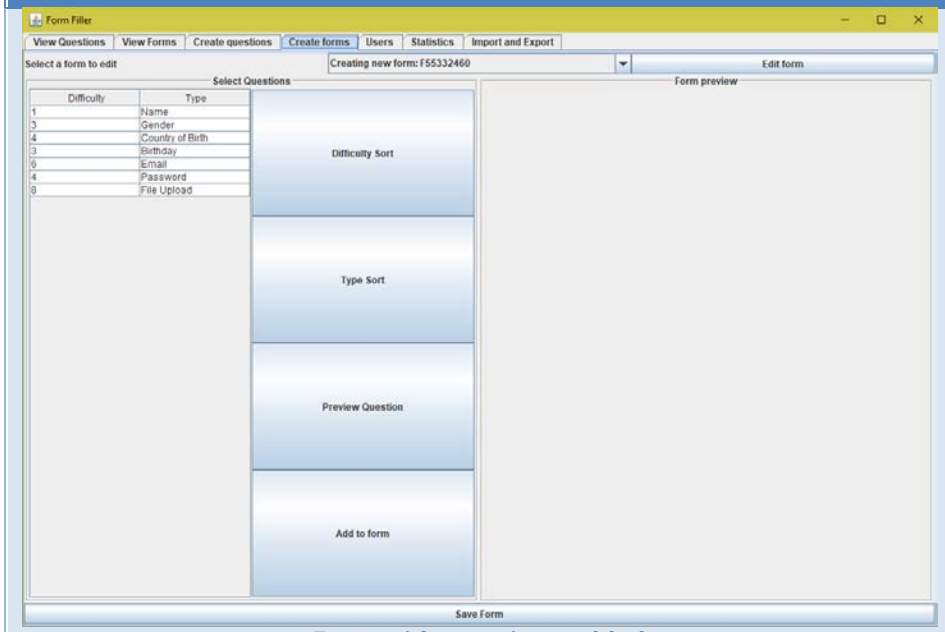
Create Questions Screen	Features
	● This screen allows the admin to create new questions by adding components to a blank panel ● There is a preview at the top of the screen which shows the admin how the question will look. This means that they are able to easily check how the question looks and are able to spot errors that they have made in creating the question (e.g. adding components in the wrong order). ● There are buttons for each type of component that the admin can add to a question. ● There is a save question button that allows the admin to save the question and add it to the system.

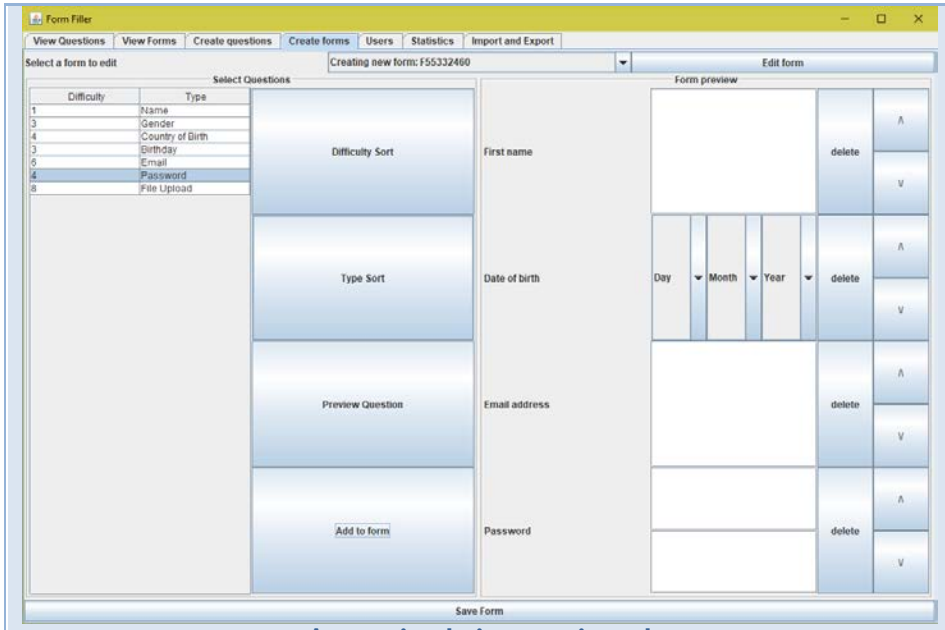
Add text field dialog	Features
	● This dialog allows the admin to specify which type of validation rule should be applied to the text field that they are about to add to the question. They can select “none”, “phone number”, or “email address”

Add options dialog	Features
	● These dialogs allow the user to specify the options that they want the user to be able to select using the radio buttons, checkboxes, or drop-down that they’ve just added to the question. ● The first dialog allows the admin to enter an option. ● The second dialog allows the admin to specify whether they have finished entering options or not.

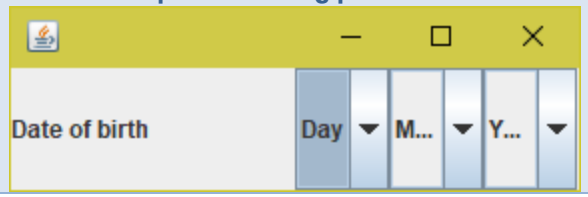
Add file chooser dialog	Features
	• This allows the user to specify what types of files the file chooser that they are about to add to the system should accept.

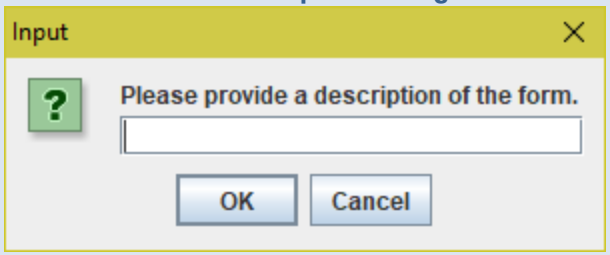
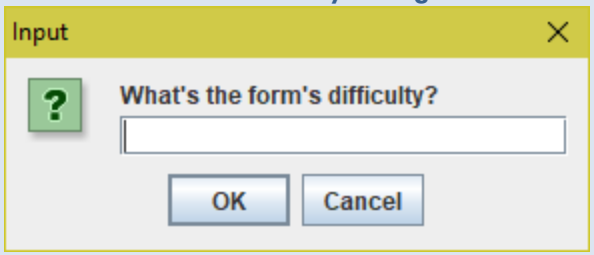
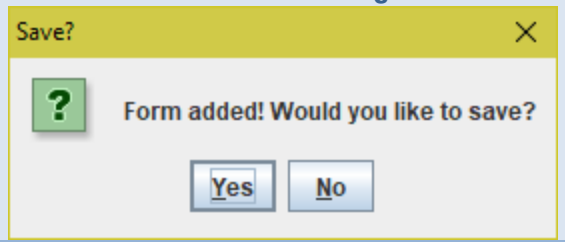
Enter final question details dialog	Features
Type entry   **Difficulty entry**  **Save dialog**  	● These dialogs allow the admin to enter the required details about the question that they have just created. Type Entry: ● The first dialog allows them to select the type from a drop down of all of the types currently in the system. ● The last option of the dialog is “new type” and if they select this type the second dialog will open. ● The second dialog allows the admin to enter a brand new type into the system. Difficulty Entry: ● This allows the admin to enter the difficulty of the question into the system. Save dialog: ● This allows the admin to specify whether they want to permanently save the question to the database.

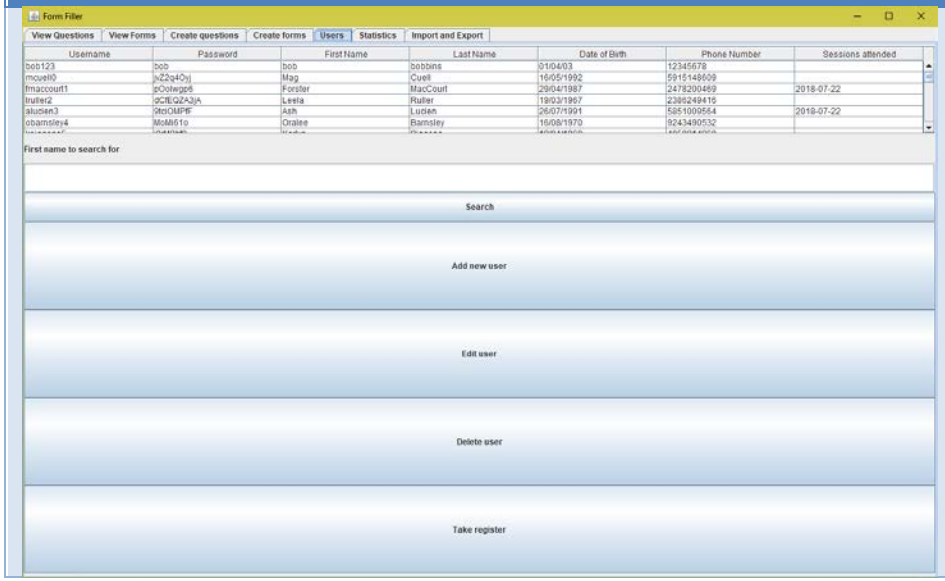
Create Forms Screen	Features
 **Form with questions added**	● The admin can user this screen to create new forms (or edit existing ones) and add them to the system. ● The drop down at the top allows them to choose a form that is already in the system to edit. ● The table on the left allows the admin to view all questions in the system along with their type and difficulty. ● There are various sorts that the admin can perform on the list of questions using the buttons to the right of the table. ● The admin can also select a question in the table and press the preview question button to have the question opened in a new window so that they can see what it looks like. ● Once the admin has selected a question and pressed the add to form button, the question will be added to the form and displayed in the form preview on the right. ● There is a preview of the form on the right of window so that the admin can see what the final form will look like. ● When questions are added to the form (as shown in the second screenshot) buttons appear to the right of the question which allow the admin to rearrange the questions in the form or to remove a question from the form. ● The “Save form” button at the bottom of the screen opens dialogs which allow the admin to enter final details about the form before adding it to the system.

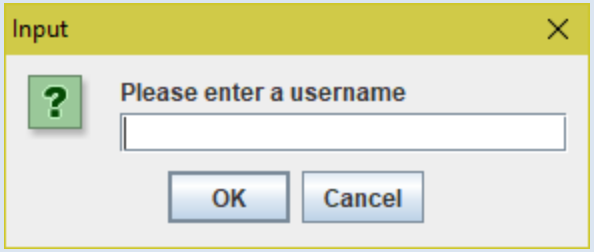
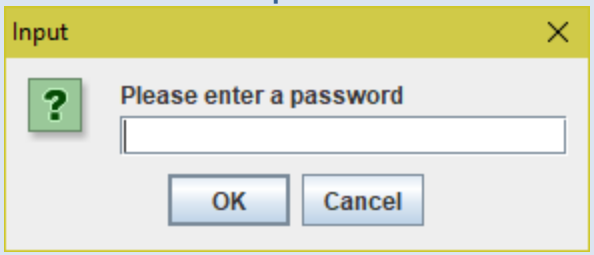
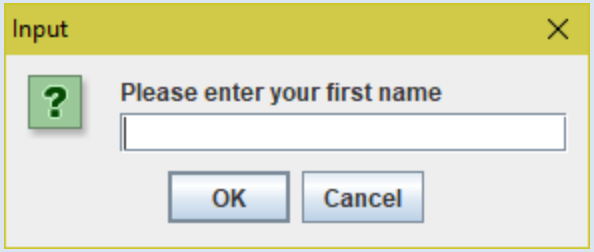
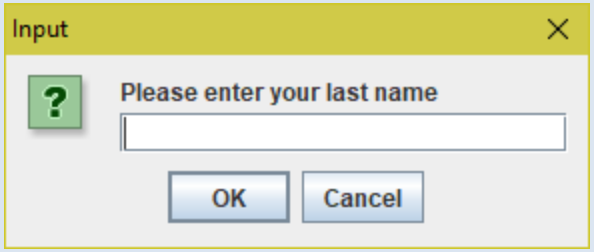


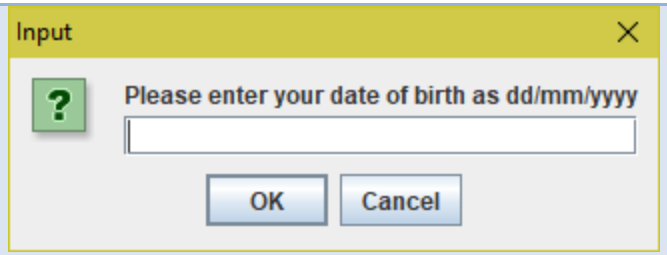
A question being previewed



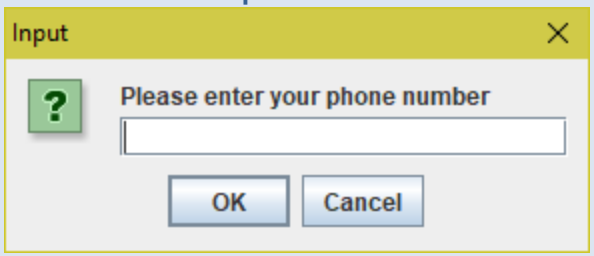
Add final form details dialog	Features
Enter description dialog  **Enter difficulty dialog**  **Save form dialog**  	Description Entry: ● This allows the admin to enter a description of the form. Difficulty Entry: ● This allows the admin to enter the difficulty of the form into the system. Save dialog: ● This allows the admin to specify whether they want to permanently save the form to the database.

Users screen	Features
	● This screen allows the admin to view details about the users in the system. They are also able to add, edit, and delete users. ● The table at the top of the screen displays all of the information (other than the statistics shown in the statistics screen) that is stored about the users in the system. ● The admin can search for a particular user by first name by using the text field. ● The admin can add a user by pressing the add new user button. ● The admin can edit, or delete a user by selecting the user in the table and pressing the corresponding button. ● The admin use the take register button to open a register that they can take.

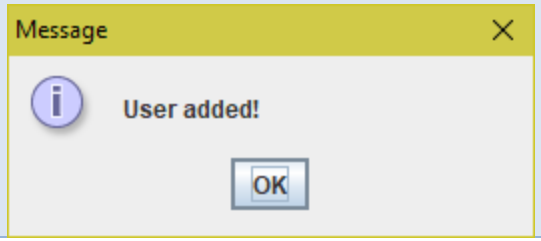
Add/edit user dialogs	Features
Enter username  Enter password  Enter first name  Enter last name  Enter date of birth	● These dialogs allow the admin to enter information about the user into the system. ● If the admin is editing a user the dialogs will already be populated with the information stored about the user so that they can edit it.

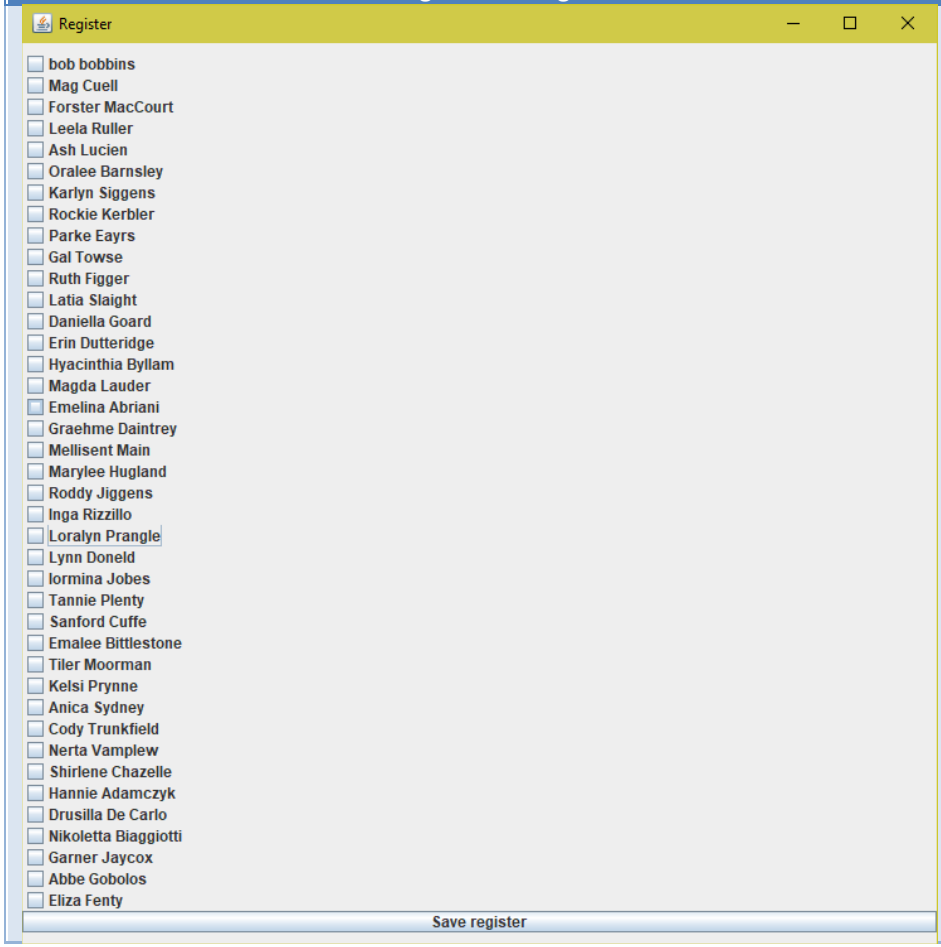


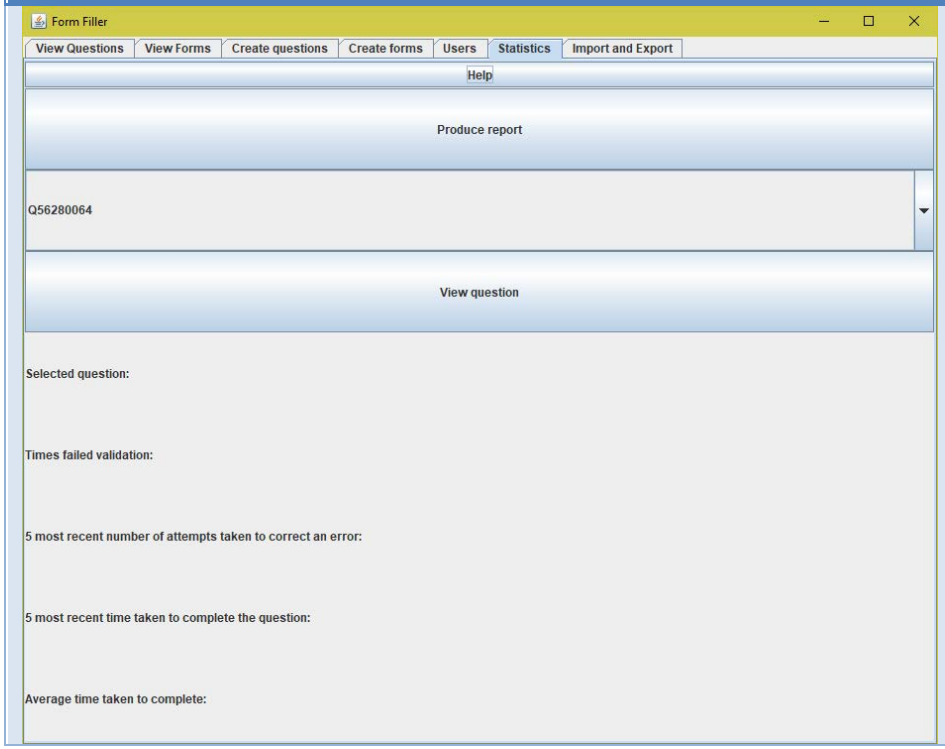
Enter phone number

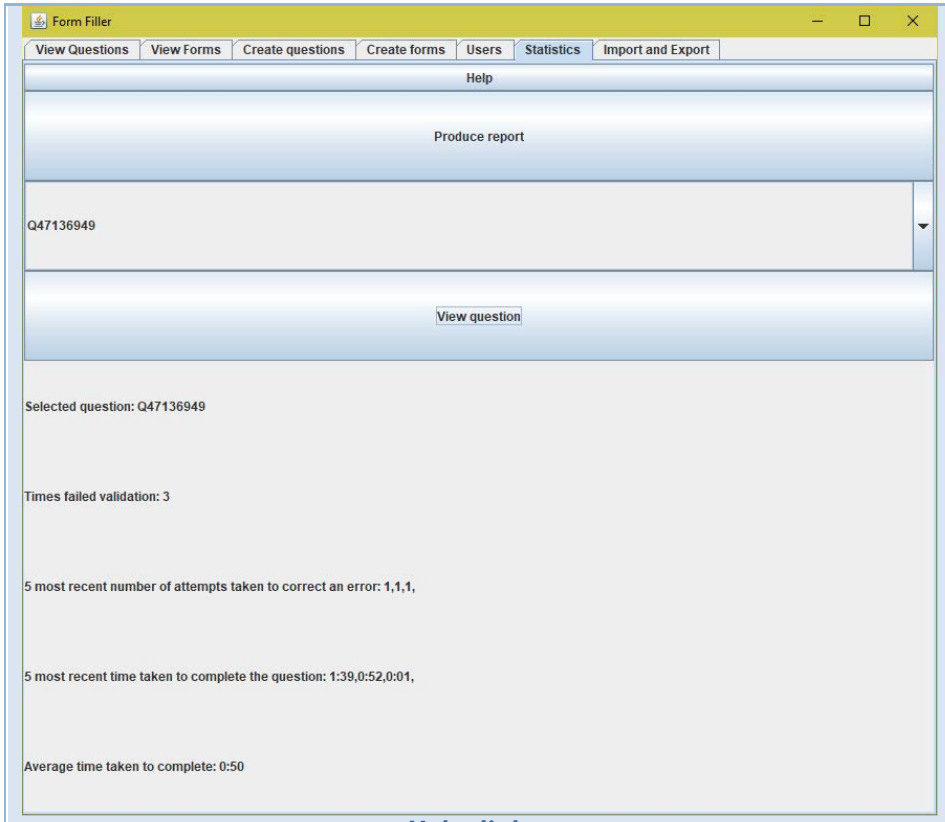


User added notification

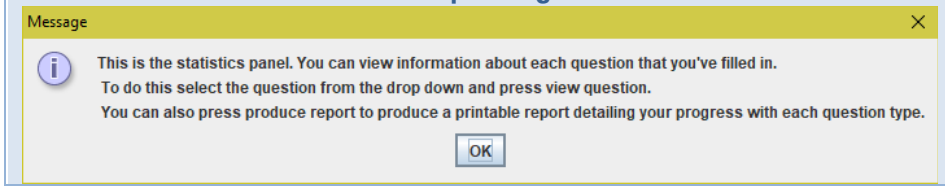


Register dialog	Features
	● This is a list of all the users in the system with checkboxes next to their name. ● The admin can tick the boxes and once they've pressed save, those users with ticked boxes will be marked as present at the session on the current date.

Statistics screen	Features
	● This screen allows the user to produce a report which they can print off. ● The user can select the questions that they've attempted using the drop down. ● Once they have selected a question and pressed the view question button, the labels at the bottom of the screen display the statistics stored about the user for that question. ● The user can also get help on this screen.


Form Filler
View Questions
View Forms
Create questions
Create forms
Users
Statistics
Import and Export
Help
Produce report
Q47136949
View question
Selected question: Q47136949
Times failed validation: 3
5 most recent number of attempts taken to correct an error: 1,1,1,
5 most recent time taken to complete the question: 1:39,0:52,0:01,
Average time taken to complete: 0:50

Help dialog


Message
This is the statistics panel. You can view information about each question that you've filled in.
To do this select the question from the drop down and press view question.
You can also press produce report to produce a printable report detailing your progress with each question type.
OK

Report preview dialog

bob123's report

bob123's report

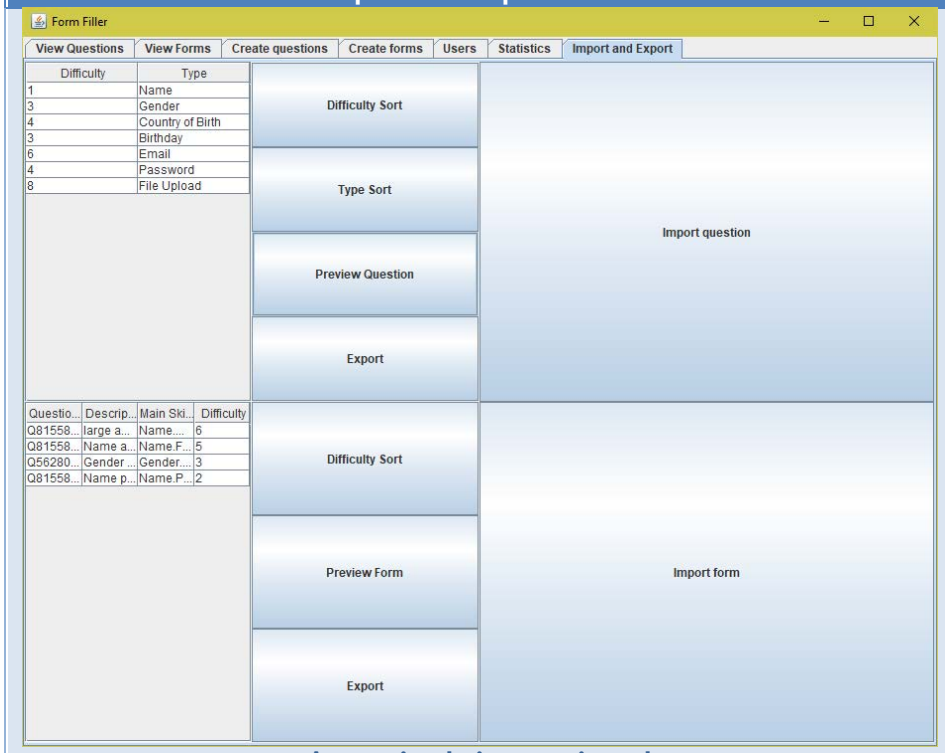
Question type	Number of times failed validation	Average number of attempts needed to correct	Average time to complete
Email	0	0	5
Name	0	0	8
Phone			
Gender	2	2	15
File Upload	2	2	9
Password	2	2	1
Calendar			
Checkboxes			
Drop-down			
Radio Buttons			
Birthday	1	1	1
Address			
James			
date of birth			
Country of Birth	2	2	6

Print

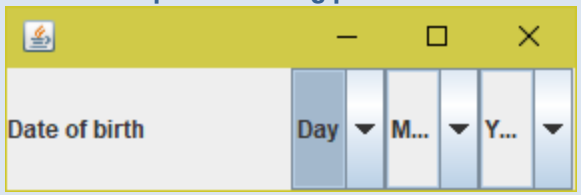
Features

- This dialog shows the generated report to the user so that they can preview it.
- The print button opens the system print dialog so that the user can print the report.

Import and Export Screen



A question being previewed



A form being previewed

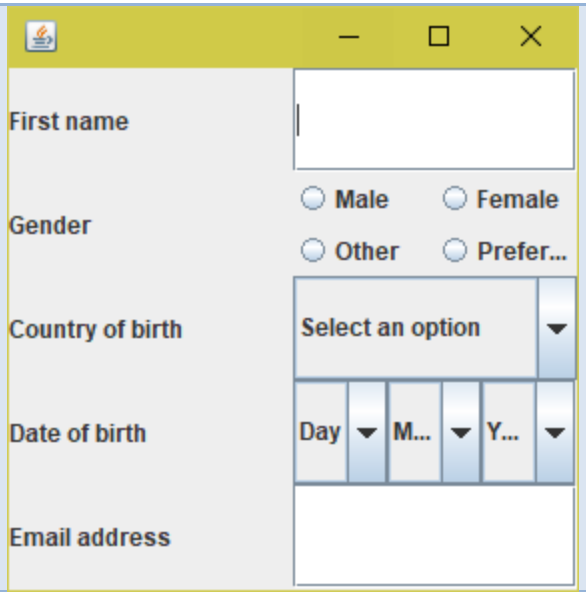
Features

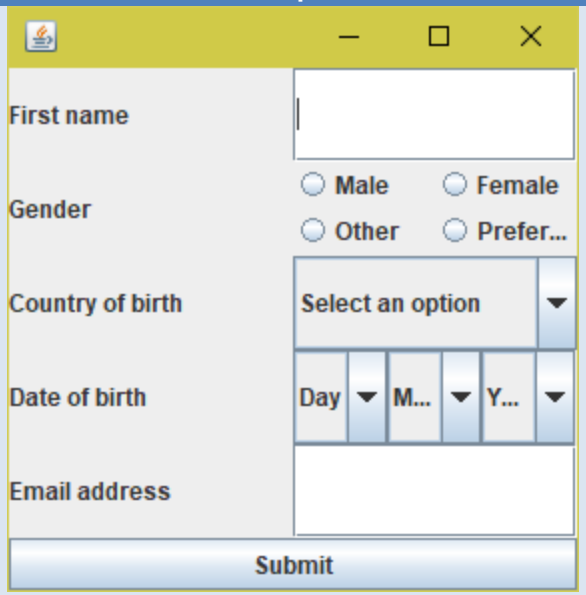
- This screen allows the user to import and export forms/questions to/from the system.

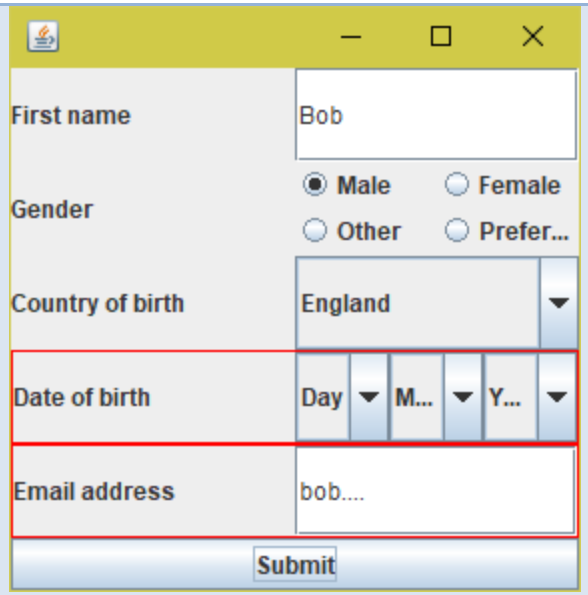
- The table in the top left allows the user to view all questions in the system along with their type and difficulty.
- There are various sorts that the user can perform on the list of questions using the buttons to the right of the table.
- The user can also select a question in the table and press the preview question button to have the question opened in a new window so that they can see what it looks like.
- Once the user has selected a question and pressed the export button a file chooser will then be opened allowing the user to select where to export the question to and what file name to give it.

- The table in the bottom left allows the user to view all forms in the system, along with the list of questions in the form, a description, the list of main skills tested, and the difficulty of each form.
- The user can perform a difficulty sort on the forms by pressing the difficulty sort button.
- The user can also select a form in the table and press the preview form button to have the form opened in a new window so that they can see what it looks like.
- Once the user has selected a form and pressed the export button a file chooser will then be opened allowing the user to select where to export the form to and what file name to give it.

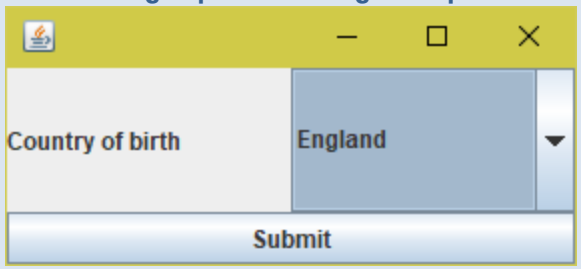
- When the import question or import form buttons are pressed a file chooser opens allowing the user to select a question/form to import into the system.


First name
Gender
Male
Female
Other
Prefer...
Country of birth
Select an option
Date of birth
Day
M...
Y...
Email address

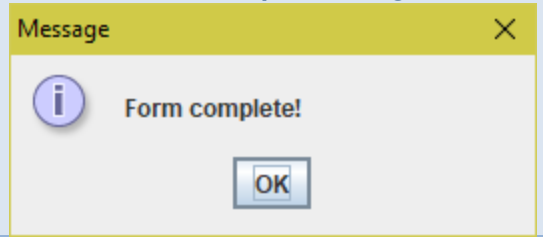
Form attempt window	Features
 An example with some questions that have failed their validation checks	● When the user selects a form to attempt and presses the attempt form button, this window opens. ● The window displays the questions in the form to the user and allows them to attempt them. ● There is a submit button at the bottom of the window that the user can press to submit the form. ● If a question fails its validation check, a red border is used to highlight this to the user. ● This window is also used when the user attempts an individual question. Rather than an entire form being displayed, just one question is shown in the window. ● If the form passes all validation checks a form complete dialog is shown to the user.



A single question being attempted



Form complete dialog



4.22 Outputs

Progress report	Data & Purpose
How the report will look when printed	● This report shows statistics about the user's progress in completing the forms broken down by question type. ● It also has the user's username in the top left to make it easy to identify which report belongs to which user when multiple reports are printed at once.

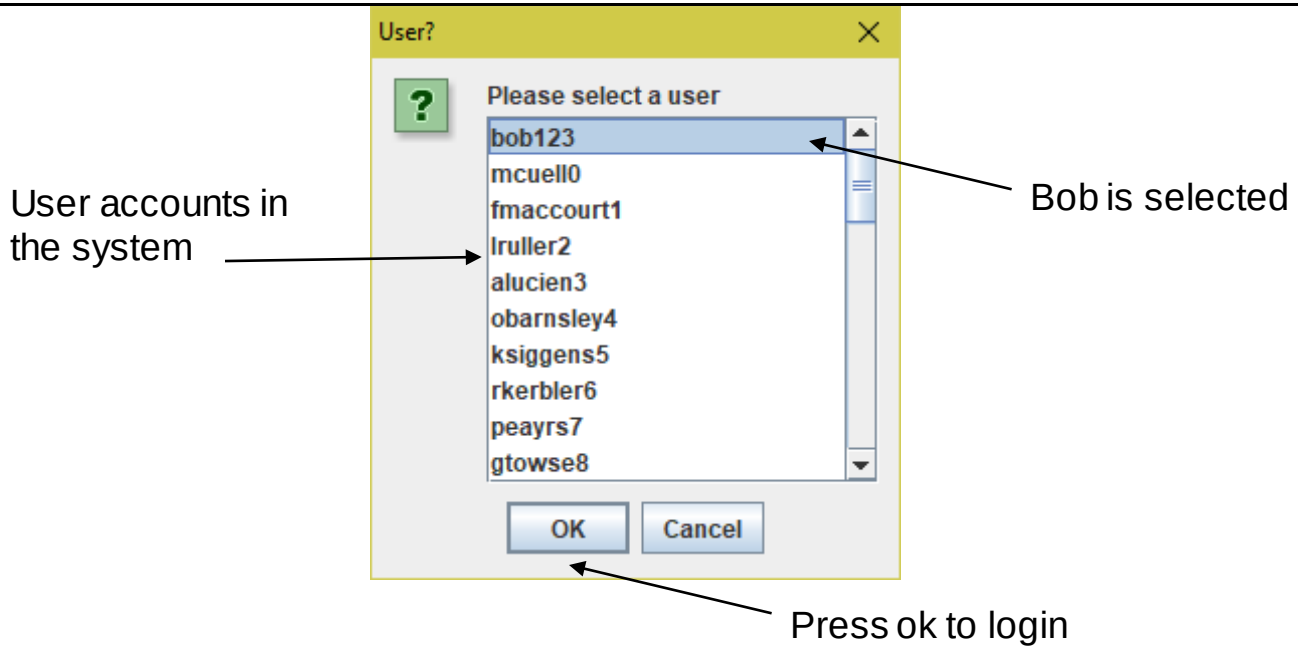
bob123's report

Question type	Number of times failed validation	Average number of attempts needed to correct	Average time to complete
Email			
Name	6	3	34
Phone			
Gender	2	2	3
File Upload			
Password			
Calendar			
Checkboxes			
Drop-down	1	1	15
Radio Buttons			
Birthday	1	1	1
Address	2	2	4

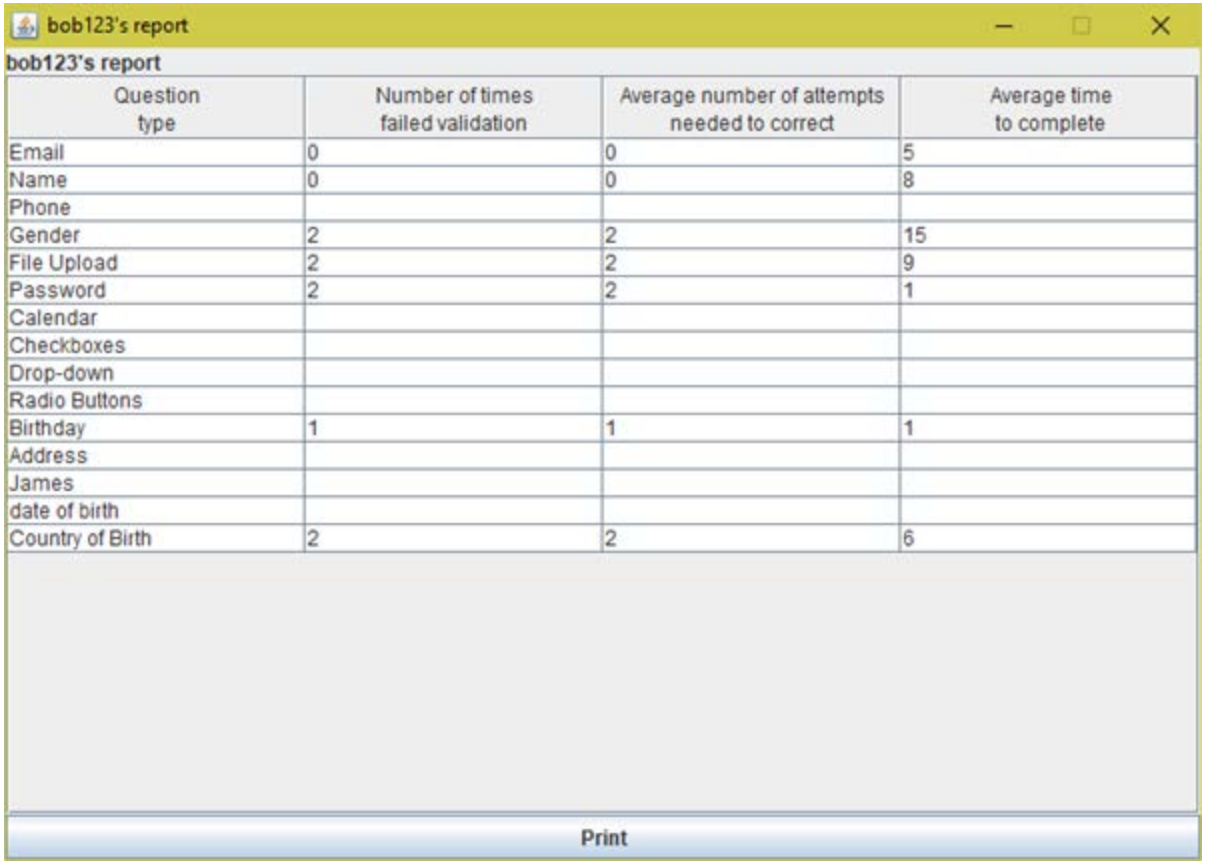
4.3 Functioning System (with Data)

Login

# *(from 4.1)*	2
Area of System	Login - Login facilities
Output & Storage Requirements	-
Data Used	Username, password

Evidence	 User? Please select a user bob123 mcuell0 fmaccourt1 lruller2 alucien3 obarnsley4 ksiggens5 rkerbler6 peayrs7 gtowse8 OK Cancel User accounts in the system Bob is selected Press ok to login

The report generated has Bob's username showing that Bob is the account that is logged in



Question type	Number of times failed validation	Average number of attempts needed to correct	Average time to complete
Email	0	0	5
Name	0	0	8
Phone			
Gender	2	2	15
File Upload	2	2	9
Password	2	2	1
Calendar			
Checkboxes			
Drop-down			
Radio Buttons			
Birthday	1	1	1
Address			
James			
date of birth			
Country of Birth	2	2	6

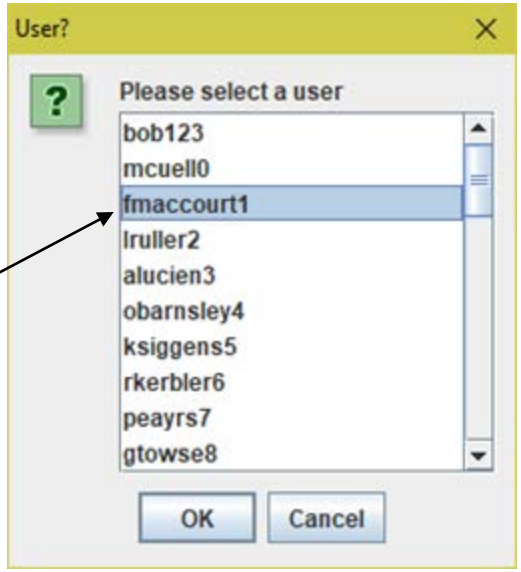
Objectives met	48
# ***(from 4.1)***	3
Area of System	Automatic attendance tracking
Output & Storage Requirements	Appends the current date to the user's entry in userDB.txt
Data Used	Current date

Evidence

fmaccourt1's row in the database

The current date (09/10/18) is not present

```
U54125754,fmaccourt1,pOoIwgp6,Forster,MacCourt,29/04/1987,2478200469,2018-07-22||
```



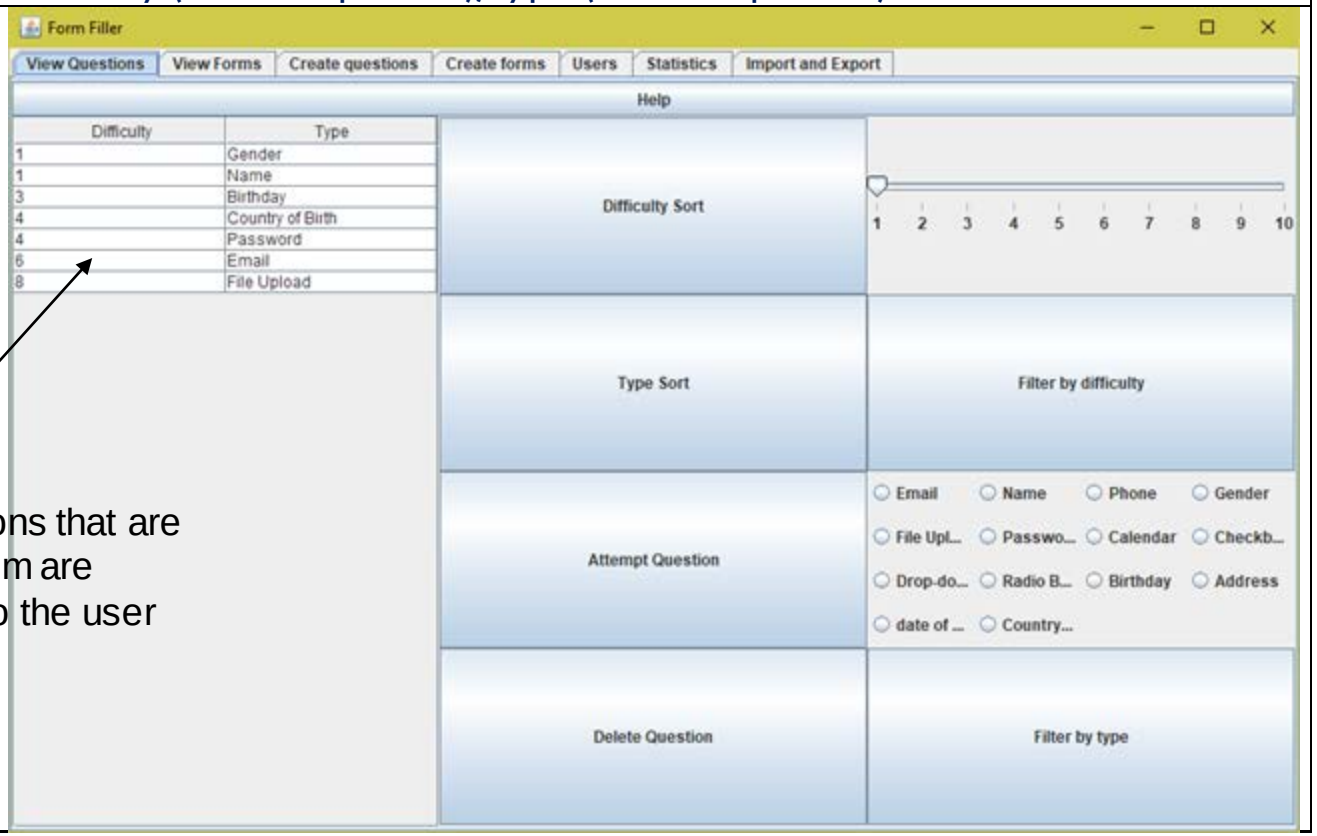
fmaccourt1 is logged in

```
U54125754,fmaccourt1,pOoIwgp6,Forster,MacCourt,29/04/1987,2478200469,2018-07-22.2018-10-09||
```

The current date (09/10/18) is now present

Objectives met	45

View Questions

# *(from 4.1)*	6
Area of System	View Questions - view
Output & Storage Requirements	-
Data Used	QuestionList, difficulty (of each question), type (of each question)
Evidence	

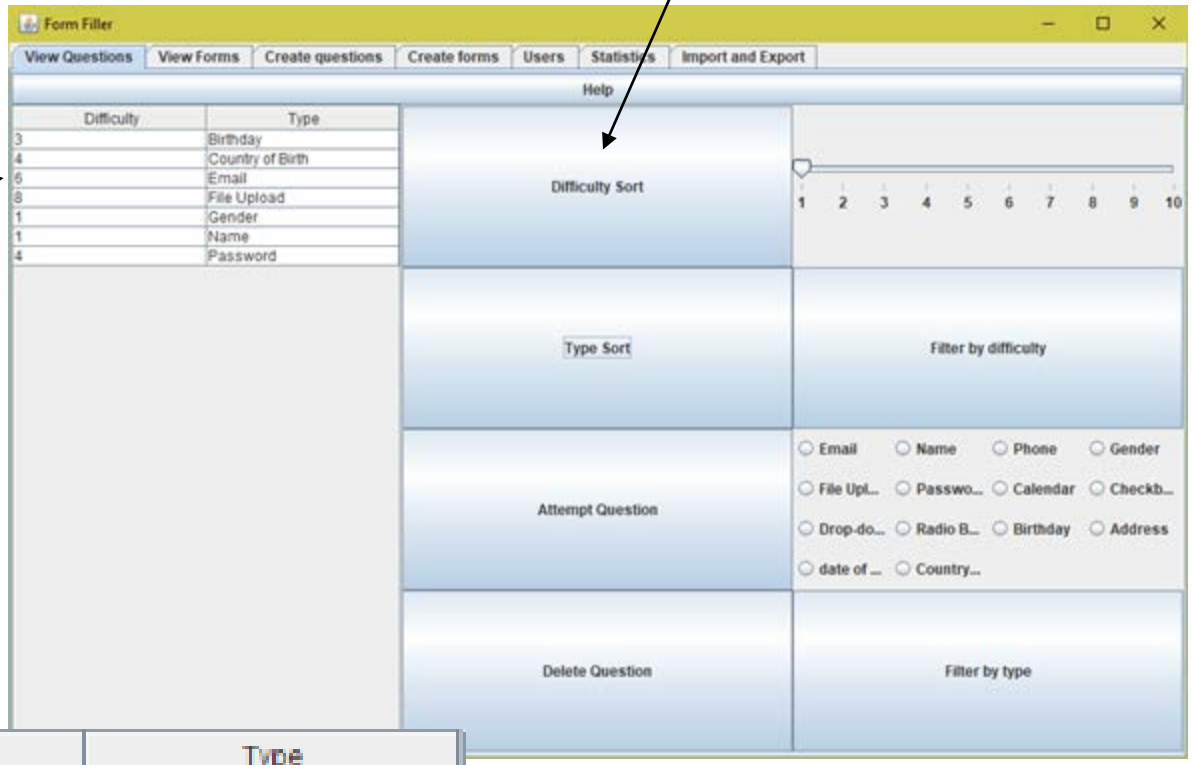
The questions that are in the system are displayed to the user

Objectives met	53 (displays the questions to the user), 54 (a question can be selected by selecting its row in the table)
# ***(from 4.1)***	7
Area of System	View questions - sort, filter
Output & Storage Requirements	-
Data Used	QuestionList, difficulty (of each question), type (of each question)

Evidence	Difficulty sort

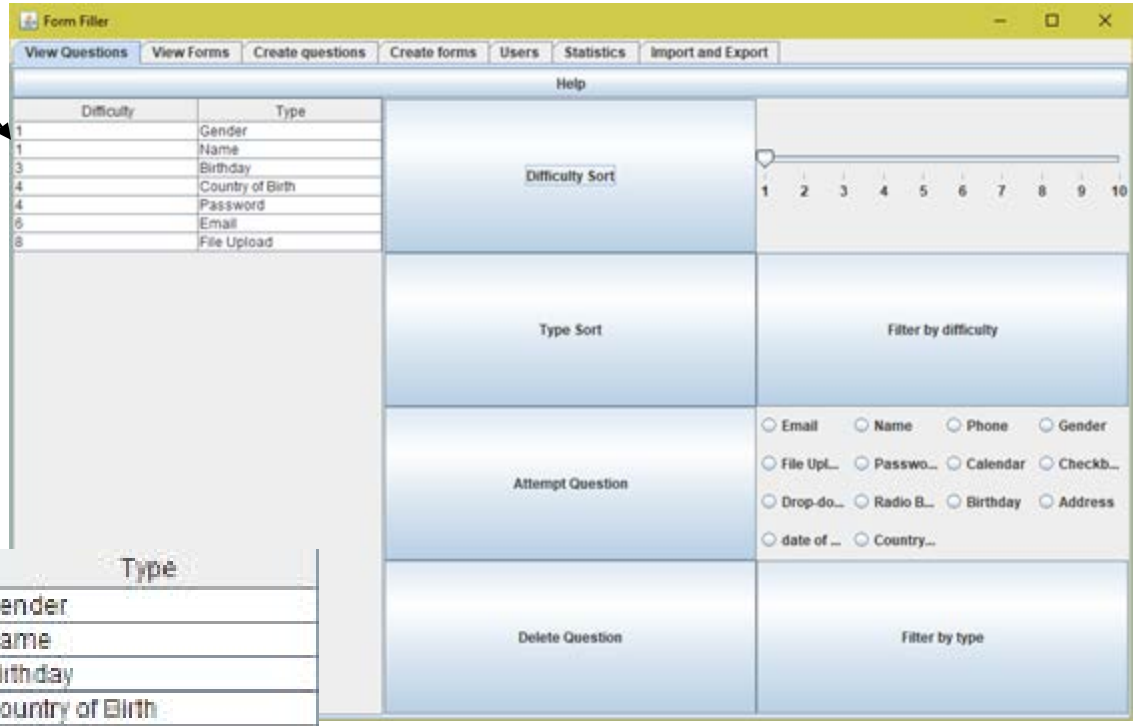
Press difficulty sort button

The questions are not in difficulty order



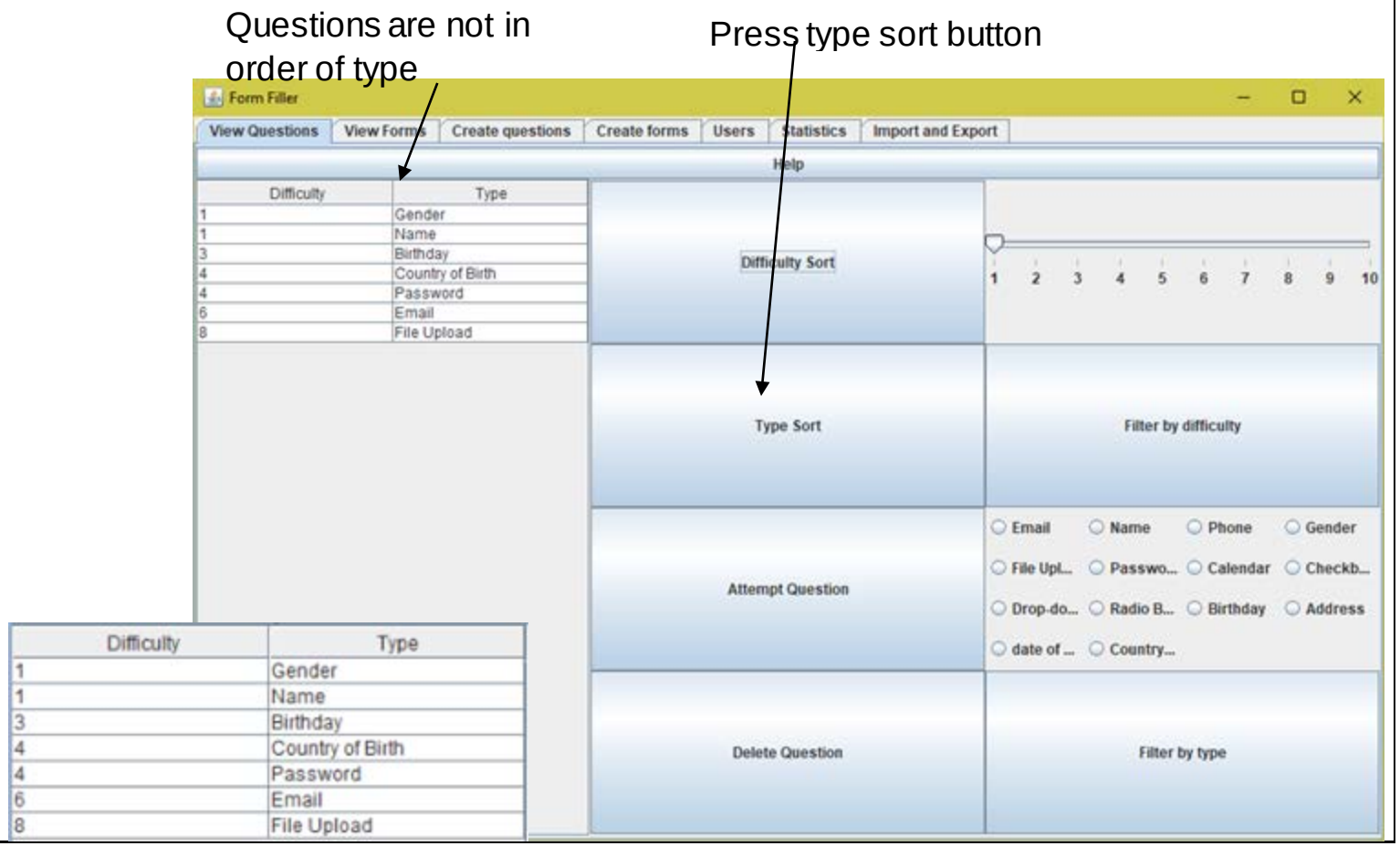
Difficulty	Type
3	Birthday
4	Country of Birth
6	Email
8	File Upload
1	Gender
1	Name
4	Password

