Appendix A

References

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Appendix B

Moodle

This section presents a brief description to the Moodle Learning Management System (LMS) (Moodle, 2013c).Moodle (Modular Object-Oriented Dynamic Learning Environment) is the most popular open source learning management system that is currently in use. According to the statistics provided in the Moodle website, there are 84,578 registered sites from 236 countries (plus unregistered sites). This has caused that over 7,623,491 courses are currently active and around 71,495,021 users are using this LMS (Moodle, 2013d).

History

Moodle was originally developed by Martin Dougiamas to help educators create online courses with a focus on interaction and collaborative construction of content, and is constantly evolving. The first version of Moodle was released on 20 August 2002. A large part of its success is due to its modular structure, which allows any developer to create additional modules and features easily.

Origin of the name

The acronym Moodle stands for Modular Object-Oriented Dynamic Learning Environment. (In the early years the "M" stood for "Martin's", named after Martin Dougiamas, the original developer). Moodle is also a verb that describes the process of lazily meandering through something, doing things as it occurs to do them, an enjoyable tinkering that often leads to insight and creativity. As such it applies both to the way Moodle was developed, and to the way a student or teacher might approach studying orteaching an online course. Anyone who uses Moodle is known as a "Moodler" (Moodle, 2013c).

Due to the ease of expansion, a lot of users have developed their own modules and then have shared them with the community. The existence of a powerful community of non-profit users has resulted in the creation of a vast collection of tools.

Pedagogical Approach

The stated philosophy of Moodle includes a constructivist and social constructionist approach to education, emphasizing that learners (and not just teachers) can contribute to the educational experience. Using these pedagogical principles, Moodle provides a flexible environment for learning communities.

Features of Moodle

Moodle's basic presentation structure is organized around courses. These are basically pages or areas within Moodle where teachers can present their learning resources and activities to students. They can have different layouts, but they usually include a number of central sections where materials are displayed and side blocks offering extra features or information.

Main user roles can be categorized as Administrator, Student and Teacher. Standard user roles of Moodle can be listed as:

- Site administrator - can "do everything" on the site
- Manager - a lesser administrator role
- Course creator - can create courses
- Teacher - can manage and add content to courses
- Non-editing teacher can grade in courses but not edit them
- Student - can access and participate in courses
- Guest - can view courses but not participate
- Authenticated user - the role all logged in users have
- Authenticated user on the front page role - a logged in user role for the front page only

A course is basically made up of resources and activities. A resource is an item that a teacher can use to support learning, such as a file or link. Moodle supports a range of resource types which teachers can add to their courses. The resources available in a standard Moodle distribution can be listed as follows.

- Book - possibilities to create an HTML book
- File - allows to upload one or multiple files such as pictures, PDF documents, spreadsheets, sound files or video files
- Folder - helpings organize files and one folder may contain other folders

- IMS content package - allows to add static material from other sources in the
- standard IMS content package format
- Label - use to display words or an image to separate resources and activities in a particular section
- Page - a single, scrollable HTML page created by teachers
- URL - a link to another website, for example Wikipedia, YouTube, etc.

An activity is a task in which the teachers want their students to participate actively (Moodle, 2013c). There are 14 different types of activities in the standard Moodle but other activities developed by community members can be included manually as well. The main activities can be listed as follows:

- Assignments - enable teachers to grade and give comments on uploaded files and assignments created on and off line
  - Upload a single file - enables the learners to upload a single file
  - Advanced uploading of files - allows the students to upload multiple files
  - Online text - allows the students to write a text by using the text editor.
  - Offline activity - is useful when the assignment is performed outside of Moodle. Students can see a description of the assignment, but can't upload files or anything.
- Chat - allows participants to have a real-time synchronous discussion
- Choice - a poll where the teacher asks a question and specifies a choice of multiple responses
- Database - enables users to create, maintain and search a database of records
- Feedback - a survey to collect feedback
- Forum - allows users to have asynchronous discussions
- Glossary - enables users to create and maintain a list of definitions, like a dictionary
- Lesson - allows delivering content in a flexible way
- Quiz - allows the teacher to design and set quizzes, which may be automatically marked along with the feedback
- SCORM - enables SCORM packages to be included as course content
- Survey - allows to gather data about the nature of the course from students

- Wiki - A collection of web pages that anyone can add to or edit
- Workshop - enables peer assessment where the students must submit their work and assess other students' work.

