



Testing Methodology to test Online Examination Application developed in SAP ABAP

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Abstract: Development of any application or system requires it to be tested for its proper functioning in all its areas. Online Examination Application is developed in SAP ABAP to conduct and manage the examination via an online environment. Testing this application is necessary to identify any bugs hampering its proper working. Manual testing is performed on Online Examination Application, to identify as many bugs as possible and produce the application that can be used to effectively conduct the exams.

Keywords: LAN, SAP, ERP, OEA, ABAP, Testing, Manual Testing.

I. Introduction

Online Examination Application has been developed as a system which conducts the exams online. This system is developed using SAP ABAP. SAP is a multinational software corporation based in Germany that makes enterprise software to manage business operations and customer relations. ABAP (Advanced Business Application Programming), a high level language created by SAP for building business applications.

This project is developed to test the Online Examination Application. Testing a software system means identifying the defects in the software, that is hampering the proper working of the system. Testing can be conducted at various levels such as unit level, system level etc., according to the requirements of the project. Also, the different types of testing can be conducted such as functional or non-functional testing, confirmation or regression testing etc.

This project aims at testing the Online Examination Application, so that the new users can successfully register for the exams and can give the exams online. Testing is necessary for this system as various checks are applied at different screens of the system. For instance, the registration page of the Online Examination Application consists of various fields to be filled in by the user. These include email address, first and last name, contact number etc. Testing ensures that there are not any special characters used in email address field, or the date entered in date of birth field is not invalid. Similarly, in Main Exam page, all the buttons such as instruction button, submit button, question number button, next and previous buttons should work properly. This is ensured with the help of testing.

II. Theoretical Framework

The Online Examination Application is developed using SAP ABAP.

SAP system was introduced as an Enterprise resource planning (ERP) software designed to coordinate all the resources, information and activities to automate the business process. It stands for Systems Applications and Products and as a business software, it integrates all applications running in an organization. These applications represent various modules on the basis of which business areas are jointly executed to accomplish the overall business logic. The integration is done by SAP by creating centralized database for all applications running in an organization. [1]

ABAP stands for Advanced Business Application Programming. It is a fourth generation language, first developed in 1980's. It was originally used to develop the SAP R/3 system. Later, it was used to enhance SAP applications, by using it for creating customized reports and interfaces. [1]

A. Candidate Module

The candidate module is used to register the new candidates and for taking their exam. It is divided into two areas:

1) Registration page

The registration page is used by the candidate to register him / her for the examination by providing all the necessary details as asked in the registration form. For successful registration, the following checks are applied on the registration form. [2]

- There should be no special character in the email address field.
- There should be no alpha numeric character in first name field of student.
- There should be no alpha numeric character in last name field of student.
- There should be no special character in the address of the student.

- There should be no alpha numeric character in city field.
- There should be only numeric characters in Contact Number & Pin code field.
- The age of the student appearing for exam should not be less than 18 years and more than 50 years & it should be in between 1950 and 1995.

2) *Main Exam Page*

The main exam page is the page where the candidate gives his/her exam. As soon as the candidate enters this page, the timer starts. The time duration for the exam is 20 minutes including the time for reading the instructions. Once the timer gets terminated then the candidate is navigated out of the test window [2].

Other features of this page are as follows:

- On clicking the instructions button, the instructions are displayed for taking up the exam.
- On clicking at the Start Exam button the candidate can start taking up the exam. Once the start button is clicked, it is disabled. The first question appears when Submit button is clicked.
- There are navigation buttons, Next and Previous to navigate between the questions. However, there is no such provision where the candidate can switch to any of the unanswered question from the current question i.e. the non-highlighted question cannot be jumped to from any of the highlighted ones [2].
- Every question has options for answers as radio buttons. When a radio button is clicked to answer the question, the response is submitted to the database and is saved there. If the users want to change the response then it can also be done. [2,4]

B. Administrator Module

The Administrator module is used to upload the questions papers for the exams and for displaying the result.