The questions are now in difficulty order

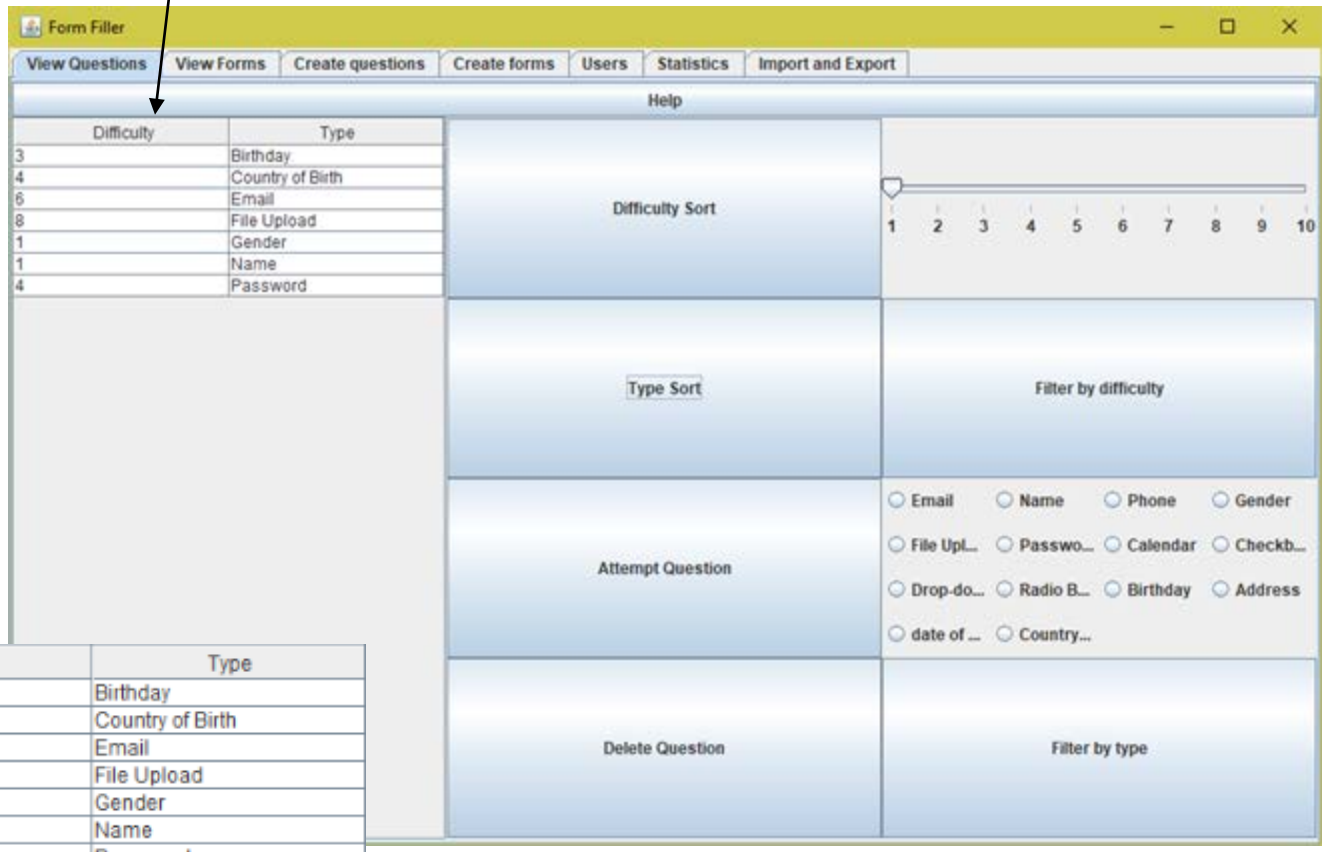


Difficulty	Type
1	Gender
1	Name
3	Birthday
4	Country of Birth
4	Password
6	Email
8	File Upload

Type sort

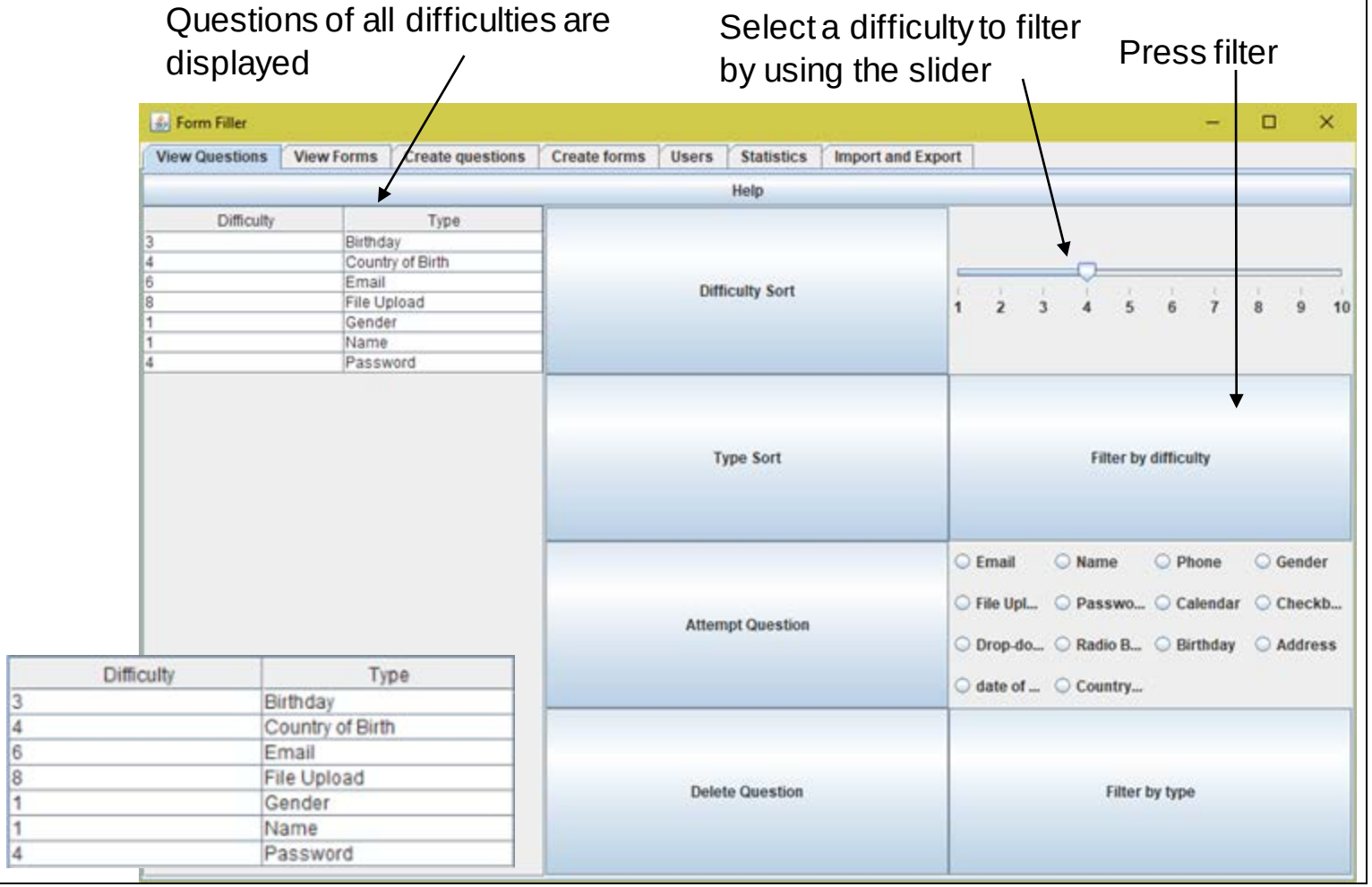

Questions are not in order of type
Press type sort button
Form Filler
View Questions
View Forms
Create questions
Create forms
Users
Statistics
Import and Export
Help
Difficulty
Type
1 Gender
1 Name
3 Birthday
4 Country of Birth
4 Password
6 Email
8 File Upload
Difficulty Sort
1 2 3 4 5 6 7 8 9 10
Type Sort
Filter by difficulty
Attempt Question
Email
Name
Phone
Gender
File Upl...
Passwo...
Calendar
Checkb...
Drop-do...
Radio B...
Birthday
Address
date of ...
Country...
Delete Question
Filter by type

Questions are now
in order of type

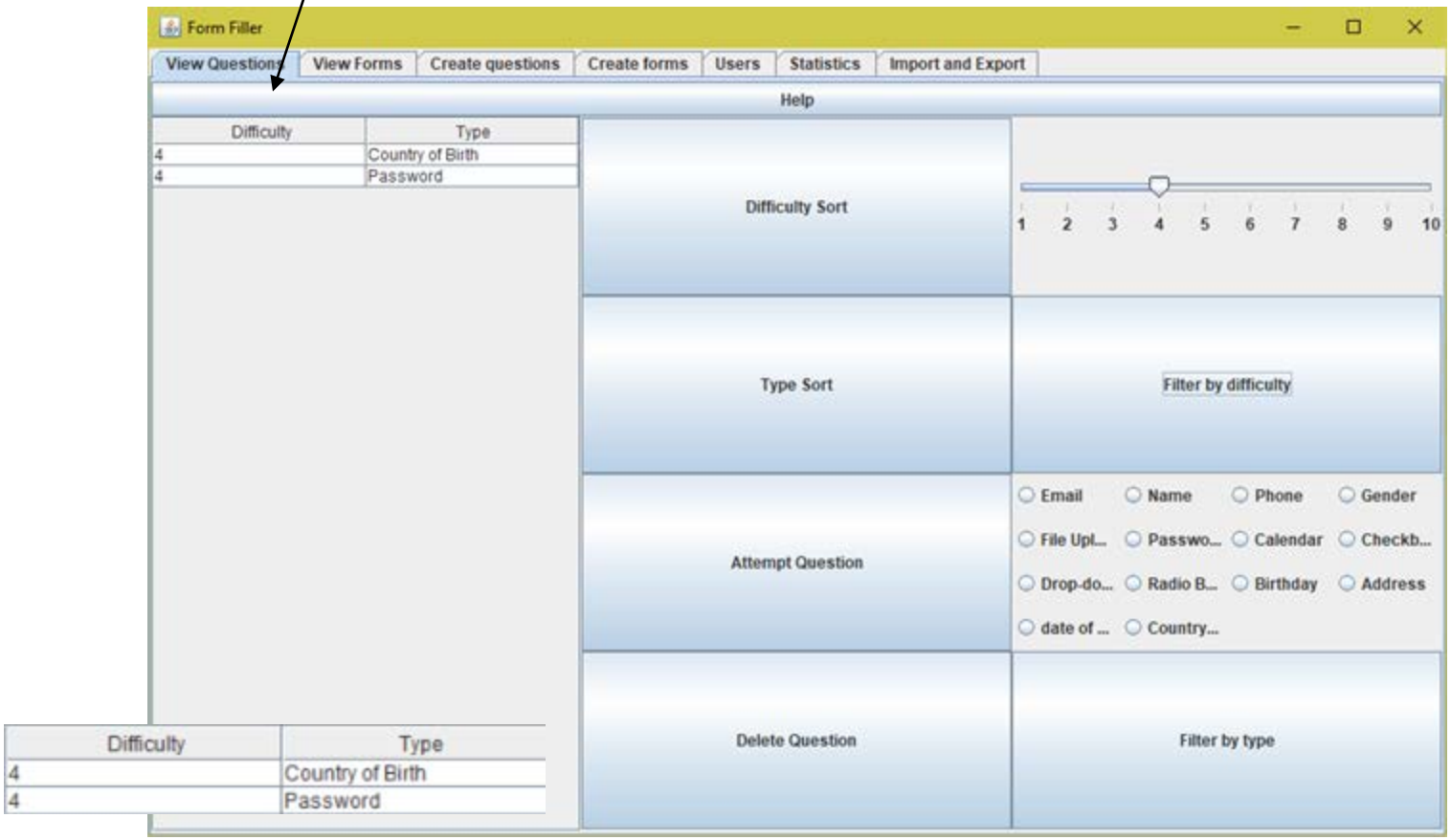


Difficulty	Type
3	Birthday
4	Country of Birth
6	Email
8	File Upload
1	Gender
1	Name
4	Password

Difficulty filter

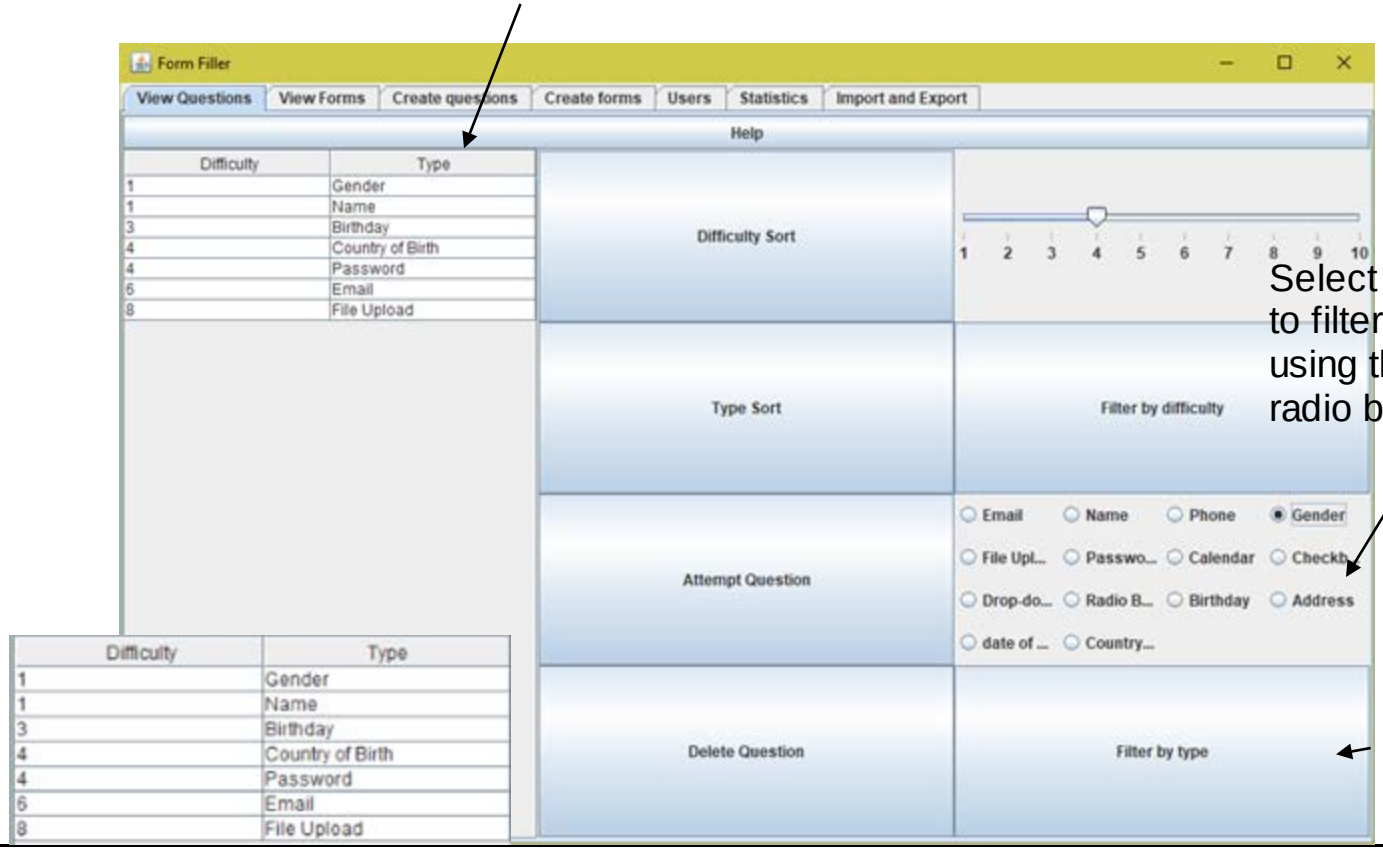

Questions of all difficulties are displayed
Select a difficulty to filter by using the slider
Press filter
Form Filler
View Questions
View Forms
Create questions
Create forms
Users
Statistics
Import and Export
Help
Difficulty
Type
3 Birthday
4 Country of Birth
6 Email
8 File Upload
1 Gender
1 Name
4 Password
Difficulty Sort
1 2 3 4 5 6 7 8 9 10
Type Sort
Filter by difficulty
Attempt Question
Email
Name
Phone
Gender
File Upl...
Passwo...
Calendar
Checkb...
Drop-do...
Radio B...
Birthday
Address
date of ...
Country...
Delete Question
Filter by type

Only questions of difficulty 4 are displayed



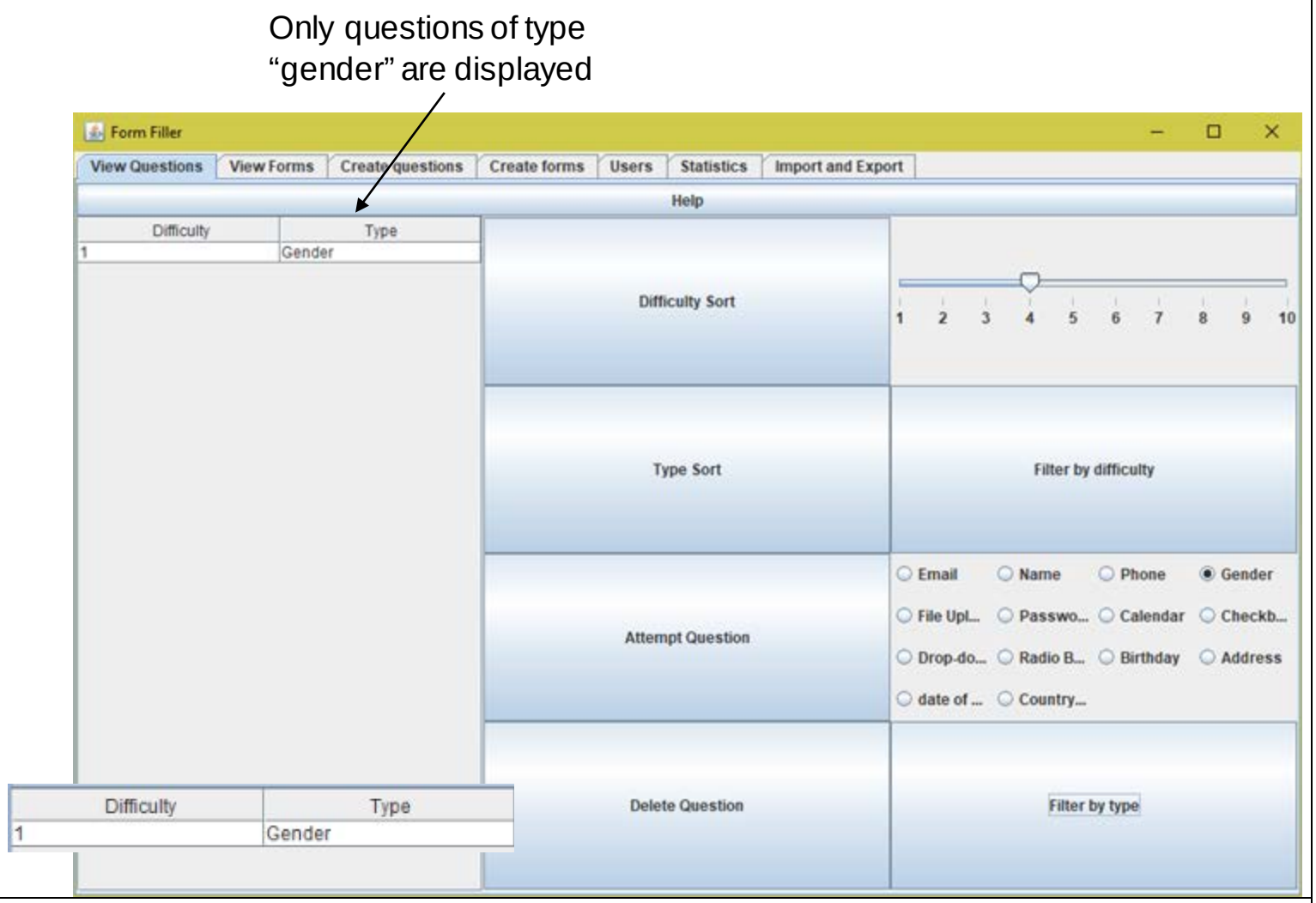
Type filter

Questions of all types are displayed

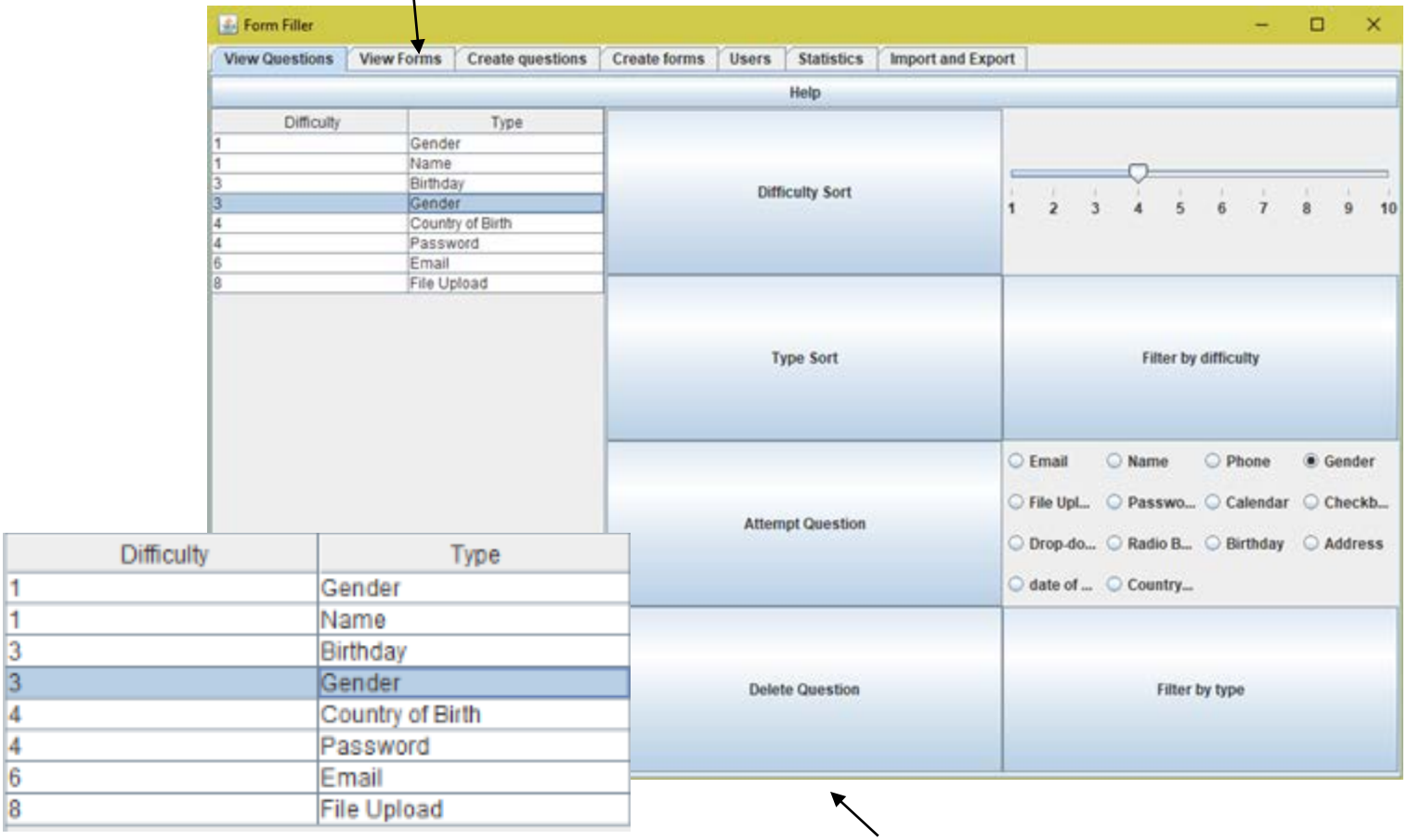


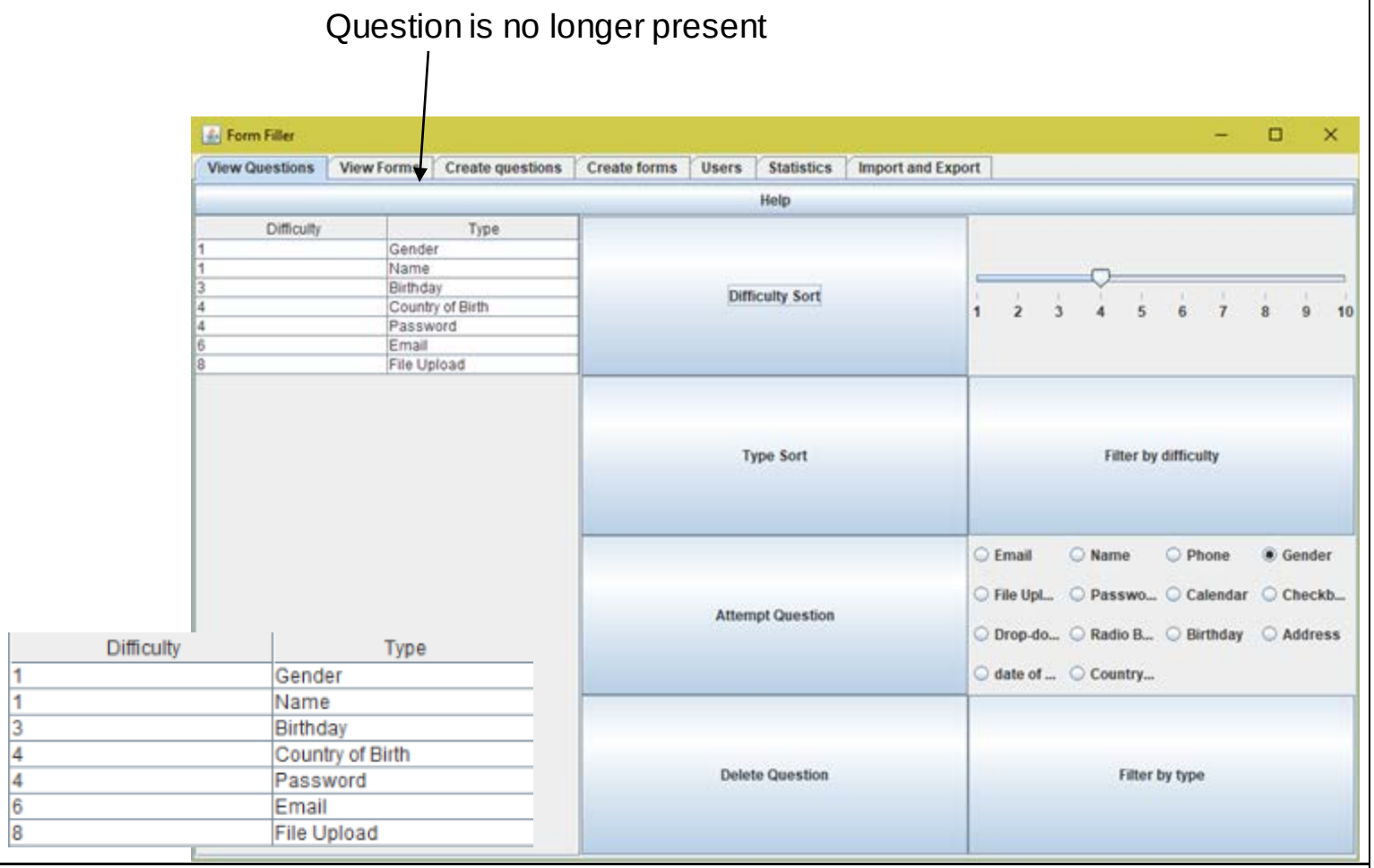
Select a type to filter by using the radio buttons

Press filter

	
Objectives met	12 (sort questions by difficulty), 13 (sort questions by type), 14 (filter questions by difficulty), 15 (filter questions by type)
# *(from 4.1)*	8

Area of System	View questions - Delete
Output & Storage Requirements	Removes the question from the question database.
Data Used	Question list, id (of the question to be deleted)

Evidence	
	Select question to delete  Press delete

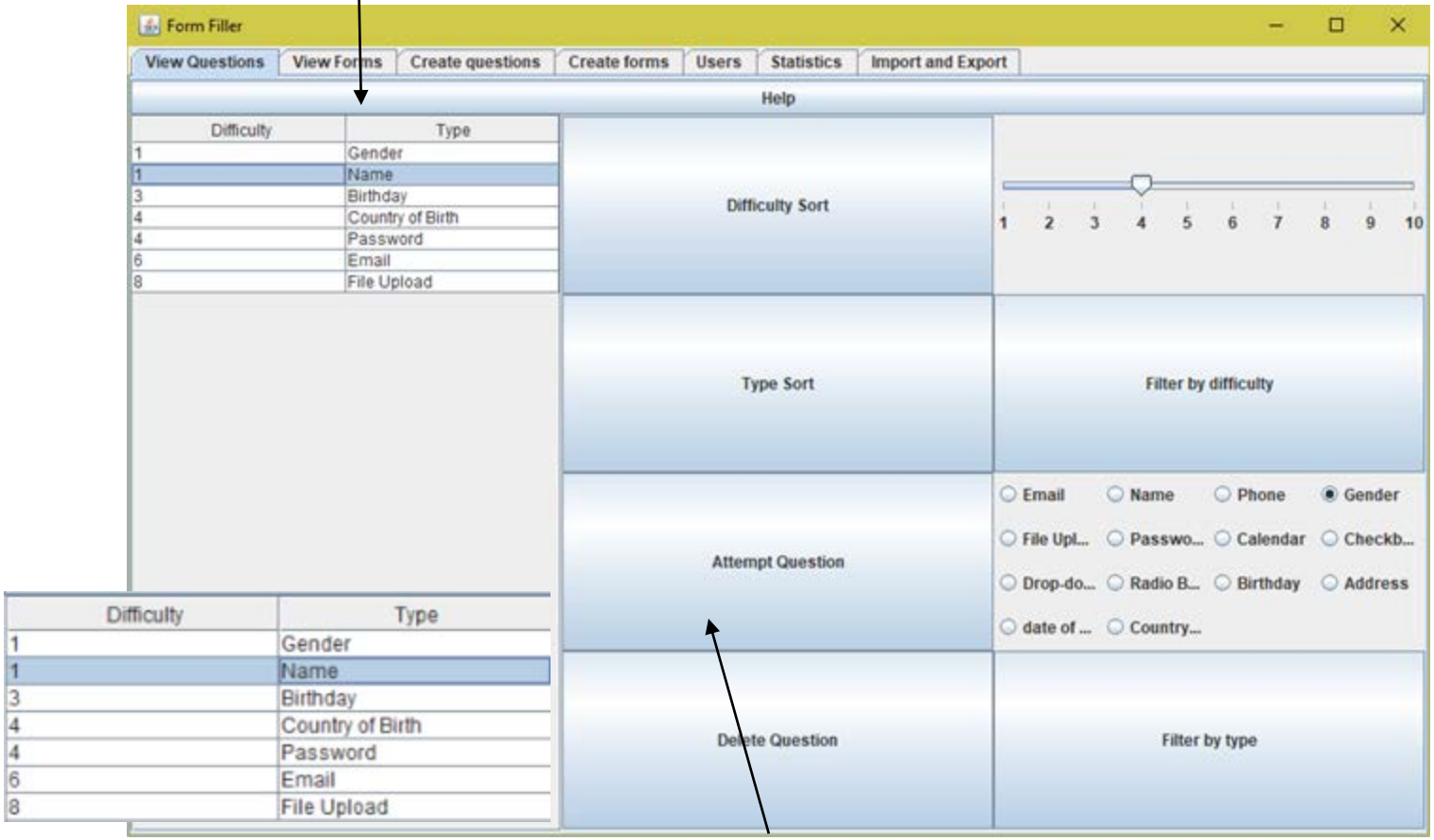


Objectives met	11 (Ability to delete questions)
# *(from 4.1)*	9
Area of System	View Questions - Attempt
Output & Storage	-

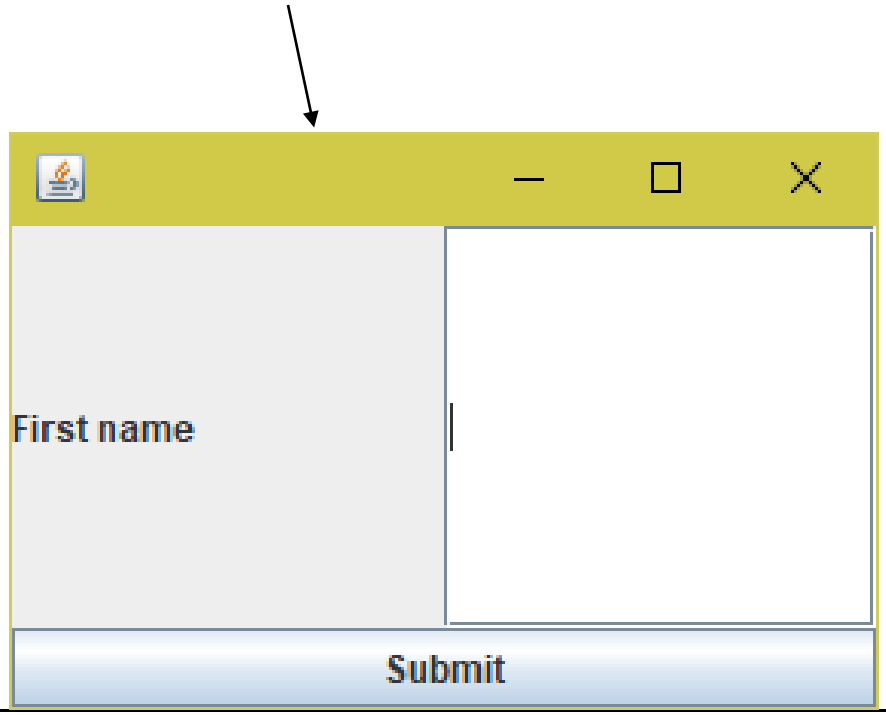
Requirements	
Data Used	id (of the question to be attempted), component list (list of components in the question)

Evidence	

Select question to be attempted



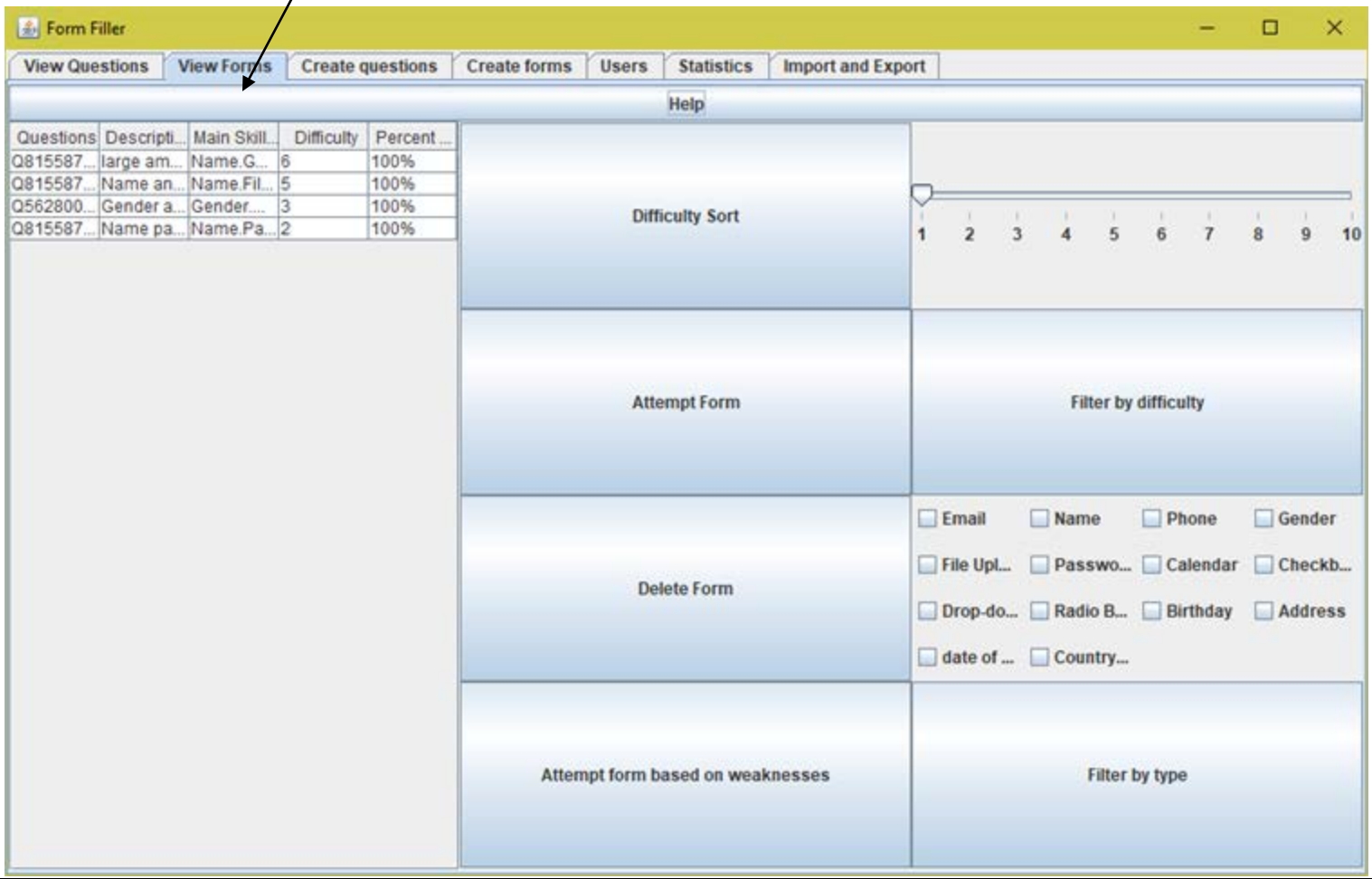
Press attempt question

	Question is opened to be attempted 
Objectives met	23 (Attempt a question), 54 (Allow a user to select a question to be attempted).

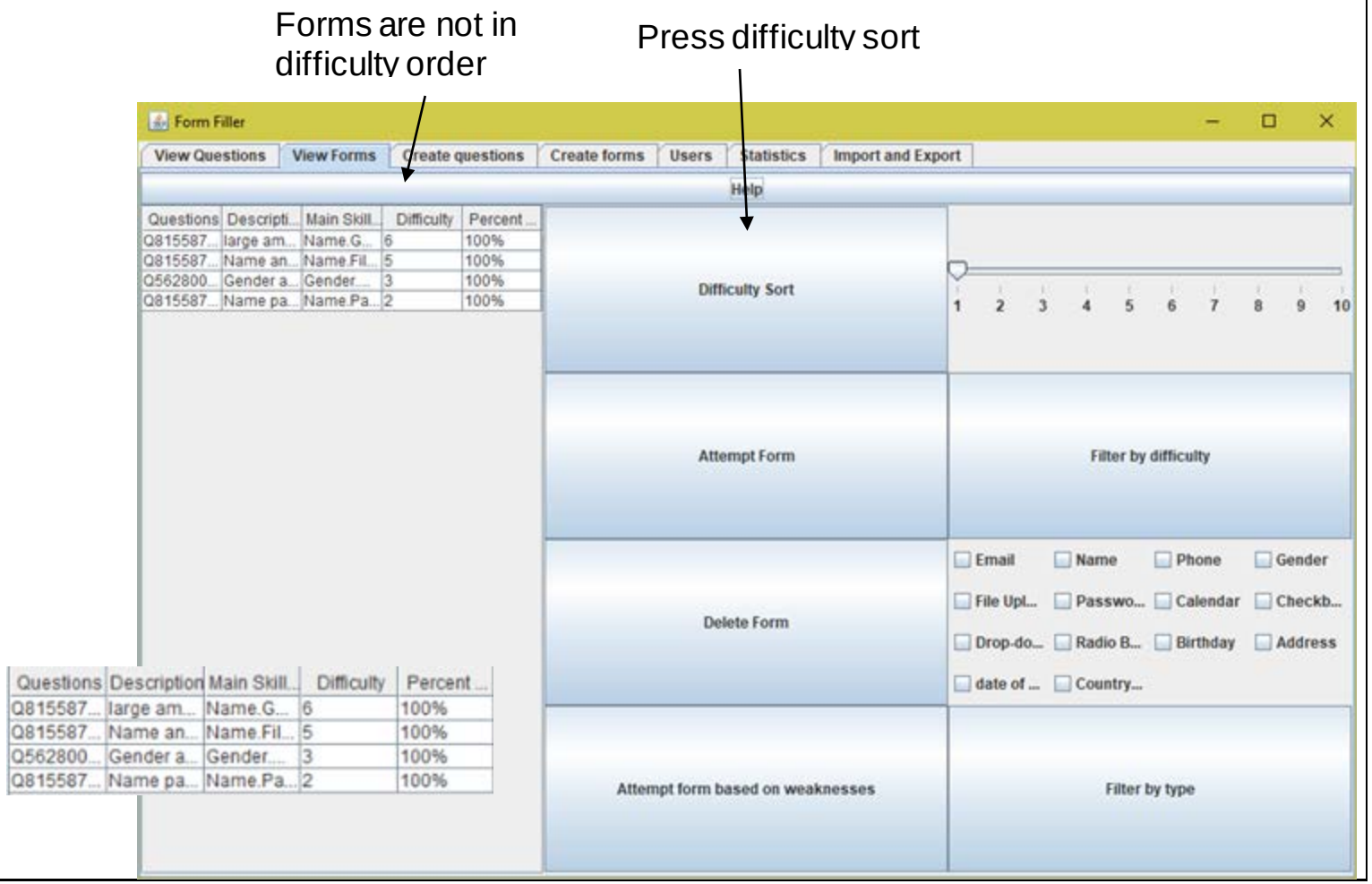
View Forms

# *(from 4.1)*	10
Area of System	View Forms - view
Output & Storage Requirements	-

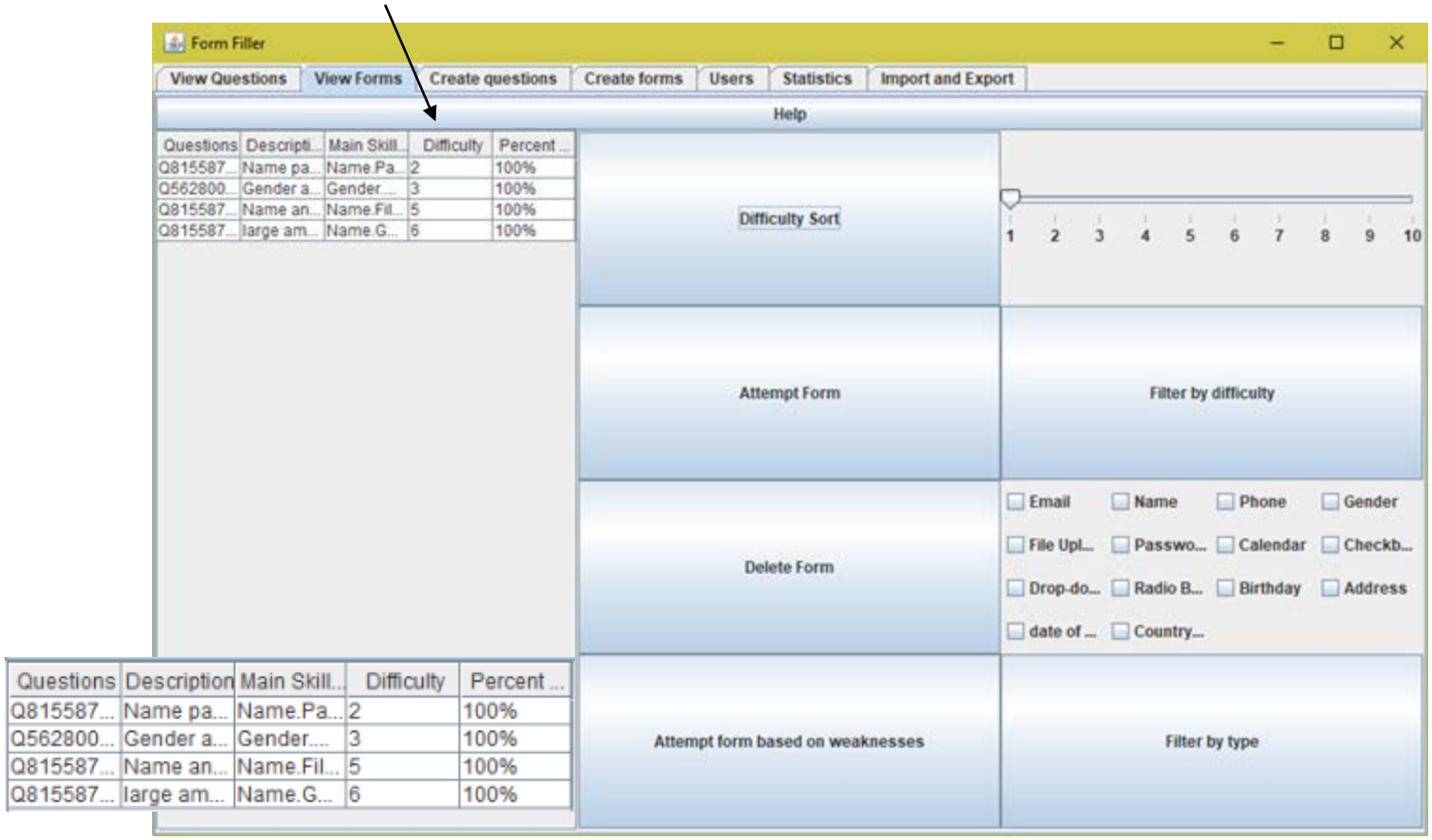
Data Used	FormList, Question Ids (of the questions in each form), Description (of each form), Main skills tested (of each form), difficulty (of each form), percent complete (of each form)

Evidence	The forms in the system are displayed to the user 
Objectives met	50 (There should be a panel to display the forms to the user)

# *(from 4.1)*	11
Area of System	View Forms - Sort, Filter
Output & Storage Requirements	-
Data Used	FormList, difficulty (of each form), main skills tested (of each form)
Evidence	Difficulty sort


Forms are not in difficulty order
Press difficulty sort
Form Filler
View Questions
View Forms
Create questions
Create forms
Users
Statistics
Import and Export
Help
Questions
Descripti...
Main Skill...
Difficulty
Percent ...
Q815587...
large am...
Name.G...
6
100%
Q815587...
Name an...
Name.Fil...
5
100%
Q562800...
Gender a...
Gender....
3
100%
Q815587...
Name pa...
Name.Pa...
2
100%
Difficulty Sort
1 2 3 4 5 6 7 8 9 10
Attempt Form
Filter by difficulty
Delete Form
Email
Name
Phone
Gender
File Upl...
Passwo...
Calendar
Checkb...
Drop-do...
Radio B...
Birthday
Address
date of ...
Country...
Attempt form based on weaknesses
Filter by type

Forms are now in difficultv order

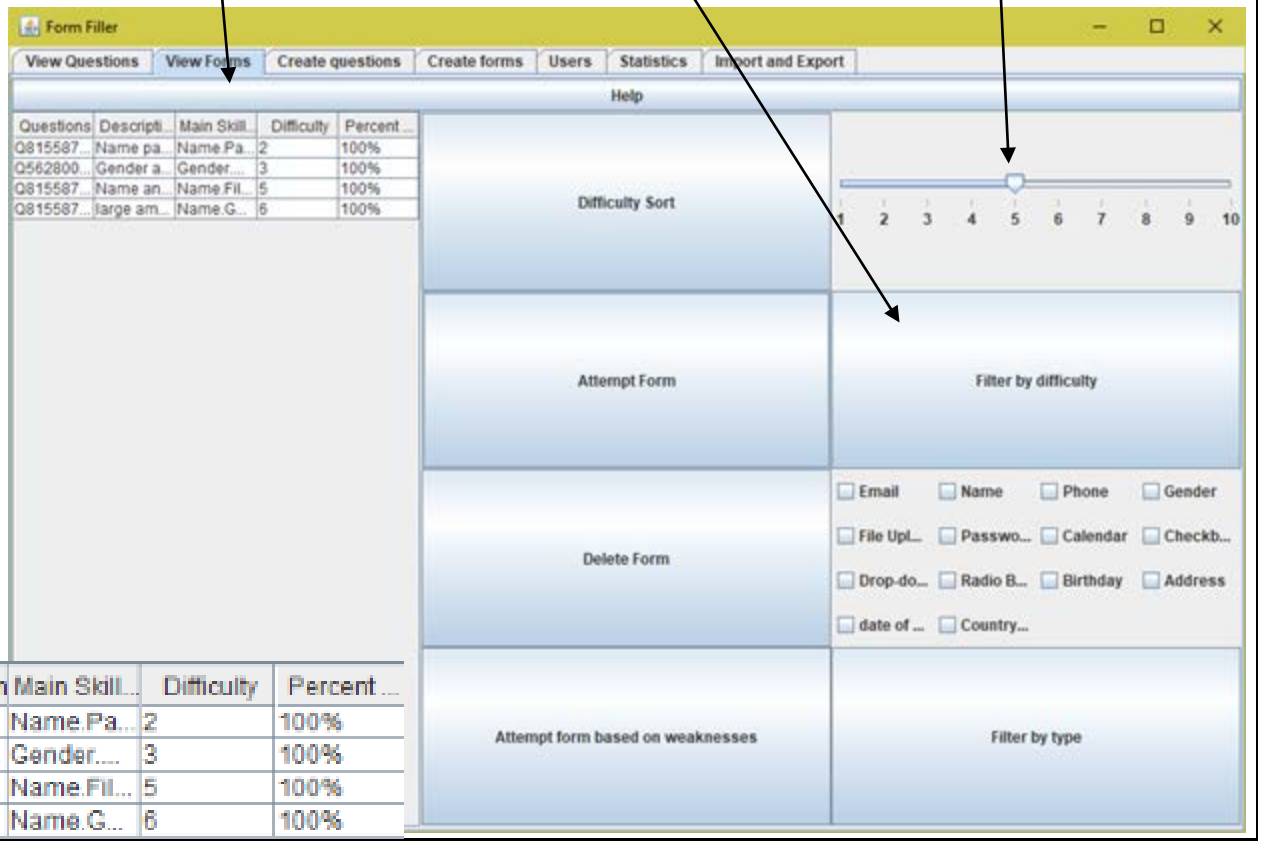


Difficulty filter

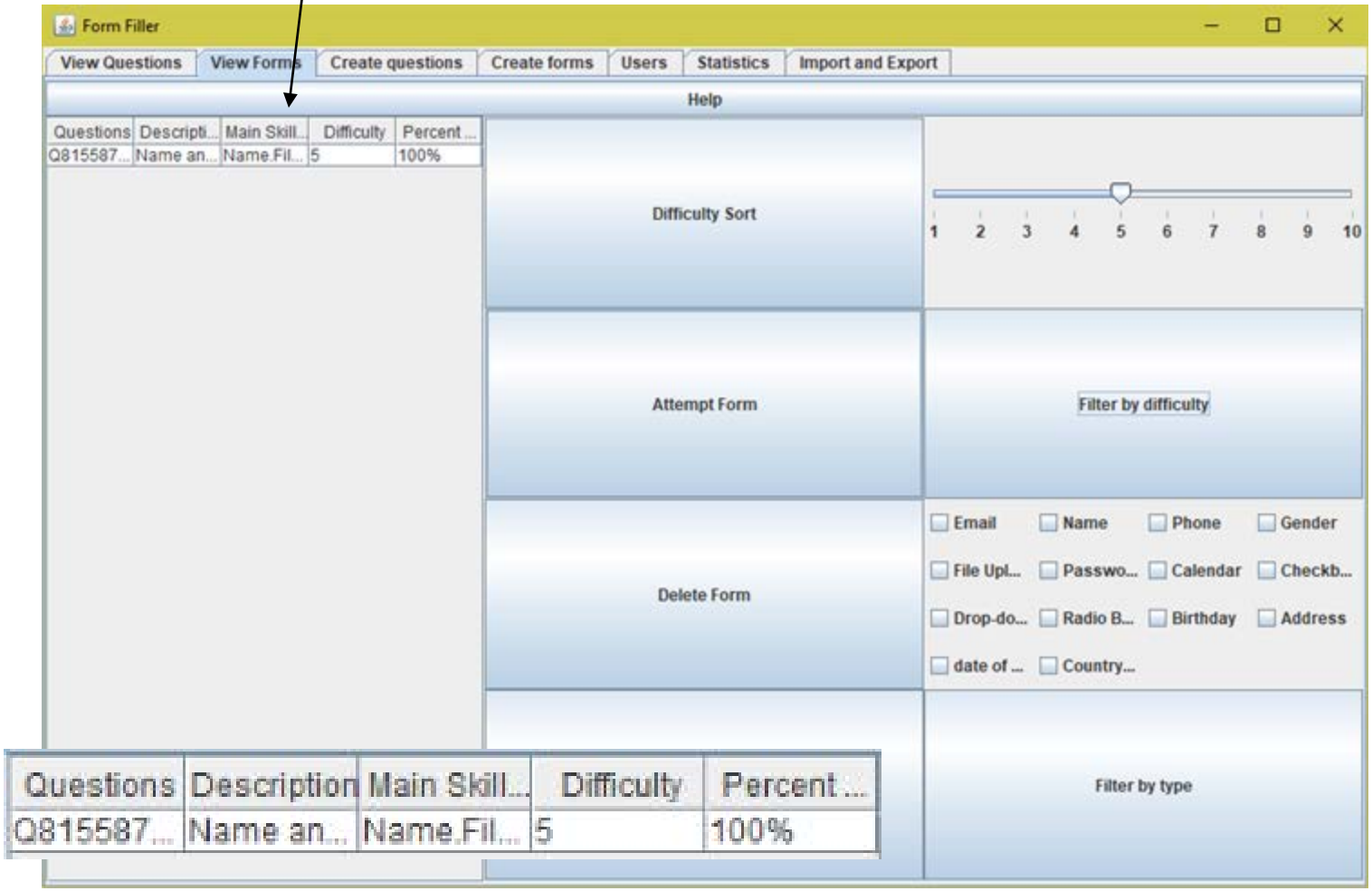
Forms of all difficulties are displayed

Press filter

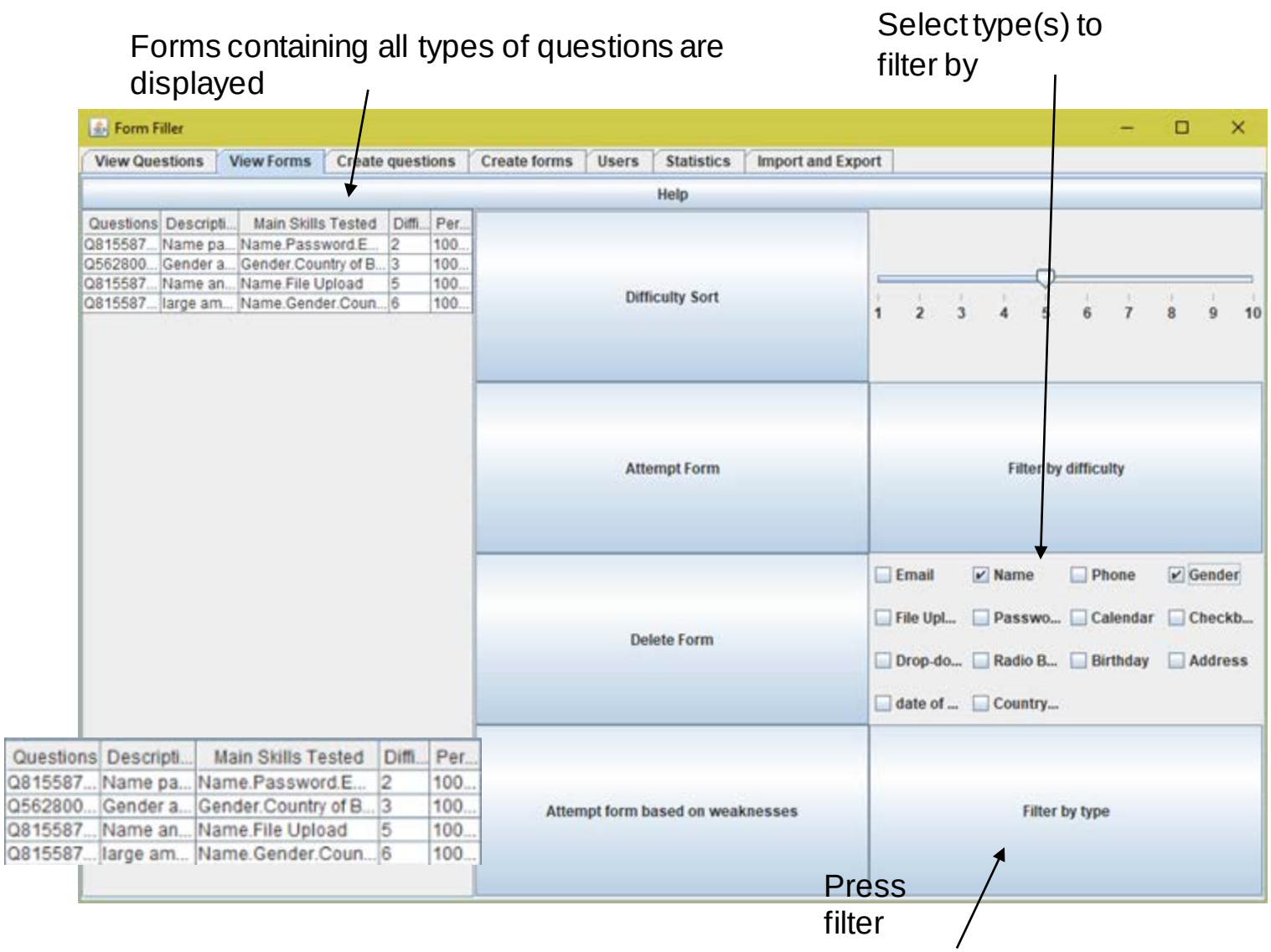
Select a difficulty to filter by using the slider.