In addition to resources and activities, Moodle provides other facilities such as grade book, course backup, course setting, reports and etc. Grade book is where all the grades of each student in a course are stored. The grader report collects items that have been graded from the various parts of Moodle, and allows teachers to view, change and sort them out into categories. The total can be calculated in various ways as well. When an assessment item is added into the Moodle course, the grade book automatically creates space for the grades and also adds the grades as they are generated. Later, students can view the grades for each item along with the total course marks as a report. Reports consist of logs, live logs, activity reports and course participation reports. Logs can be selected based on participants, date, activities and actions. Live logs display the users who are online for the last one hour along with their IP address, time, username and action. The activity report displays all the activities of the course along with the number of views and last access data and time. Finally course participation shows the user participation throughout the whole course. This can be also selected based on a particular activity, days or user roles. Additionally, Moodle consist of blocks. Blocks are widgets which add additional functionalities to the course. They can be put into any page. Currently there are 37 blocks in the standard Moodle package. It is also possible to create a block according to the guidelines, standards and themes provided in the Moodle development section and add it into a course.

Technological Approach

Moodle runs without modification on Unix, Linux, FreeBSD, Windows, Mac OS X, NetWare and any other systems that support PHP and a database such as MySQL, PostgreSQL, Microsoft SQL Server and Oracle. For the design and development of this research project, Moodle version 2.3.2 was used. This was developed in PHP 5.3.2 and supported MySQL 5.1.33, PostgreSQL 8.3, Microsoft SQL Server 2005 and Oracle 10.2 as DBMSs.

Moodle is interoperable and include features such as:

- Authentication, using LDAP, Shibboleth, or various other standard methods (e.g.IMAP)
- Enrollment, using IMS Enterprise among other standard methods, or by direct interaction with an external database
- Quizzes and quiz questions, allowing import/export in a number of formats: GIFT(moodle's own format), IMS QTI, XML and XHTML.
- Resources, using IMS Content Packaging, SCORM, AICC (CBT), LAMS
- Integration with other Content Management Systems such as Drupal andJoomla.
- Syndication, using RSS or Atom newsfeeds

Moodle Code Structure

Moodle mostly follows a transaction script approach which organizes business logic by procedures where each procedure handles a single request from the presentation). Moodle is an aggregate of many different plugins, rather than a single complex application.

Behind that basic transaction script approach, a lot of the core functionality has been re-factored out into libraries. This provides elements of a domain model. There are two layers used to separate presentation from the business logic. The outer layer is the theme of the Moodle course, which controls the more visual aspects of the Moodle interface. Then there are renderer classes which generate the HTML to be output from the data supplied by the transaction scripts and the domain model.

Unfortunately, neither PHP, nor the Moodle architecture, enforces a clear separation of the UI layer.

Moodle database

The Moodle database comprises of many tables (more than 250) because the whole database is an aggregate of the core tables and the tables belonging to each plugin. However, this large structure is understandable, because the tables for one particular plugin typically only link to each other and a few core tables. All these information were obtained from the Moodle official site (Moodle, 2013c).

Appendix C

Major Codes of the Development

This Appendix presents the most important codes of the OES system. Under this, the credentials of IMS Basic RBV specification is explained. The way the communications were carried-out between the school LMS and the OES system, and Basic OES system and the ITS is also presented.

Communication between the school LMS and the OES System

To make a communication link between the school LMS and the OES system, the URL associated with the particular course of the OES system was obtained. This URL is known as the "Launch URL" as is it used in the school LMS to launch a connection and move to the OES system. After the establishment of this connection, students who were logged into the LMS could automatically login to the OES system through the single sign-on facility. The steps followed for this communication can be explained as follows:

- In the course of the system, it is needed to select "LTI Provider" under the "Navigation" menu.
- Then after clicking on the "Add" button, it will prompt a screen as shown in Figure C.2.
- Under "Tools to be provided", select "Course". Then under that select "Send grades back" and "Force course or activity navigation". Then select the course roles for instructors and learners as "Teacher" and "Student" respectively. After that, enter the "shared secret" of the remote system. In this case, it is the secret key of the school LMS ICT course. Then enter the encoding type and save the data. And then it will display a screen as shown below in Figure C.3.

Figure C.1: Tool settings for LTI provider

Communication between the Basic OES System and the ITS

To communicate between the OES system and the ITS tool, “external tool", a service provided by the OES system was used. The “external tool" has to be configured as below.

From the main site of the system, move to the “settings" section. From there,

Select “Site Administration" ! \Plugins" ! \Activity modules" ! \External Tool".
From there, select \Add external tool configuration" and enter the configuration data as shown in Figure C.4.