1) *Uploading Questions Module*

This module is used to upload the questions. The upload question module asks for delimited text containing questions with answer which can be stored on the system or any removable drives. After selecting the file, a message will pop up confirming the upload of questions successfully.

2) *Display Result Module*

The Display Result Module is used to display the result of the candidates who have appeared for the exam. Result can be displayed on screen or as a PDF file.

III. Practical Application

For conducting testing, a procedure was followed which consisted of preparing the test cases and then executing them on the actual system. The test cases are shown from table 1-15 along with their execution results from figures 1 to 15. The testing of the entire application is done for all four modules: Registration page, Main Exam page, Uploading Questions Page and Display Result Page.

Table 1: Test Case 1

Test Case ID: 1
Test Case Title: Registration page all fields test
Description: It will check whether the system shows error or not if all the fields are not entered by the user while registration
Test Execution Date: 13 Nov 2013
Steps: <ol style="list-style-type: none"> 1. Click on the Registration Page Shortcut. 2. In the registration page, leave at least one field blank while fill all the other fields. 3. Execute or press F8.
Expected Results: If even one field is left blank by the user then the system should show an error that all the fields are necessary to be filled
Actual Result: It shows an error 'You are required to fill all details'
Status(Pass/Fail): Pass
Figure No: 1,2 ,3,4

Figure 1: Registration Page All field Test.

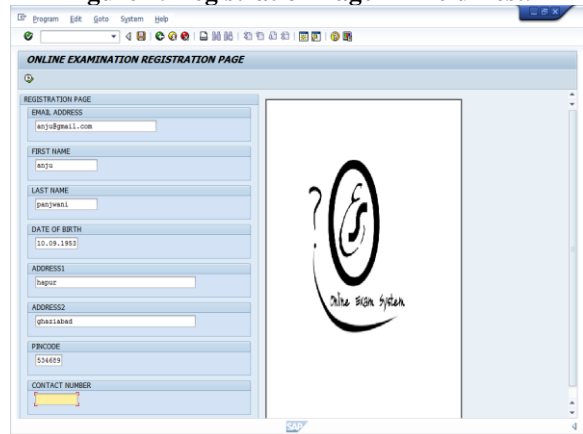
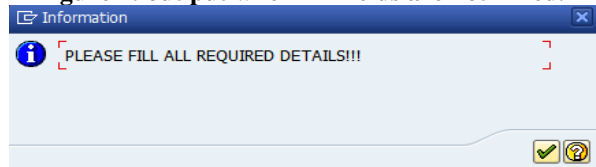


Figure 2: out put when All fields are not Filled.



The registration page requires all the fields to be filled for a successful registration. However, when first time the testing was performed on registration page, the candidate was getting registered even all fields were not filled by him/her. The constraints were applied after first time testing.[3] So the following screenshots were taken:

Figure 3: while registration, only field is Filled.

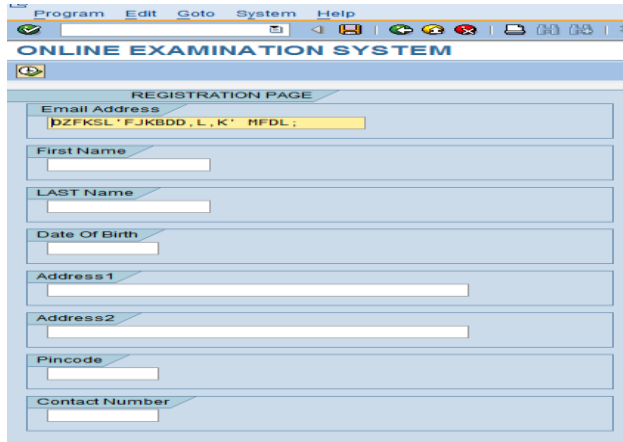


Figure 4: Database showing that the candidate is registered Even if only one field has been filled while registration.