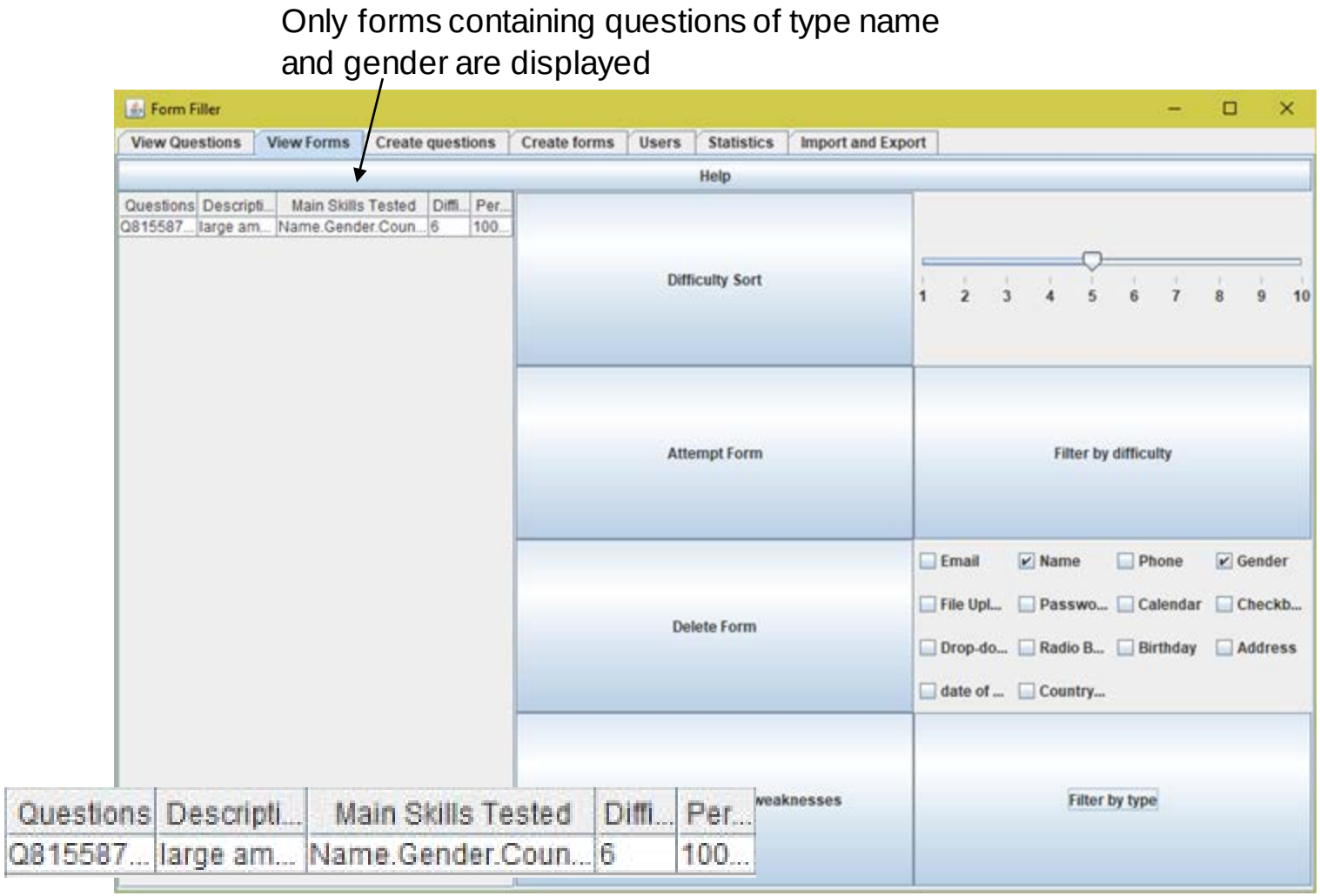


Only forms of difficulty 5 are displayed



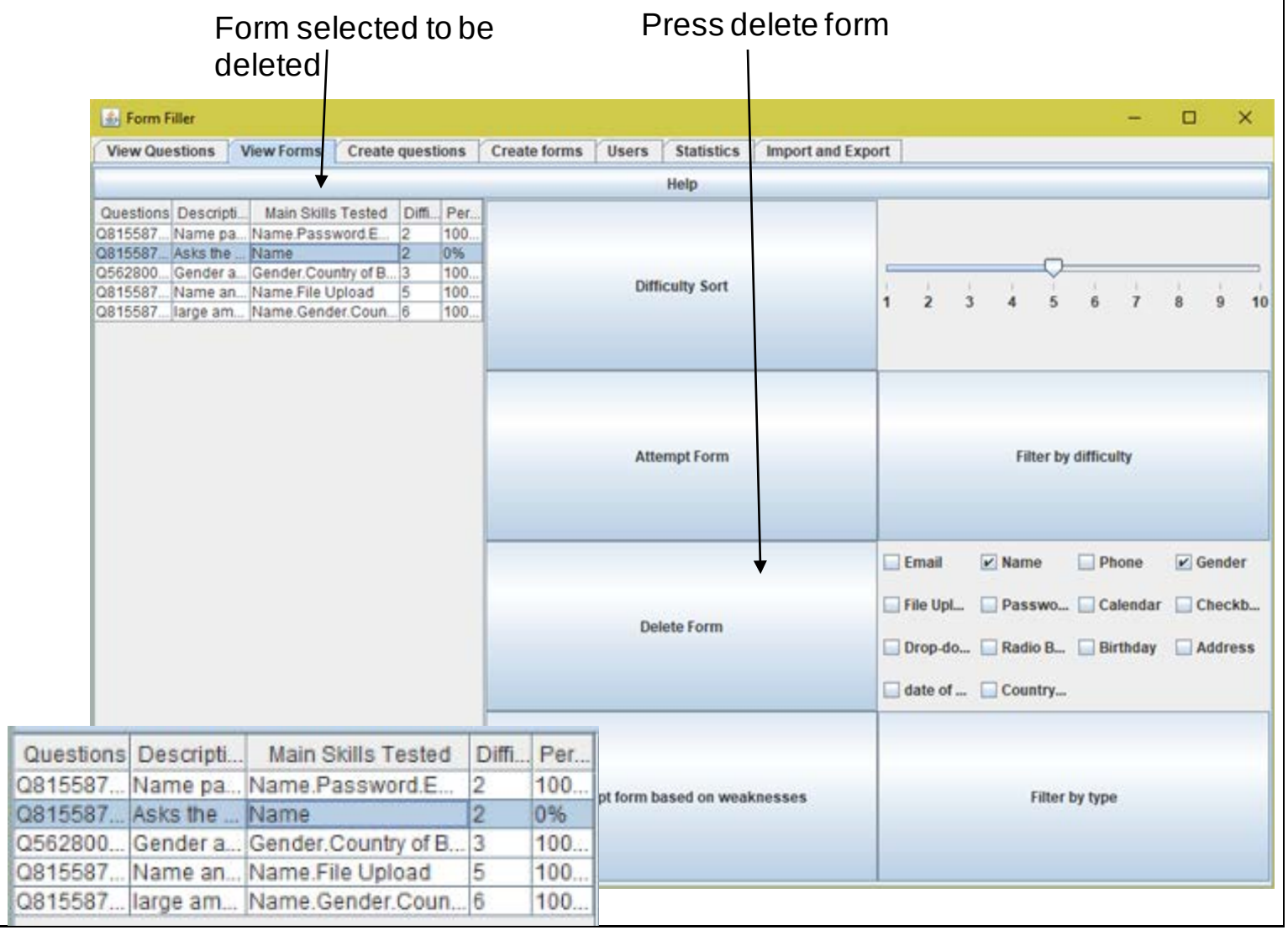
Type filter

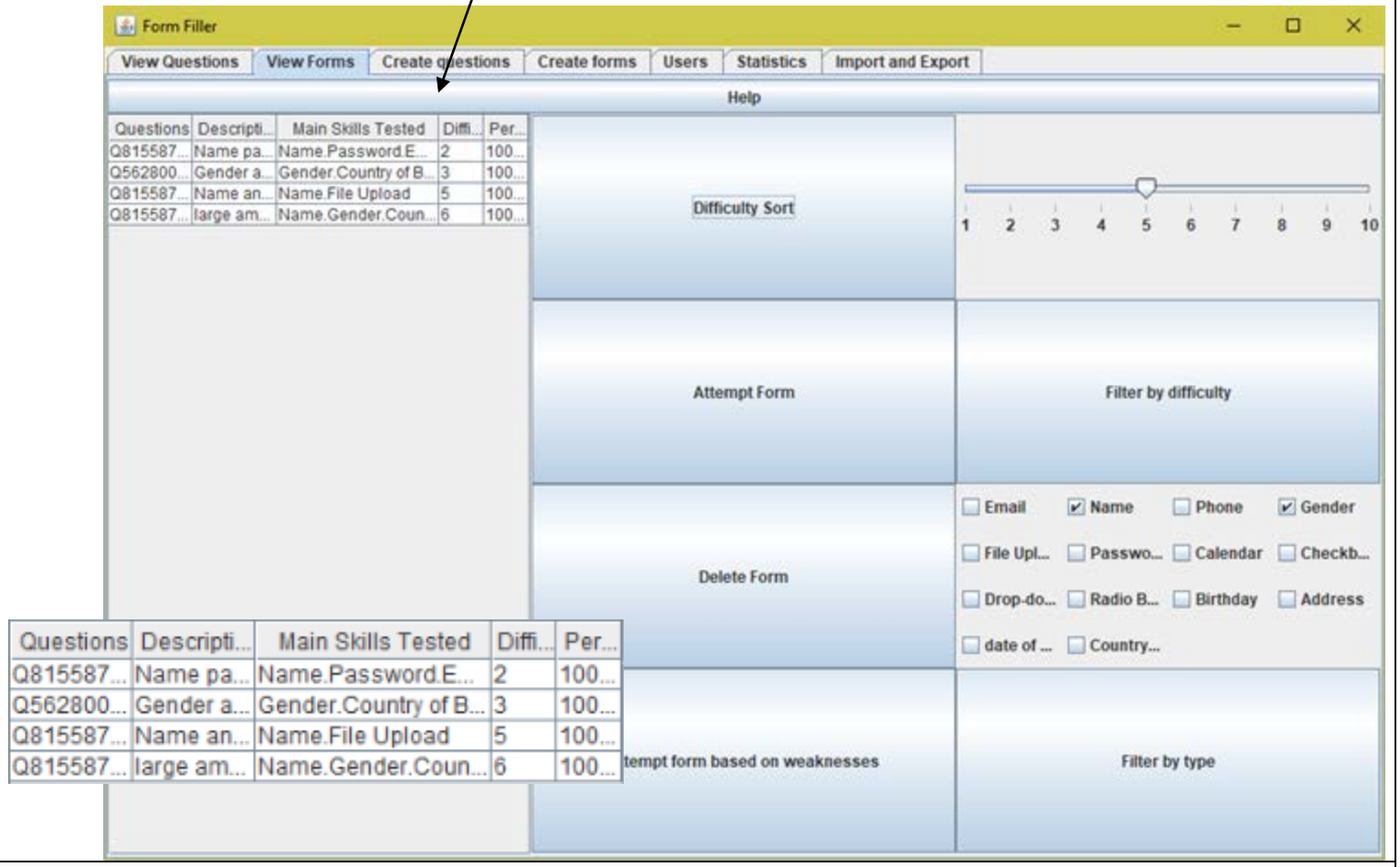

Forms containing all types of questions are displayed
Select type(s) to filter by
Form Filler
View Questions
View Forms
Create questions
Create forms
Users
Statistics
Import and Export
Help
Questions
Descripti...
Main Skills Tested
Diffi...
Per...
Q815587...
Name pa...
Name.Password.E...
2
100...
Q562800...
Gender a...
Gender.Country of B...
3
100...
Q815587...
Name an...
Name.File Upload
5
100...
Q815587...
large am...
Name.Gender.Coun...
6
100...
Difficulty Sort
1 2 3 4 5 6 7 8 9 10
Attempt Form
Filter by difficulty
Delete Form
Email
Name
Phone
Gender
File Upl...
Passwo...
Calendar
Checkb...
Drop-do...
Radio B...
Birthday
Address
date of ...
Country...
Attempt form based on weaknesses
Filter by type
Press filter

	
Objectives met	27 (Ability to sort forms by difficulty), 28 (Ability to filter forms by difficulty), 29 (Ability to filter forms by types of questions tested)

# *(from 4.1)*	12
Area of System	View Forms - Delete
Output & Storage Requirements	-
Data Used	FormList, id (of the form to be deleted)

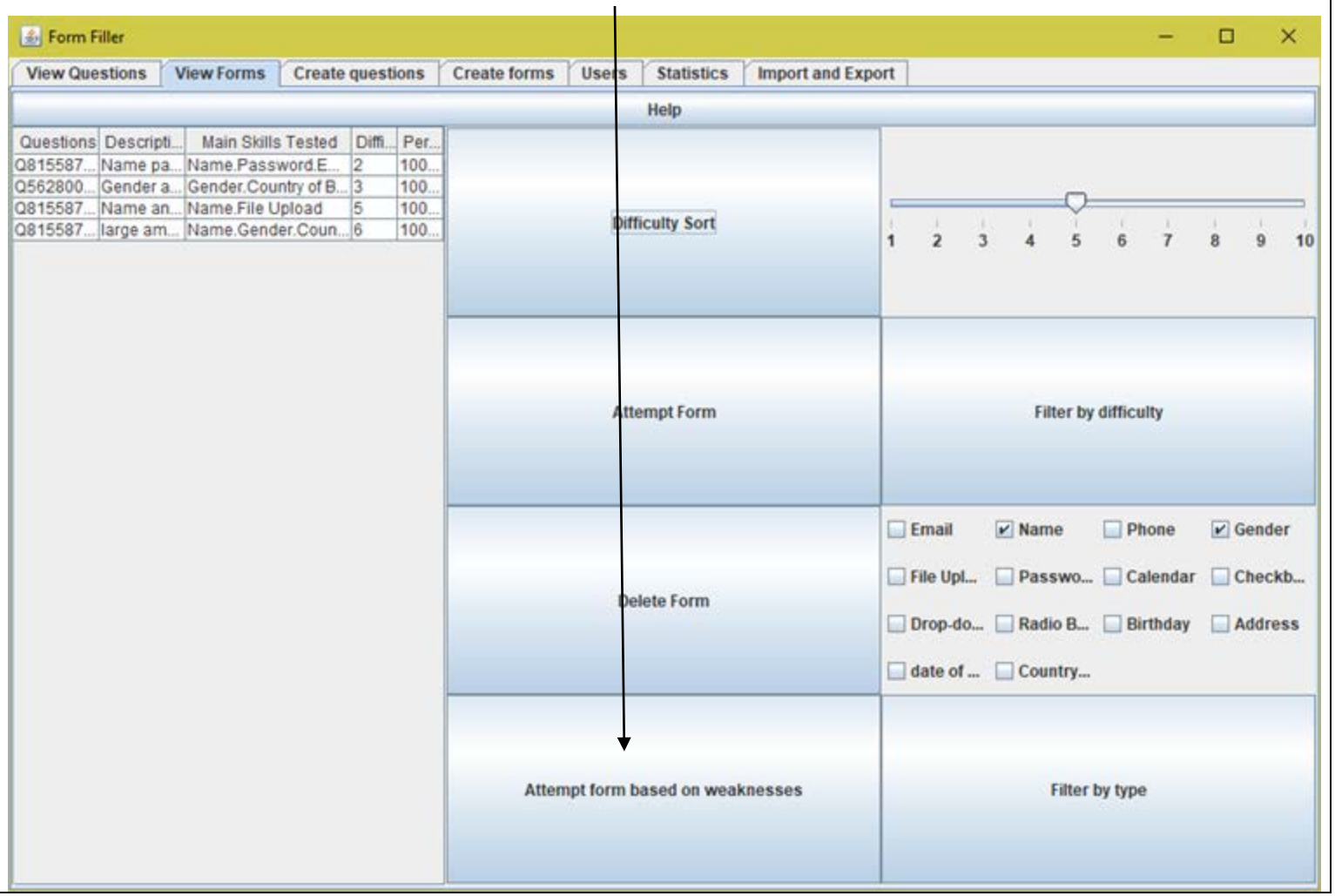
Evidence	

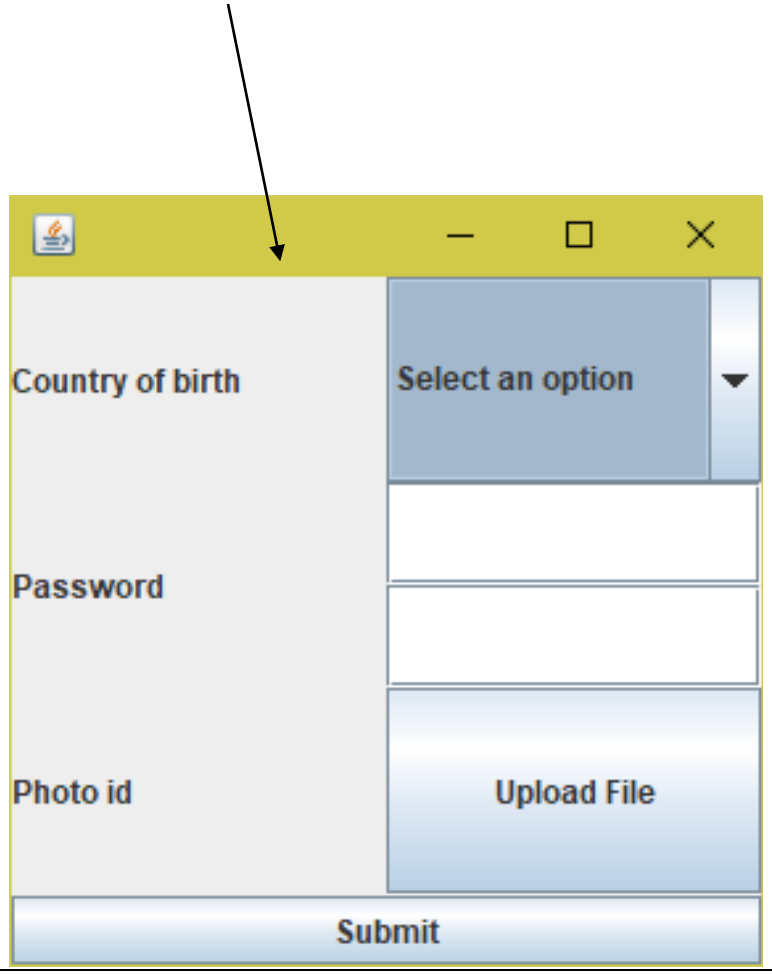

Form selected to be deleted
Press delete form
Form Filler
View Questions
View Forms
Create questions
Create forms
Users
Statistics
Import and Export
Help
Questions
Descripti...
Main Skills Tested
Diffi...
Per...
Q815587...
Name pa...
Name.Password.E...
2
100...
Q815587...
Asks the ...
Name
2
0%
Q562800...
Gender a...
Gender.Country of B...
3
100...
Q815587...
Name an...
Name.File Upload
5
100...
Q815587...
large am...
Name.Gender.Coun...
6
100...
Difficulty Sort
1 2 3 4 5 6 7 8 9 10
Attempt Form
Filter by difficulty
Delete Form
Email
Name
Phone
Gender
File Upl...
Passwo...
Calendar
Checkb...
Drop-do...
Radio B...
Birthday
Address
date of ...
Country...
pt form based on weaknesses
Filter by type

	Form no longer present in the table (i.e. it has been deleted from the system) 
Objectives met	31 (Ability to delete forms)
# *(from 4.1)*	13

Area of System	View forms - Create form from user weaknesses
Output & Storage Requirements	-
Data Used	QuestionStatList, Average number of attempts to correct an error (for each question stat)

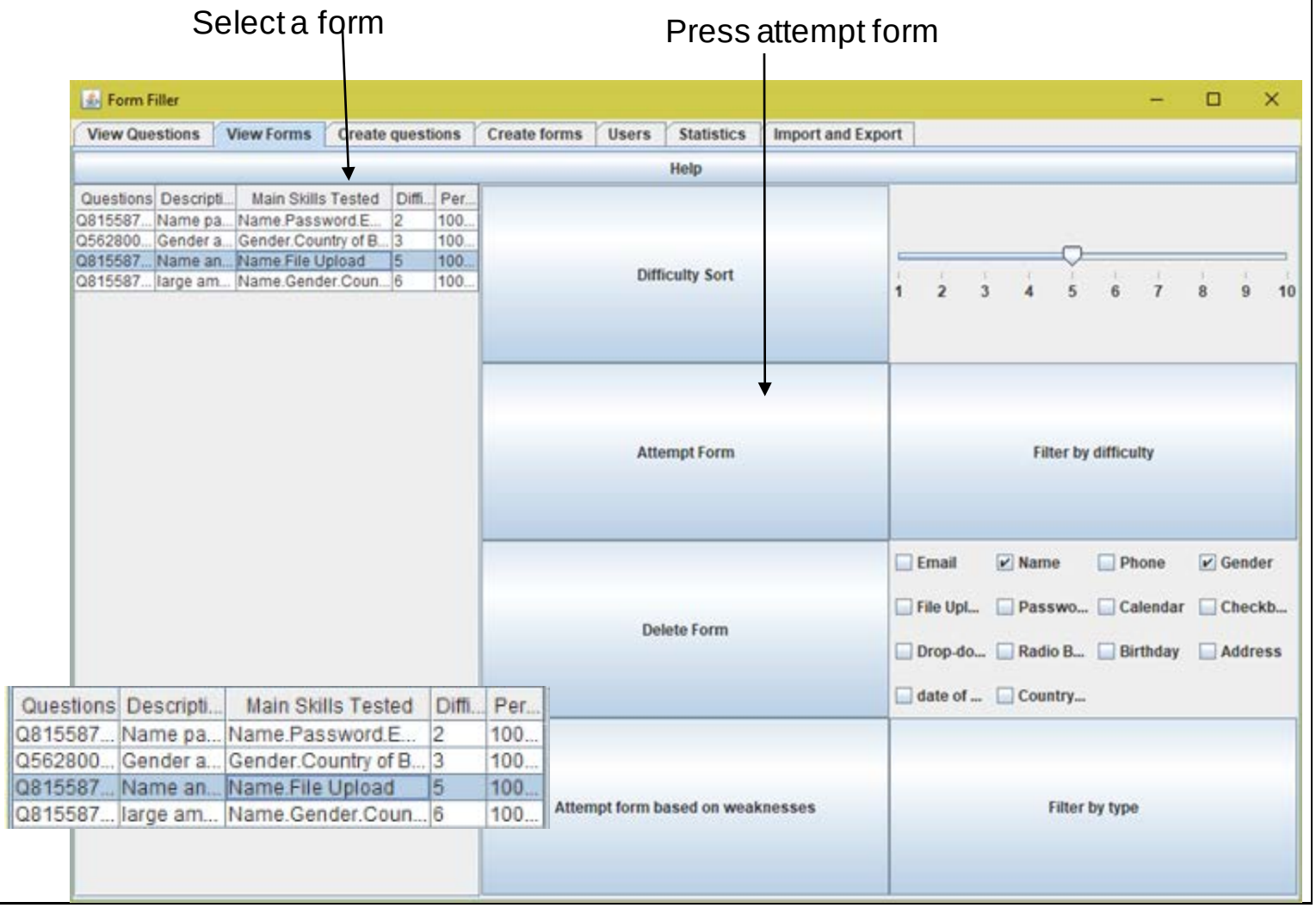
Evidence	Press attempt form based on user weaknesses

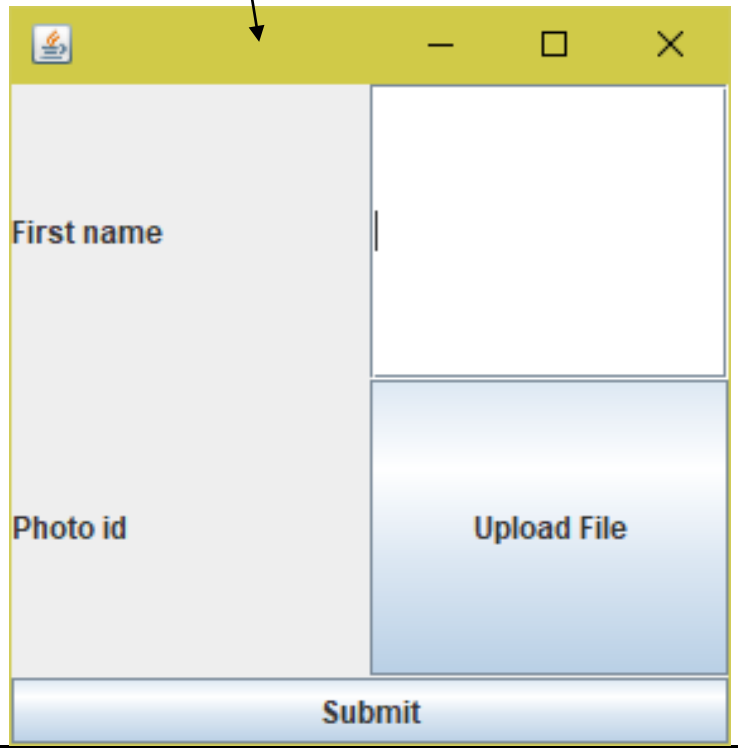


	A form containing the questions that they struggle with the most opens 
Objectives met	26 (Ability to create forms from user weaknesses)

# *(from 4.1)*	14
Area of System	View Forms - Attempt
Output & Storage Requirements	-
Data Used	id (of the form to be attempted), question list (list of questions in the form), component list (list of components in each question)

Evidence	


Select a form
Press attempt form
Form Filler
View Questions
View Forms
Create questions
Create forms
Users
Statistics
Import and Export
Help
Questions
Descripti...
Main Skills Tested
Diffi...
Per...
Q815587...
Name pa...
Name.Password.E...
2
100...
Q562800...
Gender a...
Gender.Country of B...
3
100...
Q815587...
Name an...
Name.File Upload
5
100...
Q815587...
large am...
Name.Gender.Coun...
6
100...
Difficulty Sort
1 2 3 4 5 6 7 8 9 10
Attempt Form
Filter by difficulty
Delete Form
Email
Name
Phone
Gender
File Upl...
Passwo...
Calendar
Checkb...
Drop-do...
Radio B...
Birthday
Address
date of ...
Country...
Attempt form based on weaknesses
Filter by type

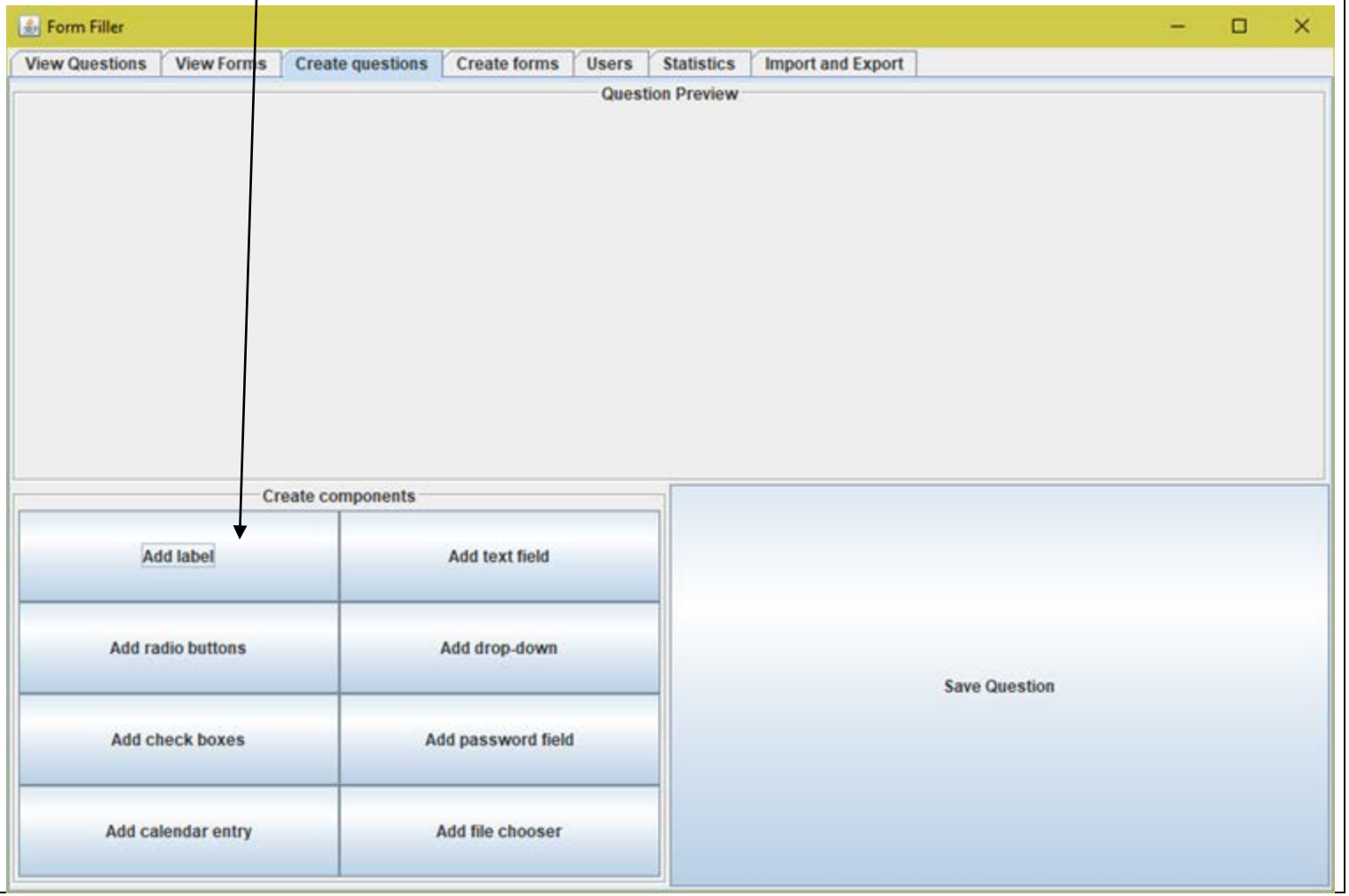
	The form is opened for the user to attempt 
Objectives met	34 (Ability to attempt a form), 51 (Allow user to select a form to be attempted)

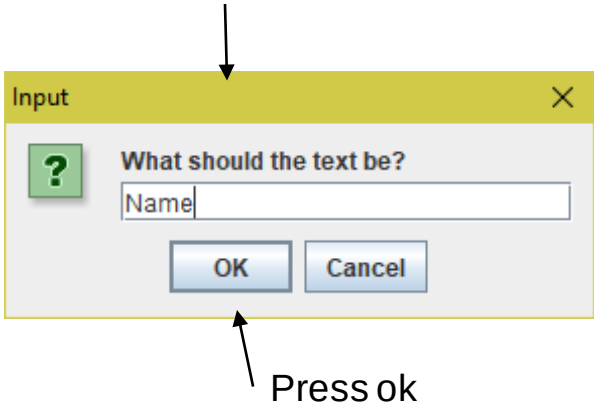
Create Questions

# (from 4.1)	15

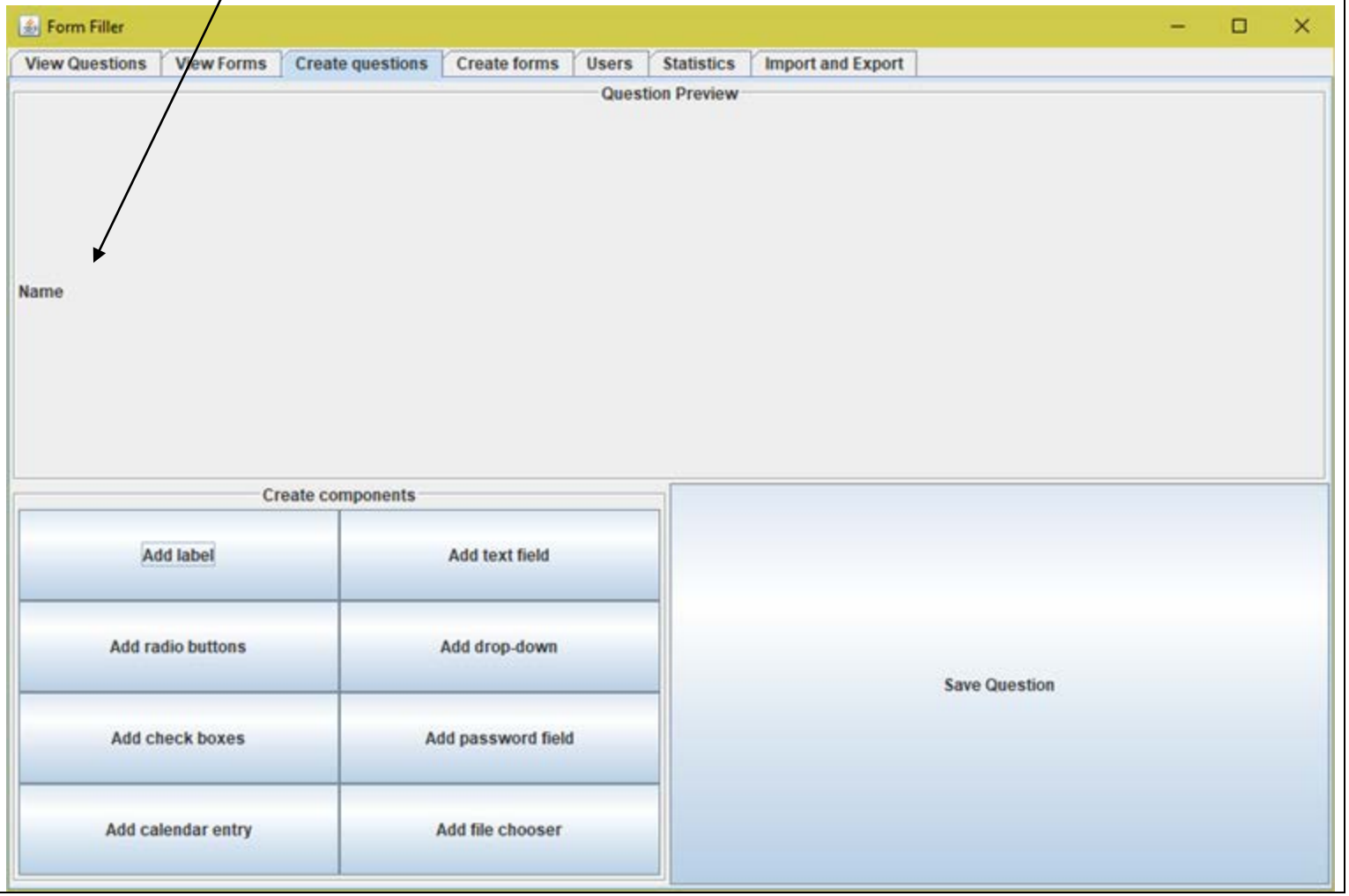
Area of System	Create Questions - Add components
Output & Storage Requirements	-
Data Used	component list (list of components in the question), type of validation required (where appropriate), options that the user can select (where appropriate)
Evidence	Add label

Press add label



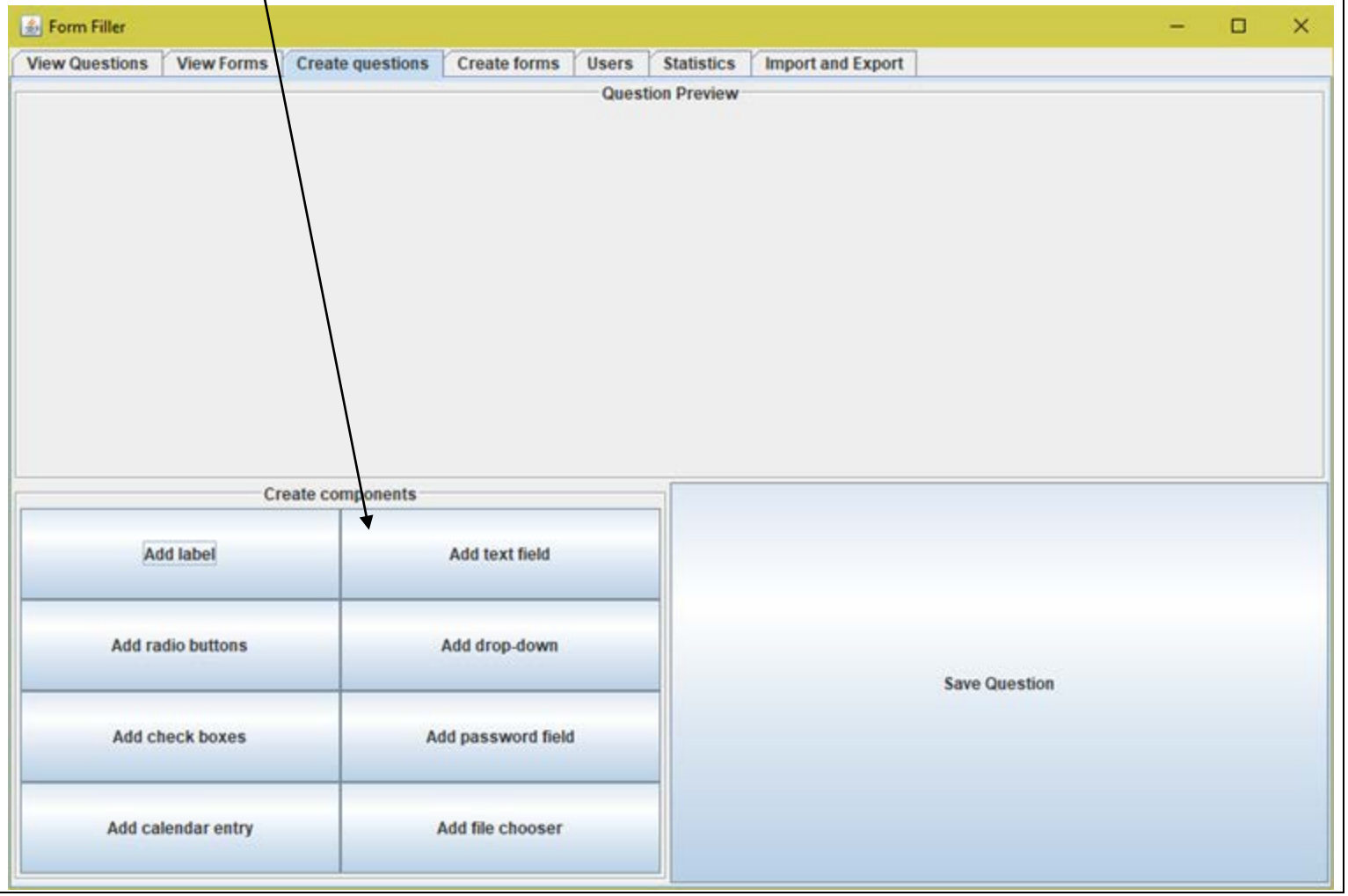
	Dialog opens to enter label text  Press ok

Label added to question

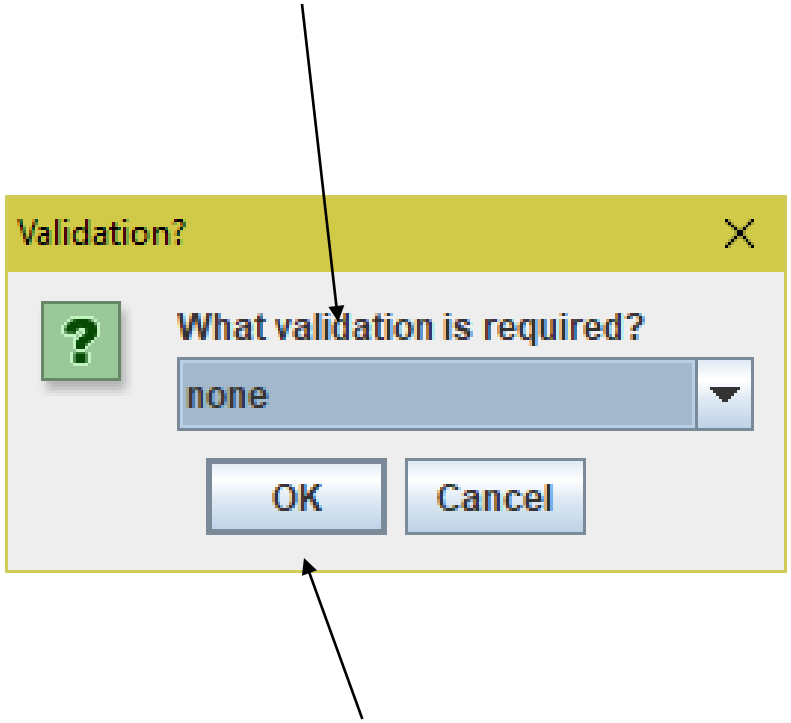


Add Text field

Press add text field

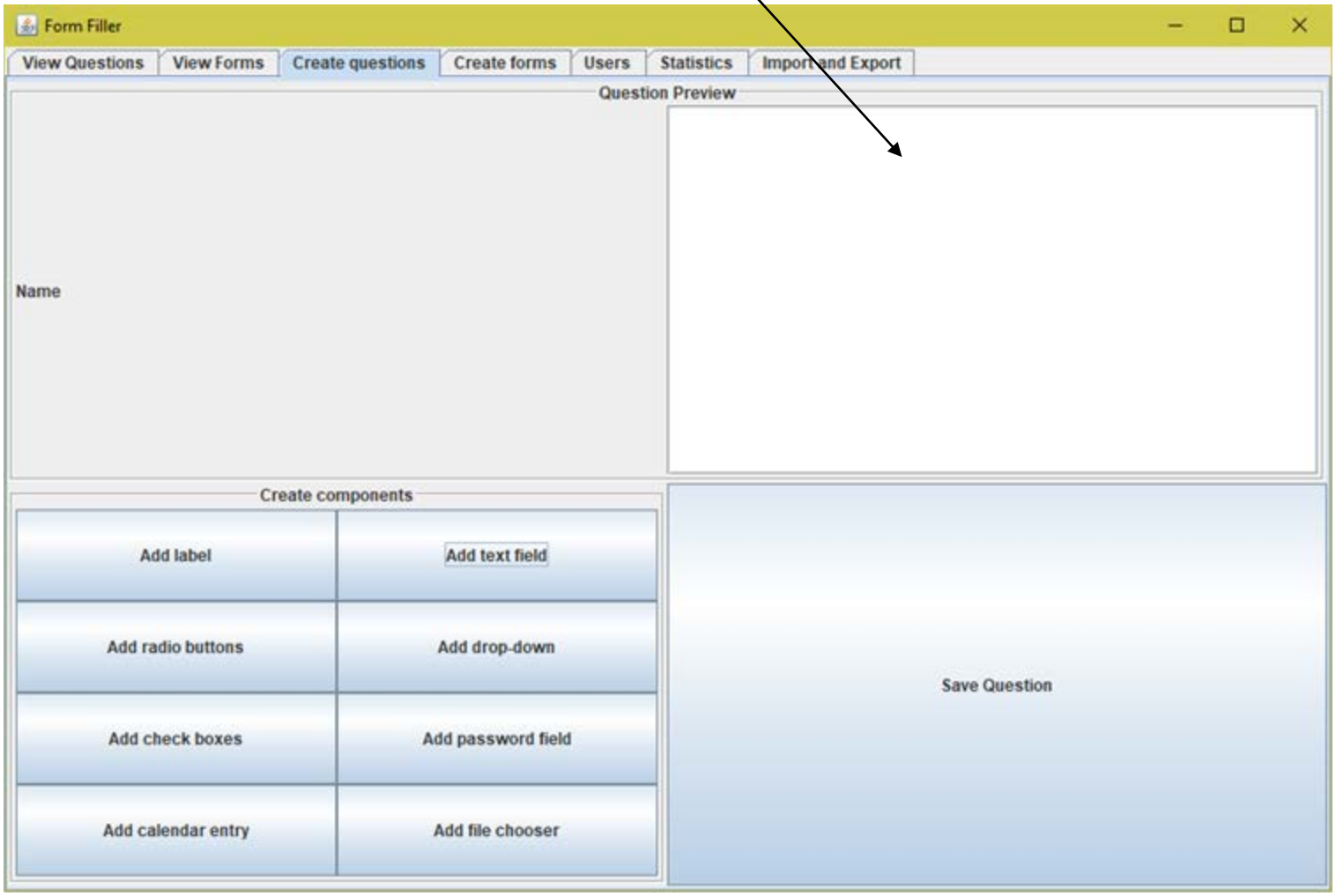


Select the validation required
from the drop down in the dialog



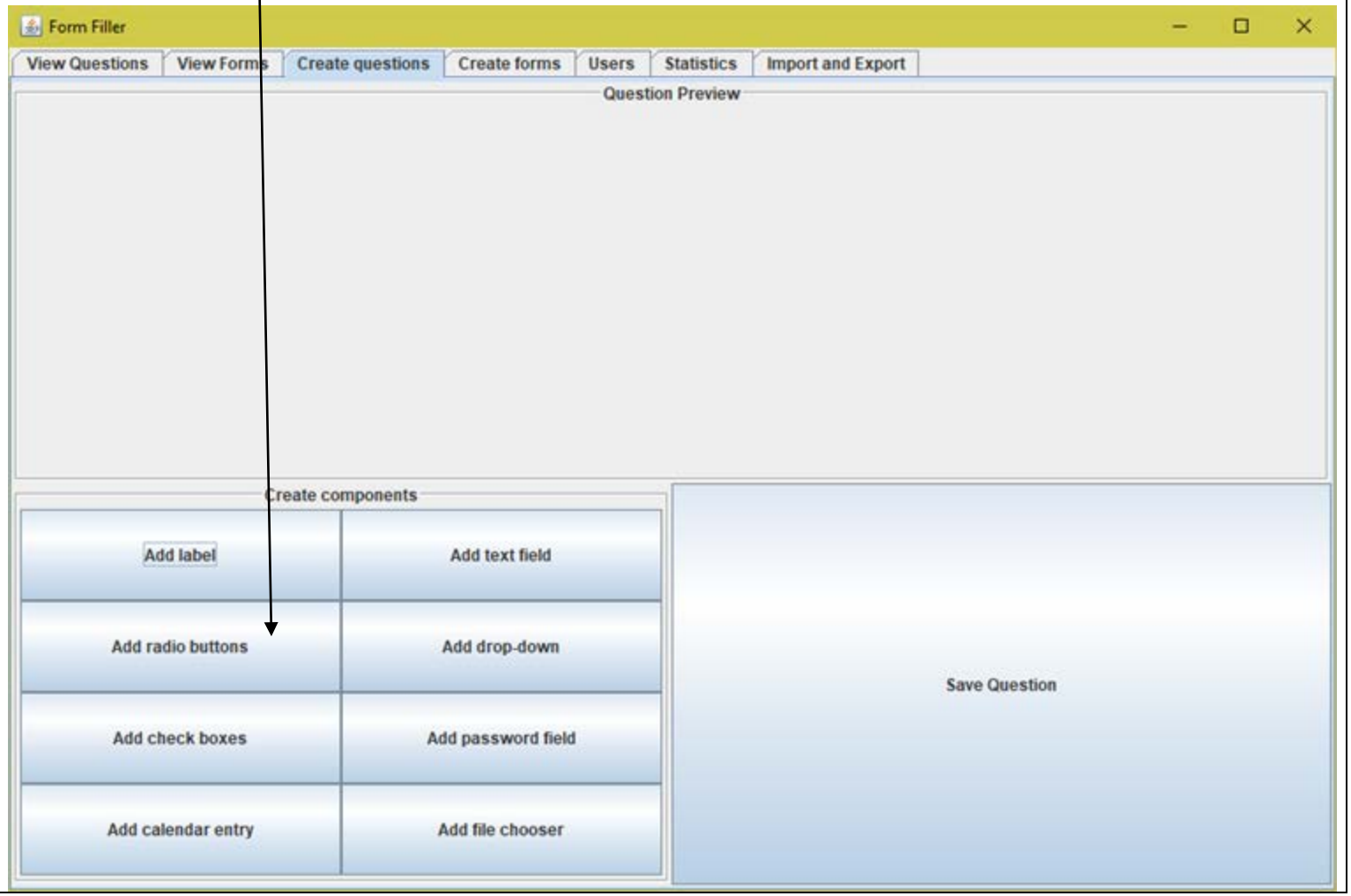
Press ok

Text field is added to question

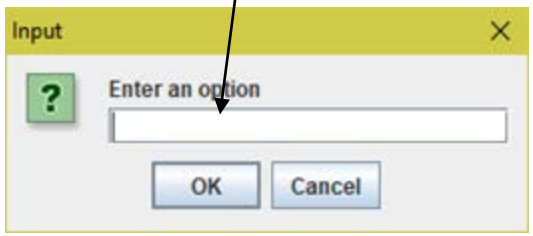


Add Radio buttons

Press add radio buttons



Enter an option into dialog that appears



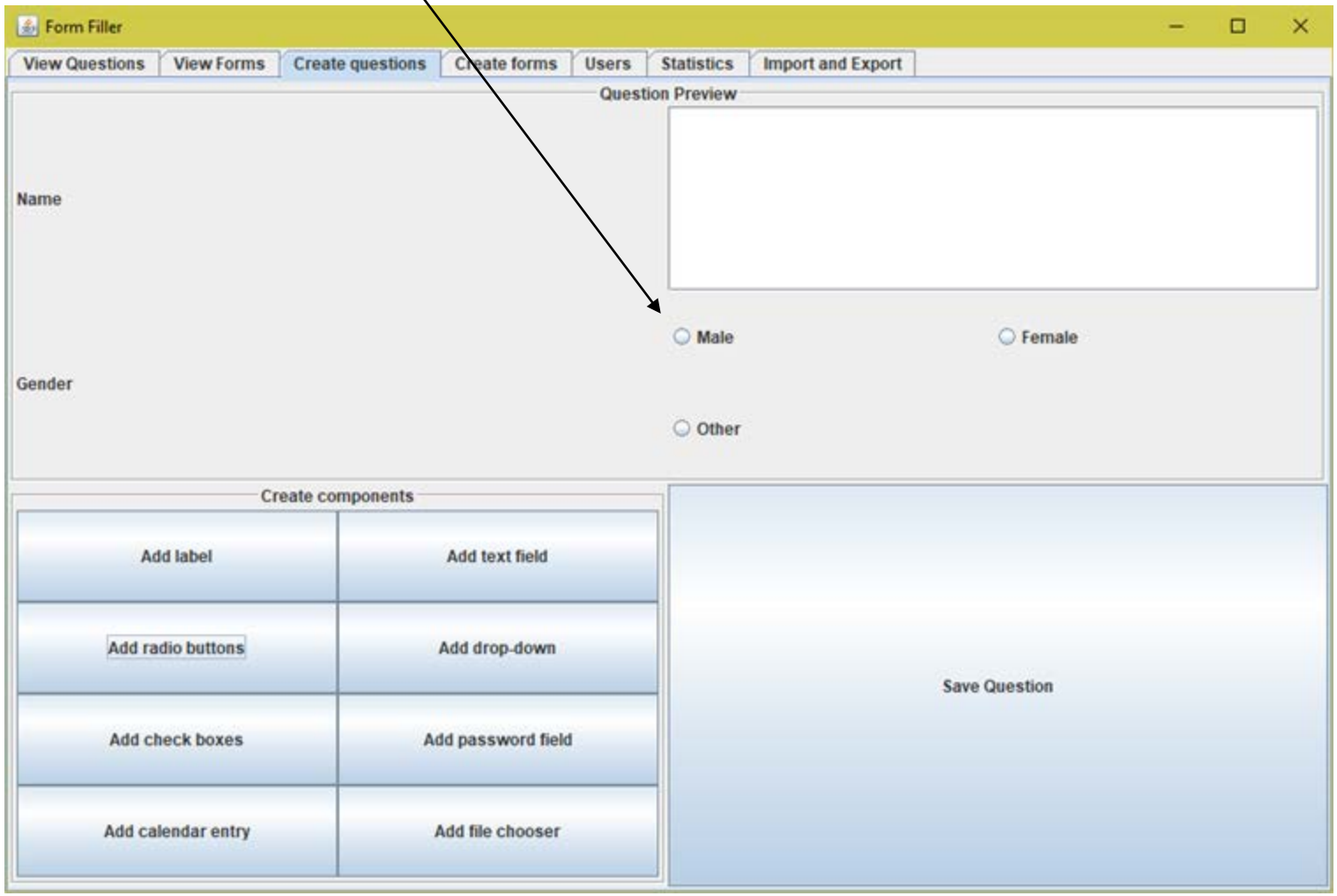
Press ok

After pressing ok this dialog appears

Press yes to continue entering options

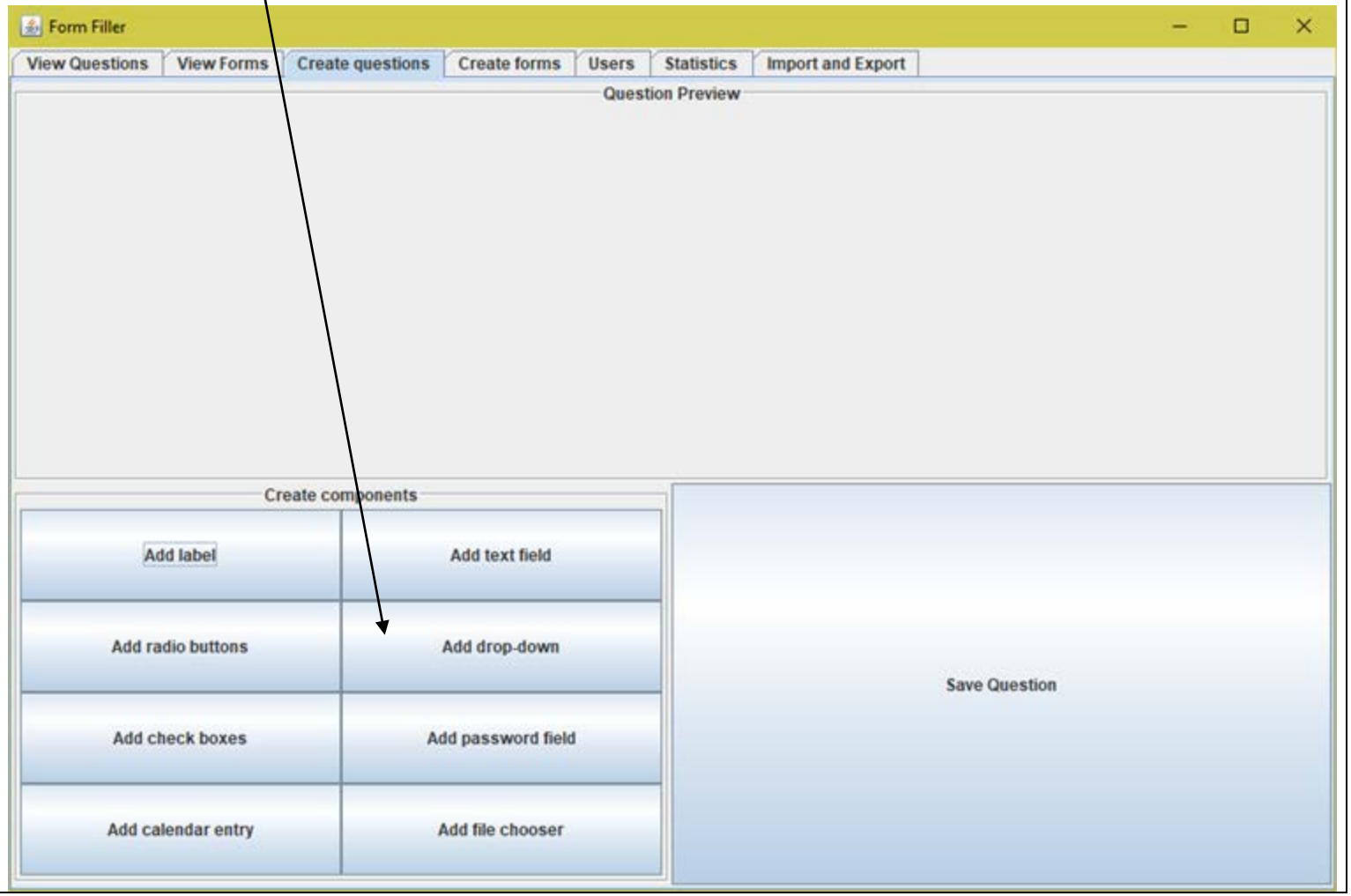
Press no to stop entering options and to add the component to the question