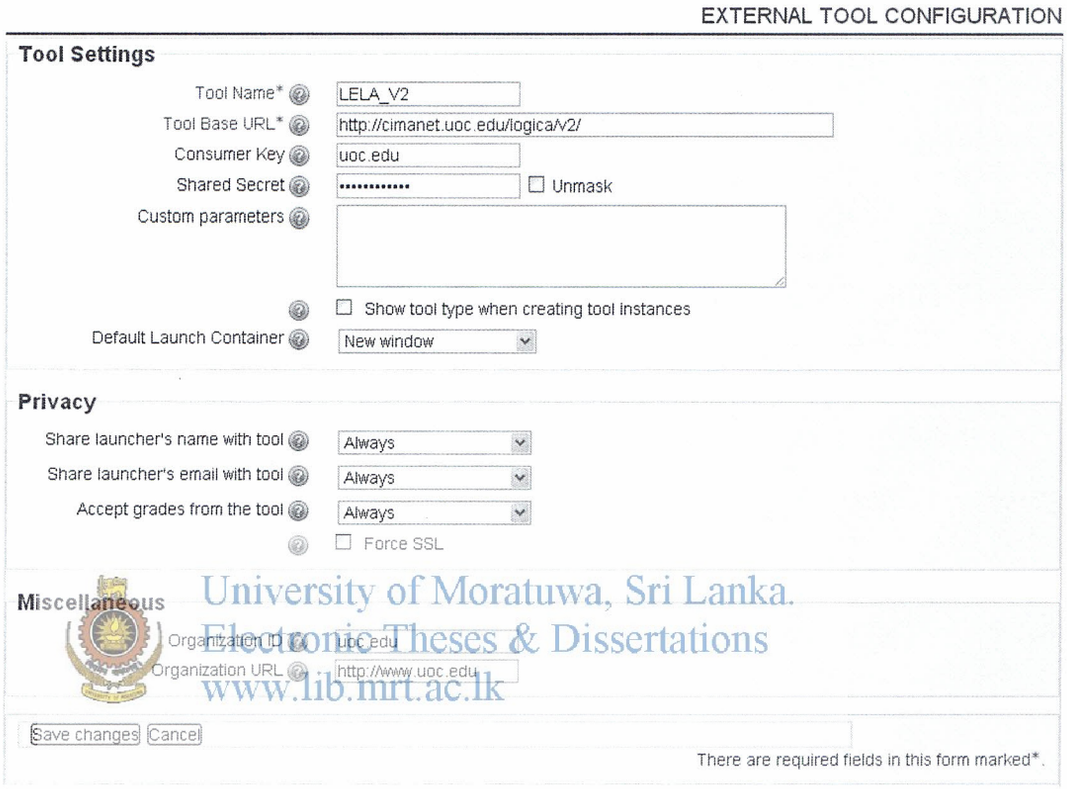


Figure C.2: External Tool Configuration details

After adding those data, it will appear under external tool types.

Then from the course page, it is needed to make a link to the ITS tool. This communication has to be carried-out in a way that students do not have to login again to the ITS tool. Therefore it was not possible to use the “URL” module of the system as it is.

This raised the need to create a special plug-in and it entitled “ITS URL” where the parameters required to make a proper connection such as session_school_id,domain_school_ id, language school_ id and username_school were added. This plugin can be reused for any other tool instead of ITS as shown in Figure C3 by making necessary modifications to the required parameters.

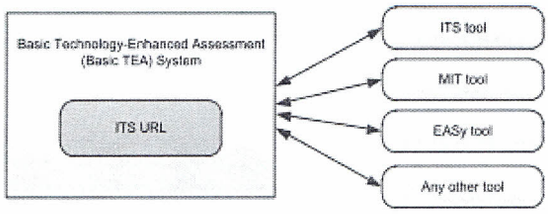


Figure C3: Communication between OES system and any other tool through "ITS

Only the main changes done to the view.php page of the ITSURL is listed as below.

```
//Adding the ITS required parameters
$sessionschoolid = $SESSION->sessionschoolid;
$domainschoolid = $SESSION->domainschoolid;
$languageschoolid = $SESSION->languageschoolid;
$usernameschool = $SESSION->usernameschool;
$lelaurl->externallelaurl .= 'j=' .$sessionschoolid.'&e='
.$domainschoolid.'&g='.$languageschoolid.'&h='.$usernameschool;

//Check if has ''?'' is in the url
if (strpos($lelaurl->externallelaurl, '?')===FALSE) {
$lelaurl->externallelaurl .= '?';
} else {
$lelaurl->externallelaurl .= '&';
}
```