Table: OES_REGTABLE
Displayed Fields: 8 of 8 Fixed Columns: 1 List Width: 6250

EMAIL_ADDRESS	FIRST_NAME	LAST_NAME	DATE_OF_BIRTH	ADDRESS1	ADDRESS2	PINCODE	CONTACT_NO
ABC@PMAIL.COM	RAHUL	KUMAR	18.05.1990	E - 103, EAST BAGARPUR, KRISHNA GALLI	SHAHADARA, DELHI	110032	9806112035
ABC@PMAIL.COM	KAPIL	KUMAR	18.05.1990	EAST BAGARPUR	SHAHADARA	110032	9851982031
ABC@PMAIL.COM	ANJU	CHADRA	19.09.1987	JANAKPURI	DELHI	110076	2513284823
DZFKSL'FJKBDD.L,K' MFDL;			00.00.0000			000000	0000000000
EWAP11@GMAIL.COM	KAPIL	NINGER	18.05.1990	E - 103,	SHAHADARA, DELHI	110032	9851982031
SHMETANK@PMAIL.COM	SHMETANK	SHARMA	15.03.1990	HOUSE NO. 5 & 6, MBA BLOCK	RAMPRAKSHA COLONY	201011	9899220542

Figure 5: Registration Page Month check test

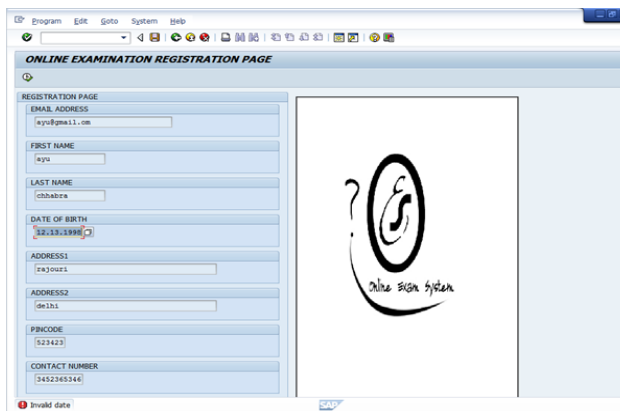


Table 2: Test Case 2

Test Case ID: 2
Test Case Title: Registration page Month test
Description: It will check whether the month entered by the user in the date of birth field of registration page is valid or not.
Test Execution Date: 13 Nov 2013
Steps: 1. Click on the Registration Page Shortcut.

2. In the registration page, enter the month greater than 12 in the date of birth field.
3. Execute or press F8.
Expected Results: The month in the date of field should be between 1-12 only. If it is greater than 12, then an error should be displayed that it is invalid.
Actual Result: error is displayed as 'Invalid date' when month is entered greater than 12.
Status(Pass/Fail): Pass
Figure No: 5

Similar to checking the month entered in the date of birth field, dates and year checks were also done. As per the constraints applied, an error was shown if the date was not input between 1 to 31, including the upper and lower limits, and the year if not input between 1950 and 1995.[6,8] The email address field was also tested such that it does not contain any symbols or special characters.

Table 3: Test Case 3

Test Case ID: 3
Test Case Title: Registration page special characters in email id test
Description: It checks that no special characters, except for one '@', are added in the email address field of the registration page.
Test Execution Date: 13 Nov 2013
Steps: 1. Click on the Registration Page Shortcut. 2. In the registration page email address field, enter special characters like £, \$, % etc. 3. Execute or press F8.
Expected Results: If special characters other than one single @ are entered, then error should be displayed.
Actual Result: The error is displayed : 'Do not fill unwanted characters'.
Status(Pass/Fail): Pass
Figure No: 6,6