Radio buttons added to the question

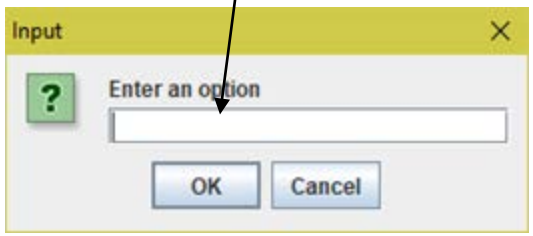


Add drop down

Press add drop down



Enter an option into dialog that appears



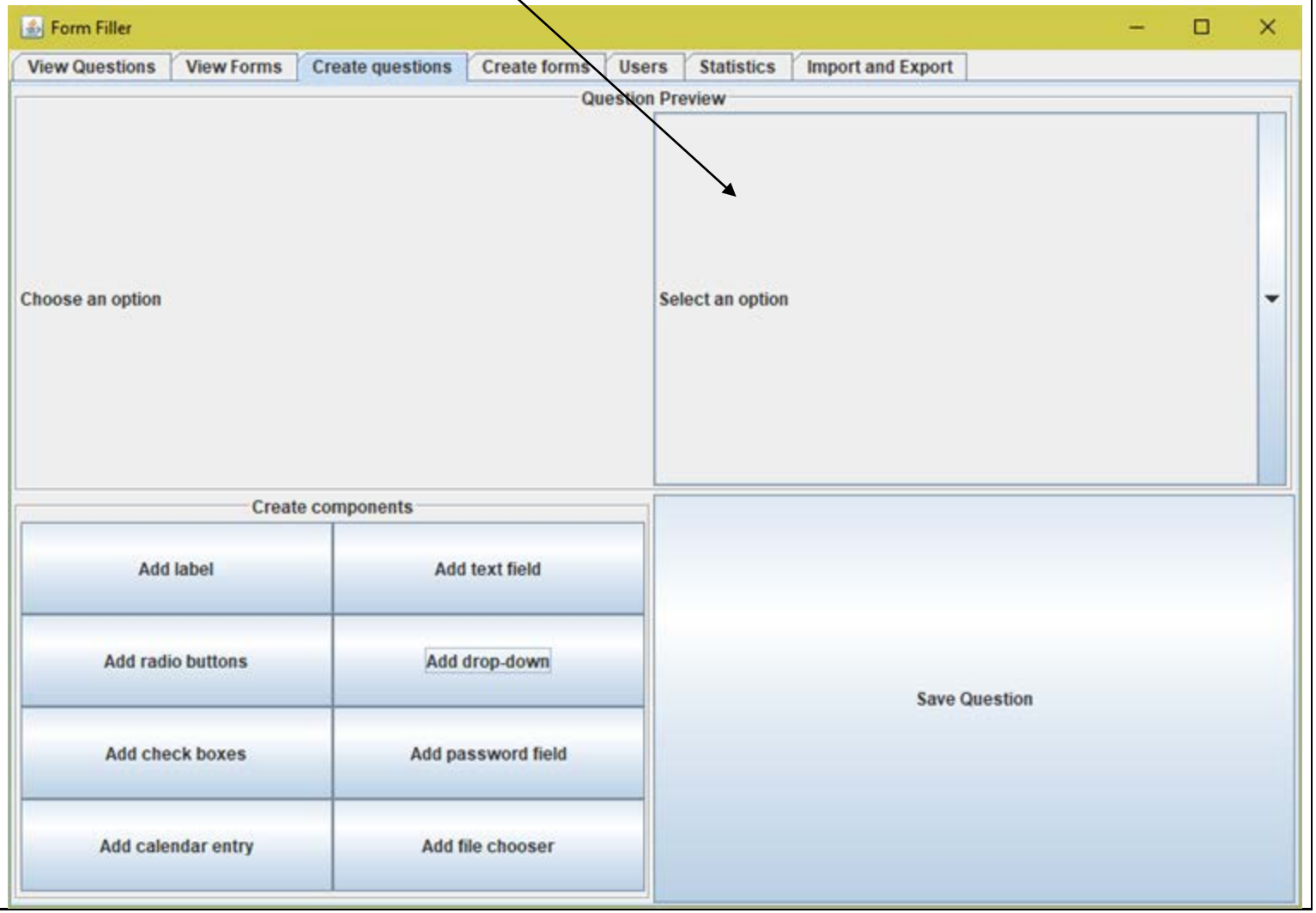
Press ok

After pressing ok this dialog appears

Press yes to continue entering options

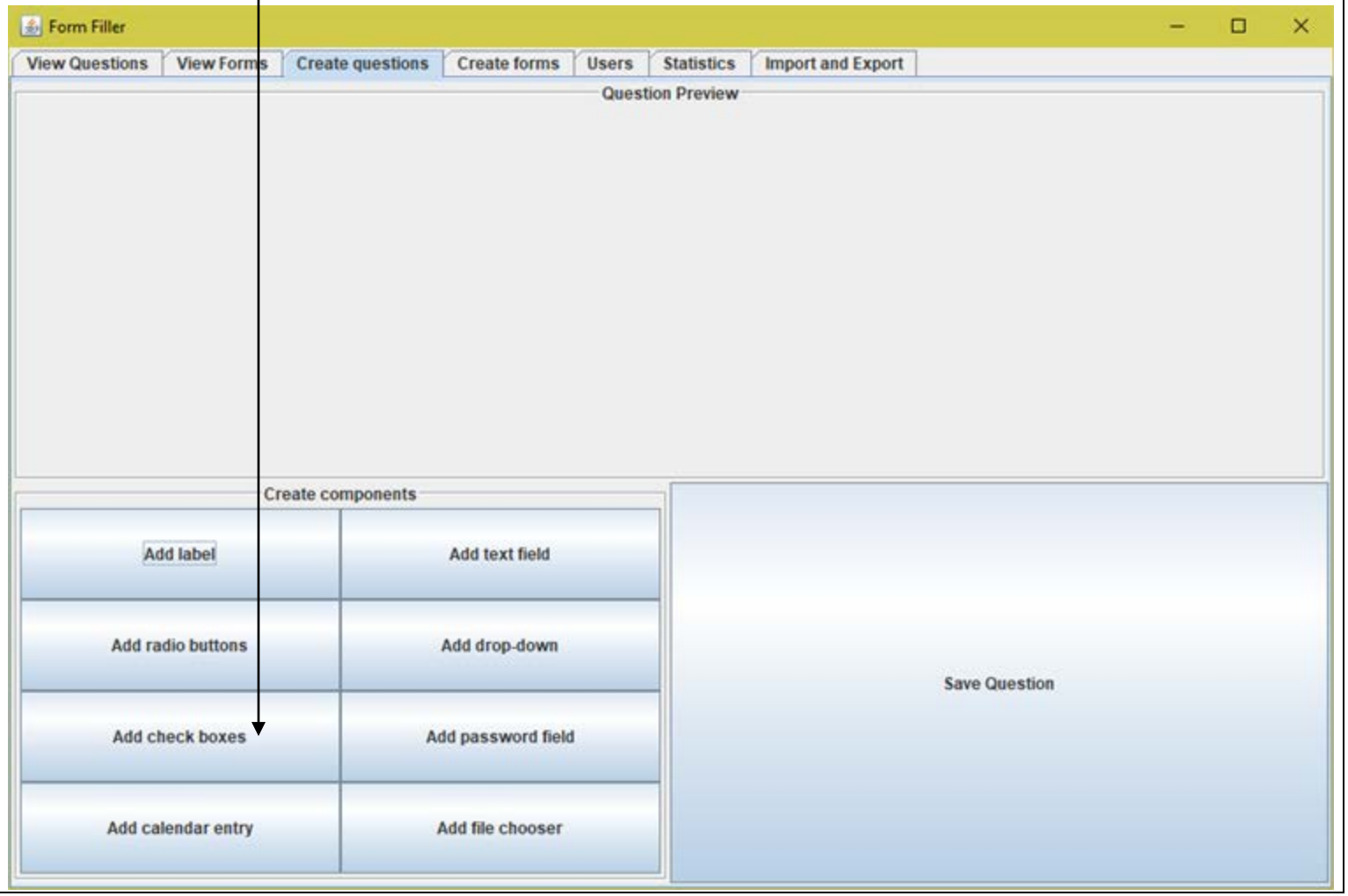
Press no to stop entering options and to add the component to the question

Drop down added to question

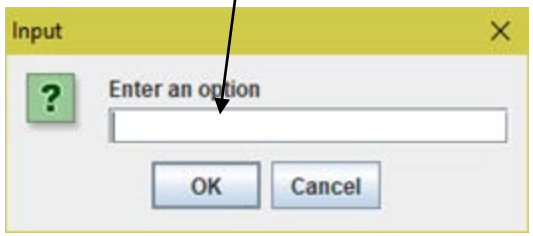


Add checkboxes

Press add check boxes



Enter an option into dialog that appears



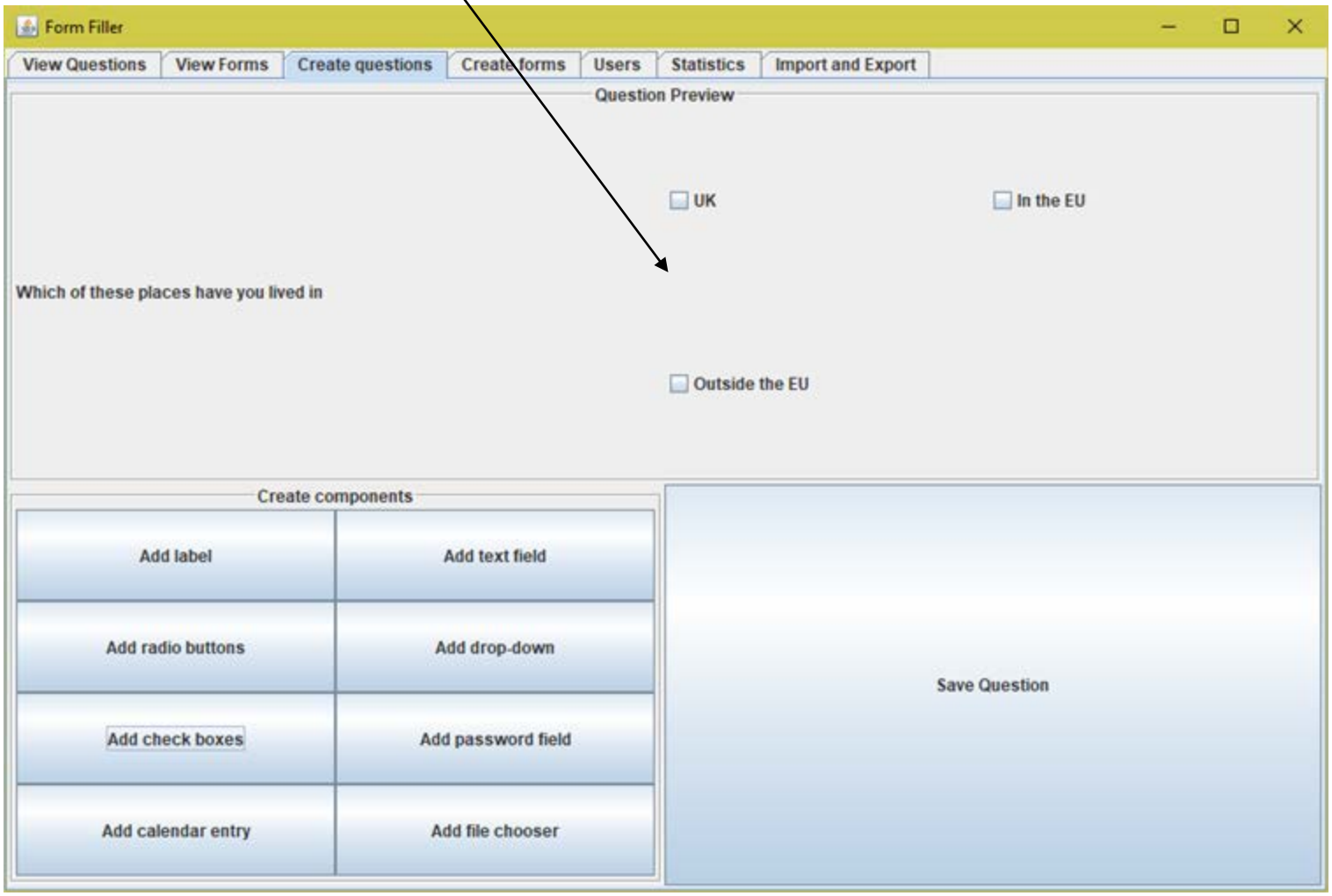
Press ok

After pressing ok this dialog appears

Press yes to continue entering options

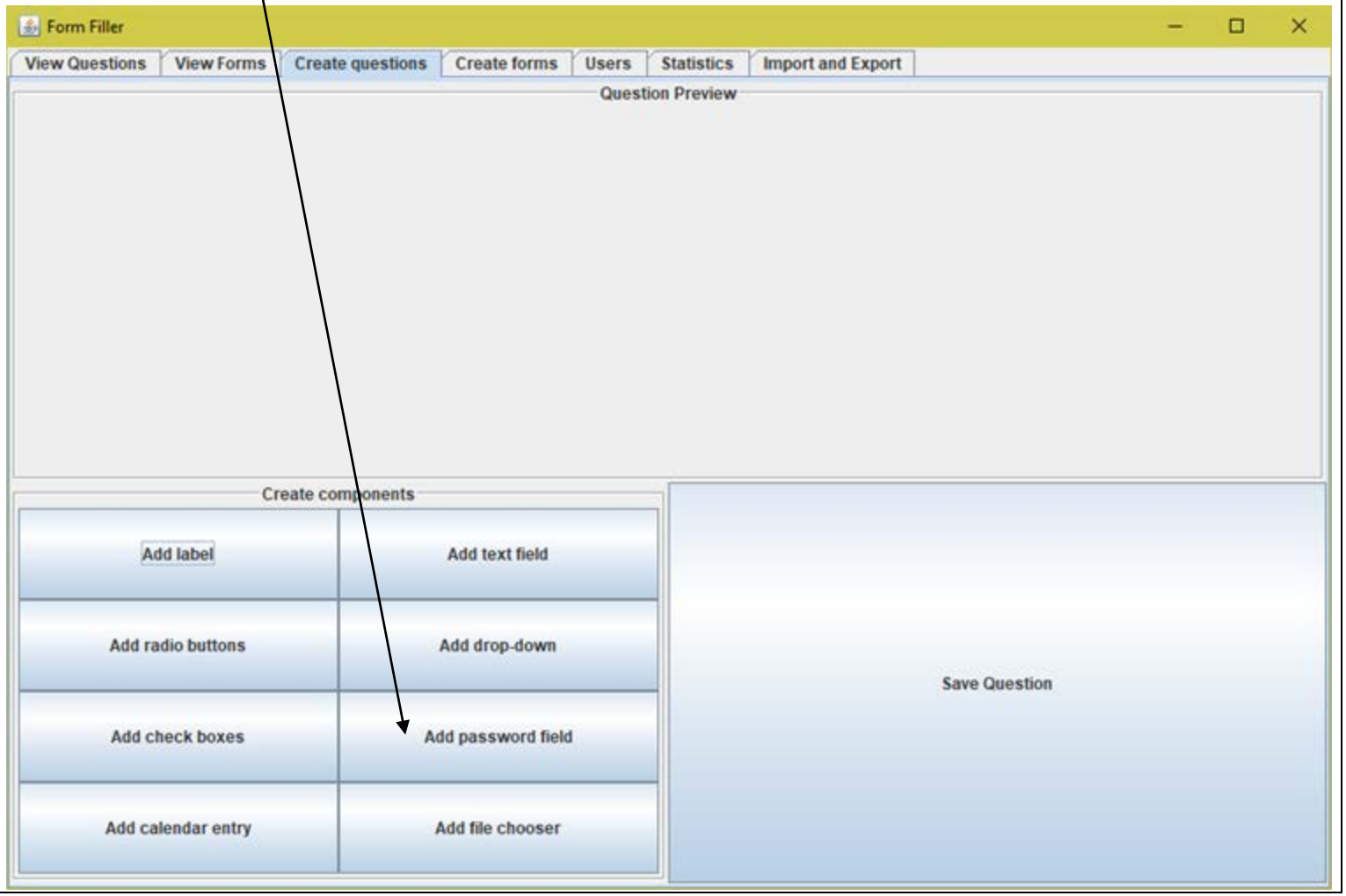
Press no to stop entering options and to add the component to the question

Checkboxes have been added to the question

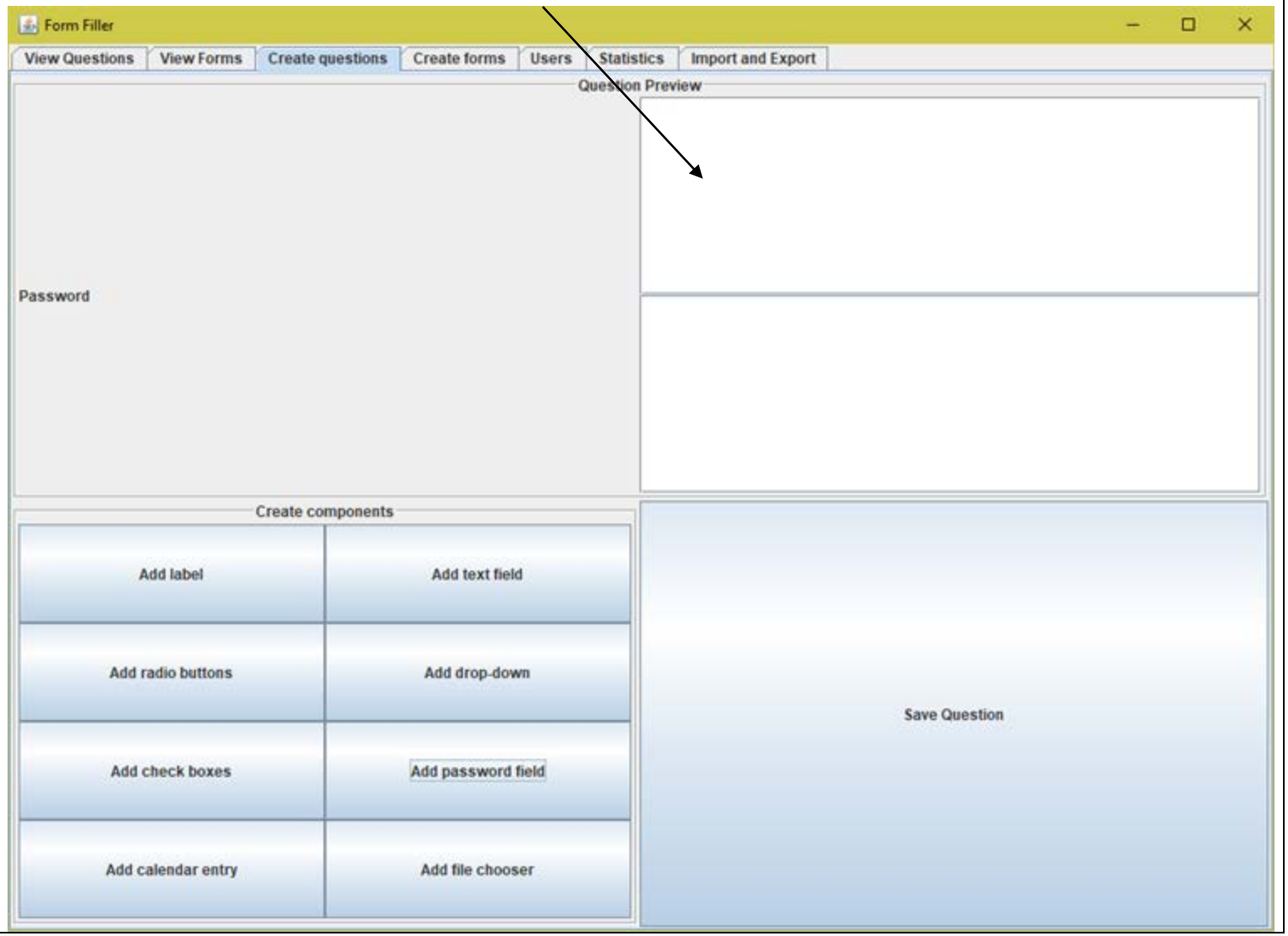


Add password field

Press add password field

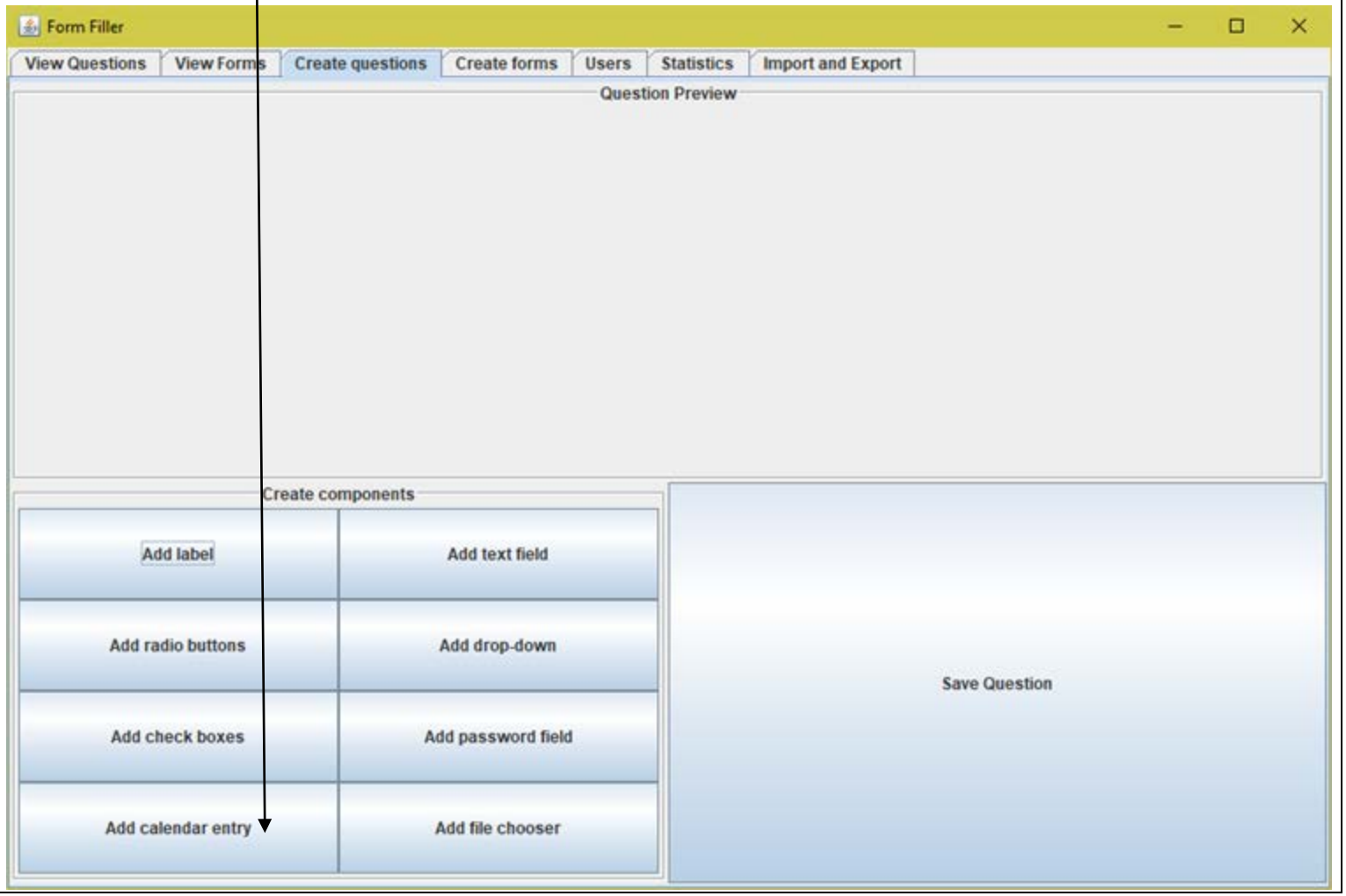


Password field added to question

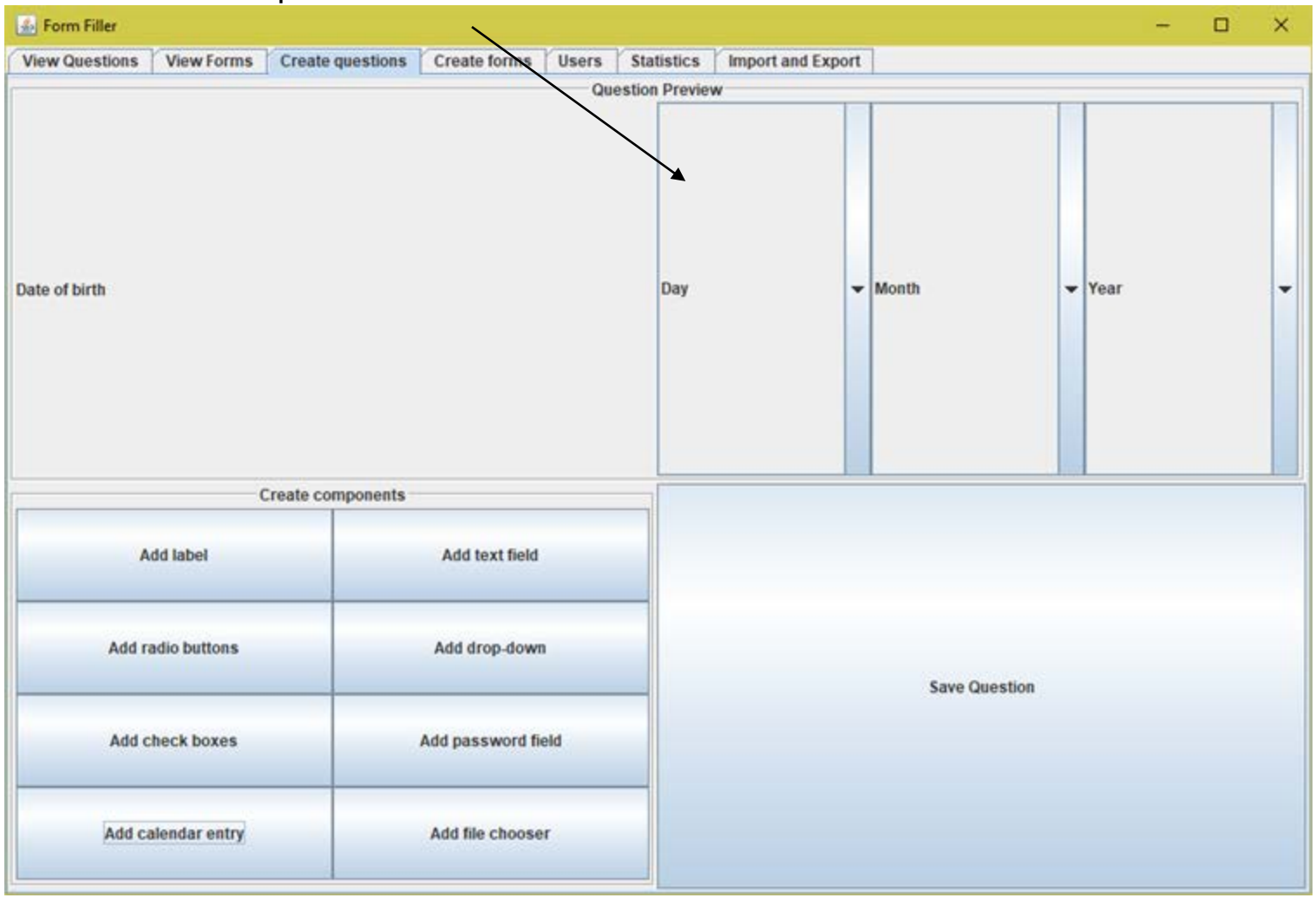


Add calendar entry

Press add calendar entry

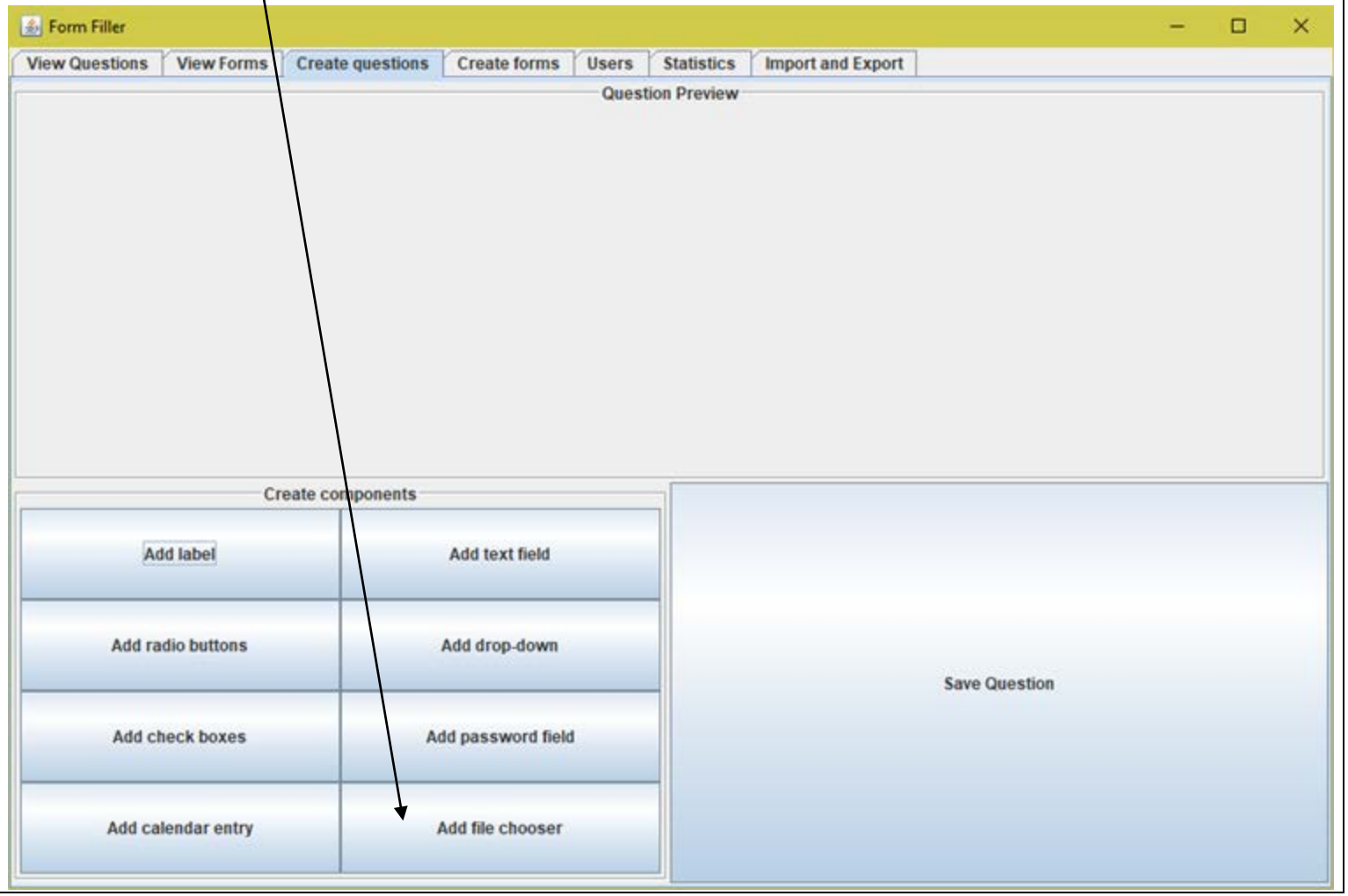


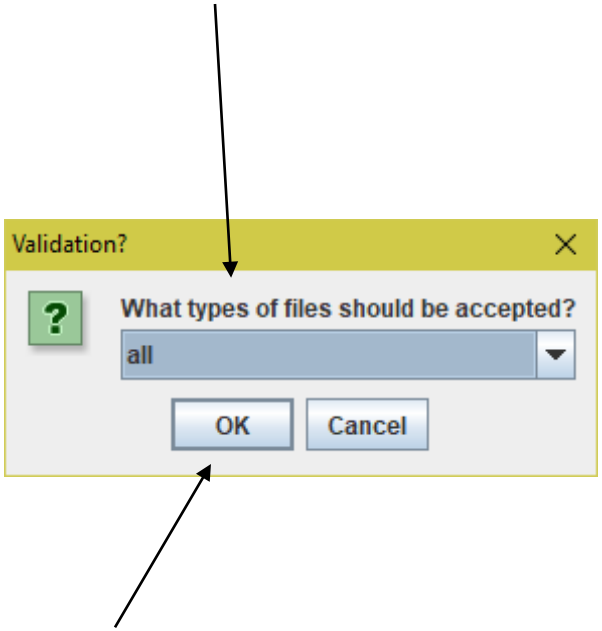
Calendar entry added to question



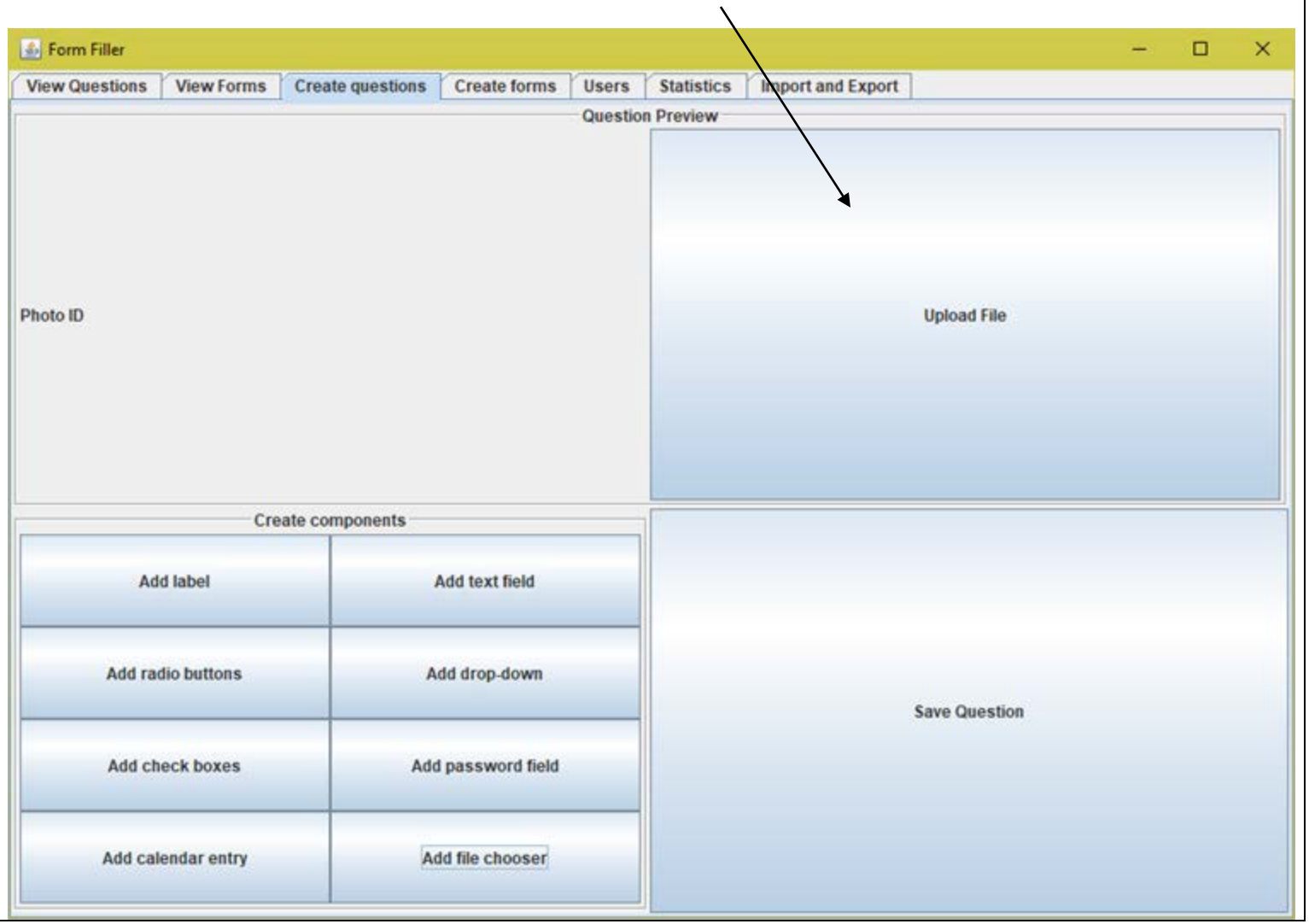
Add file chooser

Press add file chooser

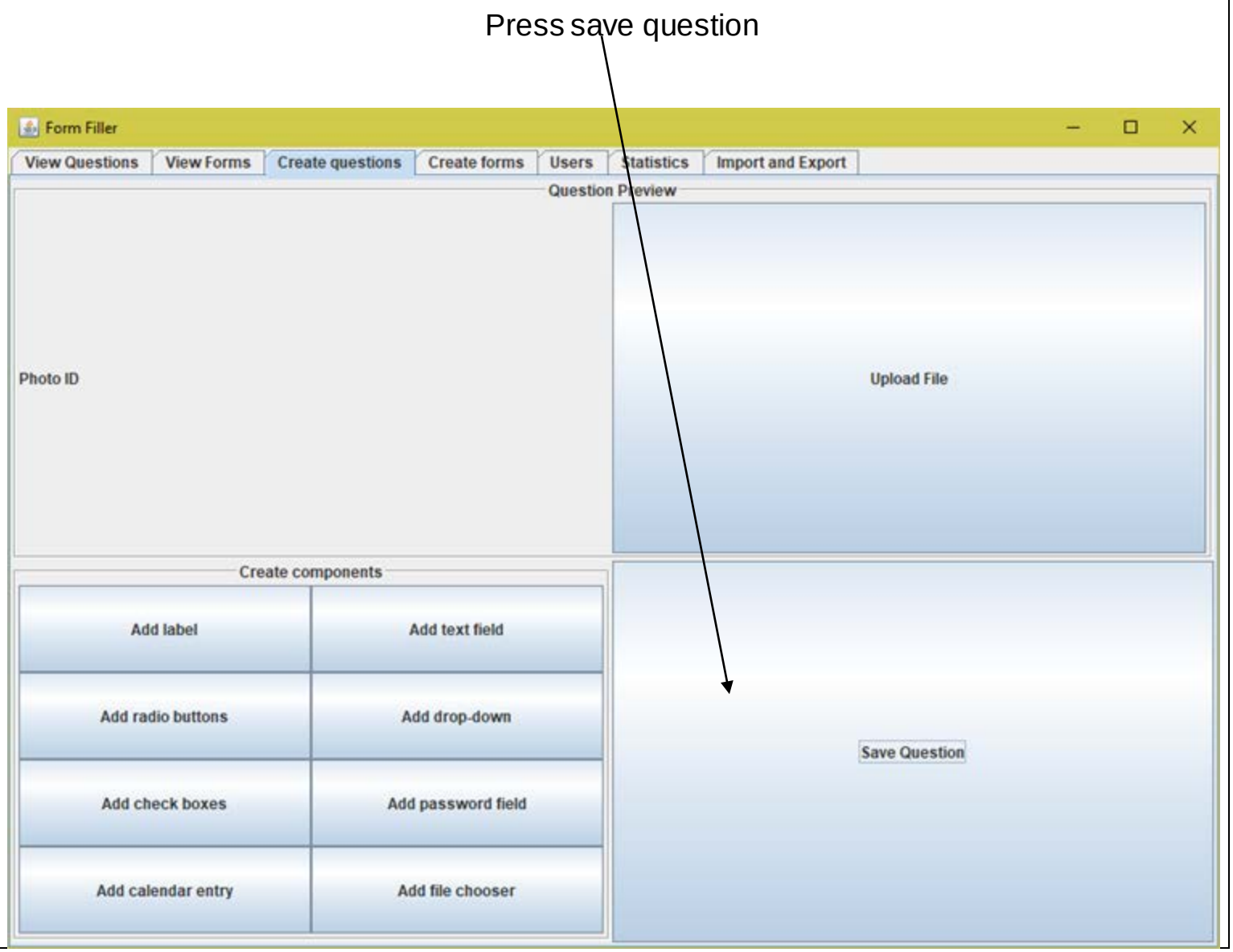


	Select which types of files should be accepted by using the drop down in the dialog that appears  Press ok

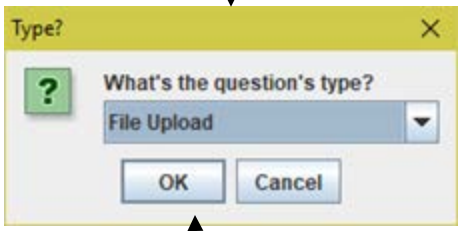
File chooser added to the question



Objectives met	1 (Ability to create questions), 2 (Ability to add labels), 3 (Ability to add text fields), 4 (Ability to specify the type of data that should be entered into the text field), 5 (Ability to add radio buttons), 6 (Ability to add drop-downs), 7 (Ability to add checkboxes), 8 (Ability to add password fields), 9 (Ability to add calendar entry), 10 (Ability to add a document upload field (file chooser))
# ***(from 4.1)***	18
Area of System	Create Questions - Add basic information
Output & Storage Requirements	QuestionDB, QuestionPanelDB
Data Used	difficulty, type, component list (list of components in the question)

Evidence	 Press save question Form Filler View Questions View Forms Create questions Create forms Users Statistics Import and Export Question Preview Photo ID Upload File Create components Add label Add text field Add radio buttons Add drop-down Add check boxes Add password field Add calendar entry Add file chooser Save Question

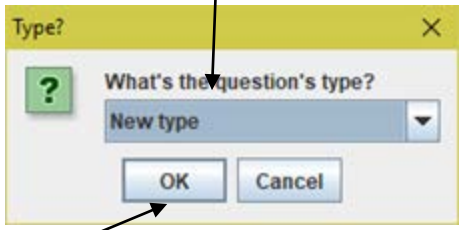
Select the type of question



Press ok

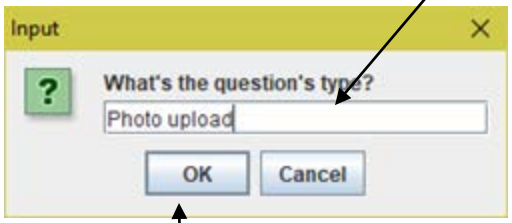
Or

Select new type

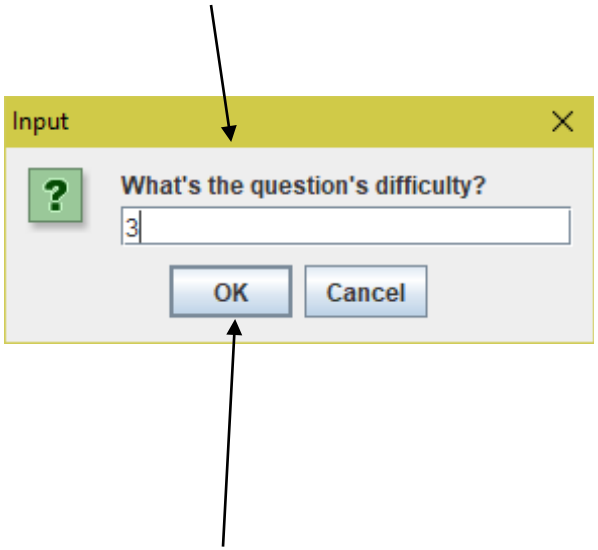


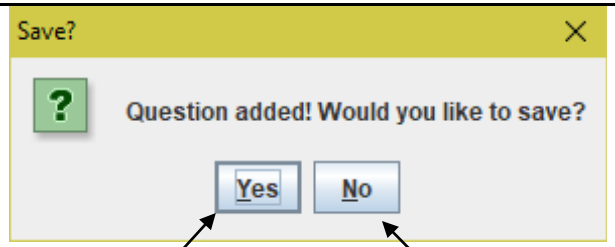
Press ok

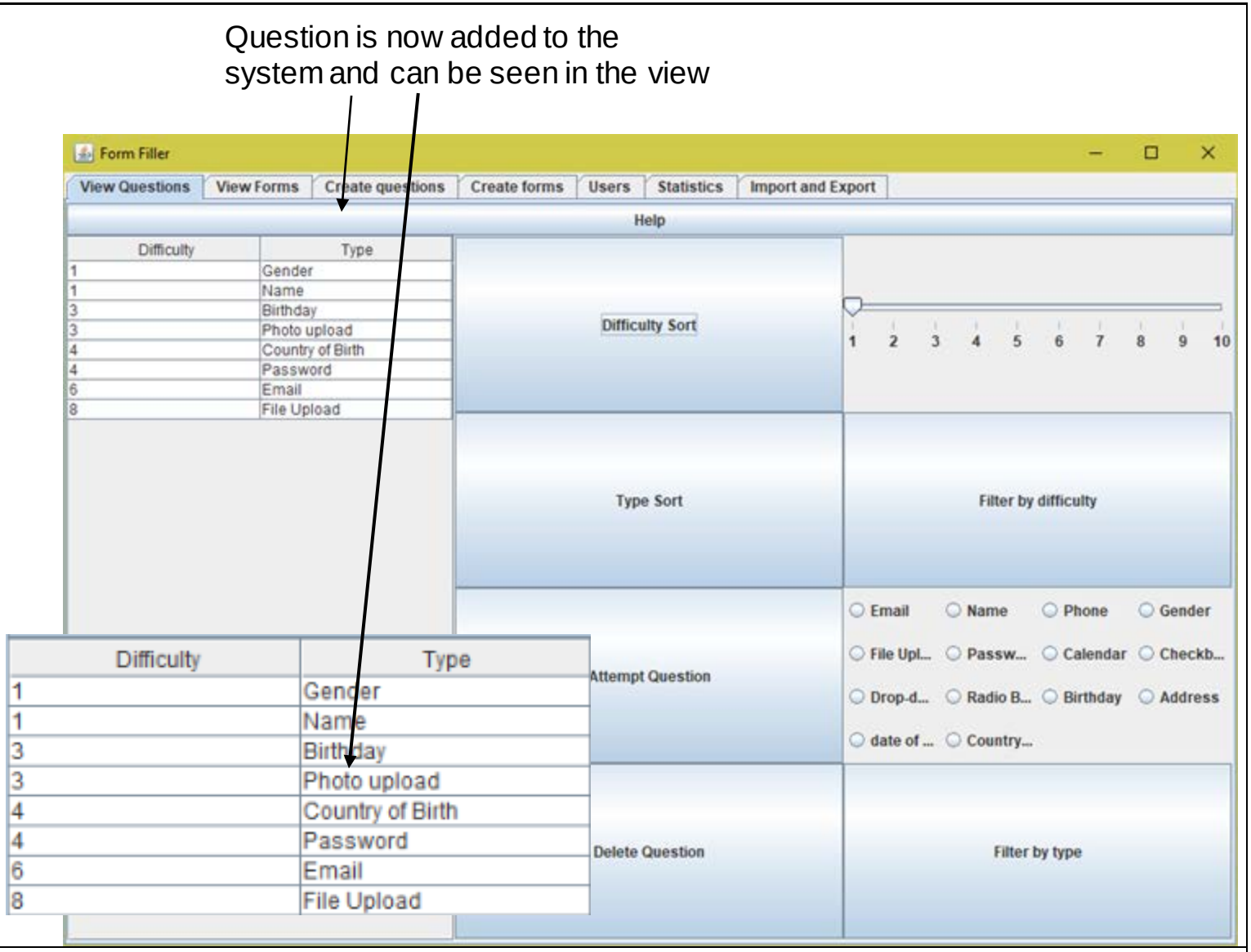
Enter the question's type in



Press ok

	Enter the question's difficulty  Press ok

	 Press yes to permanently save the question to the database Press no to only save it for this session

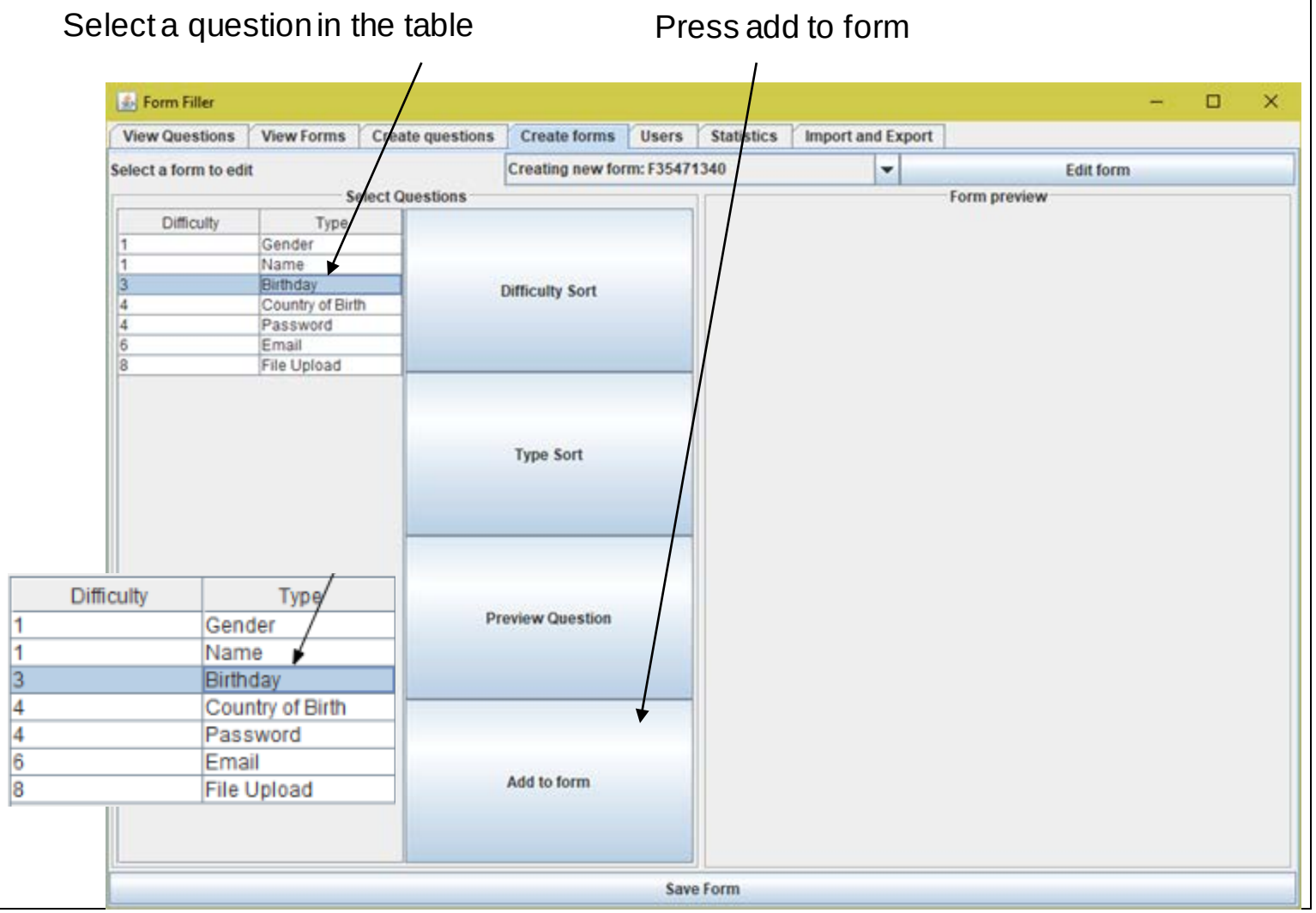


Objectives met	1 (Ability to create questions)