The "ITS URL" was created as a plug-in for the online examination system; therefore it was needed to install it into the system to incorporate with other modules. It was needed to add parameters to the session in the LTI provider. Therefore it was needed to add the following code segment to the tool.php page available in the local/lti provider folder of the OES system. Add the code segments under line 44 of the 'tool.php" code.

```
//Correct launch request
```

```
if ($context->valid) {
// added to get ITS parameters
$SESSION->sessionschoolid = $POST['customsessionid'];
$SESSION->domainschoolid = $POST['customdomaincode'];
$langltilocale = $POST['launchpresentationlocale'];
$langid = 'c'; //english
switch ($langltilocale) {
case 'ca-ES':
$langid = 'a';
break;
case 'es-ES':
$langid = 'b';
break;
case 'fr-FR':
$langid= 'd';
break;
}
$SESSION->languageschoolid = $langid;
$SESSION->usernameschool = $POST['customusername'];
//added to get ITS parameters
```


The ITS parameters which correspond to the above can be listed as:

- j = custom-sessionid
- h = custom-username
- g = launch-presentation-locale
- e = custom-domain-code

It was needed to analyze the ITS tool to understand the changes that are need to be done in order to carry-out a proper communication between the two systems. The developments done to the ITS can be listed as below:

The most essential tables used for the communication between Basic OES system and the ITS Tool

```
create table 'sellltiprovider' (
'id' bigintautoincrement not null,
```

‘domaincode‘ varchar(255) not null,
‘numberpec‘ varchar(50) not null,
‘serviceurl‘ varchar(255),
‘instanceid‘ varchar(255),
‘consumerkey‘ varchar(255),
‘consumersecret‘ varchar(255),
‘sendgrades‘ bit,
‘disabled‘ bit,
‘lastsync‘ datetime not null,
‘extrahash‘ varchar(255),
primary key (id)
) ENGINE = MYISAM ;

create table ‘sellltiprovideruser‘ (
‘id‘ bigintautoincrement not null,
‘ltiid‘ bigint not null,
‘userid‘ bigint not null,
‘usersourceid‘ bigint not null,
‘lastgrade‘ float not null,
‘lastsync‘ datetime not null,
primary key (‘id‘)
) ENGINE = MYISAM ;

- Then a new file called “configlti.php” was created as follows to add the configuration.

- Changes were done to the “check login.php” of in the “lela” folder.

- Created a new file which was directly included int he“lela”foldercalled“sync grades.php”.
- This was created to call the cron service. Cron service was used to automatically pass grades periodically at certain times (for example : every 1 hour) from the LELA system to the OES system.

• Created a class to manage the communication using the OAuth protocol called "cLTIHelper.php"

• Created the required files for the Basic LTI and OAuth communications and included them in a folder called "ims-blti". (Due to space limitations, all the codes are not included here.

This folder mainly consists of:

- blti.php
- bltiutil.php
- OAuth.php
- OAuthBody.php
- TrivialOAuthDataStore.php

After carrying-out all the necessary changes, it was needed to add the new plug-in, "ITS URL" for each activity to automatically direct students to the appropriate skill assessment test in the ITS tool. Then configure the "ITS URL" by adding the "number pec" parameter (this is the ID designated for each Continuous Assessment Test (CAT) of the ITS)

Appendix D

Questionnaire

Questionnaires

Please answer the following questions according to the given scales.

Scales:
1 – Strongly Agree, 2 – Agree, 3 – Undecided, 4 – Disagree, 5 – Strongly Disagree

1. The traditional manual system of conducting examination is the most convenient.	1	2	3	4	5
2. The traditional manual system of conducting examination is faster.	1	2	3	4	5
3. We should stick to the old traditional manual system.	1	2	3	4	5
4. The old online examination system works efficient enough.	1	2	3	4	5
5. The old online examination system looks more familiar to the usual way of conducting examination.	1	2	3	4	5
6. The old online examination system is good enough.	1	2	3	4	5
7. The new online examination system is more convenient to use.	1	2	3	4	5
8. The new online examination system saves more time.	1	2	3	4	5

9. The new online examination system is more user friendly.	1	2	3	4	5
10. It takes a shorter period of time to conduct exams in the new online examination system.	1	2	3	4	5
11. The new online examination system is more familiar to the Web surfing applications.	1	2	3	4	5
12. The new online examination system should be implemented to replace the older system.	1	2	3	4	5
13. The new online examination system is fair and efficient to use.	1	2	3	4	5
14. The new online examination system is more colorful and pleasing to the eyes.	1	2	3	4	5
15. We must use the new online examination system and implemented as soon as possible.	1	2	3	4	5
16. The new online examination system has more useful features than the old system.	1	2	3	4	5
17. The new system should be used in all higher education institutions.	1	2	3	4	5