Figure 6: Email Address Field constraints check test

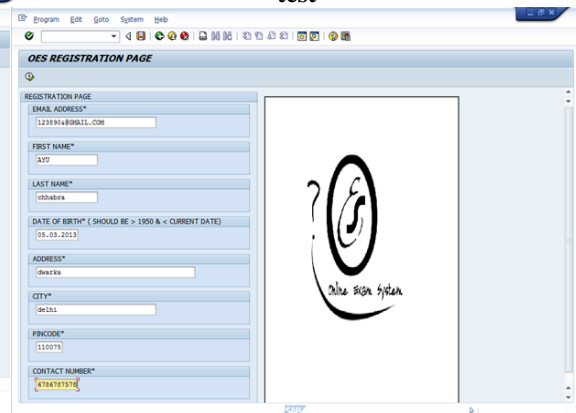
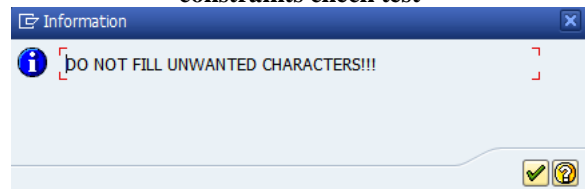


Figure 7: Output for Email address field constraints check test



The first name or last name constraints were applied that they should not contain alphanumeric characters or any other special characters.

Table 4: Test Case 4

Test Case ID: 4
Test Case Title: Registration page special characters in last name test
Description: It checks that whether there are any special characters in the first or last name fields in the registration page.
Test Execution Date: 13 Nov 2013
Steps: <ol style="list-style-type: none"> 1. Click on the Registration Page Shortcut. 2. In the registration page first or last name field, enter special characters like £, \$, % etc.. 3. Execute or press F8.
Expected Results: If special characters are entered in the first name or last name fields, then error should be displayed.
Actual Result: The error is displayed correctly.
Status(Pass/Fail): Pass
Figure No: 8,9

Figure 8: Last Name Constraint check test

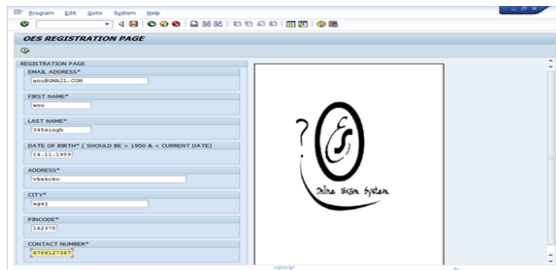
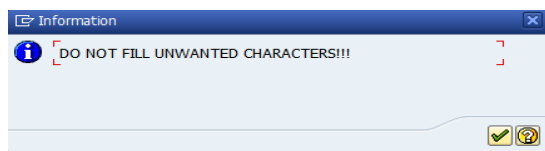


Figure 9: Output of last name constraints check test.



Testing the Main Exam page

Testing the Main Exam page includes testing whether the Instruction button, Start button, Navigation Buttons such as previous or next and Question number buttons etc are working properly or not.

Table 5: Test Case 5

Test Case ID: 5
Test Case Title: Main Exam page Instruction Button test
Description: It will be checked that when the Instructions Button is clicked on the main exam page, the instructions are displayed or not.
Test Execution Date: 14 Nov 2013

Steps: <ol style="list-style-type: none"> 1. Click on the Exam Main Page Shortcut 2. The Main Exam page is displayed. Click on 'Instructions' Button.
Expected Results: When the Instructions Button is clicked, the Instructions should be displayed.
Actual Result: The instructions are displayed when the user clicks the instruction button
Status(Pass/Fail): Pass
Figure No: 10