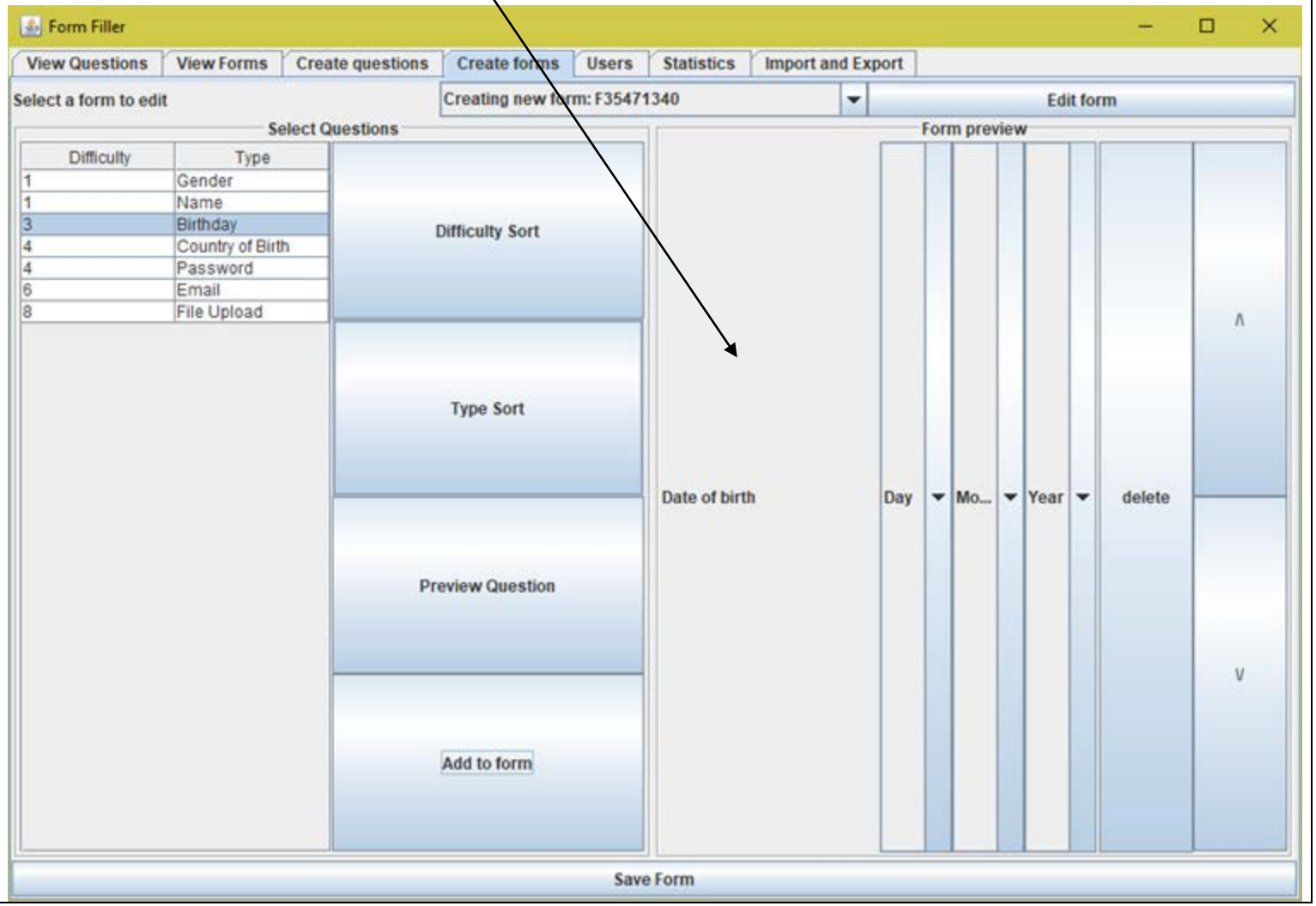
Create Forms

# *(from 4.1)*	19
Area of System	Create Form - Add questions
Output & Storage Requirements	-
Data Used	id (of the question to add), question panel id (of the question to add), component list (of the question to add)

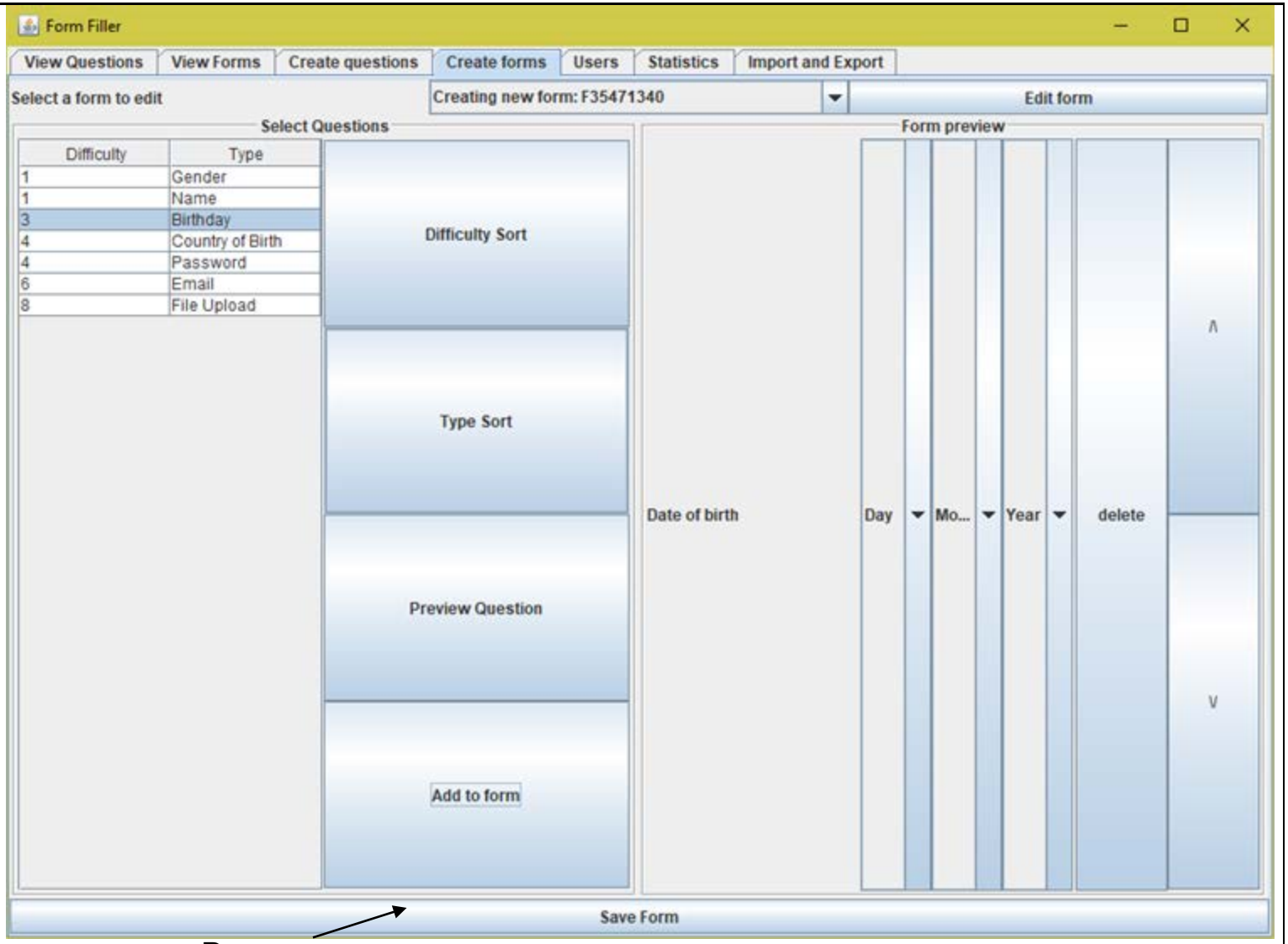
Evidence	

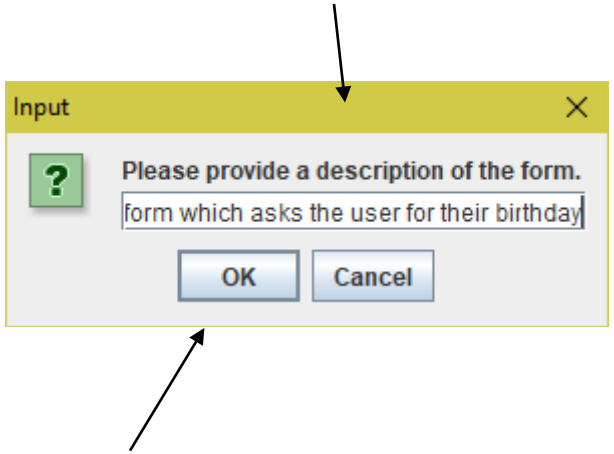

Select a question in the table
Press add to form
Form Filler
View Questions
View Forms
Create questions
Create forms
Users
Statistics
Import and Export
Select a form to edit
Creating new form: F35471340
Edit form
Select Questions
Form preview
Difficulty
Type
1 Gender
1 Name
3 Birthday
4 Country of Birth
4 Password
6 Email
8 File Upload
Difficulty Sort
Type Sort
Preview Question
Add to form
Save Form

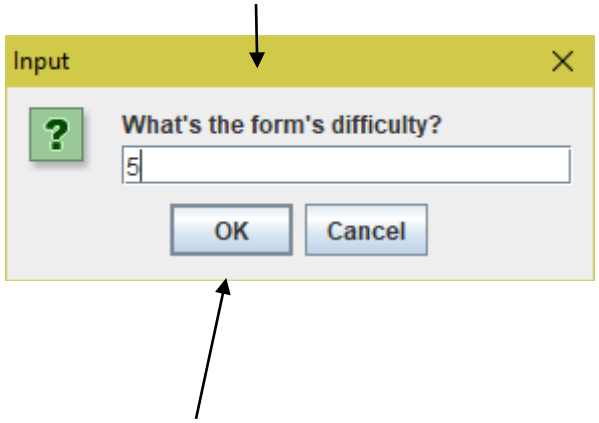
Question is added to the form

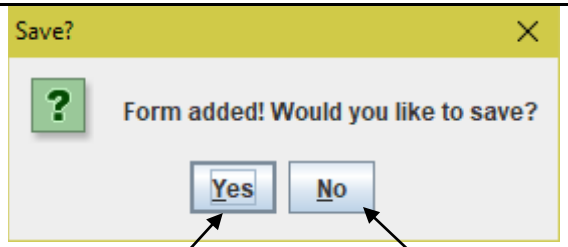


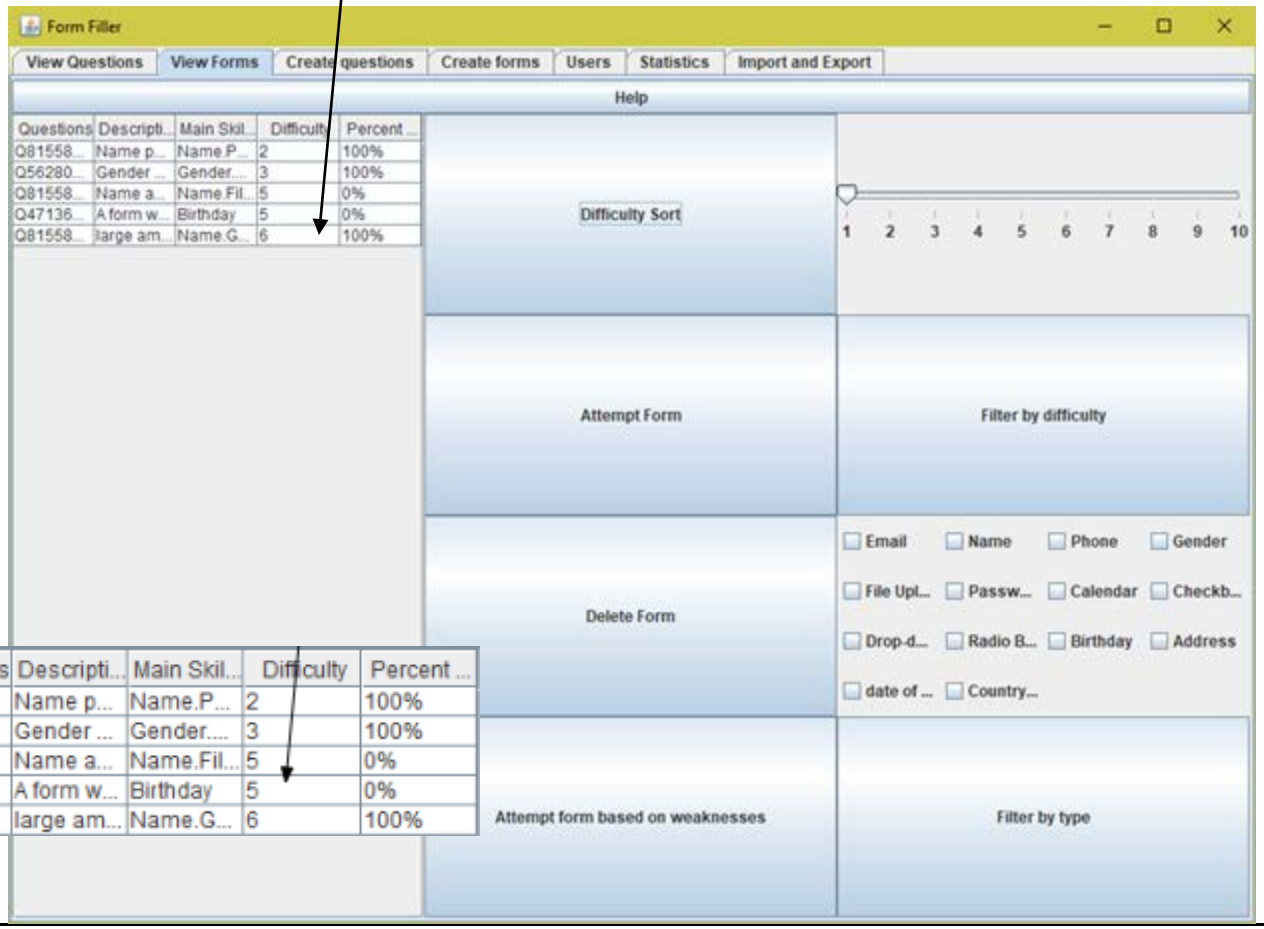
Objectives met	25 (Ability to create forms), 57 (The user should be able to create forms by selecting questions from a list)
# ***(from 4.1)***	20
Area of System	Create forms - Add basic information
Output & Storage Requirements	formDB
Data Used	id (of the form), question panel id list, description, difficulty

Evidence	 Form Filler View Questions View Forms Create questions Create forms Users Statistics Import and Export Select a form to edit Creating new form: F35471340 Edit form Select Questions Difficulty Type 1 Gender 1 Name 3 Birthday 4 Country of Birth 4 Password 6 Email 8 File Upload Difficulty Sort Type Sort Preview Question Add to form Form preview Date of birth Day Mo... Year delete Save Form Press save form

	Enter a description of the form in the dialog box that appears  Press ok

	Enter the form's difficulty in the next dialog box  Press ok

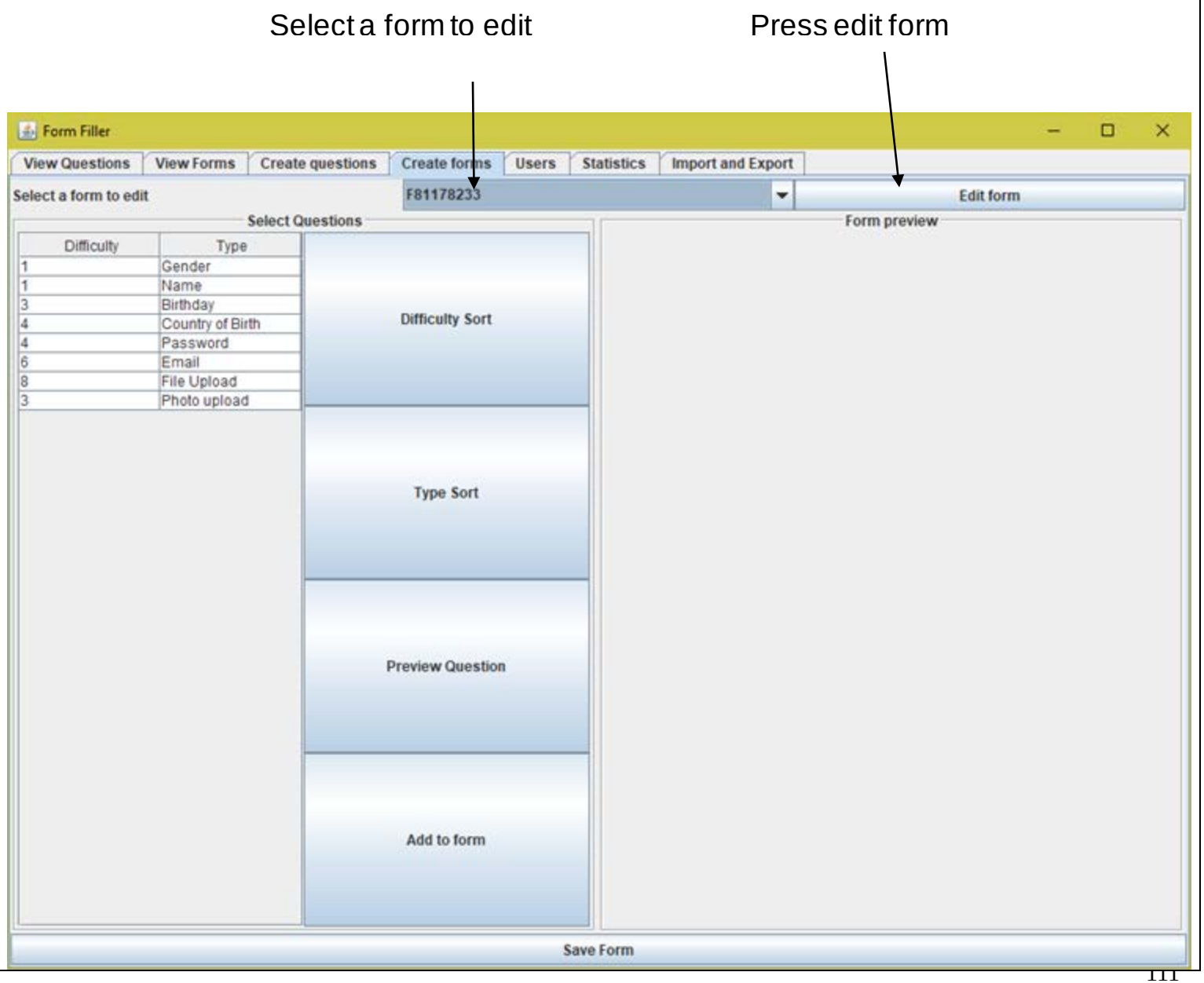
	 Press yes to permanently save the form to the database Press no to only save it for this session

	Form can be seen in the view forms table 
Objectives met	25 (Ability to create forms)

Edit forms

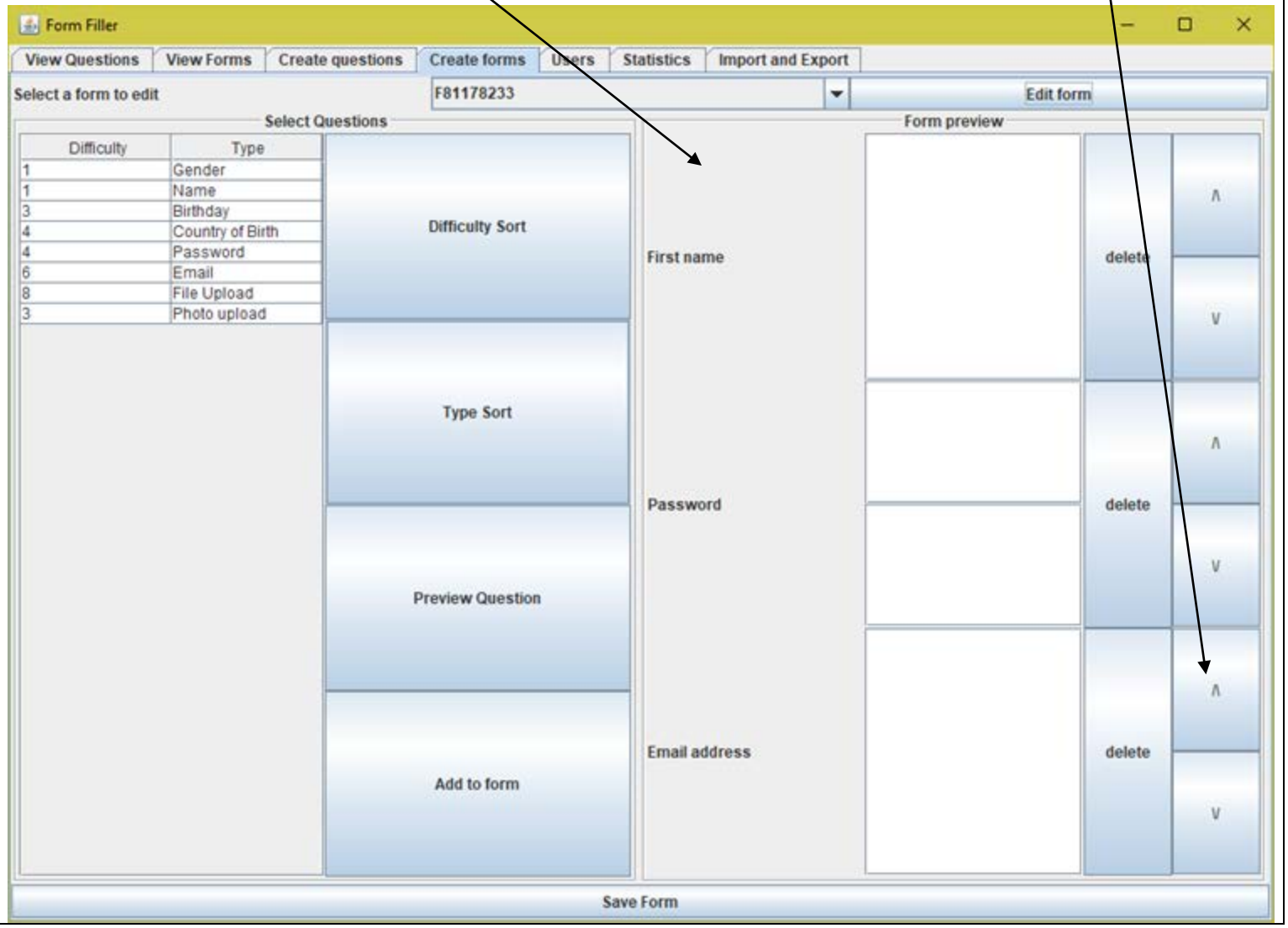
# *(from 4.1)*	21
Area of System	Edit Forms - Rearrange questions
Output & Storage Requirements	-
Data Used	id (of the question to move), position in form to move it to

Evidence	

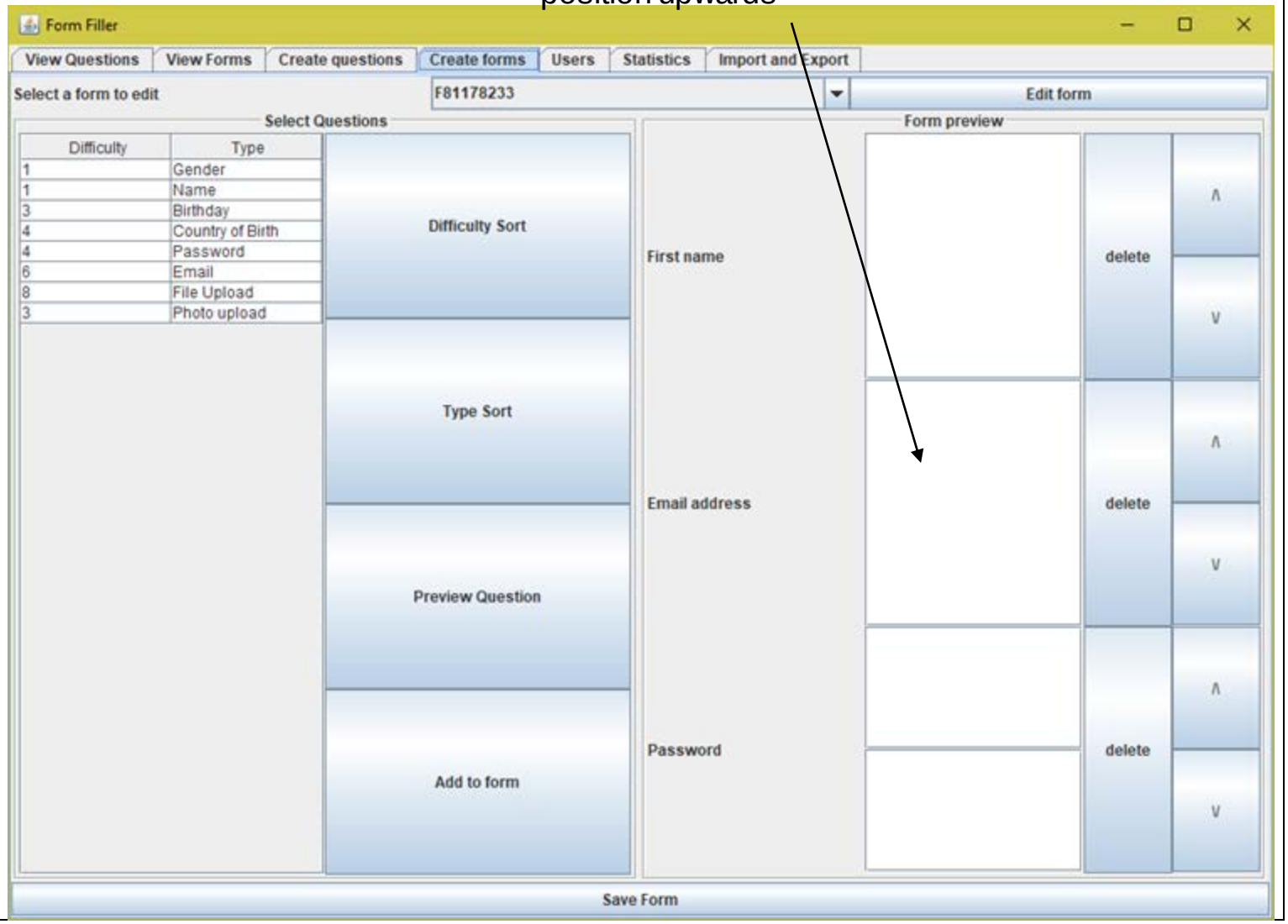

Select a form to edit
Press edit form
Form Filler
View Questions
View Forms
Create questions
Create forms
Users
Statistics
Import and Export
Select a form to edit
F81178233
Edit form
Select Questions
Form preview
Difficulty
Type
1 Gender
1 Name
3 Birthday
4 Country of Birth
4 Password
6 Email
8 File Upload
3 Photo upload
Difficulty Sort
Type Sort
Preview Question
Add to form
Save Form

Form is loaded to edit

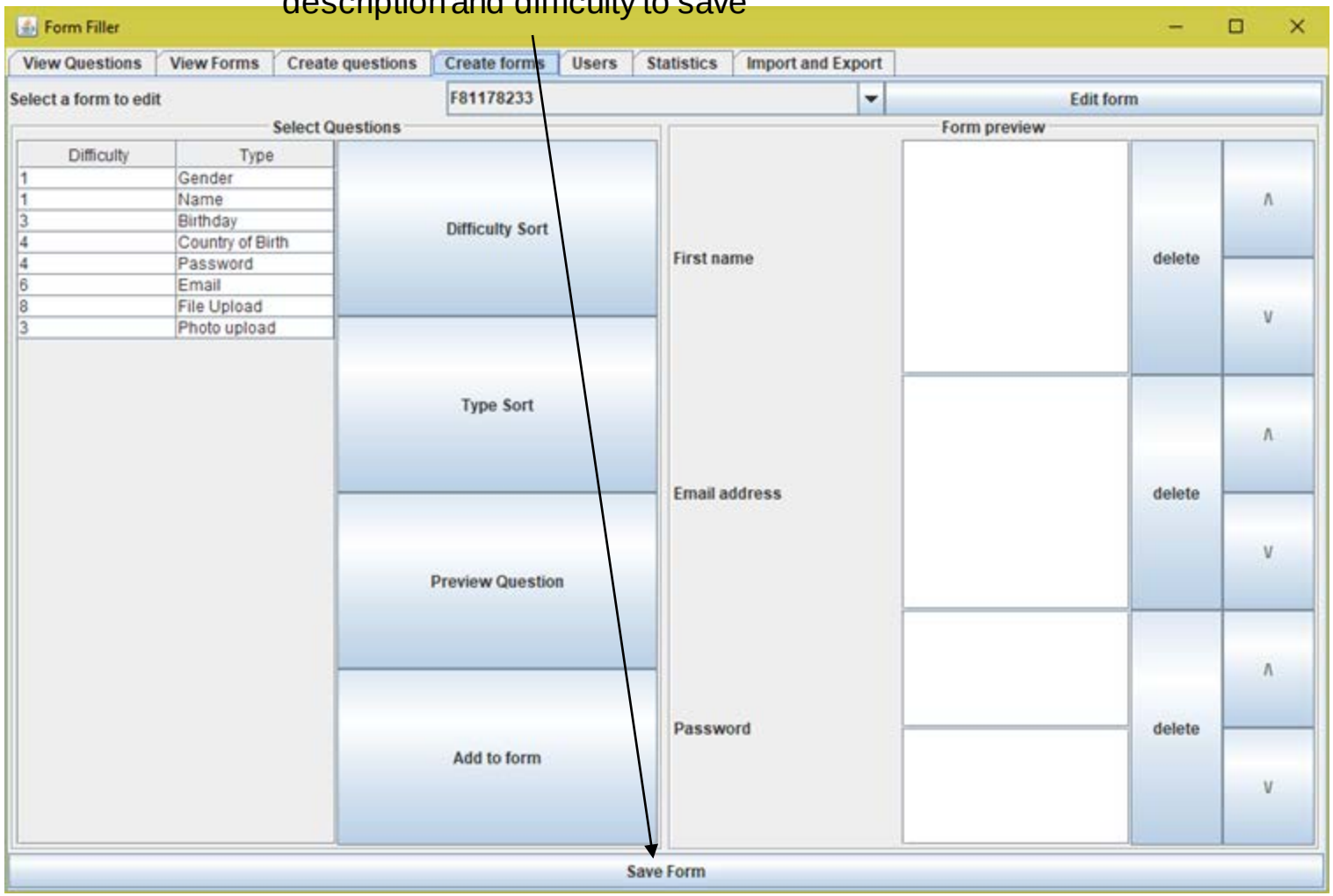
Press an arrow next to a question to move it up or down



Question has moved 1 position upwards



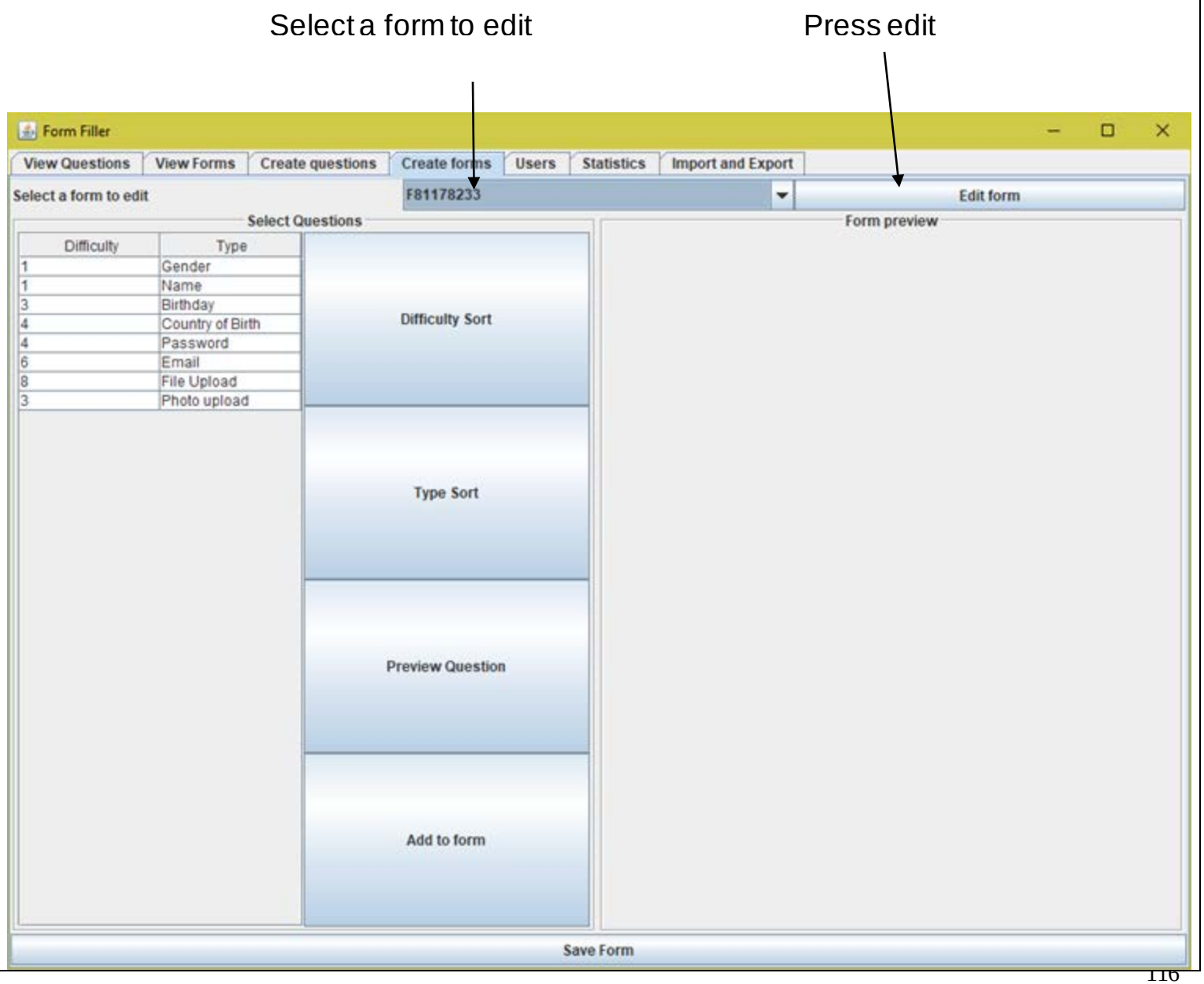
Press save form and then re-enter the description and difficulty to save



Objectives met	30 (Ability to edit forms)

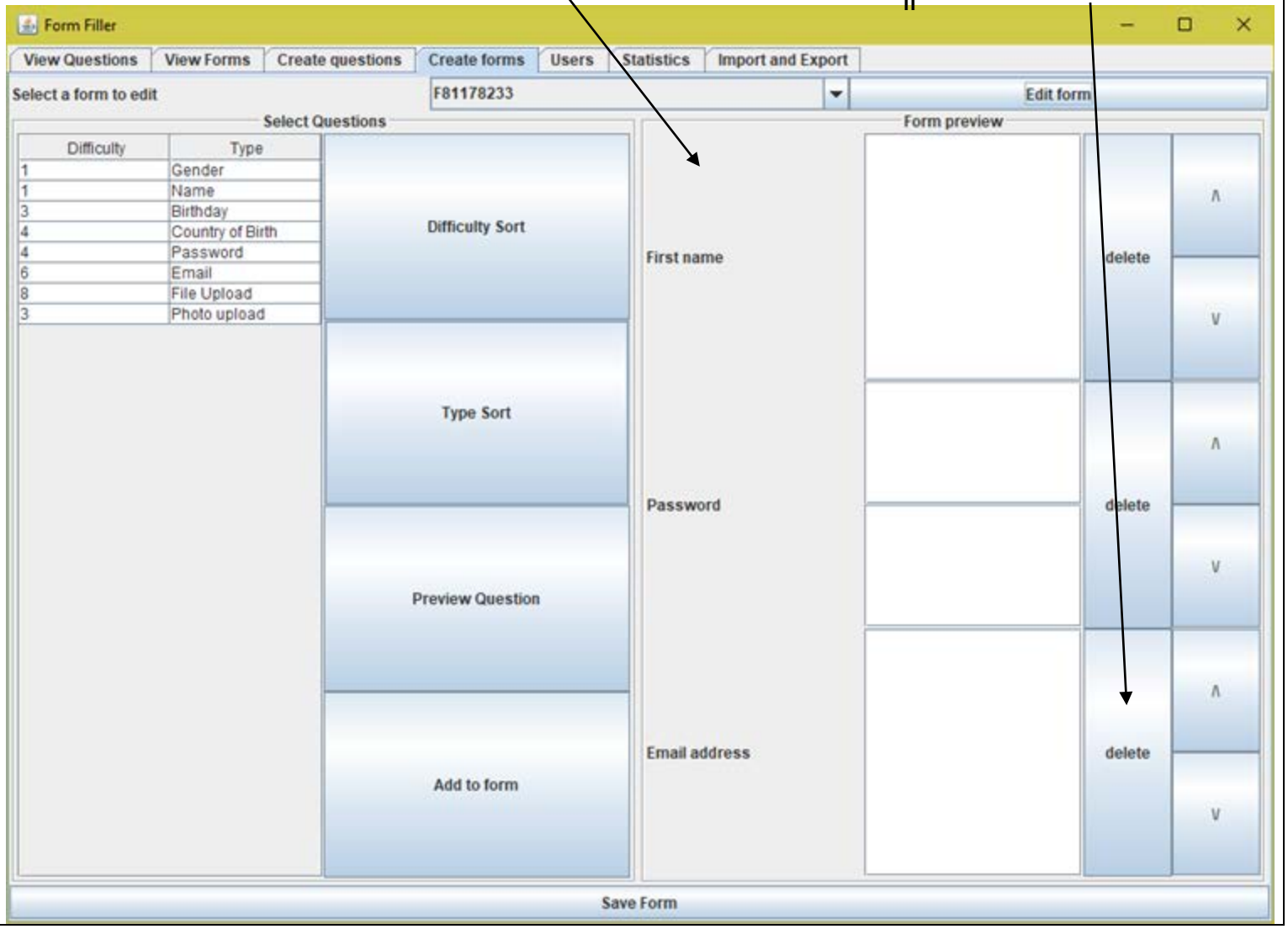
# *(from 4.1)*	22
Area of System	Edit Forms - Remove Questions
Output & Storage Requirements	-
Data Used	id (of the question to delete)

Evidence	

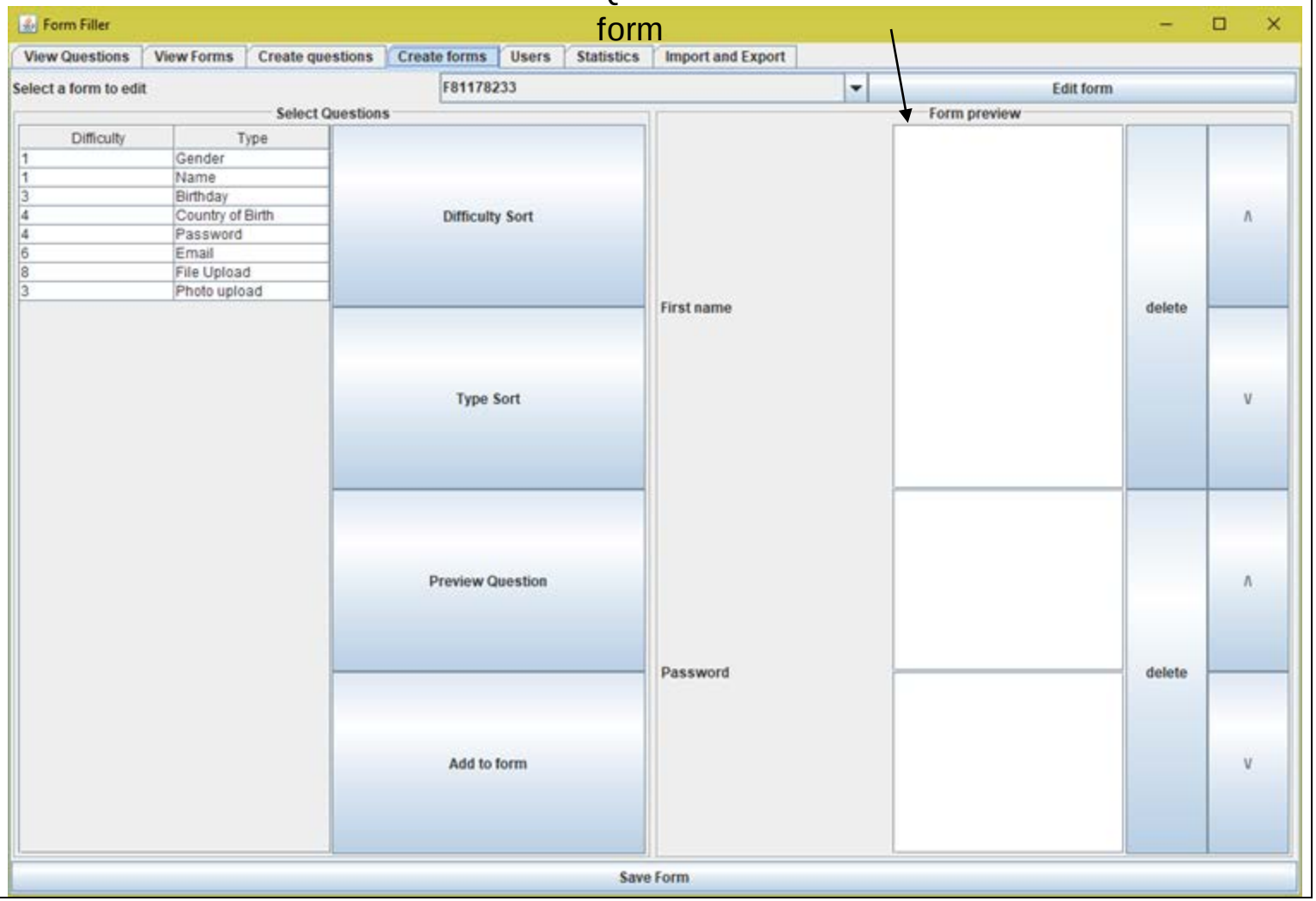

Select a form to edit
Press edit
Form Filler
View Questions
View Forms
Create questions
Create forms
Users
Statistics
Import and Export
Select a form to edit
F81178233
Edit form
Select Questions
Difficulty
Type
1 Gender
1 Name
3 Birthday
4 Country of Birth
4 Password
6 Email
8 File Upload
3 Photo upload
Difficulty Sort
Type Sort
Preview Question
Add to form
Form preview
Save Form

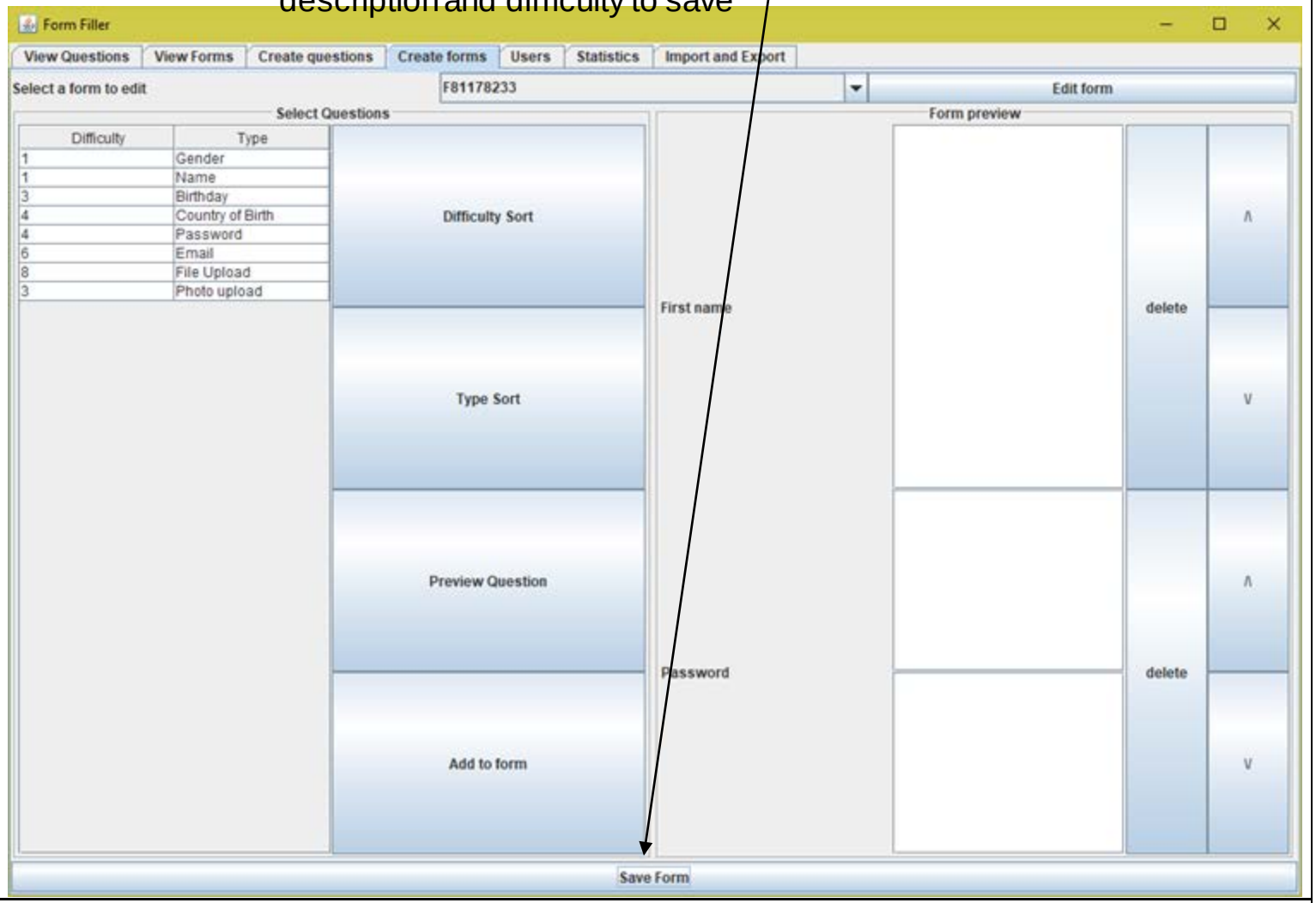
Form is loaded to edit

Press a question's delete button to delete it



Question has been removed from the form



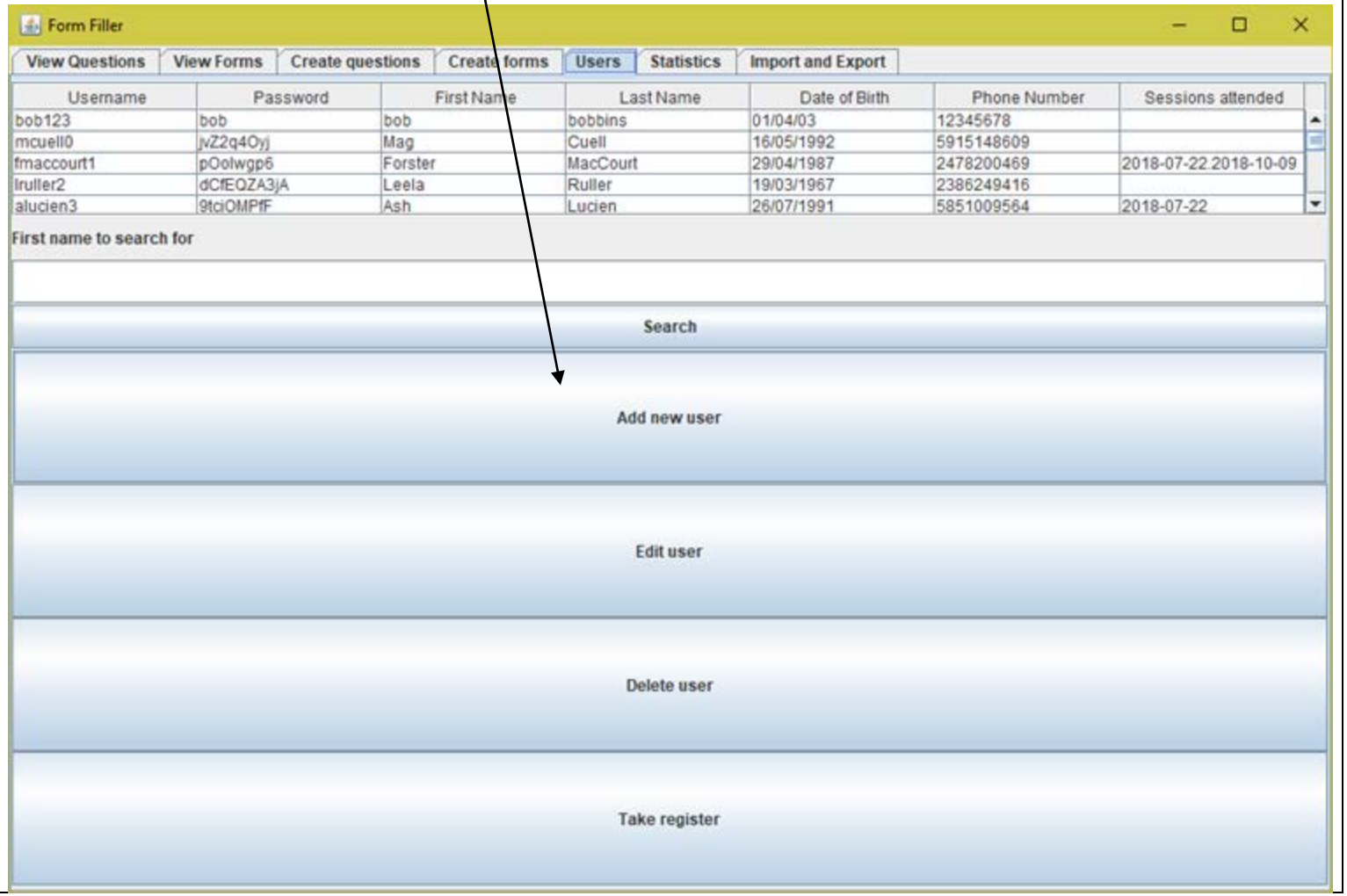
	Press save form and then re-enter the description and difficulty to save 
Objectives met	30 (Ability to edit forms)

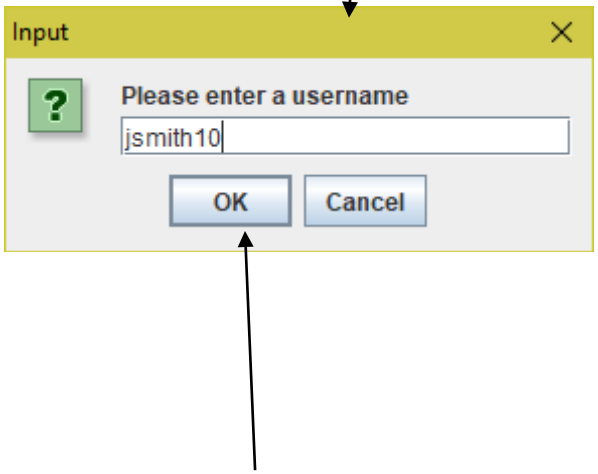
Users

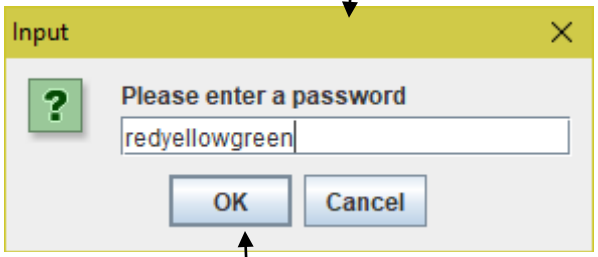
# *(from 4.1)*	23
Area of System	Users - Add
Output & Storage Requirements	UserDB
Data Used	id, username, password, first name, last name, date of birth, phone number, sessions present at (a list of the dates of the sessions that the user has attended)

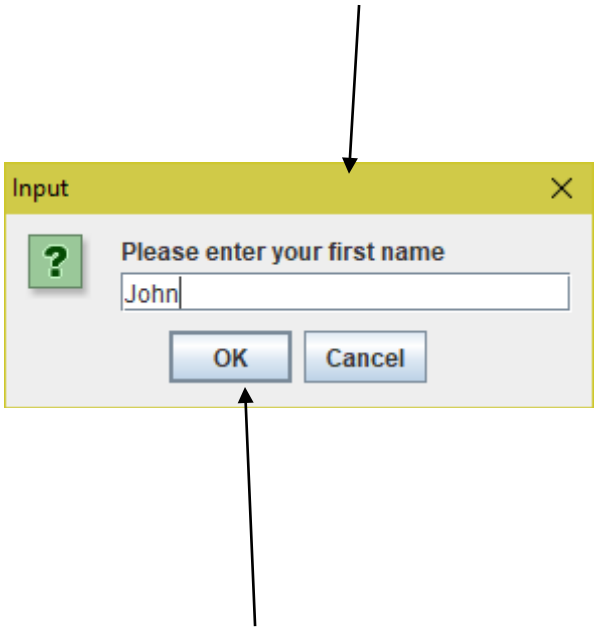
Evidence

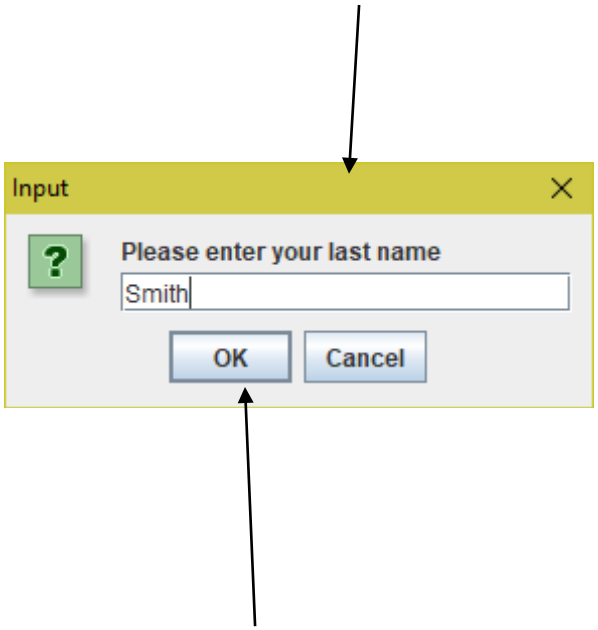
Press add new user



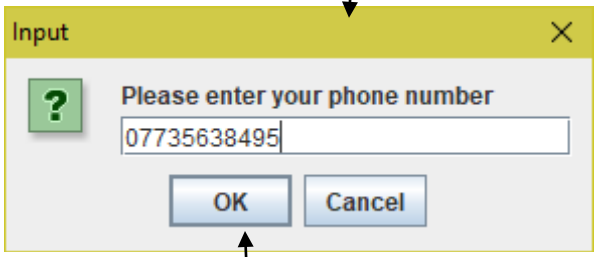
	Enter a username in the dialog that opens  Press ok

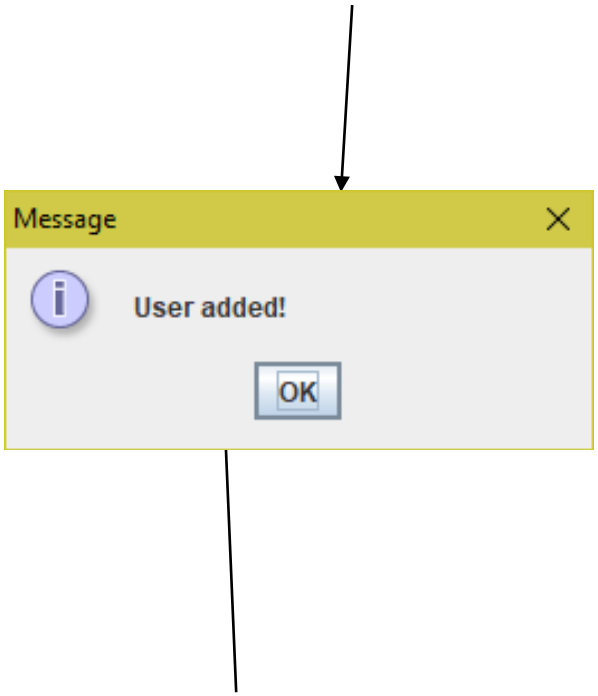
	Enter a password in the dialog that opens  Press ok