Appendix E

OES Screen Shots

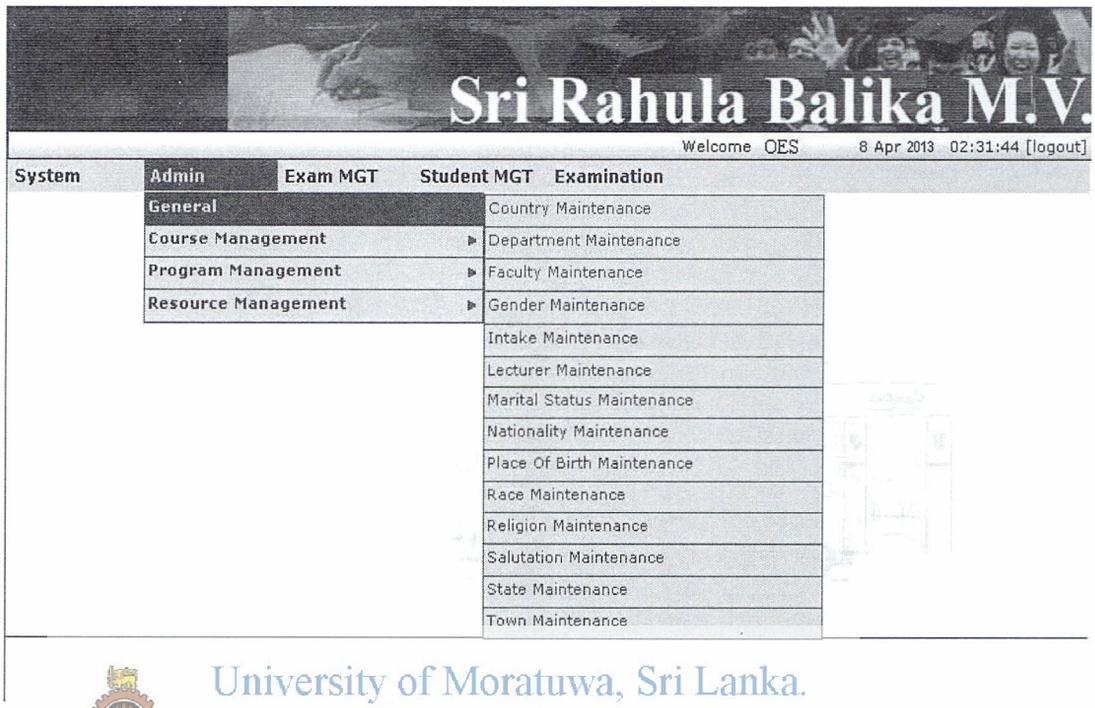
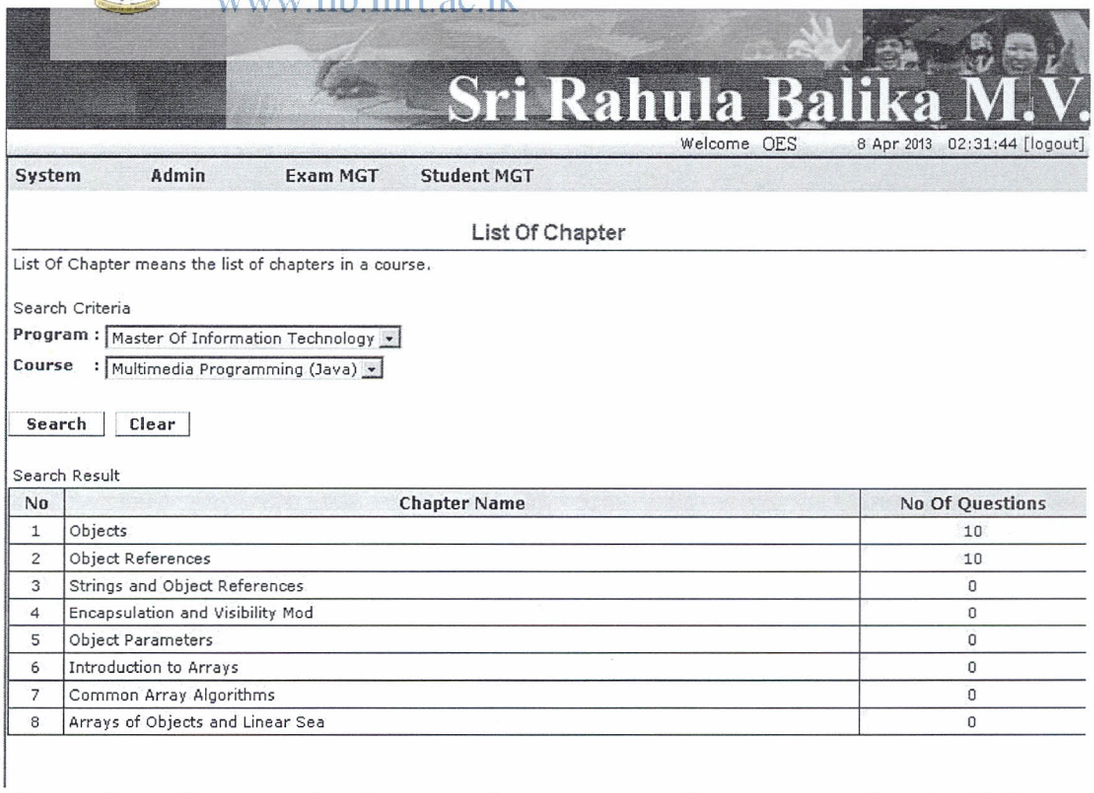