Figure 10: Output of Main Exam page Instructions button

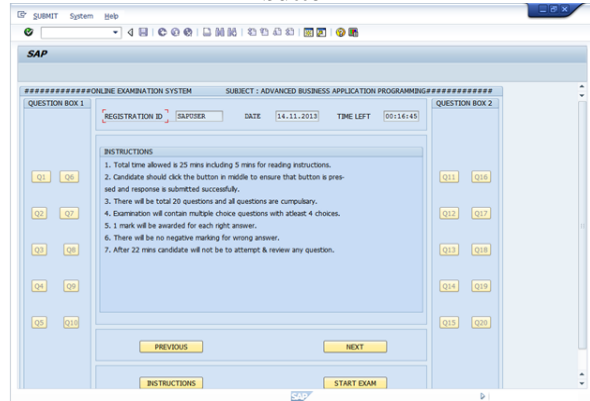


Table 6: Test case 6

Test Case ID: 6
Test Case Title: Main Exam page Start button test
Description: To start the exam, the start button is clicked by the user. This test will check that when start button is clicked, whether first question is displayed or not and the start button is disabled or not.
Test Execution Date: 14 Nov 2013
Steps: <ol style="list-style-type: none"> 1. Click on the Exam Main Page Shortcut. 2. Click the 'Start Exam' button.
Expected Results: When the start Button is clicked, the system should display the first question and the start button should be disabled.
Actual Result: The first question appears on the click of the start exam button, and the start button is disabled.
Status(Pass/Fail): Pass
Figure No: 11

Figure 11: Output of Main Exam page Start Exam button

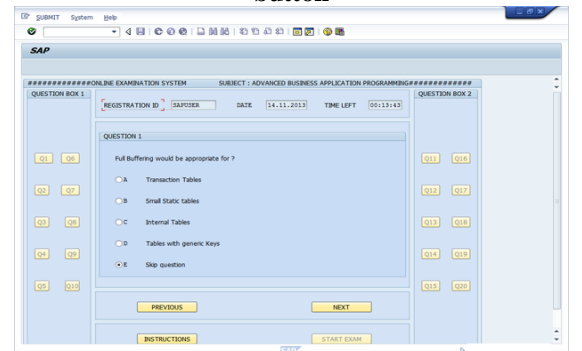


Table 7: Test Case 7

Test Case ID: 7
Test Case Title: Radio Buttons working in Main Exam page test
Description: It will check that whether clicking the radio button for selecting the answers will submit the user response or not.
Test Execution Date: 14 Nov 2013
Steps: 1. Click on the Exam Main Page Shortcut. 2. Click on start exam. 3. Click a radio button.
Expected Results: Once the radio button is clicked, it should submit the response to the database
Actual Result: The response is submitted successfully
Status(Pass/Fail): Pass
Figure No: 12,13

Figure 12: Radio Buttons working in Main Exam page

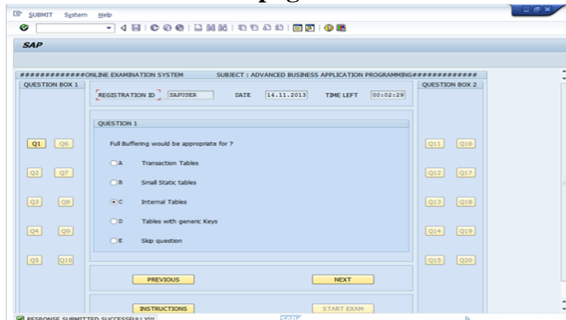


Figure 13: Output showing responses submitted successfully to the database

QSTN_NO	USER_NAME	E_DATE	SELECTED
01	GESNOV130002	00.00.0000	C
01	GESNOV130003	00.00.0000	A
01	GESNOV130003	13.11.2013	A
01	GESNOV130004	00.00.0000	A
01	GESNOV130004	13.11.2013	A
01	GESNOV130005	00.00.0000	A
01	GESNOV130005	13.11.2013	A
01	GESNOV130007	00.00.0000	E
01	SAPUSER	00.00.0000	E
01	SAPUSER	13.11.2013	A
01	GESNOV130002	00.00.0000	C
02	GESNOV130003	13.11.2013	E
02	GESNOV130004	13.11.2013	E
02	GESNOV130005	13.11.2013	A
02	GESNOV130007	00.00.0000	C
02	SAPUSER	00.00.0000	C
02	SAPUSER	13.11.2013	A
03	GESNOV130002	00.00.0000	E
03	GESNOV130003	13.11.2013	C
03	GESNOV130004	13.11.2013	A
03	GESNOV130005	13.11.2013	A
03	GESNOV130007	00.00.0000	E
03	SAPUSER	13.11.2013	C
04	GESNOV130002	00.00.0000	E
04	GESNOV130003	13.11.2013	C
04	GESNOV130004	13.11.2013	A
04	GESNOV130005	13.11.2013	E
04	GESNOV130007	00.00.0000	E

From Figure 12, it can be seen that there were more than one user at a particular point of time. The testing was done with about 15 users giving exams under ideal conditions and the exam was successfully accomplished. Hence the system at least could hold the load of 15 users at a time. [7]

Testing the Uploading Questions page

The Uploading Questions Module is used to upload the question papers for the exam.