	Enter their first name in the dialog that opens  Press ok

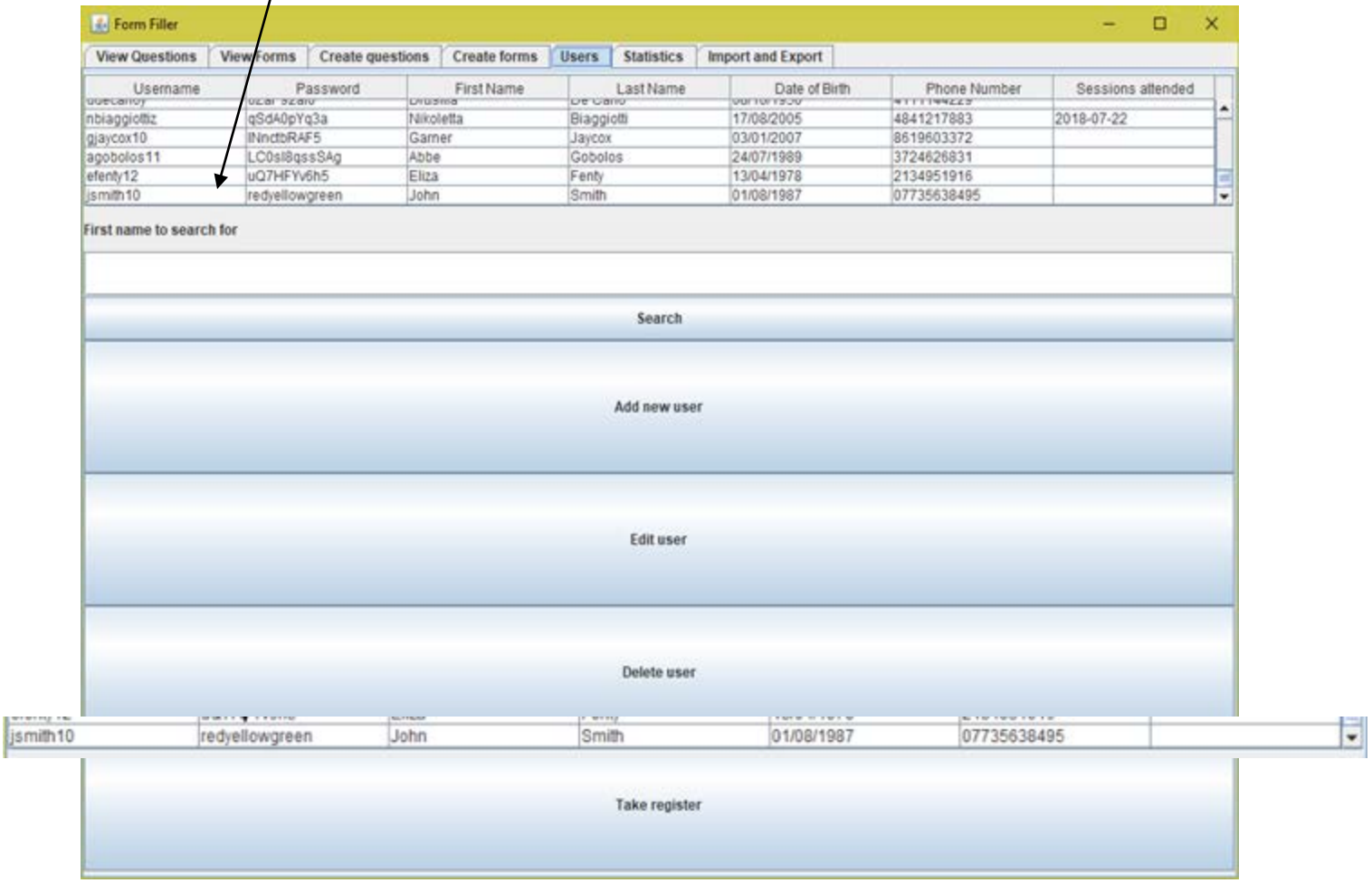
	Enter their last name in the dialog that opens  Press ok

	Enter their date of birth in the dialog that opens Press ok

	Enter their phone number in the dialog that opens  Press ok

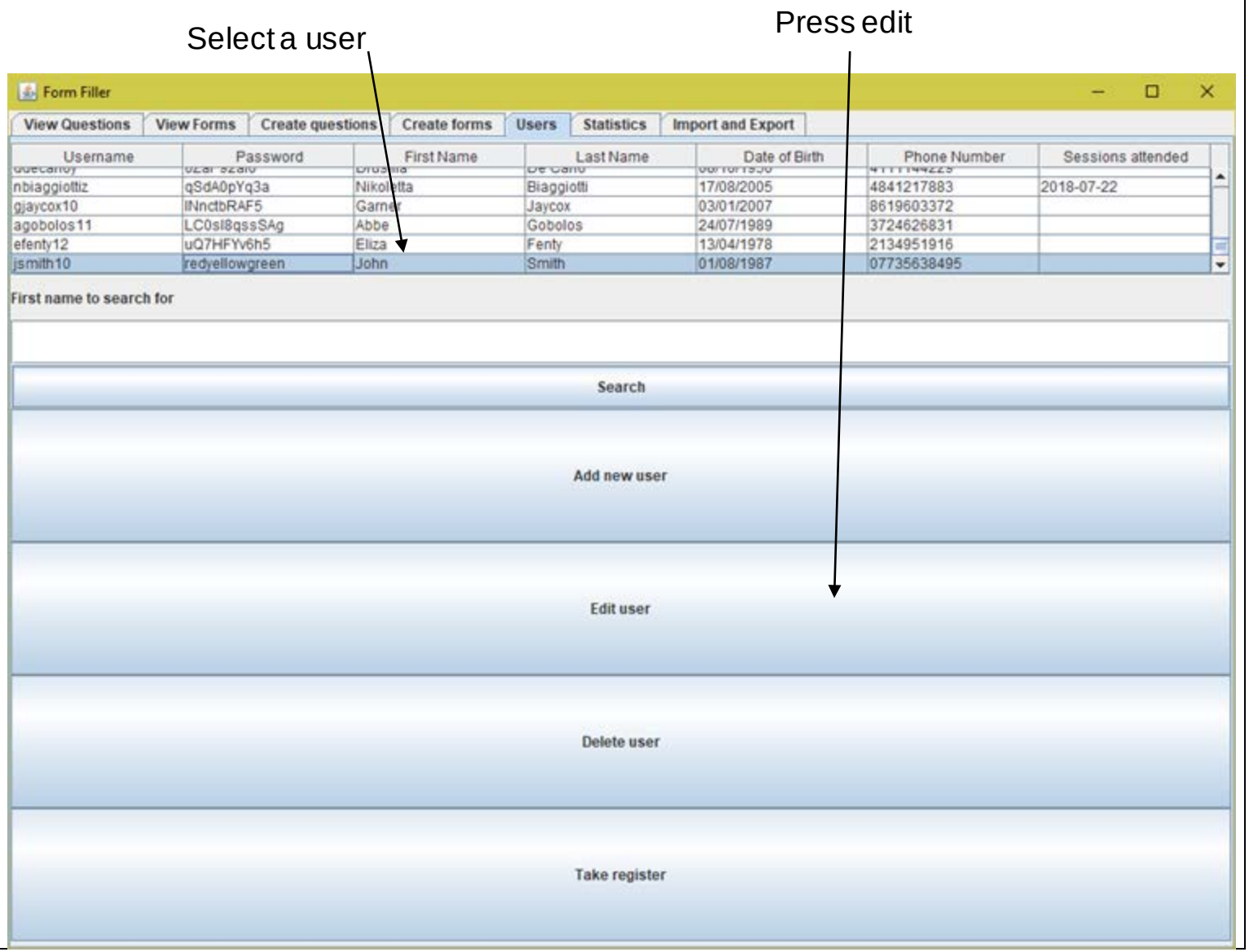
	User added dialog appears  Press ok

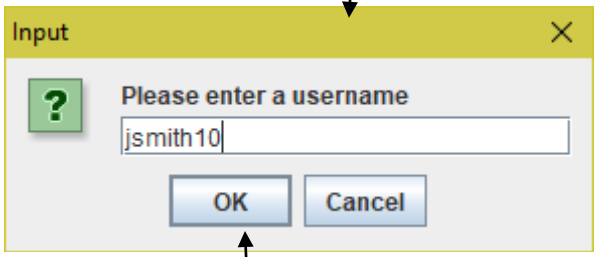
The new user can be seen in the user table

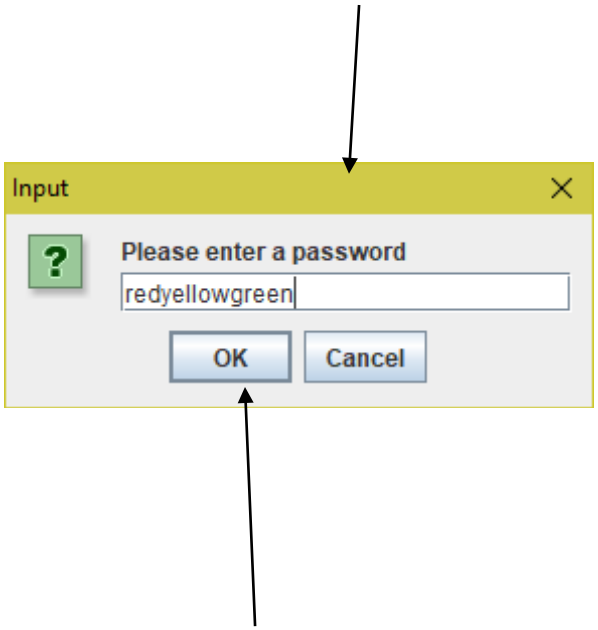


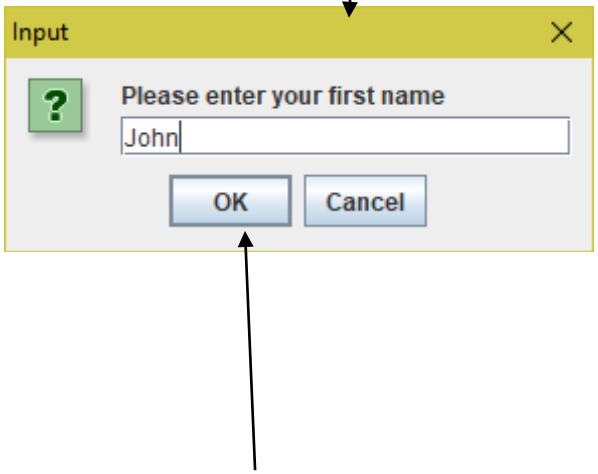
Objectives met	38 (Ability to add users), 44 (First name, last name, Date of birth and phone number should be stored for each user)
# *(from 4.1)*	24
Area of System	Users - Edit
Output & Storage Requirements	UserDB
Data Used	id, username, password, first name, last name, date of birth, phone number, sessions present at (a list of the dates of the sessions that the user has attended)

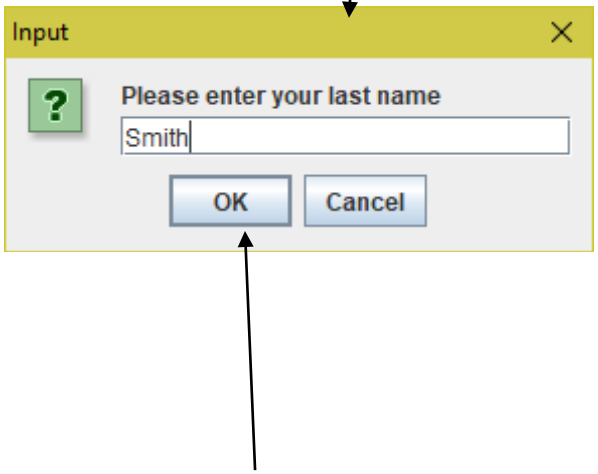
Evidence	


Select a user
Press edit
Form Filler
View Questions
View Forms
Create questions
Create forms
Users
Statistics
Import and Export
Username
Password
First Name
Last Name
Date of Birth
Phone Number
Sessions attended
nbiaggiottiz
qSdA0pYq3a
Biaggiotti
17/08/2005
4841217883
2018-07-22
gjaycox10
lNnctbRAF5
Jaycox
03/01/2007
8619603372
agobolos11
LC0sl8qssSAg
Abbe
Gobolos
24/07/1989
3724626831
efenty12
uQ7HFYv6h5
Eliza
Fenty
13/04/1978
2134951916
jsmith10
redyellowgreen
John
Smith
01/08/1987
07735638495
First name to search for
Search
Add new user
Edit user
Delete user
Take register

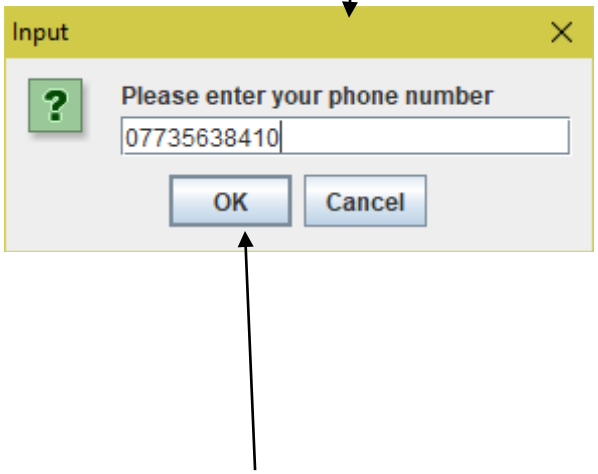
	Edit their username in the dialog that opens  Press ok

	Edit their password in the dialog that opens  Press ok

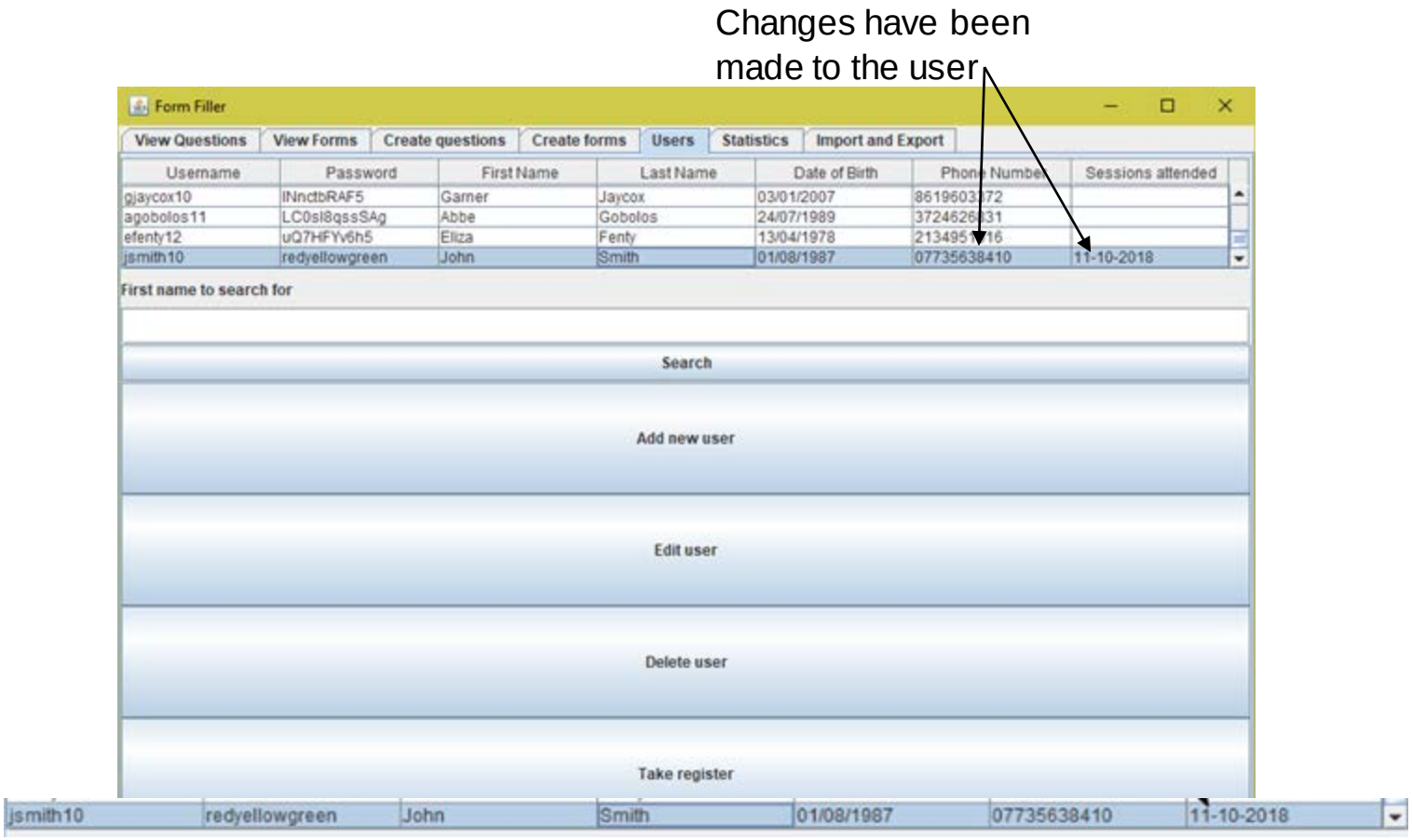
	Edit their first name in the dialog that opens  Press ok

	Edit their last name in the dialog that opens  Press ok

	Edit their date of birth in the dialog that opens Press ok

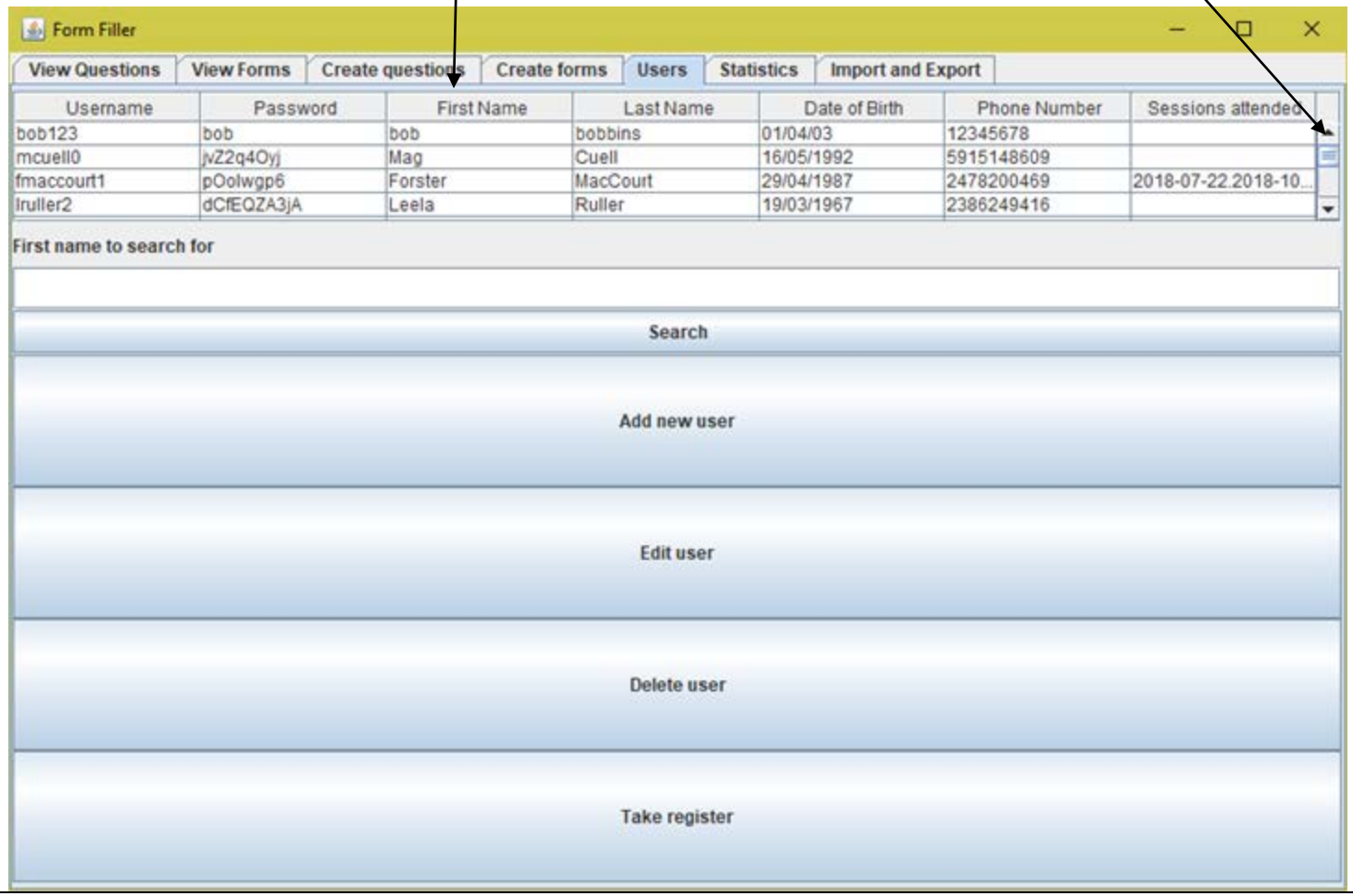
	Edit their phone number in the dialog that opens  Press ok

	Edit the list of sessions that they have been present at in the dialog that appears Press ok



Objectives met	39 (Ability to edit users), 44 (First name, last name, Date of birth and phone number should be stored for each user), 62 (The admin user should be able to edit information about each user)
# *(from 4.1)*	25

Area of System	Users - View
Output & Storage Requirements	-
Data Used	UserList, for each user: [id, username, password, first name, last name, date of birth, phone number, sessions present at (a list of the dates of the sessions that the user has attended)]

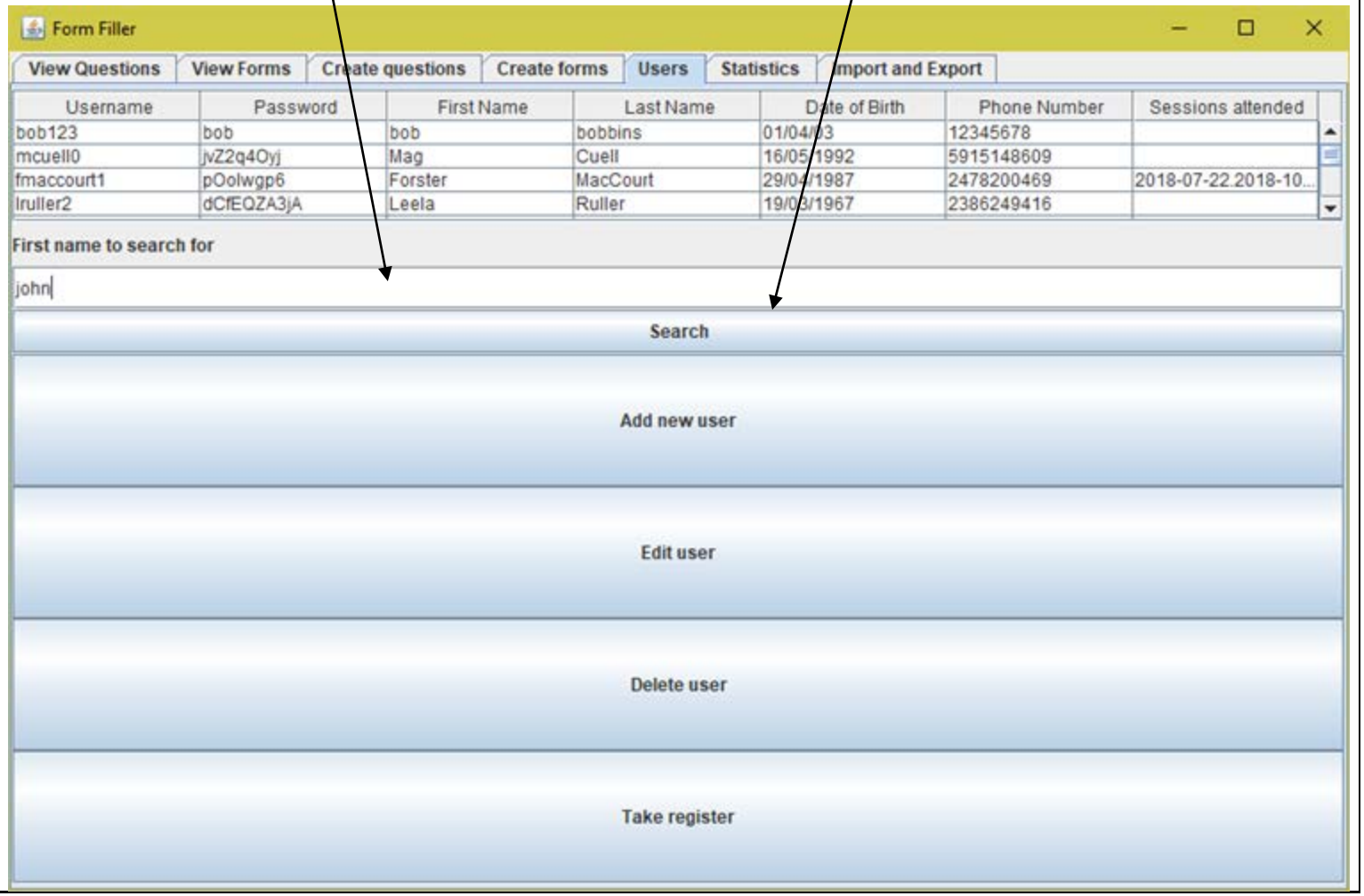
Evidence	All of the users in the system can be seen in this table along with the data stored about them The table can be scrolled to view more users 
Objectives met	60 (The admin user should be able to view information about each user)

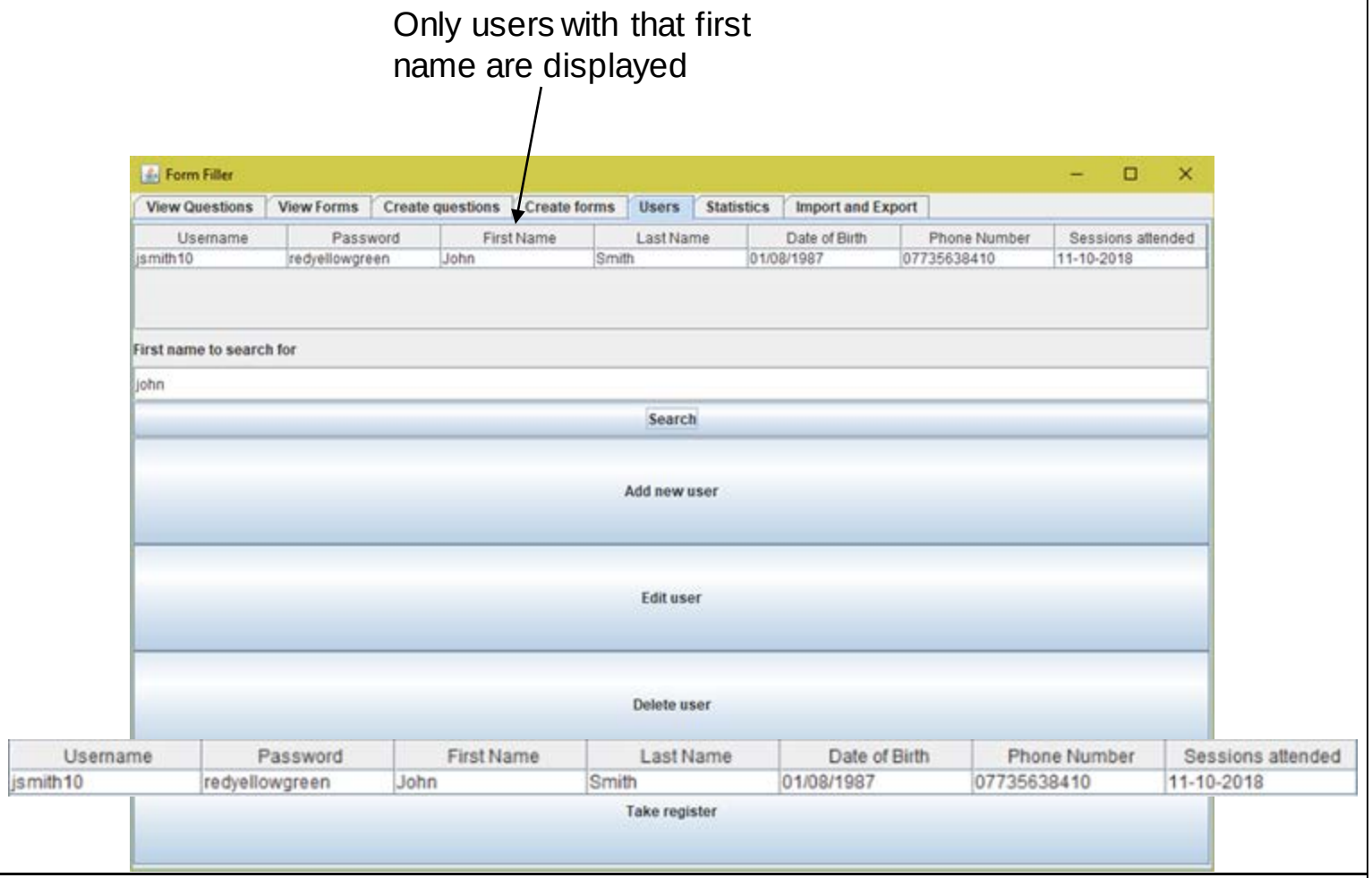
# *(from 4.1)*	26
Area of System	User - Search
Output & Storage Requirements	-
Data Used	first name to search for, first name (of each user in the system)

Evidence

Enter a first name in the search box

Press search





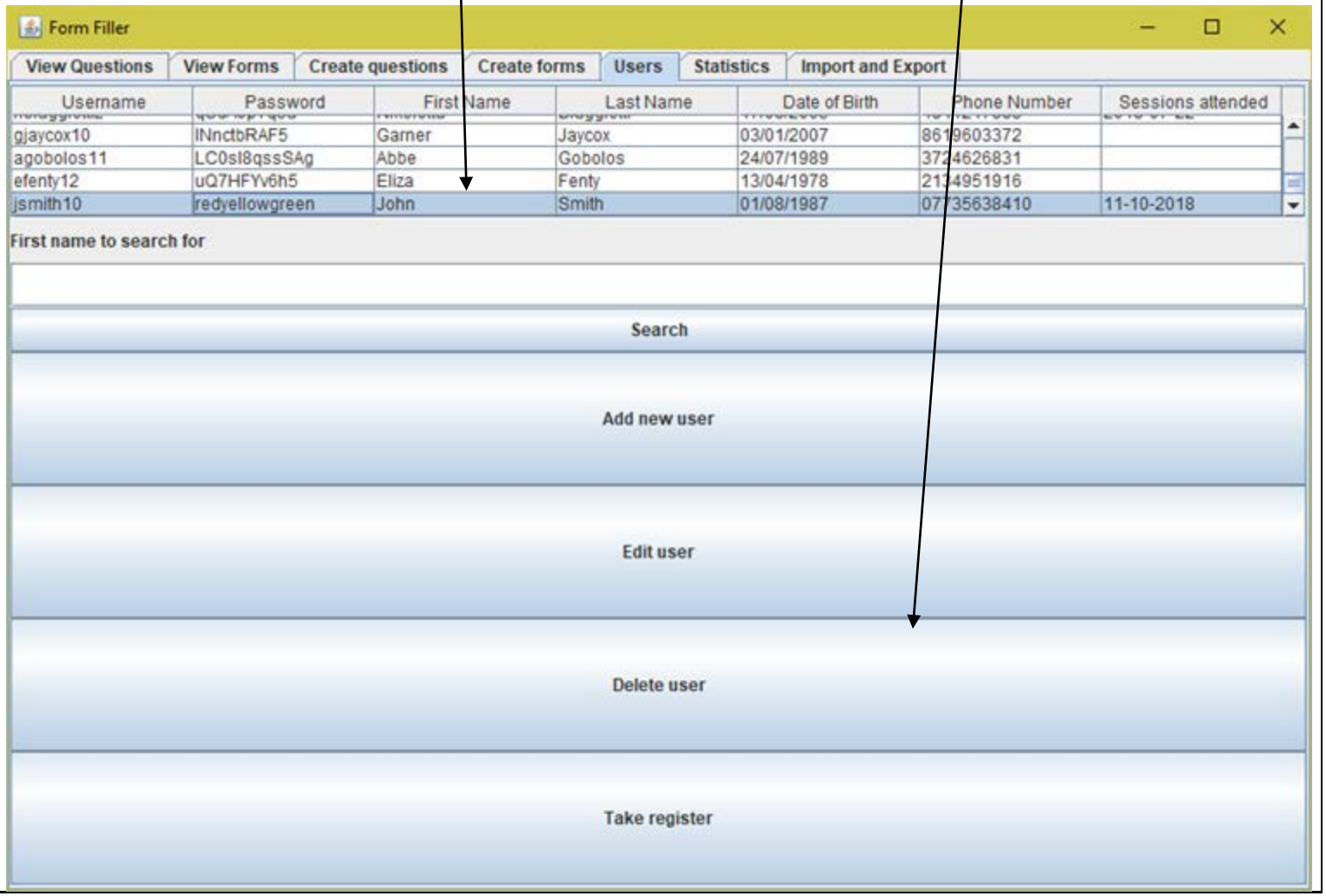
Objectives met	41 (Ability to search through users)
# *(from 4.1)*	27
Area of System	Users - Delete
Output & Storage	UserDB

Requirements	
Data Used	id (of user to delete)

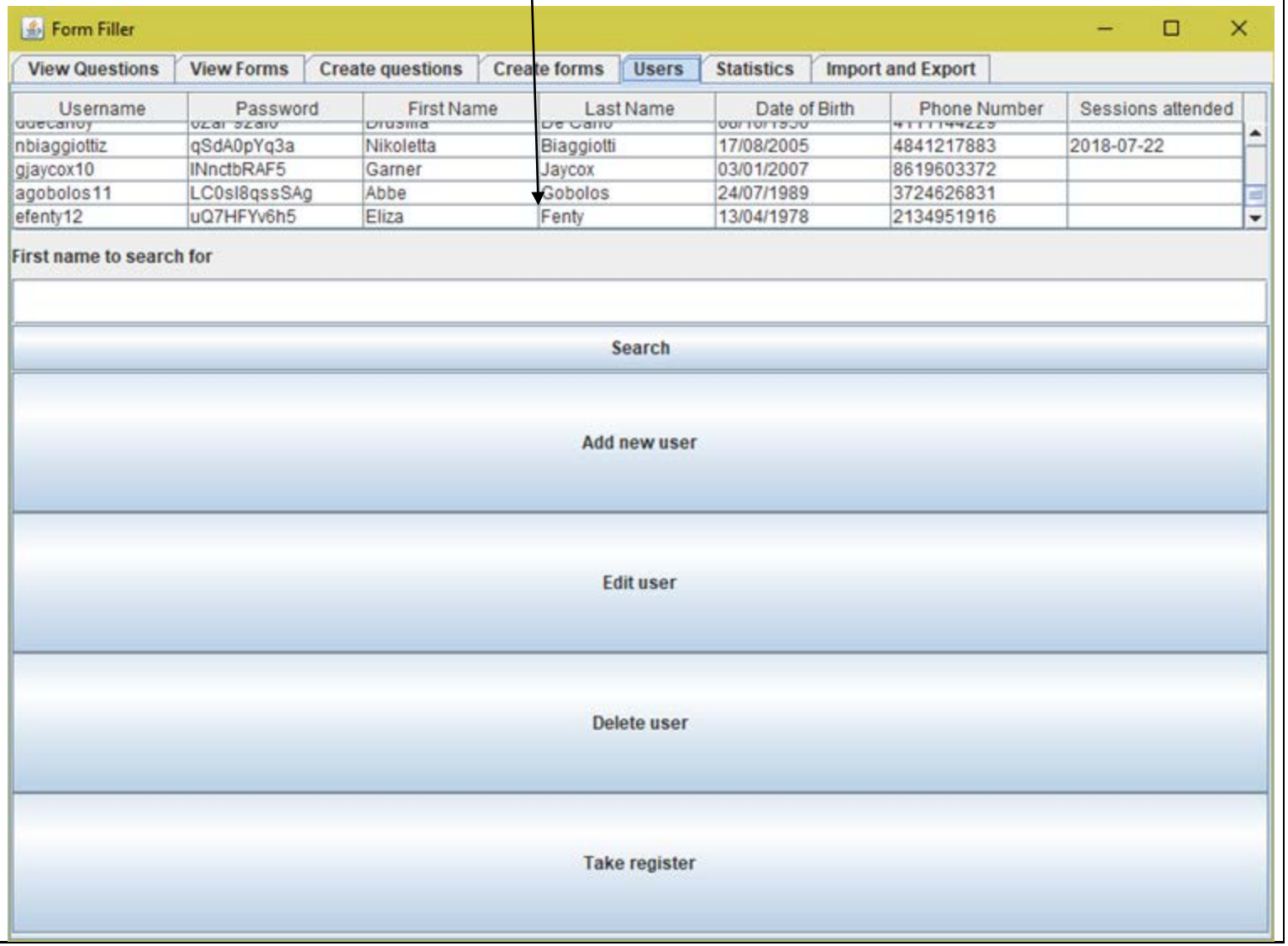
Evidence	

Select user in table to delete

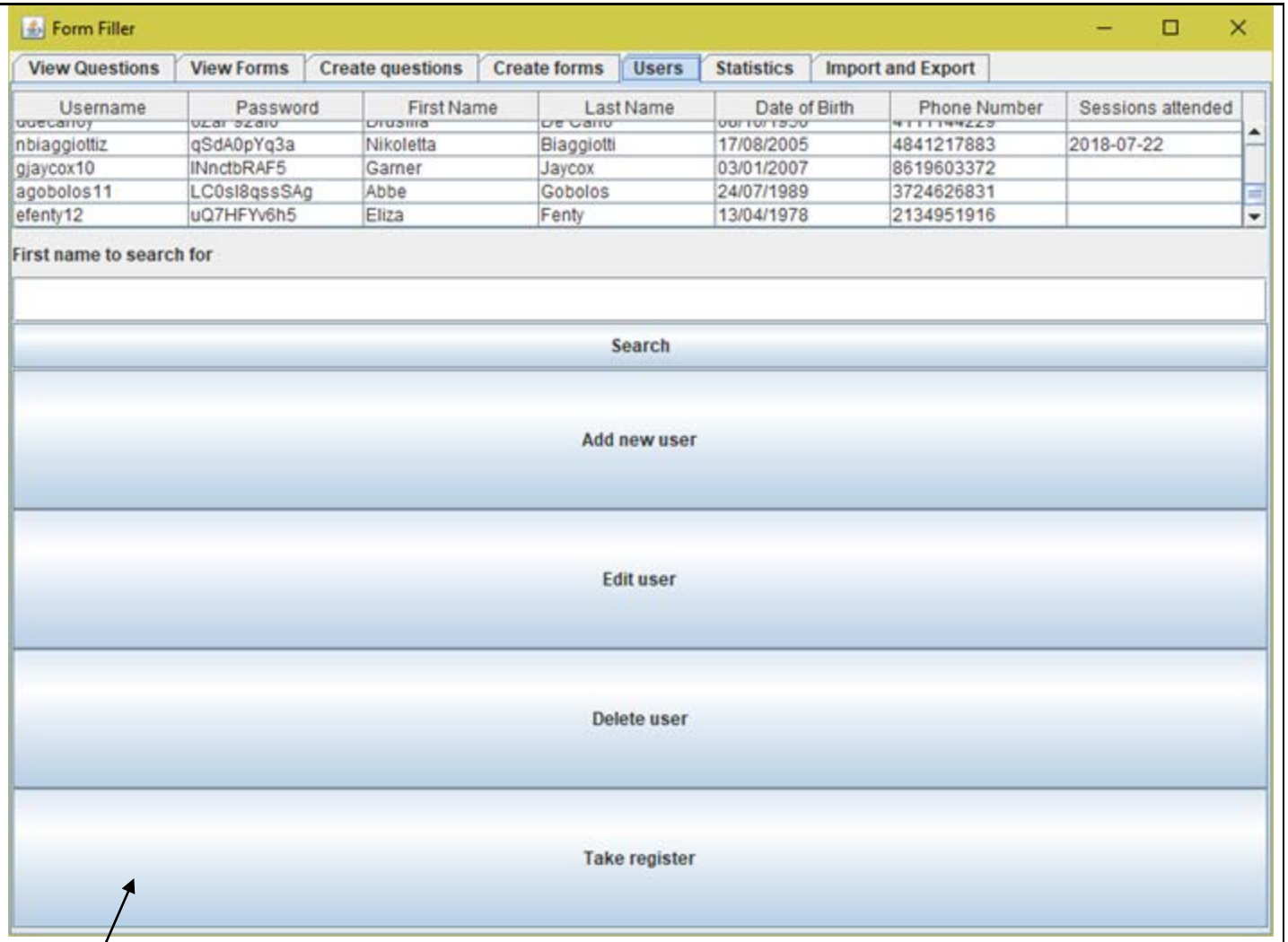
Press delete user



User is no longer present in the table (i.e. it has been deleted from the system)



Objectives met	40 (Ability to delete users)
# ***(from 4.1)***	28
Area of System	Users - Take register
Output & Storage Requirements	UserDB
Data Used	current date, UserList, Sessions present at array (for each user) (a list containing the dates of the sessions that the user attended)

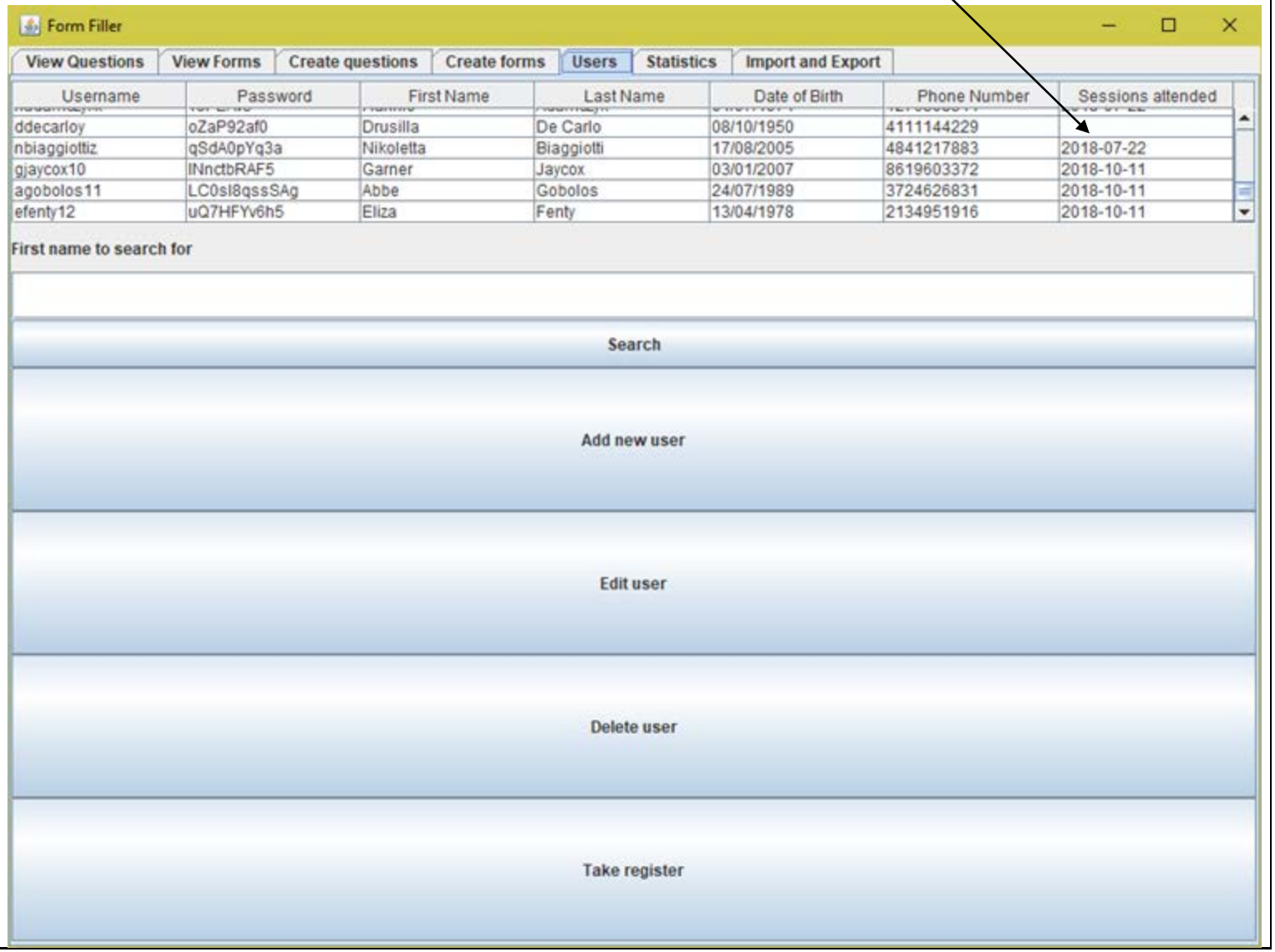
Evidence	

Press take register

Check the checkboxes of the users that are present in the register that opens

Press save register

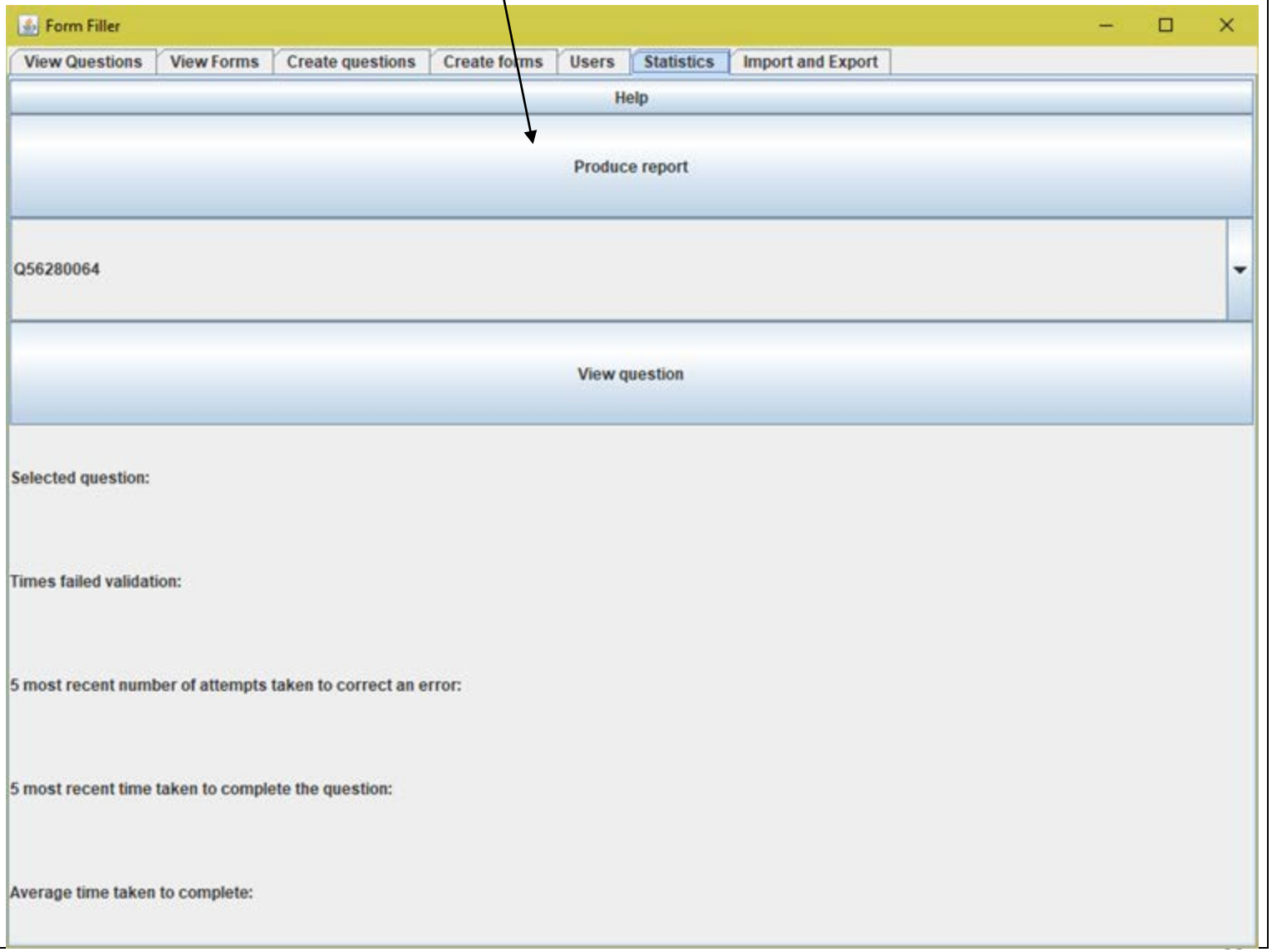
The users selected have had today's date added to their sessions attended array (i.e. they have been marked present for today)



Objectives met	63 (The admin user should be able to take a register)

Statistics

# *(from 4.1)*	30
Area of System	Statistics - Produce report
Output & Storage Requirements	Report (printable)
Data Used	user id (id of the user to produce a report of), question stat list (belonging to the user), time taken to complete array (for each question), number of attempts taken to correct an error array (for each question), total number of times failed validation (for each question)

Evidence	Press produce report 

Report opens in new window

bob123's report

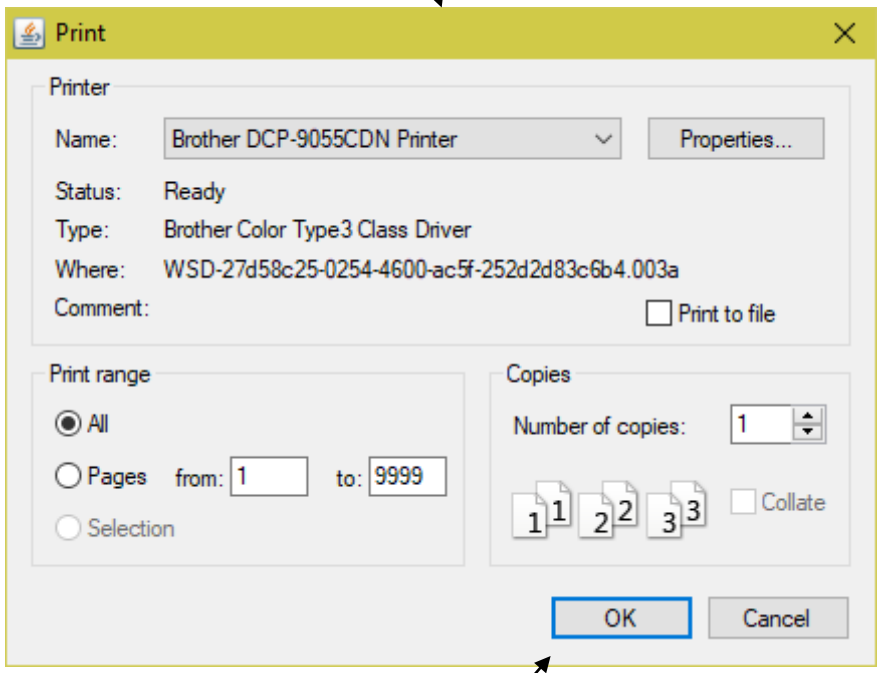
bob123's report

Question type	Number of times failed validation	Average number of attempts needed to correct	Average time to complete
Email	0	0	5
Name	0	0	8
Phone			
Gender			
File Upload	2	2	9
Password	2	2	1
Calendar			
Checkboxes			
Drop-down			
Radio Buttons			
Birthday	1	1	1
Address			
date of birth			
Country of Birth	2	2	6
Photo upload			

Print

Press print

Use system dialog to print the report



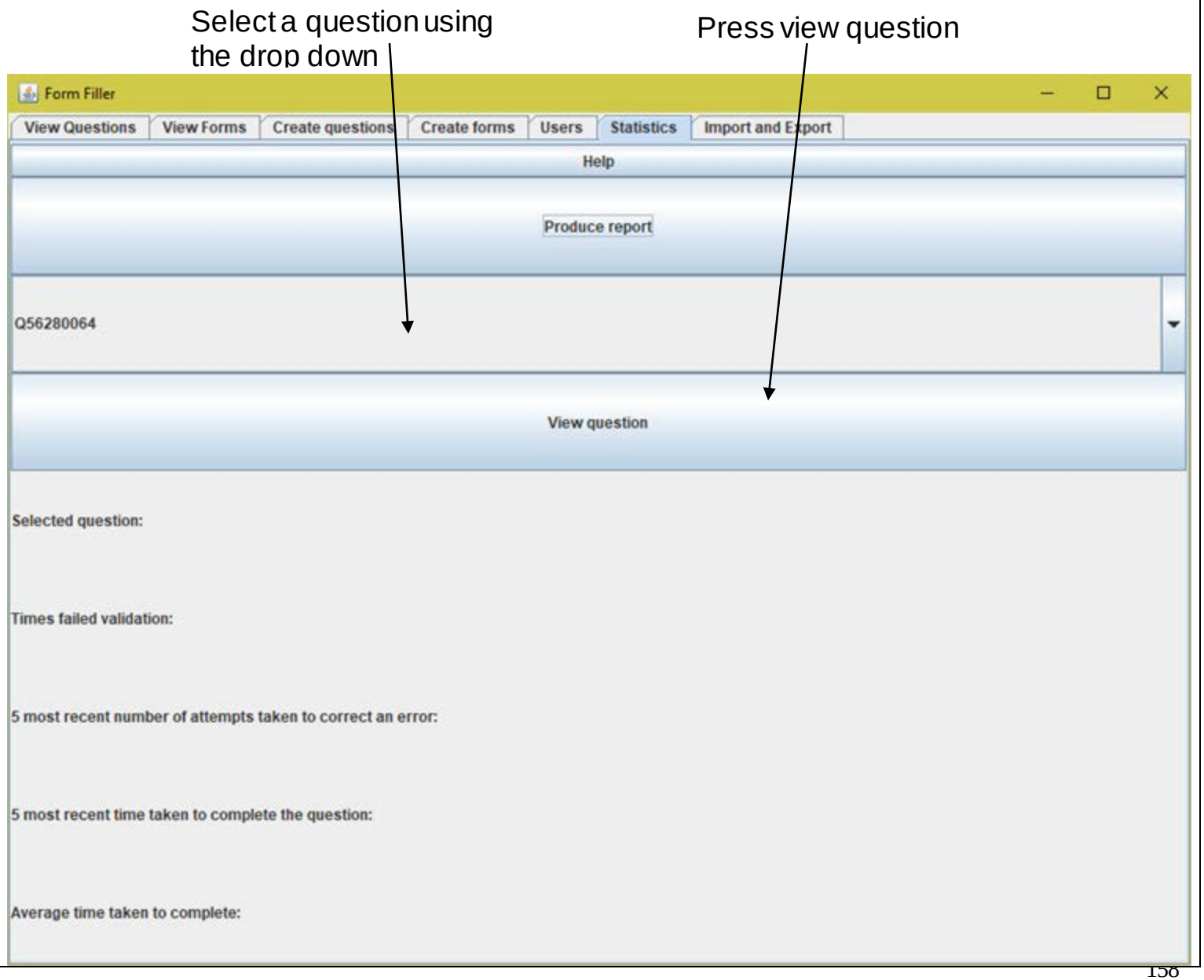
Press ok to print

How the report will look when printed

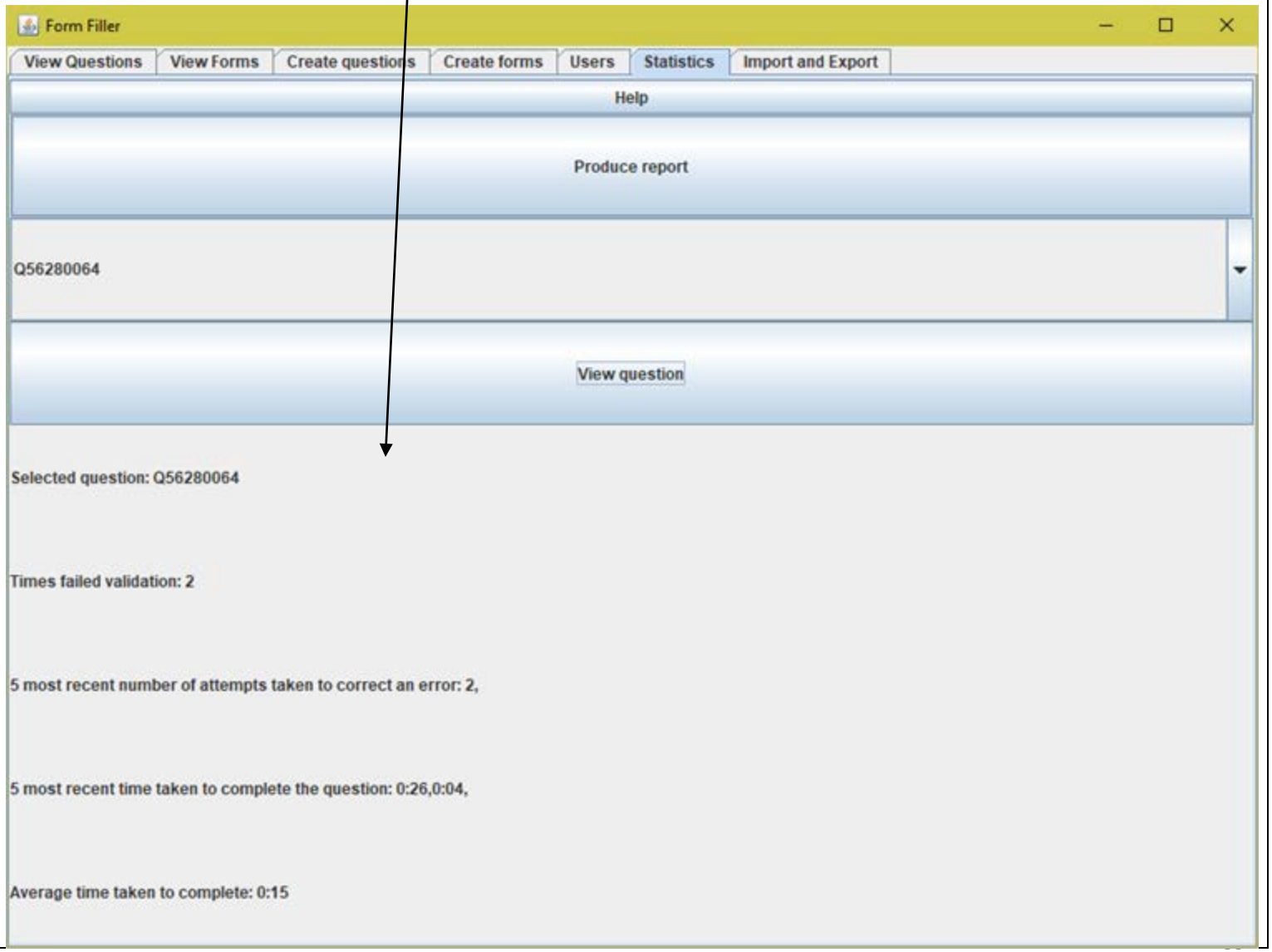
bob123's report

Question type	Number of times failed validation	Average number of attempts needed to correct	Average time to complete
Email			
Name	6	3	34
Phone			
Gender	2	2	3
File Upload			
Password			
Calendar			
Checkboxes			
Drop-down	1	1	15
Radio Buttons			
Birthday	1	1	1
Address	2	2	4