Figure above describes the menu for accessing general maintenance pages in OES.



No	Chapter Name	No Of Questions
1	Objects	10
2	Object References	10
3	Strings and Object References	0
4	Encapsulation and Visibility Mod	0
5	Object Parameters	0
6	Introduction to Arrays	0
7	Common Array Algorithms	0
8	Arrays of Objects and Linear Sea	0

Figure above illustrates the chapter maintenance page for courses register in OES.

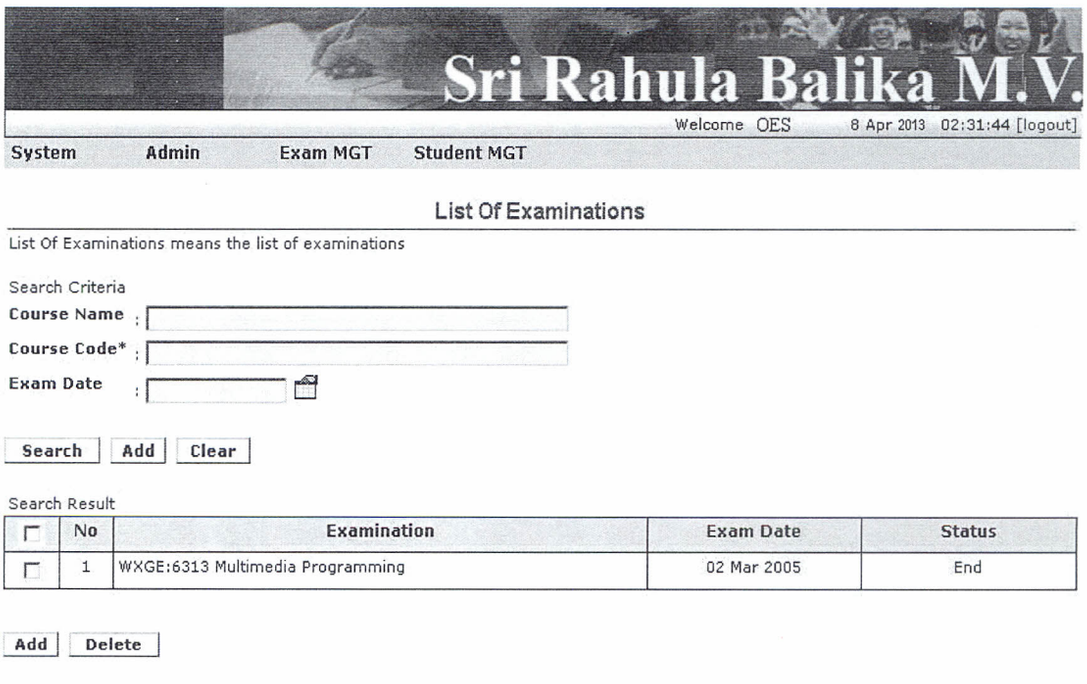


Figure above illustrates the list of examination created by lecturer in OES.