Table 8: Test Case 8

Test Case ID: 8
Test Case Title: Uploading questions test
Description: It will check that the file containing the questions can be successfully uploaded or not.
Test Execution Date: 14 Nov 2013

Steps: 1. Click on the Upload Questions Shortcut. 2. Enter the name of the file which contains the questions. 3. Click open.
Expected Results: The questions should be uploaded when the file name is given.
Actual Result: The questions are uploaded according to the file name given.
Status(Pass/Fail): Pass
Figure No: 14,15,16

Figure 14: Uploading the file

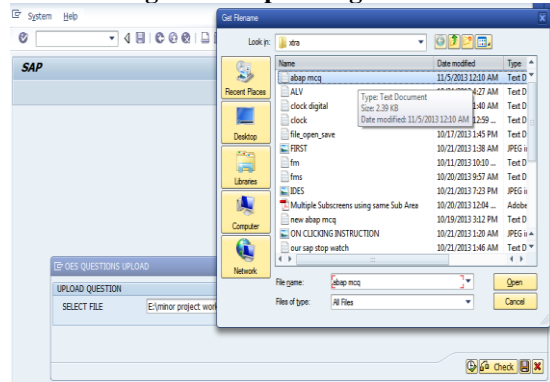


Figure 15: Question Numbers uploaded

QSTN_NO
01
02
04
05
06
07
08
09
10
11
12
13
14
15
16
17
18
19
20

Figure 16: particular question showing its choices and correct answer.

Table ZOESEXAM Display	
QSTN_NO	1
QUESTION	Full Buffering would be appropriate for?
RESP A	Transaction Tables
RESP B	Small Static tables
RESP C	Internal Tables
RESP D	Tables with generic Keys
ANSWER	B

Testing the Disply Result Page

The Display Result page is tested to show that the result of a particular candidate is displayed at a specified location.

Table 9: Test Case 9

Test Case ID: 9
Test Case Title: Display Result test
Description: It will check that whether the result is displayed on the specific location or not.
Test Execution Date: 14 Nov 2013
Steps: <ol style="list-style-type: none"> 1. Click on Display Result Shortcut. 2. Provide the information such as registration id, location for result and exam date.
Expected Results: The result should be displayed in the PDF format at the specified location.
Actual Result: The result is displayed at the specified location.
Status(Pass/Fail): Pass
Figure No: 17

Figure 17: Result of specific user displayed successfully.

ONLINE EXAMINATION RESULT		
REGISTRATION ID : OESNOV130003		
TOTAL MARKS : 40		
MARKS OBTAINED : 2.0000000000000000E+00		
EXAM DATE : 20131113		
QUESTION	ORIGINAL ANSWER	ANSWER ATTEMPTED
1	B	ANSWER ATTEMPTED
2	A	B
3	B	D
6	B	A
4	B	C
5	A	A
7	D	B
8	C	C
9	D	D
10	A	A
11	C	B
12	C	C
13	D	B
14	C	C
15	B	C
16	A	C
17	A	A
20	B	D
18	C	B

IV. Conclusion

It can be concluded that testing plays a very important role in the life cycle of the project. Testing has helped to identify the various bugs in the software. Testing the Online Examination Application has removed almost all the possible bugs, and put the system into a steady state.

V. Functioning Of OEA

System is operated at a high level of efficiency and all the teachers and user associated with the system understands its advantage. The system solves the overhead associated manual type of examination.

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