Objectives met	42 (Ability to produce a report on the user's weak areas/progress)
# ***(from 4.1)***	32
Area of System	Statistics - View stats for individual question
Output & Storage Requirements	-
Data Used	id (of the question to view the statistics for), number of times failed validation, 5 most recent number of attempts to correct an error, 5 most recent times taken to complete the question, average time taken to complete

Evidence	
	 Select a question using the drop down Press view question Form Filler View Questions View Forms Create questions Create forms Users Statistics Import and Export Help Produce report Q56280064 View question Selected question: Times failed validation: 5 most recent number of attempts taken to correct an error: 5 most recent time taken to complete the question: Average time taken to complete:

The statistics are for the selected question are displayed

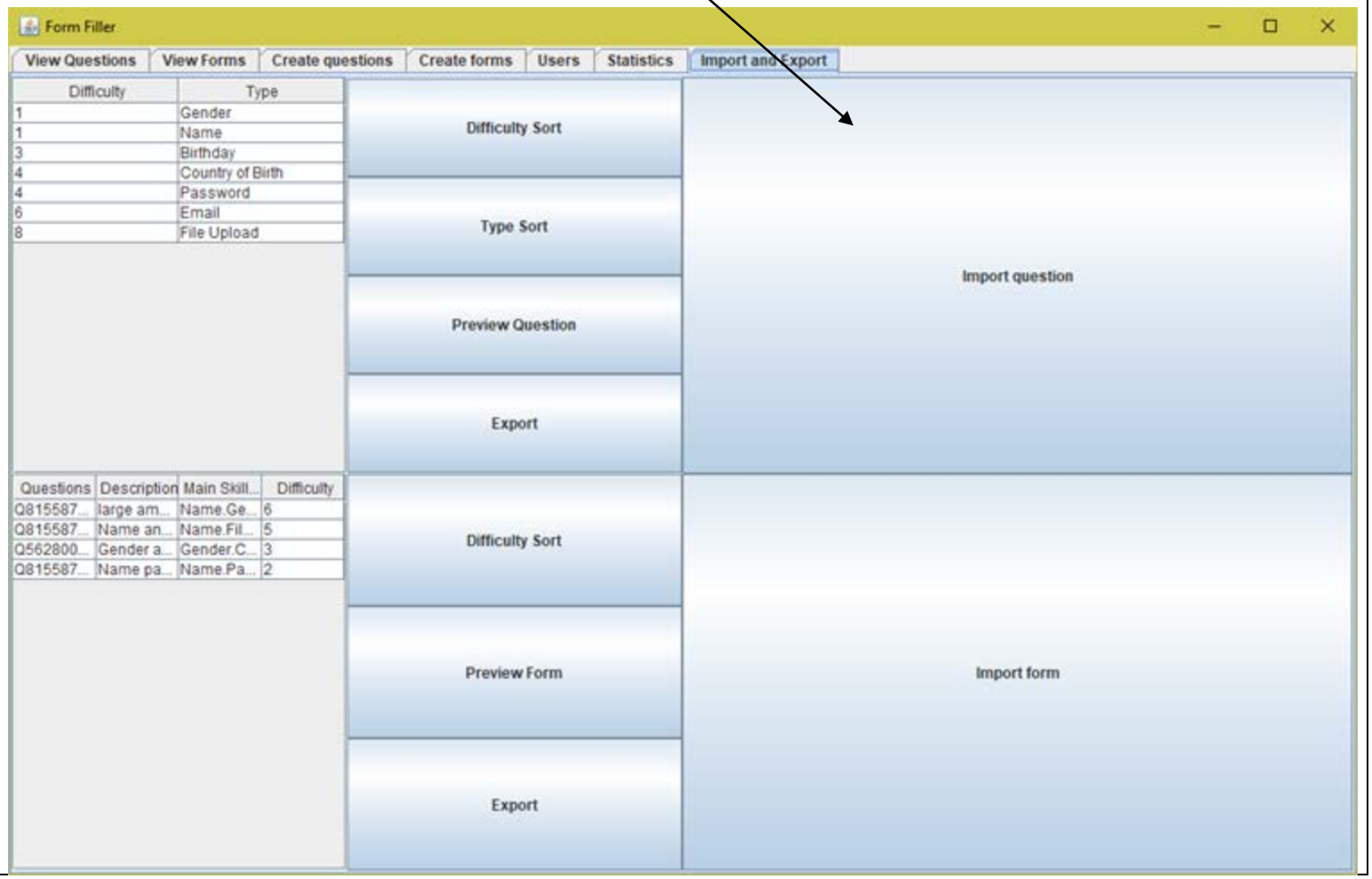


Objectives met	-

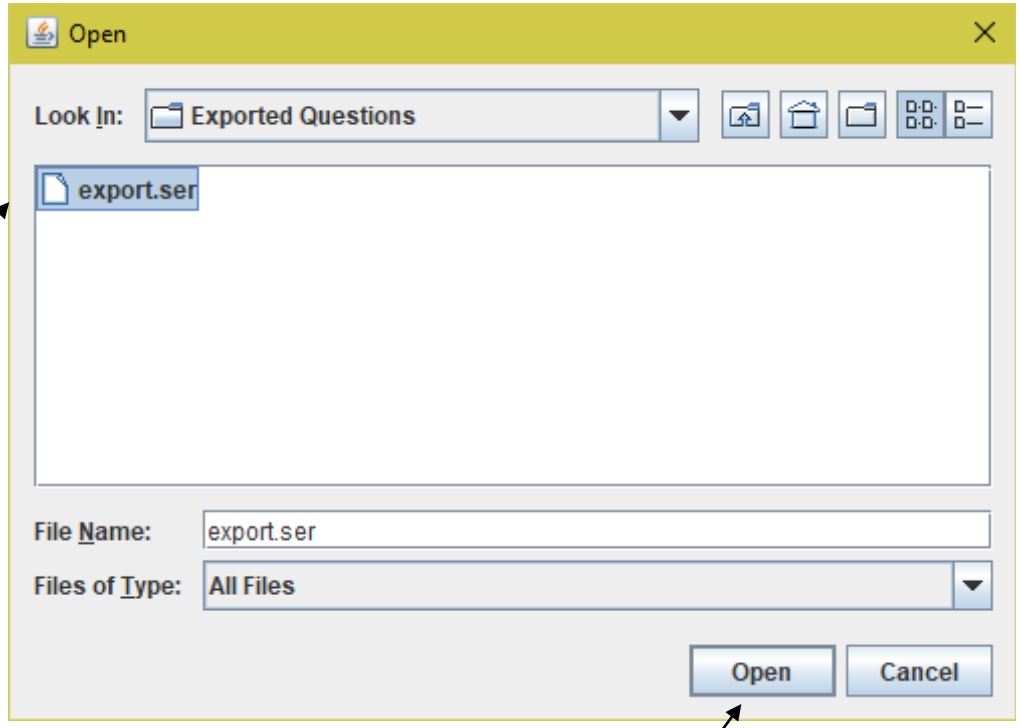
Import

# *(from 4.1)*	34
Area of System	Import - Import questions
Output & Storage Requirements	questionDB, questionPanelDB
Data Used	id, difficulty, type, component list (list of components in the question)

Evidence	Press import question



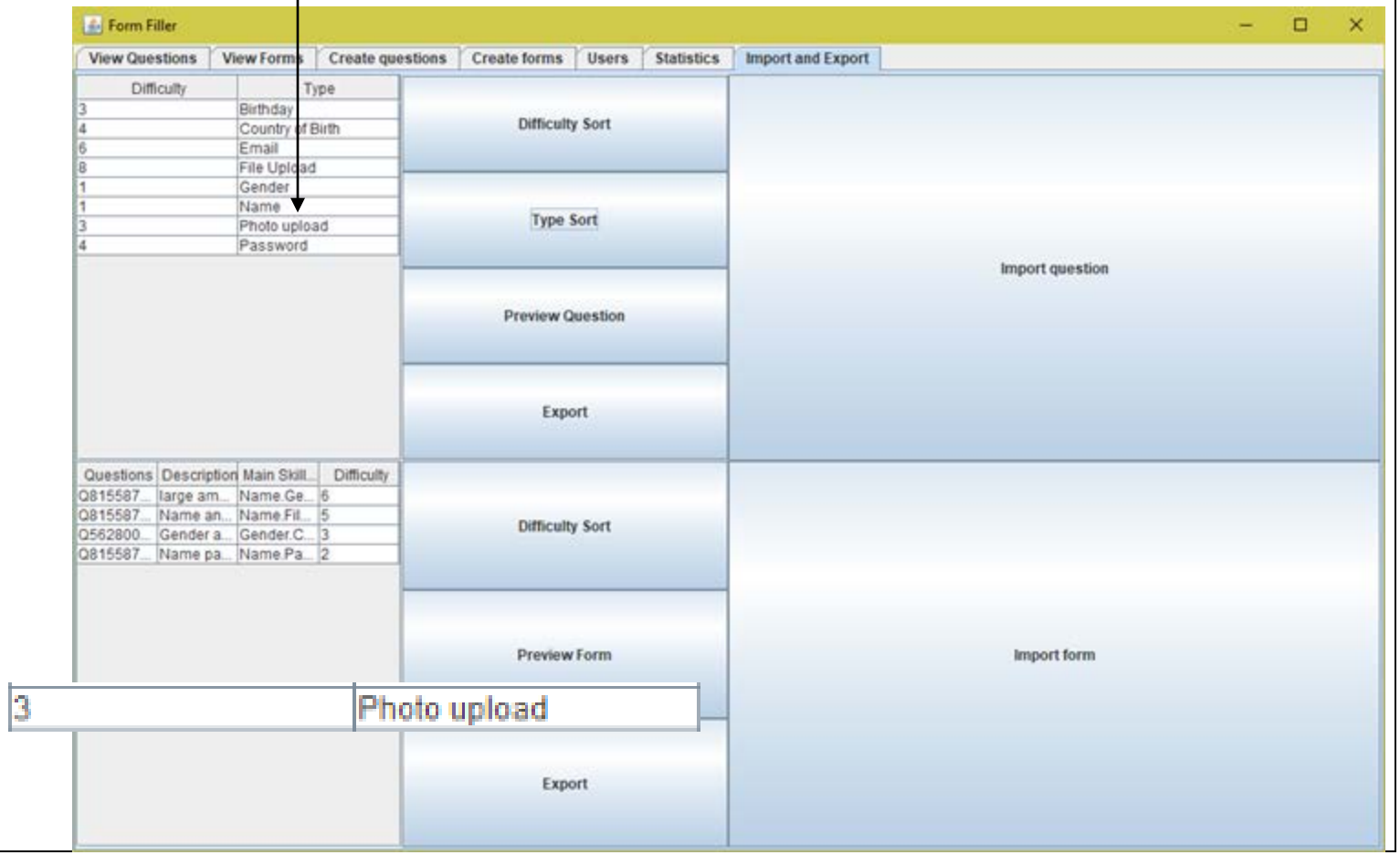
Navigate to an exported question in the file chooser that opens

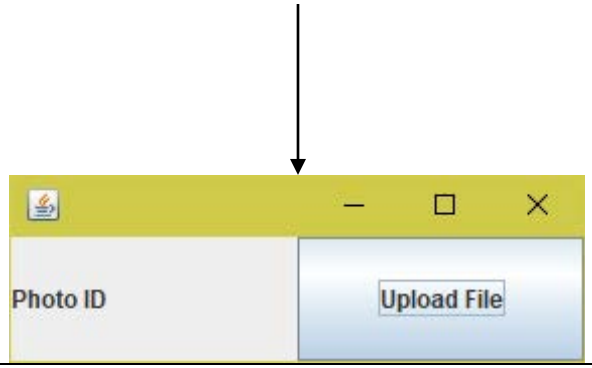


Select the question

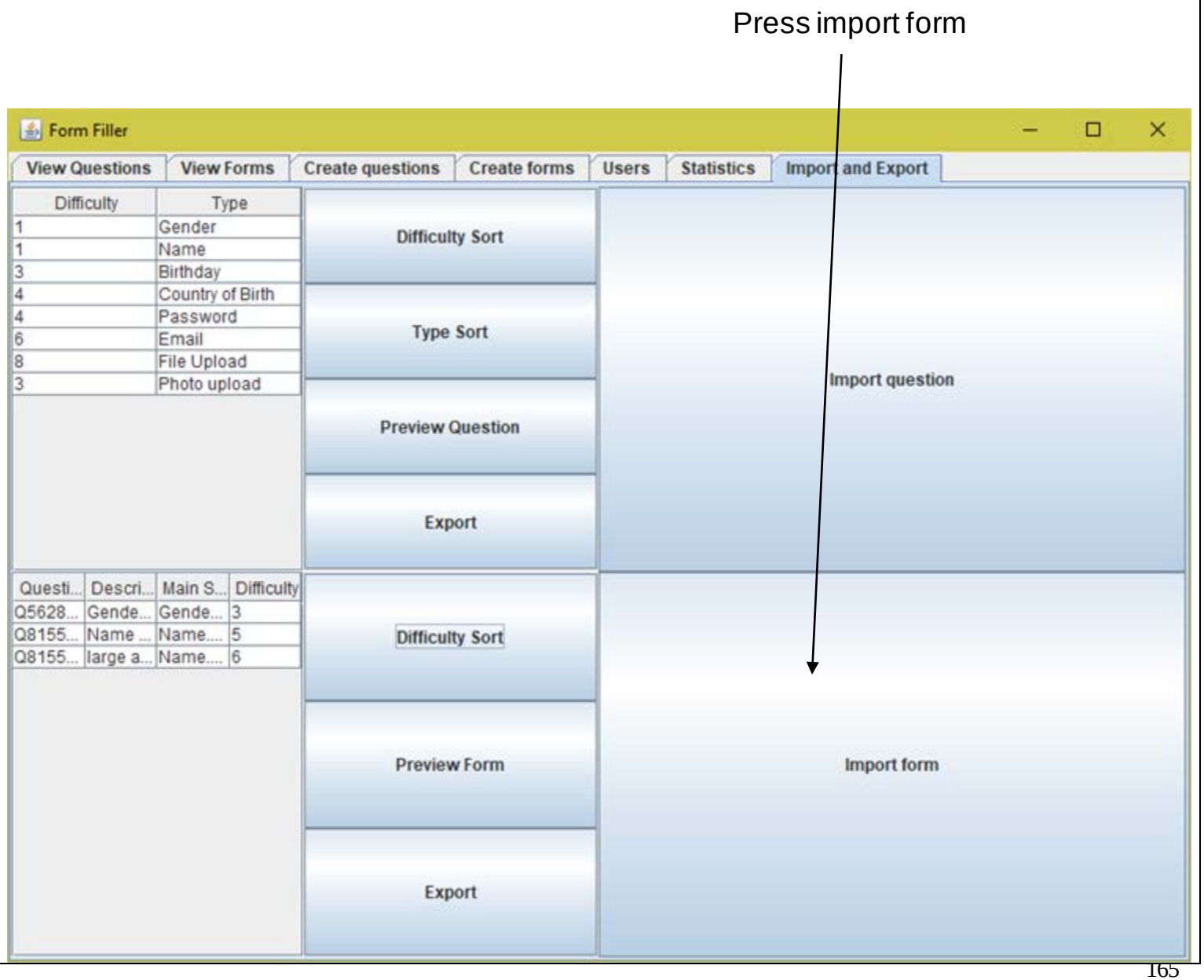
Press open

Imported question

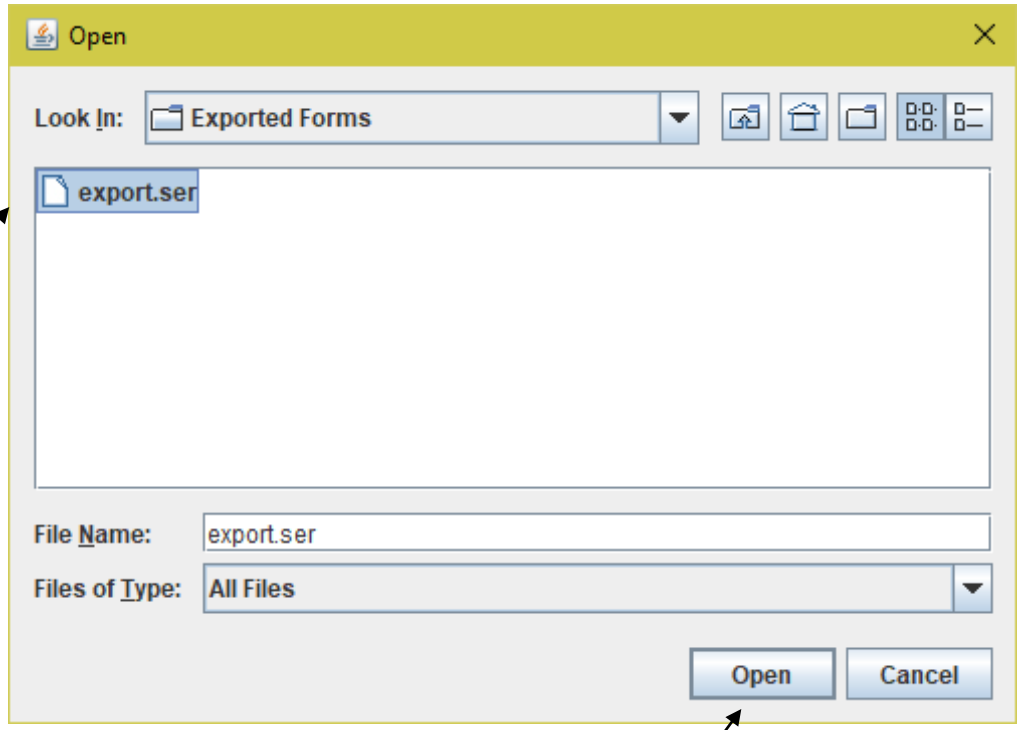


	The imported question 
Objectives met	22 (Ability to import a Question from file)
# *(from 4.1)*	35
Area of System	Import - Import Forms
Output & Storage Requirements	formDB
Data Used	id (of the form), question panel id list, description, difficulty

Evidence	


Press import form
Form Filler
View Questions
View Forms
Create questions
Create forms
Users
Statistics
Import and Export
Difficulty
Type
1 Gender
1 Name
3 Birthday
4 Country of Birth
4 Password
6 Email
8 File Upload
3 Photo upload
Difficulty Sort
Type Sort
Preview Question
Export
Import question
Questi... Descri... Main S... Difficulty
Q5628... Gende... Gende... 3
Q8155... Name ... Name.... 5
Q8155... large a... Name.... 6
Difficulty Sort
Preview Form
Export
Import form

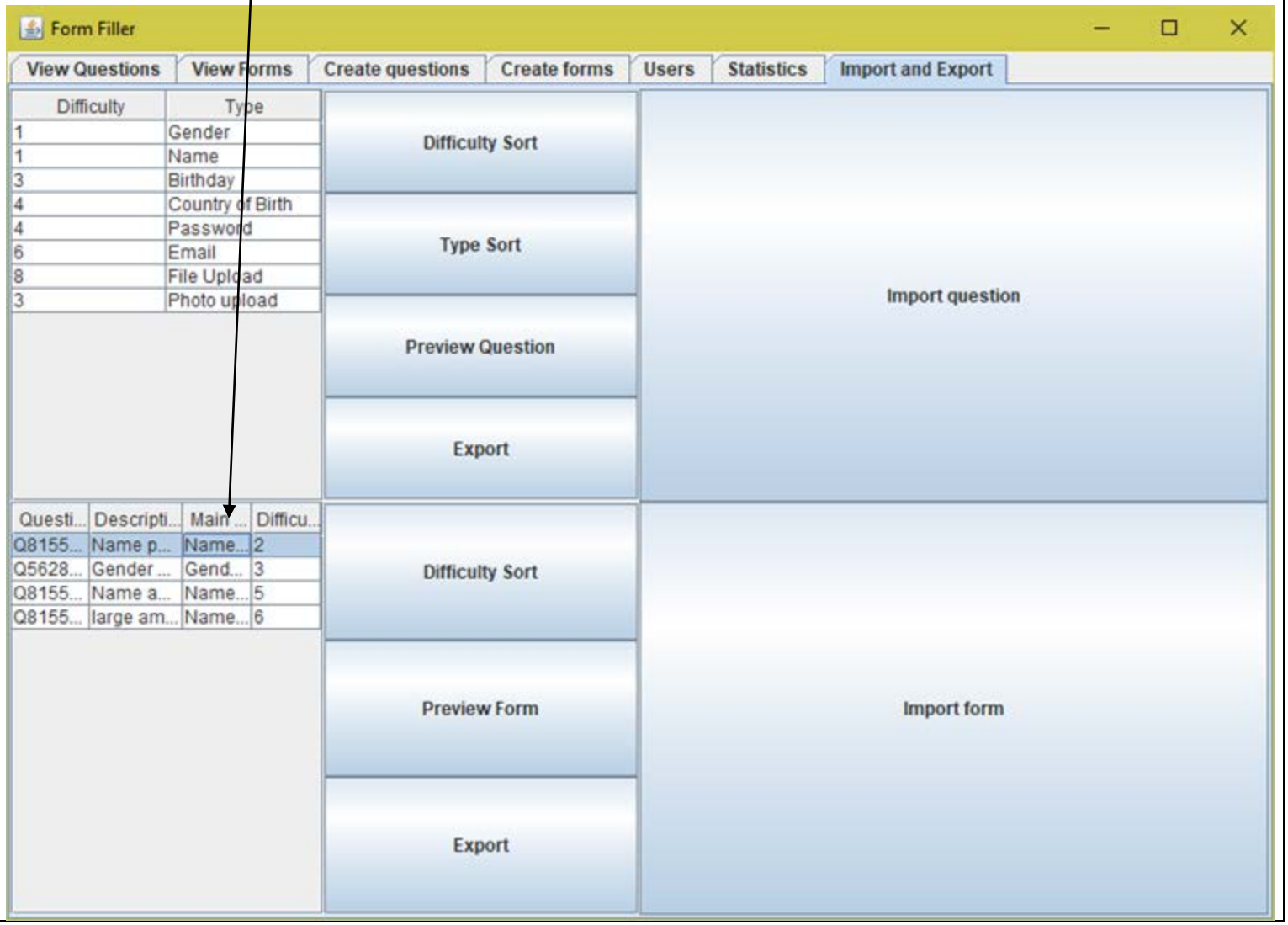
Navigate to an exported form in the file chooser that opens

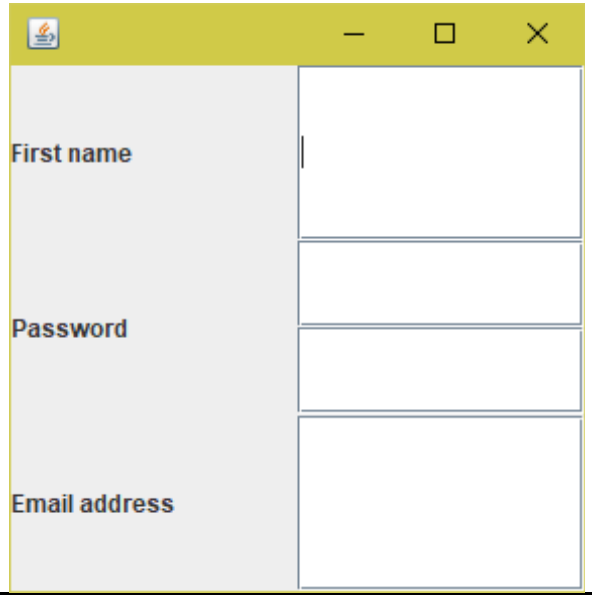


Select the form

Press open

Imported form can be seen the form table



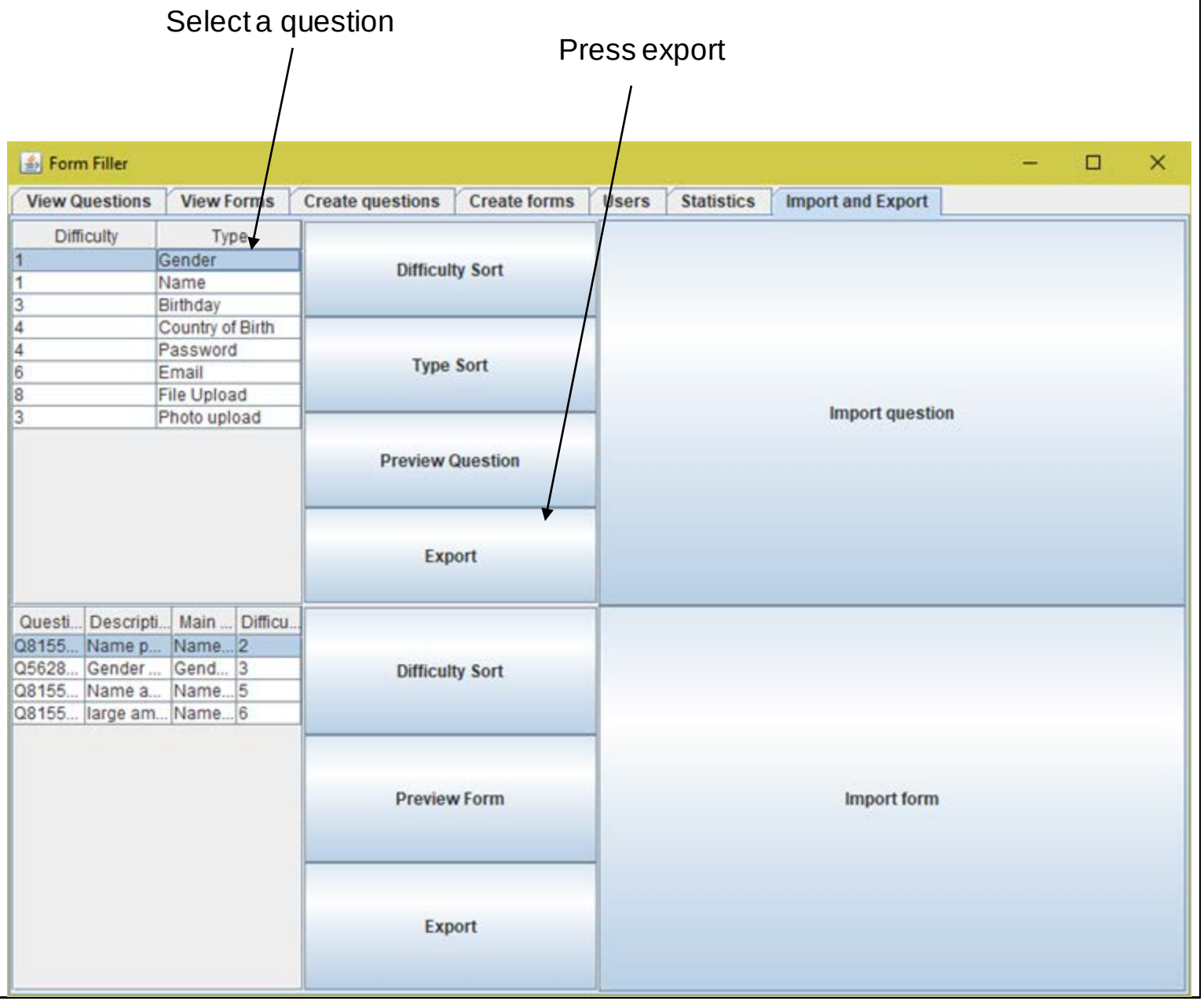
	The imported form 
Objectives met	33 (Ability to import forms from file)

Export

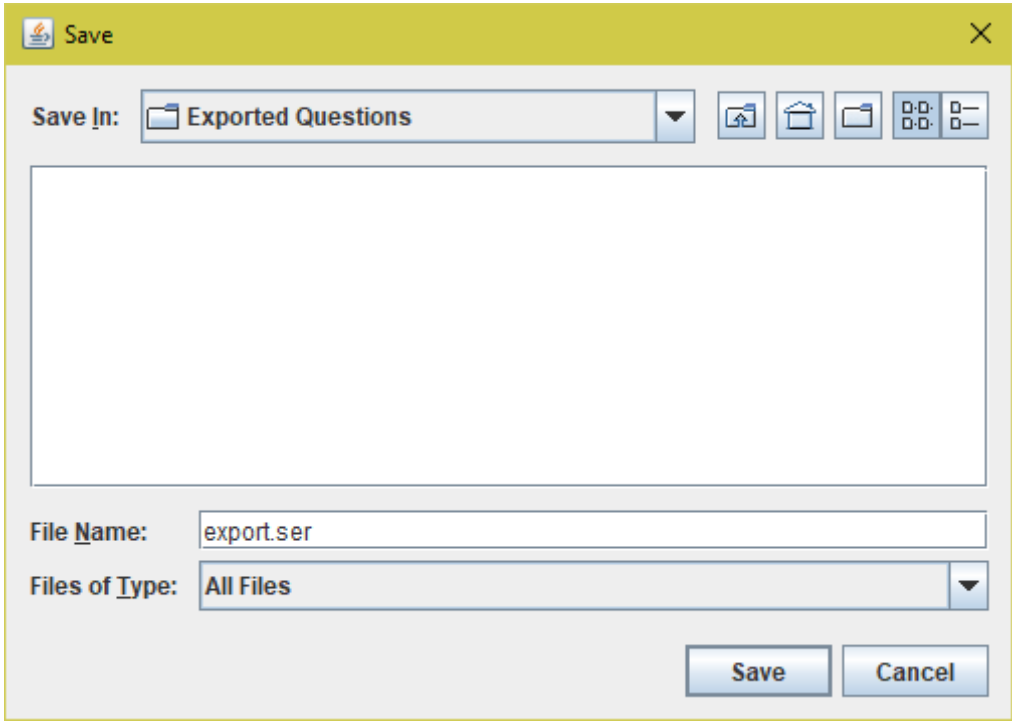
# *(from 4.1)*	36
Area of System	Export - Export Questions
Output & Storage	Exported question file

Requirements	
Data Used	id, difficulty, type, component list (list of components in the question)

Evidence	

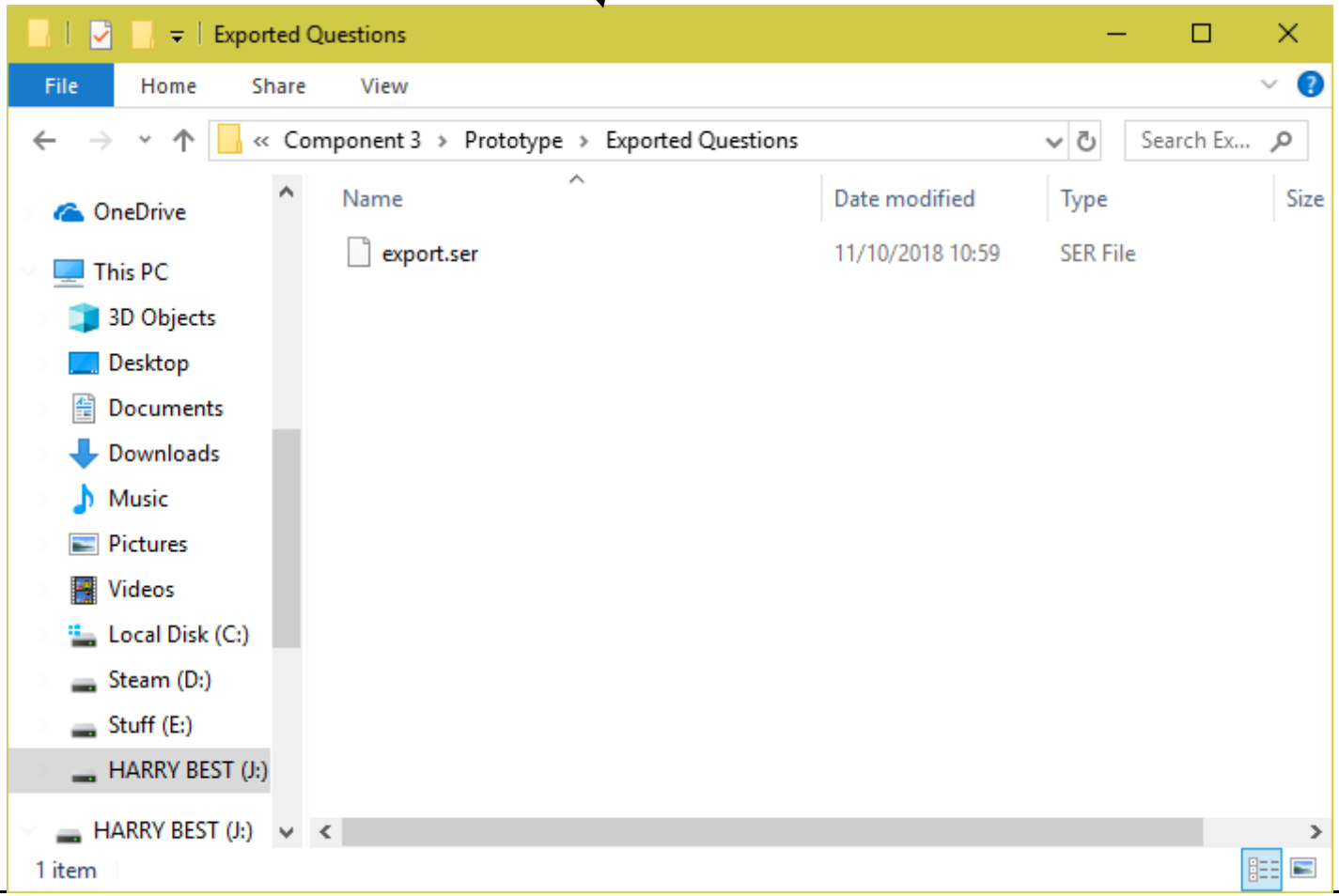

Select a question
Press export
Form Filler
View Questions
View Forms
Create questions
Create forms
Users
Statistics
Import and Export
Difficulty
Type
1 Gender
1 Name
3 Birthday
4 Country of Birth
4 Password
6 Email
8 File Upload
3 Photo upload
Difficulty Sort
Type Sort
Preview Question
Export
Import question
Questi... Descripti... Main ... Difficu...
Q8155... Name p... Name... 2
Q5628... Gender ... Gend... 3
Q8155... Name a... Name... 5
Q8155... large am... Name... 6
Difficulty Sort
Preview Form
Export
Import form

Use the file chooser that opens to navigate to a location to export the question to

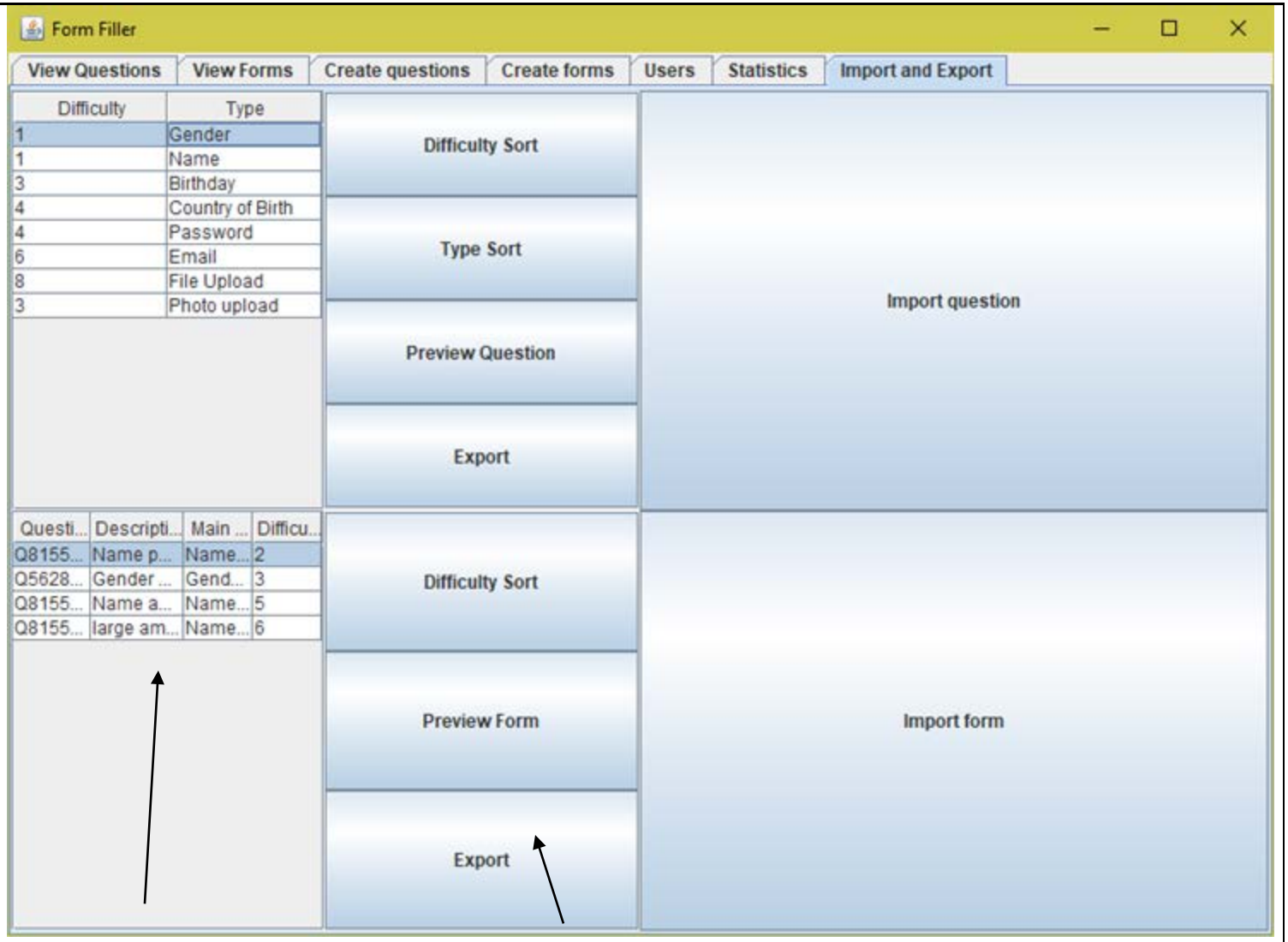


Press save

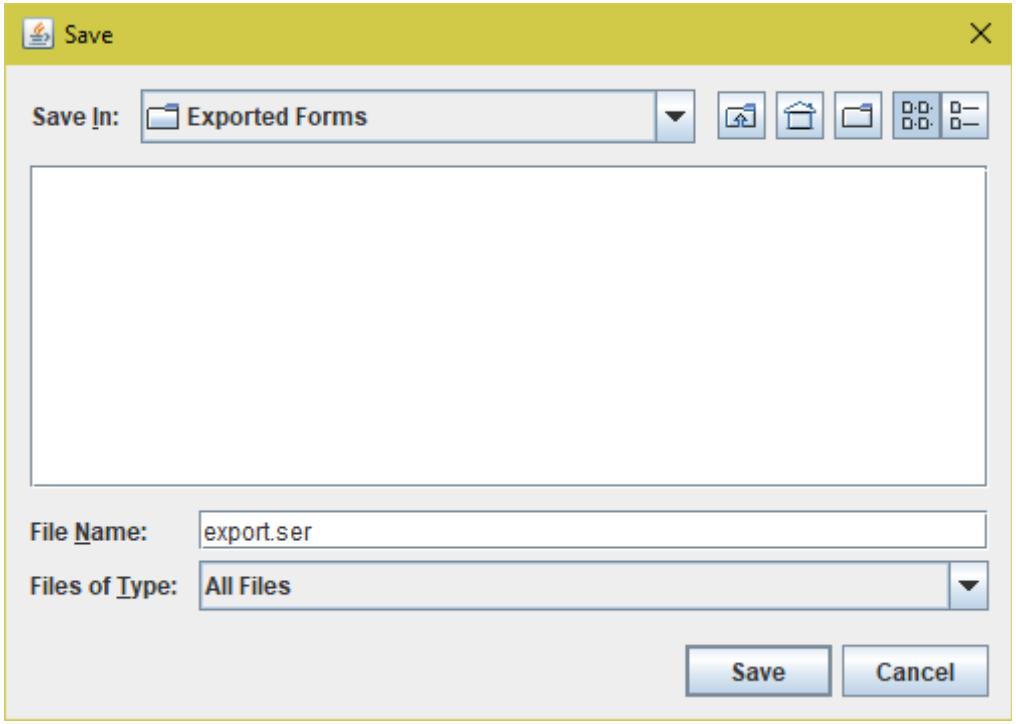
Question has
been exported



Objectives met	21 (Ability to export a question to file)
# ***(from 4.1)***	37
Area of System	Export - Export Forms
Output & Storage Requirements	Exported Form file
Data Used	id (of the form), question panel id list, description, difficulty

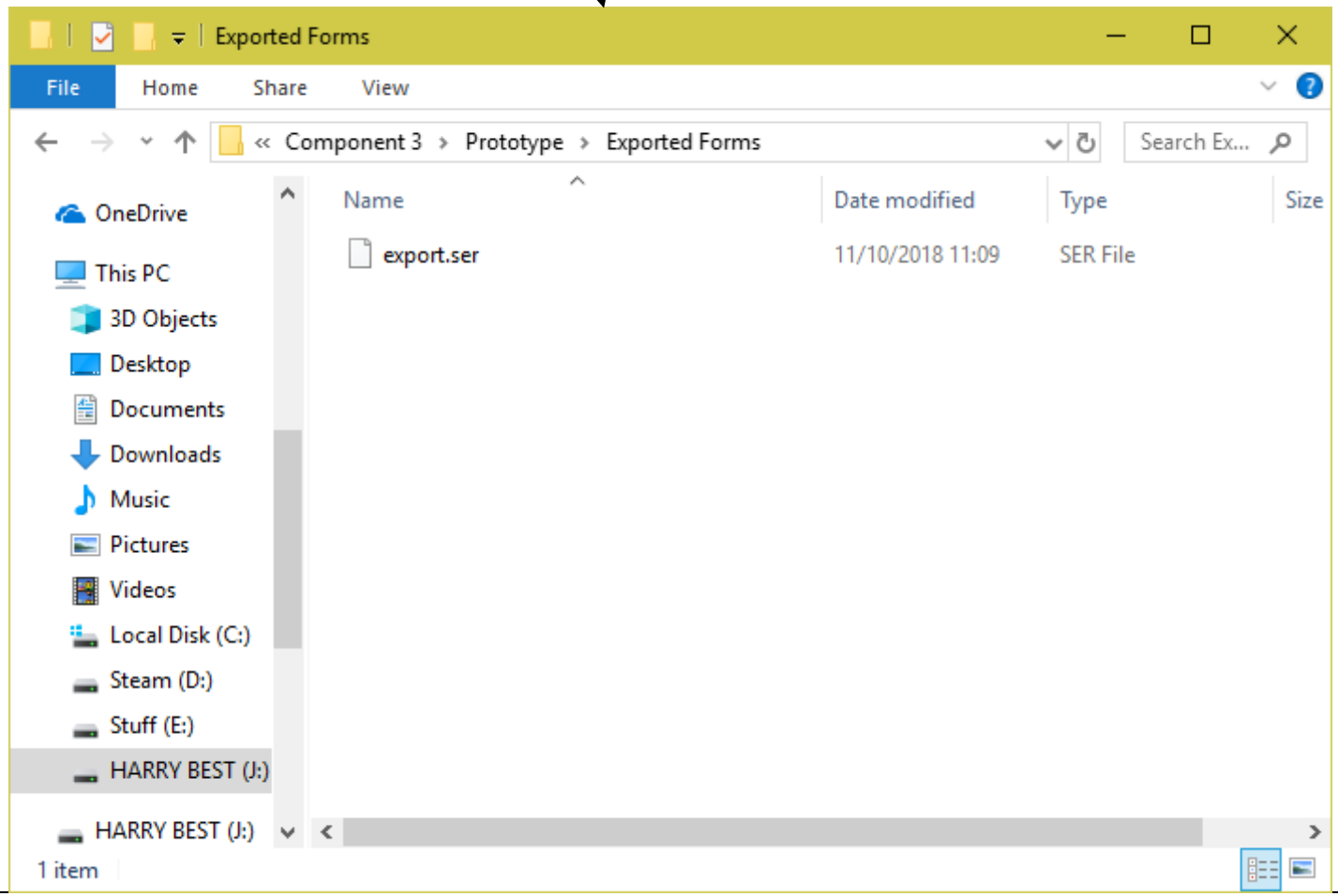
Evidence	 Form Filler View Questions View Forms Create questions Create forms Users Statistics Import and Export Difficulty Type 1 Gender 1 Name 3 Birthday 4 Country of Birth 4 Password 6 Email 8 File Upload 3 Photo upload Difficulty Sort Type Sort Preview Question Export Import question Questi... Descripti... Main ... Difficu... Q8155... Name p... Name... 2 Q5628... Gender ... Gend... 3 Q8155... Name a... Name... 5 Q8155... large am... Name... 6 Difficulty Sort Preview Form Export Import form Select a form to export Press export

Use the file chooser that opens to navigate to a location to export the form to



Press save

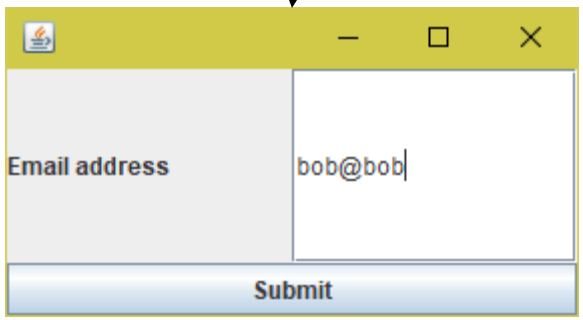
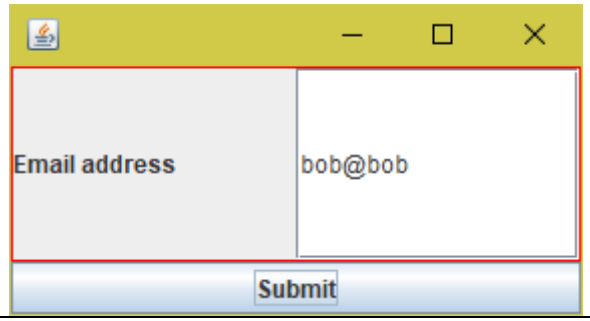
Form has been exported

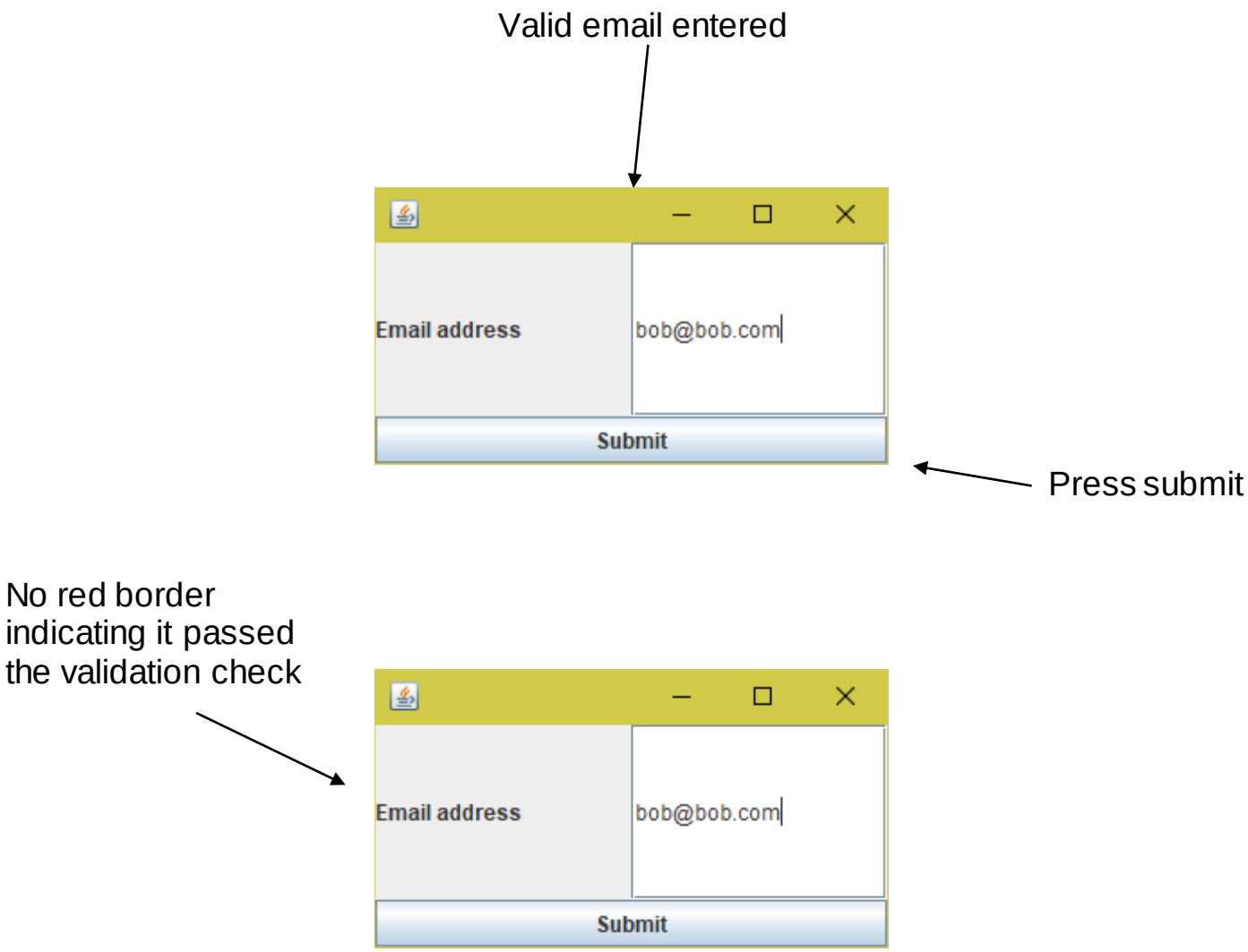


Objectives met	32 (Ability to export forms to file)

Component Validation

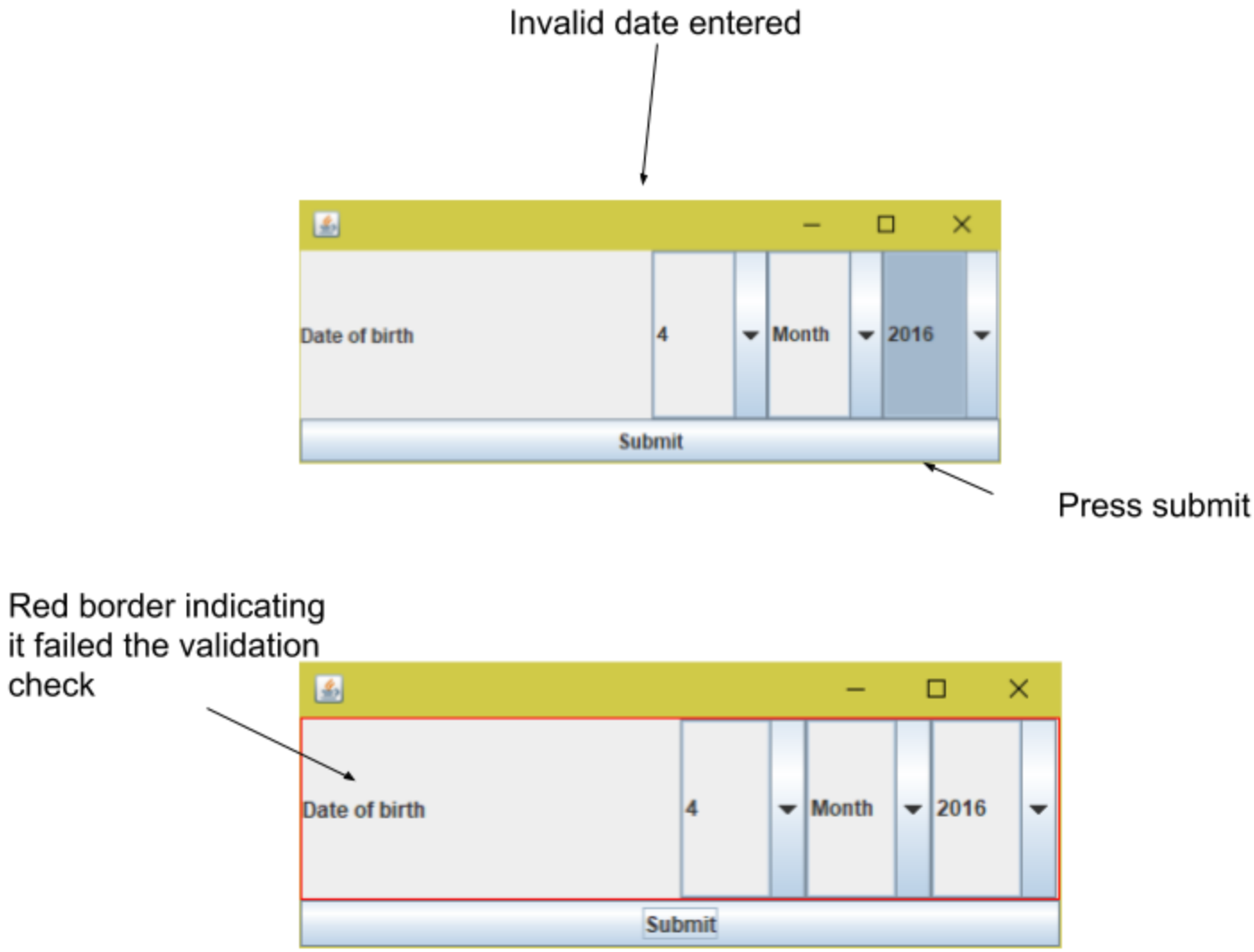
# *(from 4.1)*	38
Area of System	Component validation - Email address
Output & Storage Requirements	-
Data Used	Text (entered into the field)