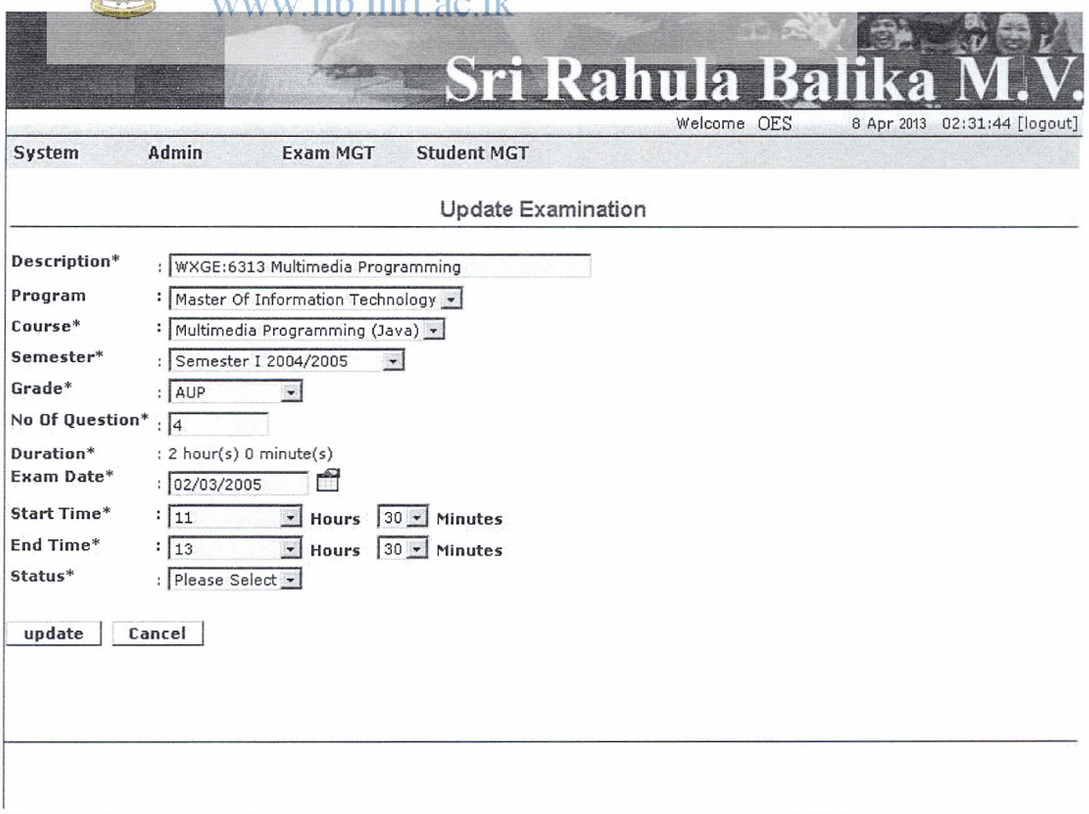


Figure above describes the examination maintenance screen in OES.

Welcome OES 8 Apr 2013 02:31:44 [logout]

System Admin Exam MGT Student MGT

List Of Chapter

List Of Chapter means the list of chapters in a course.

Search Criteria

Program : Master Of Information Technology

Course : Multimedia Programming (Java)

Search Clear

Search Result

No	Chapter Name	No Of Questions
1	Objects	10
2	Object References	10
3	Strings and Object References	0
4	Encapsulation and Visibility Mod	0
5	Object Parameters	0
6	Introduction to Arrays	0
7	Common Array Algorithms	0
8	Arrays of Objects and Linear Sea	0

Figure above describes the number of questions group by chapter for a particular coursecurrently available in question bank.

Welcome OES 8 Apr 2013 02:31:44 [logout]

System Admin Exam MGT Student MGT

List Of Examination Questions

List Of Examination Questions means the list of examination questions.

	No	Question Bank
☐	1	What attributes do all real world objects have?
☐	2	What attributes do all Software objects have?
☐	3	What is the defining characteristic of a von Neumann computer?
☐	4	When you run a Java application by typing java someClass what is the first method that starts?
☐	5	What is a class?
☐	6	What is another name for creating an object?
☐	7	What are the static variables and methods of a class?
☐	8	Which of the following invokes the method length() of the object str and stores the result in val?
☐	9	How many objects of a given class may be constructed in an application?
☐	10	Which of the following is correct?

Add Delete Back

Figure above describes the list of examination questions in OES question bank.