Evidence	Invalid email entered  Press submit Red border indicating it failed the validation check 

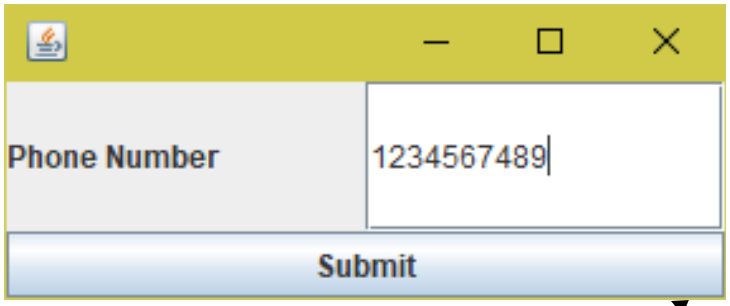
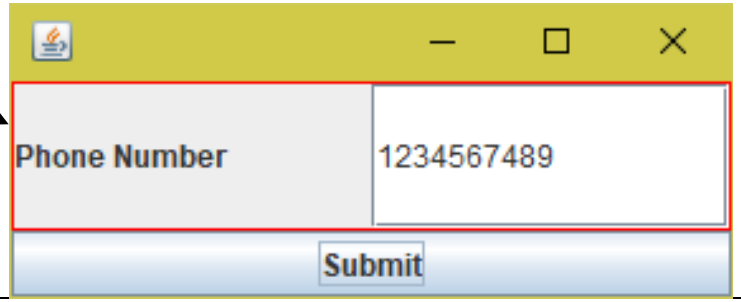


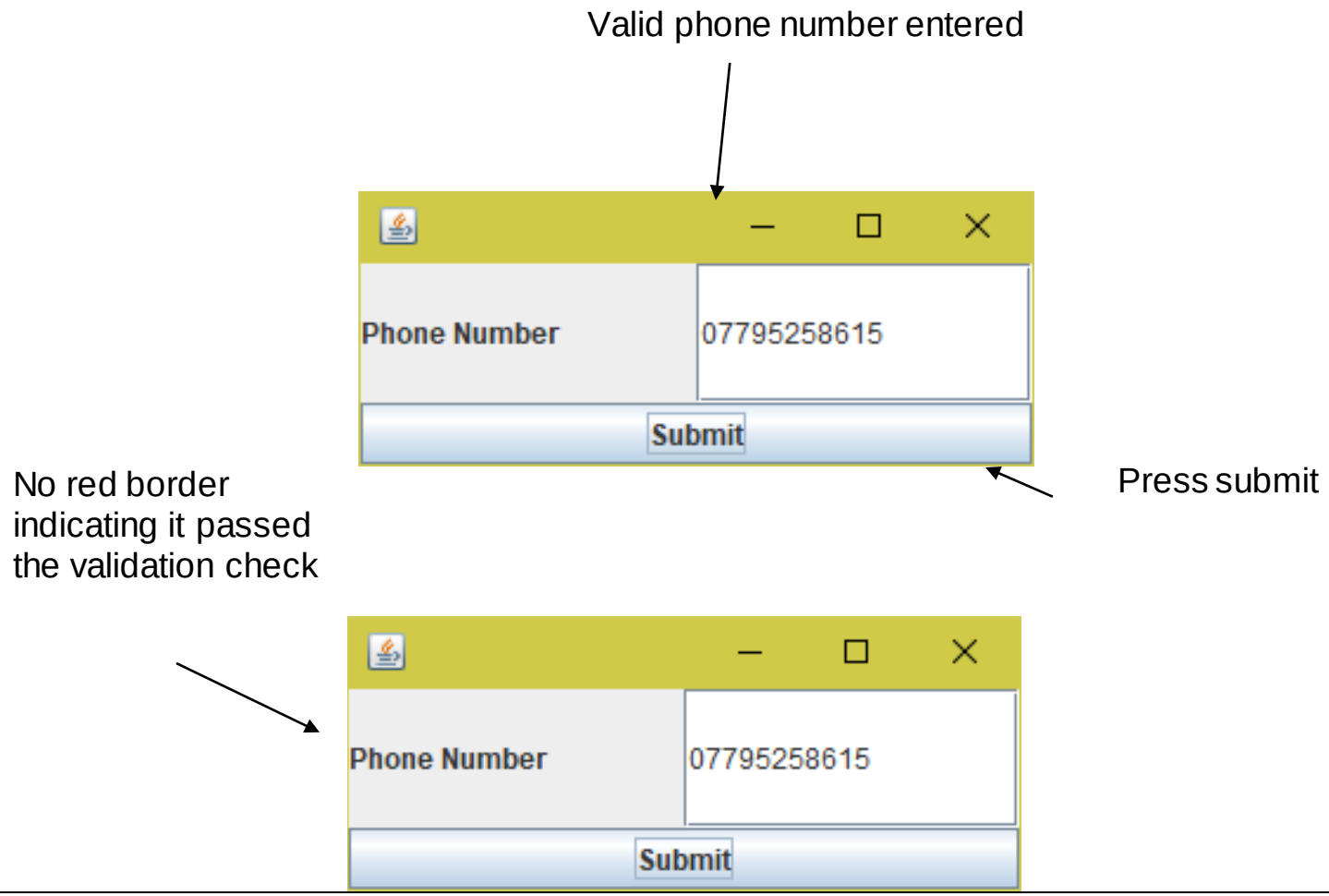
Objectives met	16 (Email addresses, dates, and phone numbers should have format checks)

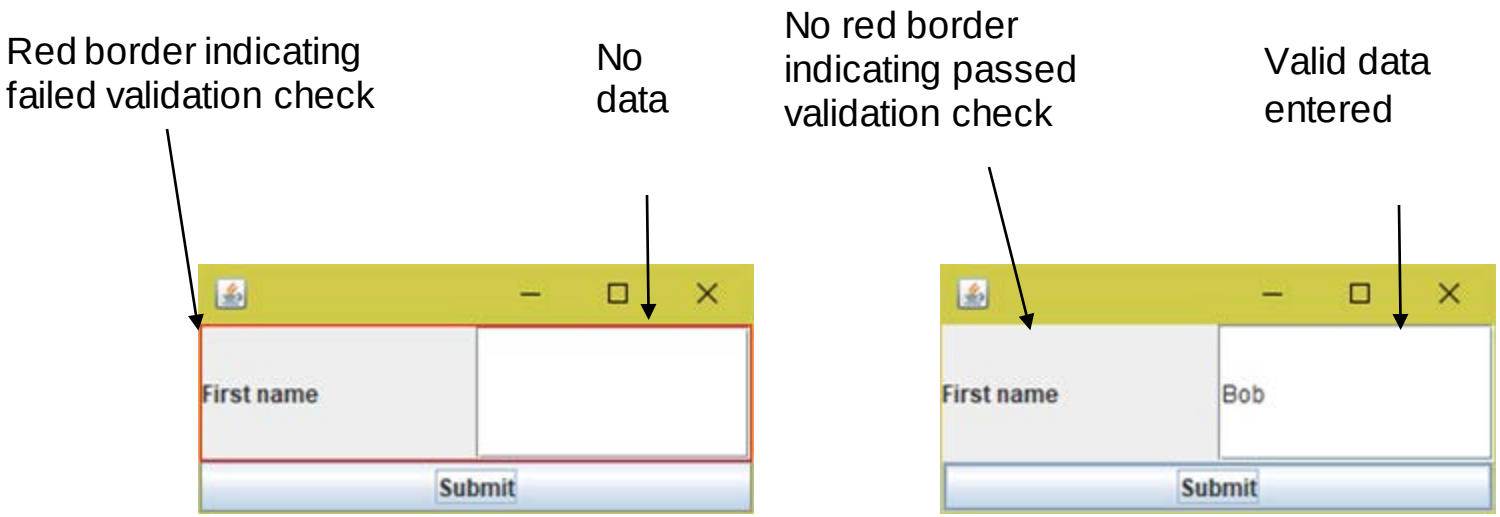
# *(from 4.1)*	39
Area of System	Component Validation - Date
Output & Storage Requirements	-
Data Used	Date entered

Evidence	 Invalid date entered Date of birth 4 Month 2016 Submit Press submit Red border indicating it failed the validation check Date of birth 4 Month 2016 Submit

Objectives met	16 (Email addresses, dates, and phone numbers should have format checks)
# *(from 4.1)*	40
Area of System	Component Validation - phone number
Output & Storage Requirements	-
Data Used	Phone number entered

Evidence	Invalid phone number entered  Press submit Red border indicating it failed the validation check 

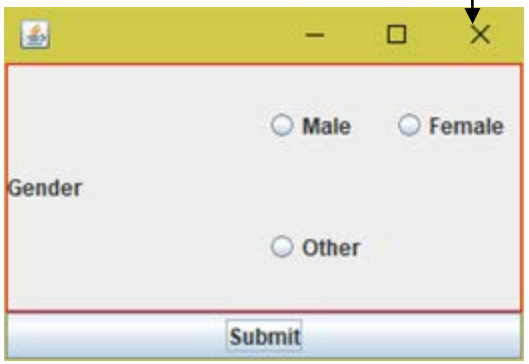
	
Objectives met	16 (Email addresses, dates, and phone numbers should have format checks)
# *(from 4.1)*	42
Area of System	Component validation - presence
Output & Storage	-

Requirements	
Data Used	Data entered in each field
Evidence	Text field 

Radio buttons

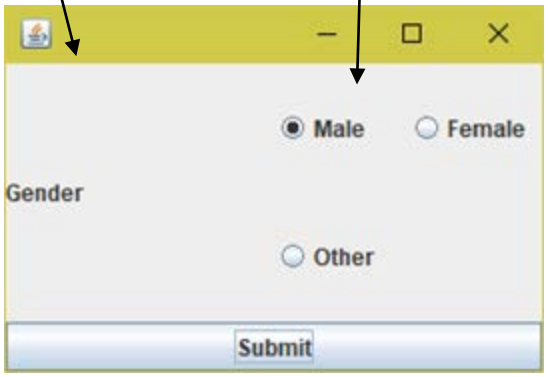
Red border indicating failed validation check

No option selected

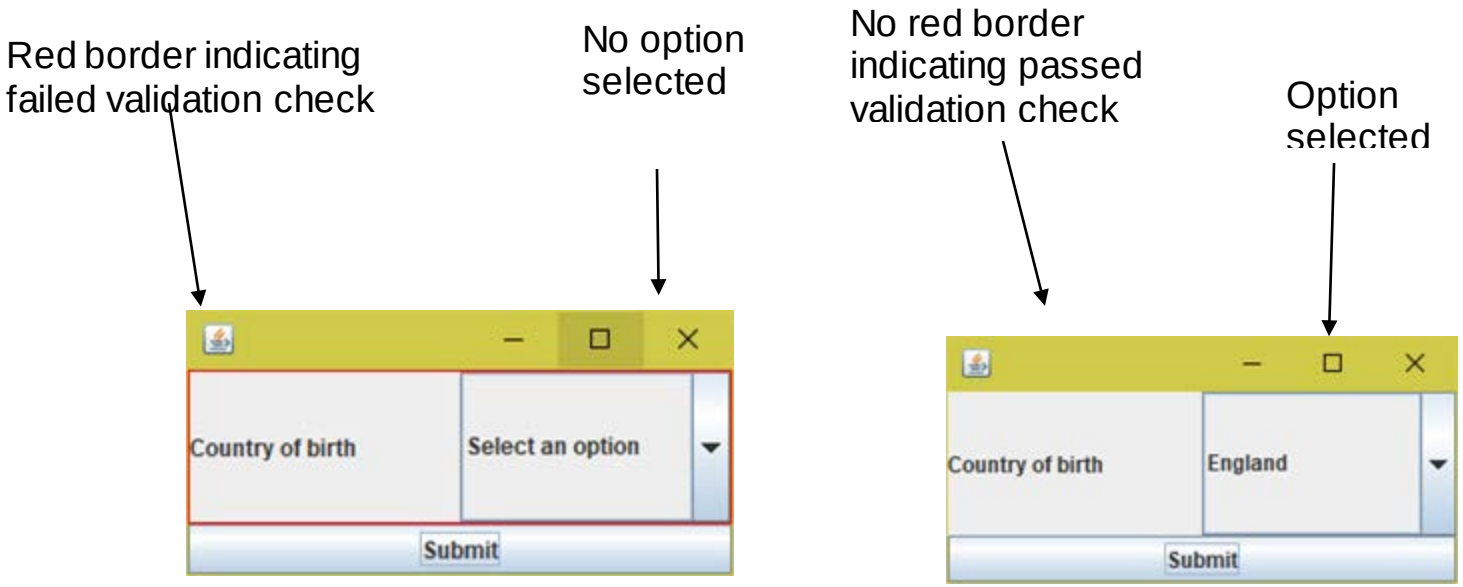


No red border indicating passed validation check

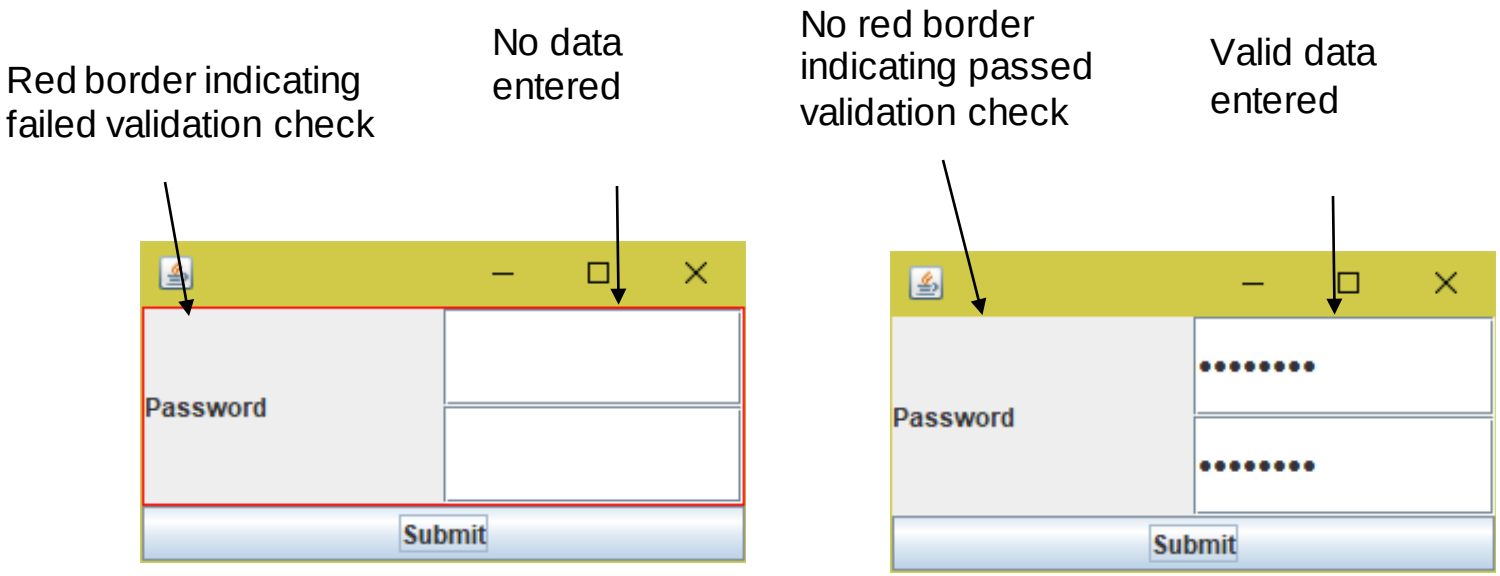
Option selected



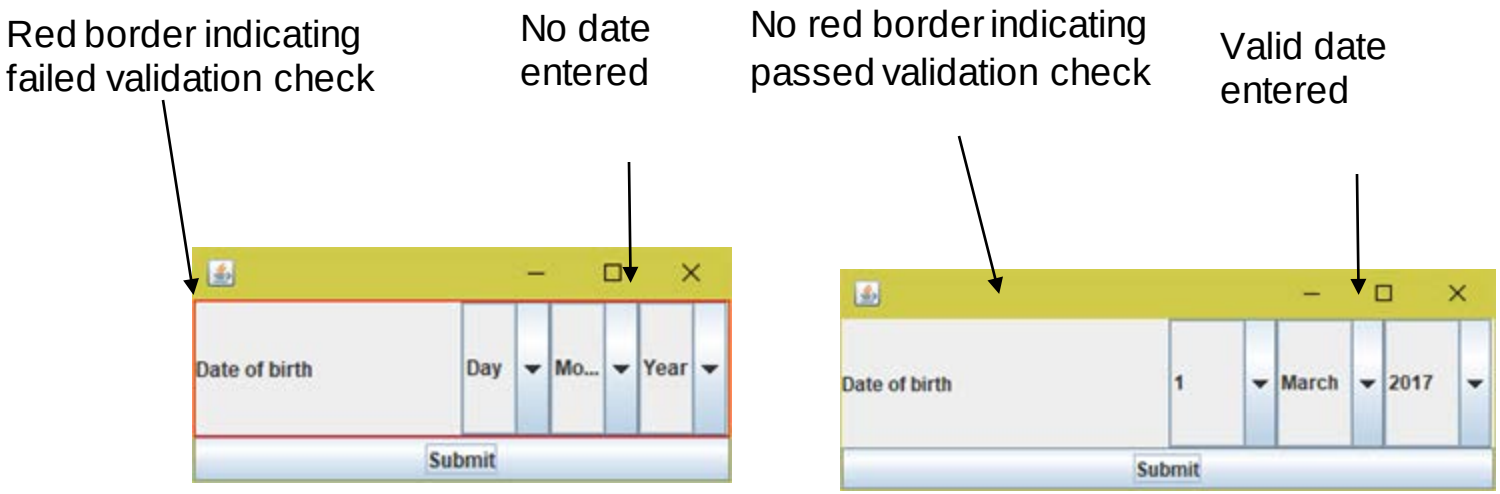
Drop-down


Red border indicating failed validation check
No option selected
No red border indicating passed validation check
Option selected
Country of birth
Select an option
Submit
Country of birth
England
Submit

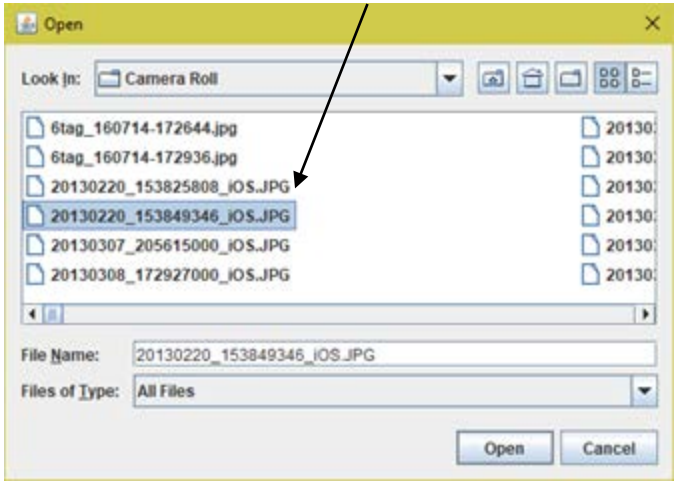
Password fields



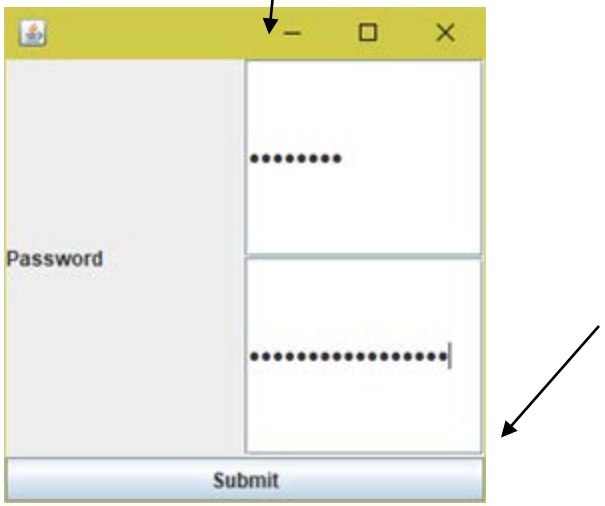
Calendar entry



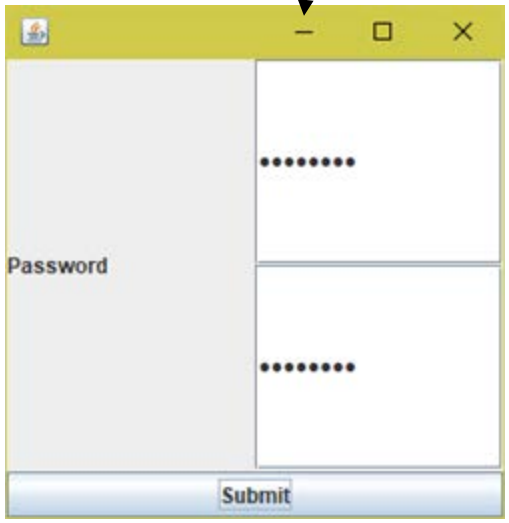
File chooser

	Red border indicating failed validation check No file uploaded Photo selected  No red border indicating passed validation check
Objectives met	19 (All fields should have presence checks)

# *(from 4.1)*	43
Area of System	Component Validation - double entry verification
Output & Storage Requirements	-
Data Used	password1 and password2 (the passwords entered in the password fields)

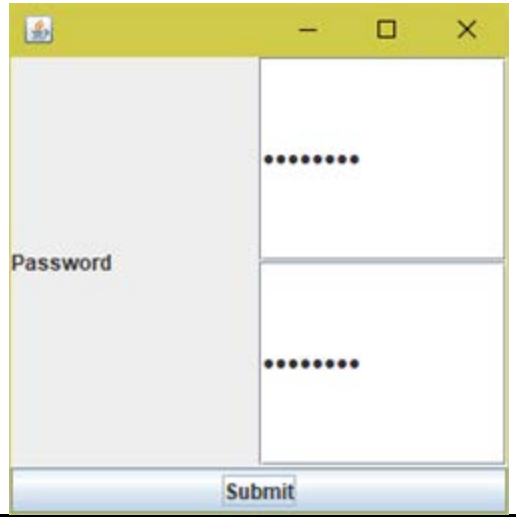
Evidence	
	Mismatching passwords  Press submit Red border

Matching passwords entered



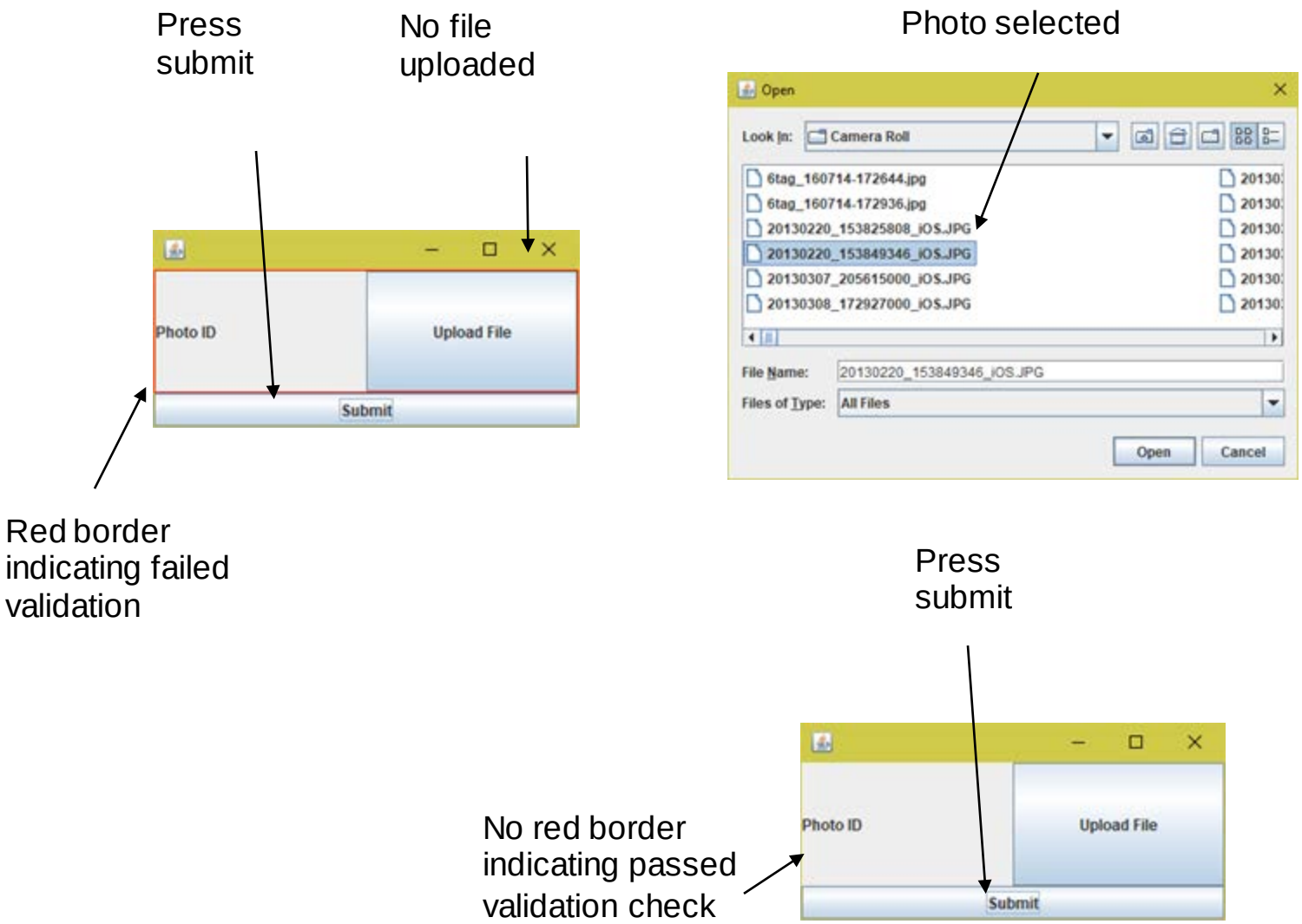
Press submit

No red border



Objectives met	18 (Passwords should have double entry verification)
# ***(from 4.1)***	44
Area of System	Component Validation - document upload fields
Output & Storage Requirements	-
Data Used	File path (of uploaded file)
Evidence	

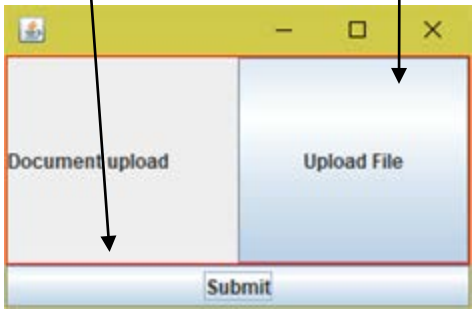
	Photo


Press submit
No file uploaded
Photo selected
Photo ID
Upload File
Submit
Open
Look In:
Camera Roll
6tag_160714-172644.jpg
6tag_160714-172936.jpg
20130220_153825808_iOS.JPG
20130220_153849346_iOS.JPG
20130307_205615000_iOS.JPG
20130308_172927000_iOS.JPG
File Name:
20130220_153849346_iOS.JPG
Files of Type:
All Files
Open
Cancel
Red border indicating failed validation
Press submit
No red border indicating passed validation check
Photo ID
Upload File
Submit

Document upload

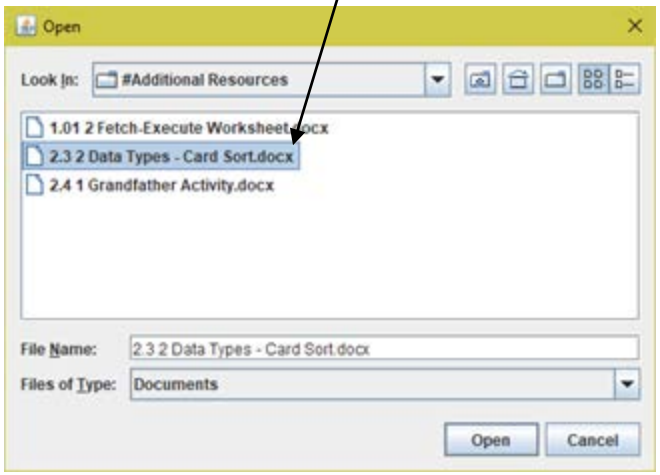
Press submit

No file uploaded



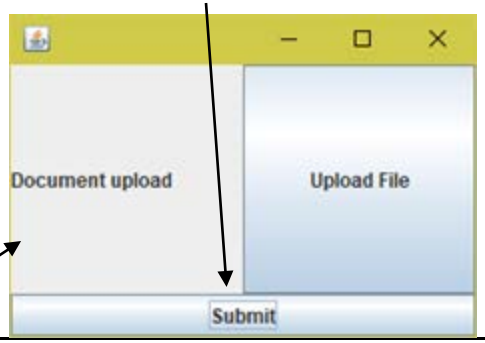
Red border indicating failed validation check

Document selected



Press submit

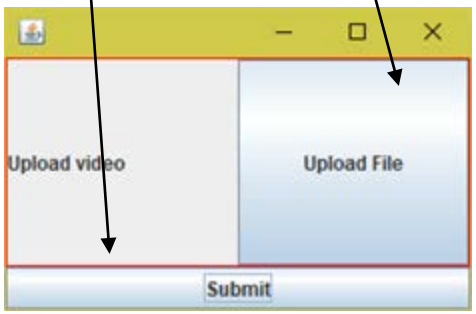
No red border indicating passed validation check



Video upload

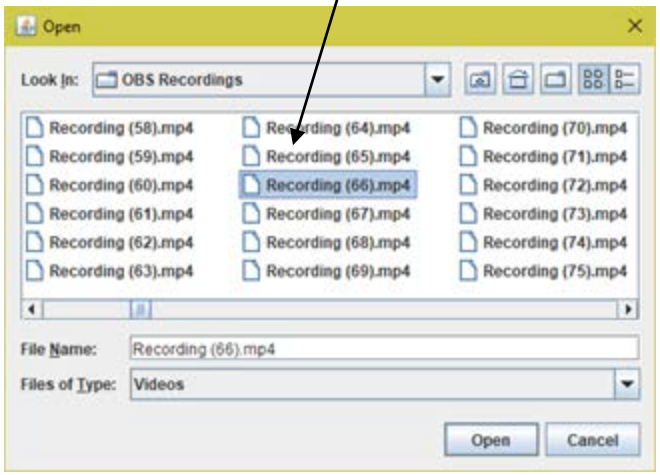
Press submit

No file uploaded



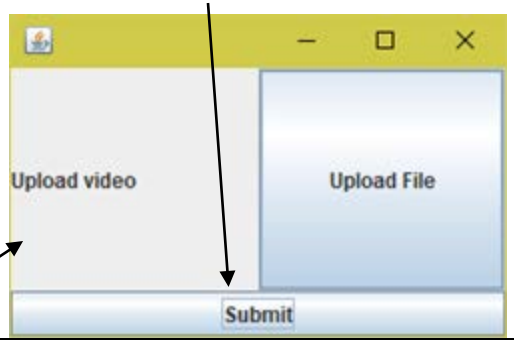
Red border indicating failed validation check

Video selected



Press submit

No red border indicating passed validation check

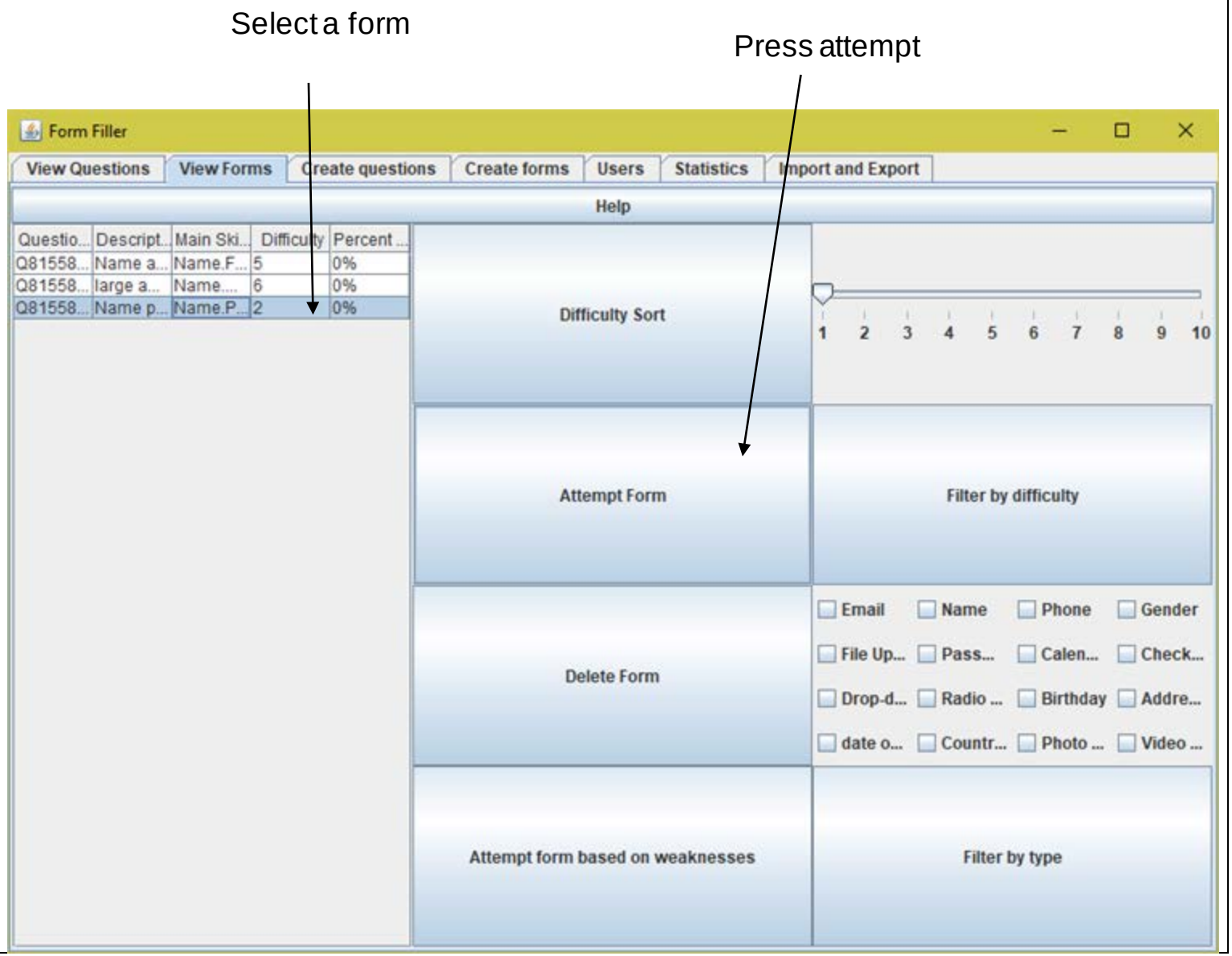


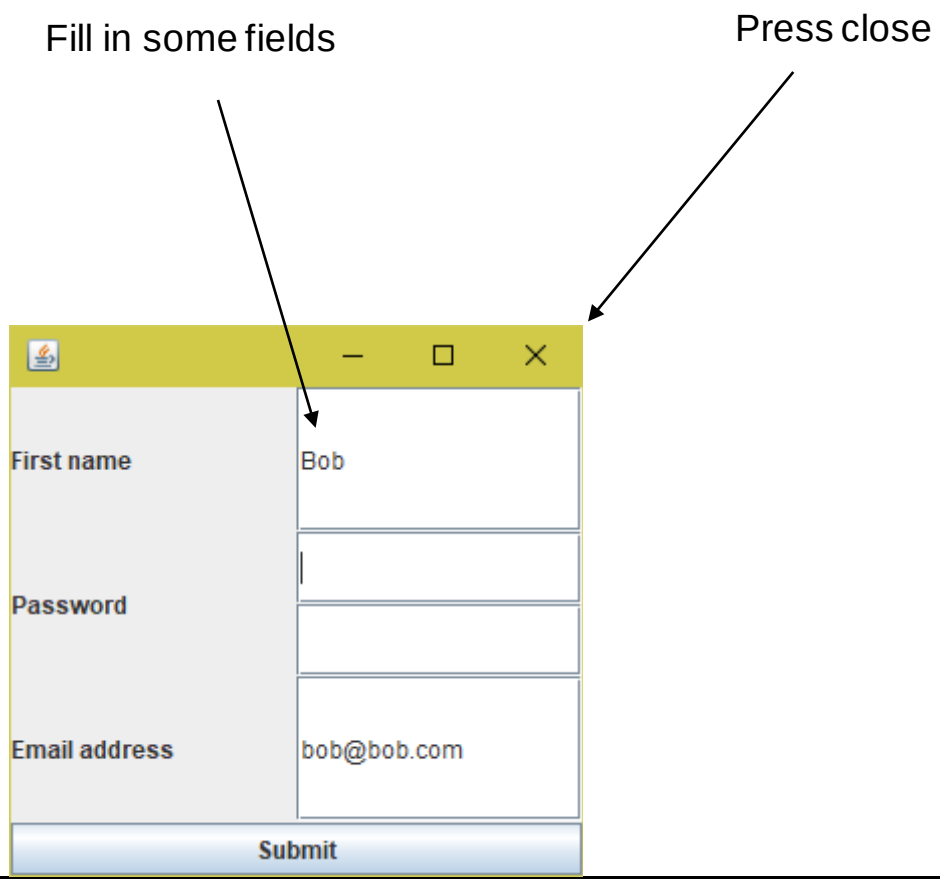
Objectives met	20 (Document upload fields should only allow certain types of files to be uploaded)

Attempt form

# *(from 4.1)*	45
Area of System	Attempt form - save progress
Output & Storage Requirements	FormInProgressDB
Data Used	Data entered into the fields of each question

Evidence	


Select a form
Press attempt
Form Filler
View Questions
View Forms
Create questions
Create forms
Users
Statistics
Import and Export
Help
Questio... Descript... Main Ski... Difficulty Percent ...
Q81558... Name a... Name.F... 5 0%
Q81558... large a... Name.... 6 0%
Q81558... Name p... Name.P... 2 0%
Difficulty Sort
1 2 3 4 5 6 7 8 9 10
Attempt Form
Filter by difficulty
Delete Form
Email Name Phone Gender
File Up... Pass... Calen... Check...
Drop-d... Radio ... Birthday Addre...
date o... Countr... Photo ... Video ...
Attempt form based on weaknesses
Filter by type

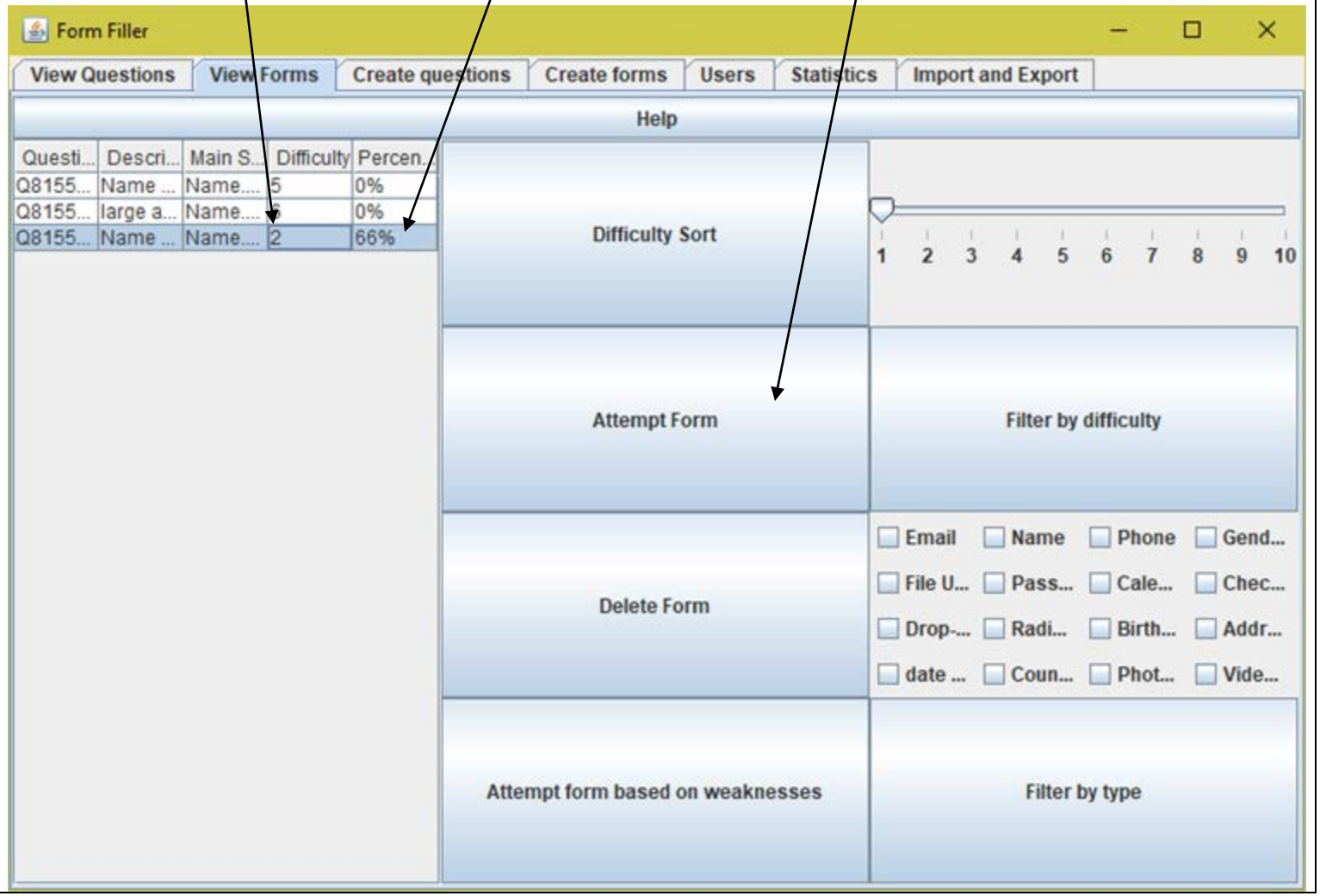

Fill in some fields
Press close
First name
Bob
Password
Email address
bob@bob.com
Submit

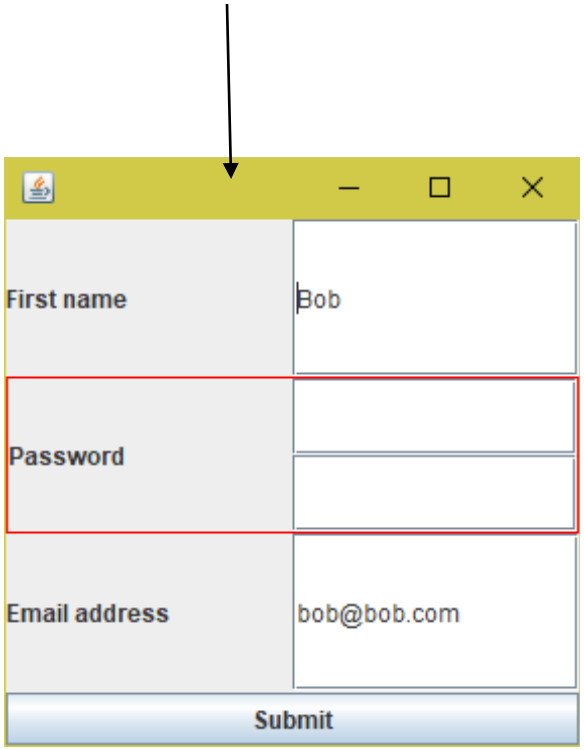
Restart the system and log in as the same user

Select the same form

Percentage complete updated

Press attempt



	What was entered in the fields has been saved 
Objectives met	43 (How much of each form a user has attempted should be tracked)
# *(from 4.1)*	46
Area of System	Attempt form - Validate answers

	See component validation section
# *(from 4.1)*	2
Area of System	Attempt form - Track statistics
	See statistics section. The statistics are gathered automatically the user doesn't have to do anything.

4.4 Self-Evaluation

4.41 Functioning of the Prototype

Overall, I think that the prototype functions well. It fulfils almost all of the requirements for the system.

Questions

The admin is able to create a wide variety of questions. Each component that can be added to a question has the correct and appropriate validation applied to it and this was one of the most important requirements of the system. However, the prototype doesn't include the facility to add a date picker than uses a calendar, a drop down date entry was used instead. In the final system, an actual calendar will be used to enter dates.

The admin is also not able to add components to a question using a drag and drop system and can only use buttons in the prototype.

The admin can enter all the required information about the question once they have finished creating it.

The user is able to find questions in the system and attempt them. This also satisfies another important requirement of the system.

All other requirements for questions are satisfied. E.g. sort filter, and attempt.

Forms

The admin user can create forms in the system by adding questions from the list of questions. They are able to sort and preview the questions before they had them to the form. There is also a facility to edit forms that are already created, and the admin can rearrange the questions in the form, and add and remove questions from the form.

The admin is able to enter a description of the form and its difficulty after creating it.

The user can view the forms that are in the system and select one to attempt. They can perform all the sorts and searches that are detailed in the requirements of the system. They can also attempt a form that is automatically created and includes questions that the system has identified as the ones that the user struggles with the most.

When the user attempts a form all of the components are correctly validated. When the user closes a form and reopens it (even after system restarts) their progress is saved.

The prototype satisfies all requirements for the forms section of the system.

Statistics

The prototype tracks all of the statistics that were specified in the requirements of the system. When the user attempts a question (on its own or as part of a form) the system tracks how many times that they have failed the validation checks, how long it took them to complete the question, and how many times it took them to correct an error.

There is also a screen that displays all of these statistics to the user. They can view statistics about individual questions or produce a report which they can print that shows their overall progress broken down by type of question. However, there are no graphs displayed to user which is a feature that is required for the final system. There is also no facility for the admin to produce reports for multiple users at once, this is also a feature that is required for the final system.

User

All data that was specified in the requirements to be stored about each user is stored in the prototype. The admin can also view this information in the users tab of the prototype. The admin can add, edit, and delete users. All requirements for user are fulfilled by the prototype.

4.42 Good Features

Questions

I think that the method of creating questions is simple and allows the admin to create questions very quickly because they only need to press a button to add a component. Although a drag and drop feature is planned for the final system, I will not implement it and I will use buttons instead to add components because of how quick and easy it makes adding components. I think that the preview of the question is helpful and works well.

I think that the wide range of components that I have successfully managed to implement allows the admin to create a wide range of questions for the system. The only component that I wasn't able to fully successfully implement was a calendar entry.

From a programming standpoint, I think that the way that validation for each component was implemented was a good way of doing it. This is because the validation is contained within each component object using an interface. This means that other parts of the system could call the validation method on each component and have a boolean returned based on whether the validation check was successful without having to know how the validation routine actually worked. This made it very easy to write the form displayer class as it just had to call the validate method of each component.

The use of a type list meant that there was no risk of repeated types and so meant that the type filters and sorts worked correctly because there were no redundant types. I will handle the types the same way in the final system.

I'm mostly happy with the progress saving features of the system. This is because it all happens behind the scenes and the user never has to consciously save their progress. Whenever the user closes a question or form that they are attempting the progress is automatically saved (what they've entered into each field) and the percentage that they have completed the form is updated. I think that the best part about the implementation of this feature is that it's user specific e.g. each user's progress is saved individually therefore if one user attempts a form and closes it, when a different user opens the same form it will be blank for them and save their own progress without interfering with the other user's progress. Another good part of this feature is that if the same question is in multiple forms the progress for each is kept separate also, i.e. if the user enters something into a text field of the question on one form when they open the same question in a different form it will be blank (or have what they entered into that form saved).

Forms

The admin is able to easily create forms in the system by selecting questions from a list, this was implemented exactly as specified in the requirements. I think that the form creation is well implemented because it meets these requirements. I think that the facility to rearrange the questions in the form and delete them is a very useful and easy to use feature. This is because all that the admin has to do is press the buttons that appear next to the questions in the form preview. I also think that it's useful for the admin to be able to edit past forms and I think that using a dropdown on the create forms screen to select a form to edit is very easy to use because they don't have to use a different interface to edit forms - they can use the one that they're familiar with from creating forms.

I think that the form creation screen is probably the best laid out screen in the application. This is because it's clear what each area of the screen is for because of the borders. There is also little wasted space.

Statistics

Automatic statistic tracking was difficult to implement however I think that it works well. I'm most happy with how the system determines how long the user has spent on a question. A mouse listener was used. When the mouse is over any component of a question a timer is started and times how long it was over that question. If the mouse moves to another question a timer is started for that question and the timer is stopped for the previous and the time is stored. This is repeated until the user stops attempting the form. Once the user has stopped attempting the form the total time that the mouse was on each question is saved.

I think that the method of using QuestionStat objects also worked very well it because it allows the statistics for each user and each question to be kept entirely separate. This means that the system works very well with multiple users and the data for one user doesn't affect the data of another user.

User

I am pleased that every requirement for the user section of the system was met (apart from encryption). I think that the process of adding or editing users is simple and well implemented. The automatic attendance tracking also works well and makes it easy for the attendance of a user to be tracked.

4.43 Shortcomings

Questions

The major shortcoming of the implementation of the questions is the actual implementation of how the graphical components are saved. Rather than just the data that is stored in each field being saved the actual JComponent object is serialised. This is ok when the system is running on a fast computer however when running on a slow computer, like those that are used at the computer club, the system grinds to a halt whenever a question has to be saved. This happens when a new question is created or when a user closes a form and their progress is saved. This method of serialising the JComponent also had negative consequences during the development, other than the slow down. Because the actual object was saved, whenever I changed the class file of each component object I would have to delete the entire question database and recreate all the questions as there would be a mismatch between the stored objects and the altered class. This made the prototype very temperamental as the question database was easy to corrupt. There was also no easy way of fixing a corrupt database. This would be unacceptable for the finished system because Steph will not have time to recreate the question database and so it must be reliable in the final system.

There was also no facility to edit questions. I didn't include the facility to edit questions because questions are only around 4 components at most therefore it would be just as fast to create a new question, however I think that the final system would benefit from the ability to edit questions. This is because if a question is recreated all of the user's progress on that question gets wiped because the new 'edited' question has a different id. It also means that the question has to be re-added to all of the forms that it is in. This would be very inconvenient for Steph if she ever had to edit a question.

When a question is deleted it is not deleted from all of the forms that it is in. This means that when one of the forms that it's in in loaded the system produces an error. This effectively breaks all of the forms that the question is in and so makes deleting a question useless. In the final system the system should also remove the question from all of the forms that it's in when the question is deleted.

Forms

When editing a form, the old description is not displayed to the user to be edited and the user has to enter the entire description again. This means that if a form is to be edited the admin has to remember what the old description was and retype it.

Statistics

There are no graphs displayed to the user on the view statistics screen. There is also no way for the user to view statistics about multiple questions at once. This limits the usefulness of the statistics screen because the data could be represented in a better way and there is only so much information that can be conveyed only by using labels.

The layout of the statistics panel is also quite poor as everything is in one column and it's not clear immediately what each part of the screen does. This is because the layout from the design wasn't able to be achieved because I omitted graphing and decided on an easier layout for the prototype.

User

The user data isn't encrypted in the prototype. This doesn't matter for the prototype because only 'dummy' data is used, however for the final system it's very important that encryption is implemented well because sensitive data will be stored about each user.

The user screen of the system is perhaps the worst laid out screen. The main purpose of the screen is to show the data stored about each user to the admin user, however this isn't effectively done in the prototype. This is because the majority of the space is taken up by the buttons at the bottom of the screen and this means that the table is very small and only a few users can be seen at a time.

The register is also poorly laid out because so many users are on it and so it's a bit too densely populated with names.

4.44 Suggestions for Improvements

Questions

Fixing the implementation of the saving of questions is the main improvement that needs to be made. The data stored in each field should be saved rather than directly saving the JComponent object. This will speed up the system a large amount and is essential for the system to run well on the slow computers of the computer club. It will also mean that the database is less likely to become corrupt and so the system will be more reliable.

Adding the facility to edit questions would also be a good improvement because it means that if a small error is made in a question it will be able to be fixed easily without having to recreate the entire question and update the forms that it's in. However, I don't think that I will be implementing it because this will encourage the admin to create longer questions, and really questions should only be 1 row of components in order to stop the admin simply creating an entire form as a question. Because questions are very few components it wouldn't be much of a benefit to be able to edit them. If a question was edited it also means that the statistics stored about the question would be invalid as the older version of the question could have been easier or harder. It makes more sense for the old question to just be deleted from the system and a new one created instead.

When a question is deleted it should be automatically removed from all of the forms that it's in so those forms aren't corrupted.

Forms

A more robust way of editing forms would be a good improvement. This is would include the old description of the form being able to be edited rather than having to enter an entirely new description. The difficulty should also be able to be edited like this also.

It would be good if there was a way to enter a name for each form so that the forms can have another way be identified rather than just the description (e.g. "Blue badge form"). This might make it easier for users to find forms in the system. It also means that when editing forms, the form to be edited can be selected by title rather than by ID which is easier and more user friendly.

The layout of forms could be improvement. Making them take up the entire screen would be better, with realistic spacing between questions. It would also be good if the admin could add headings to different sections of the forms as this would mean that the forms would more closely mimic real world forms. The potential to add pages / have the system automatically add pages would be good for large forms too.

Statistics

A potentially better way of monitoring the time spent on each question could be implemented. This could be taking into account where the text cursor is in additional to where the mouse pointer this. However, this may not make much of an improvement because it would be difficult to tell which question the user was attempting if the mouse pointer and the text cursor were in different places.

It would be good if there was a way for the user to view the statistics for multiple questions at once. It would also be better if the user could select questions from the question table rather than just selecting questions by id. This is because the user wouldn't actually know the id of the question as it's hidden from them in the system. Using the question table means that the user would be able to search, sort, and preview the questions before selecting one.

User

A better layout of this screen should be implemented (like that detailed in the design). A more intelligent register could be used to make it easier for the admin to take a register and to reduce the clutter of displaying all of the users in the register. This more intelligent register system could only show the users that have attended at least once in the past two weeks and if the admin wanted to mark a user that wasn't present in the past two weeks they would have to search for them by first name. This would be a good way of reducing the clutter because it's most likely that the users that are present will be those that were present in at least one of the last two sessions. Populating the register this way means that those users that don't come anymore won't appear in the register without having to delete their accounts.