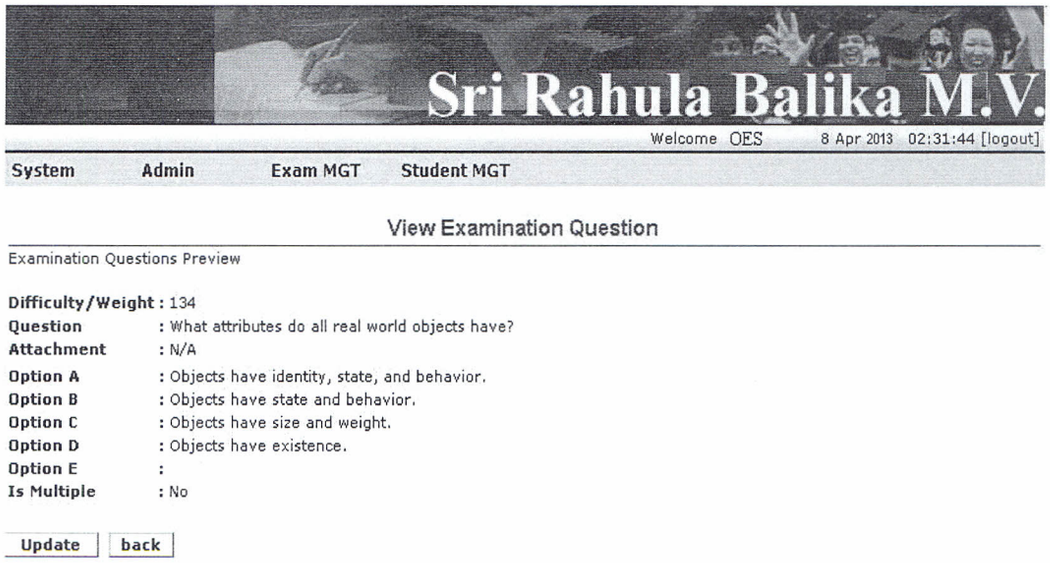


Figure above illustrates the question detail for the selected examination question.

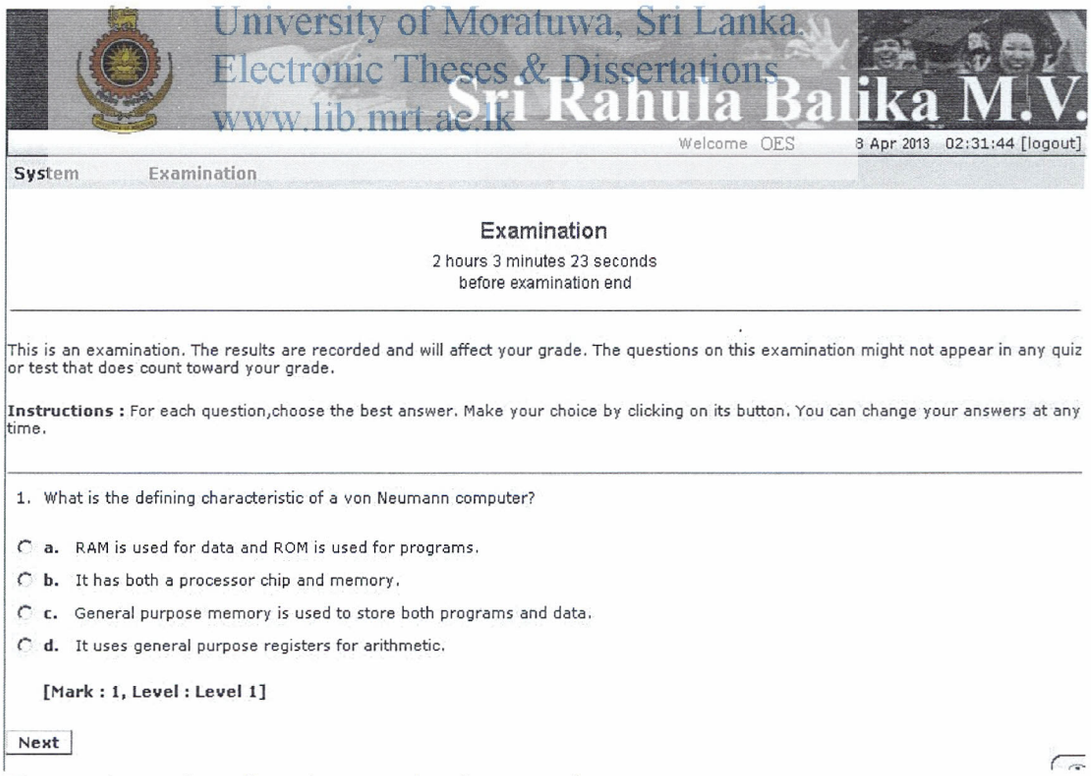


Figure above describes the examination question page.

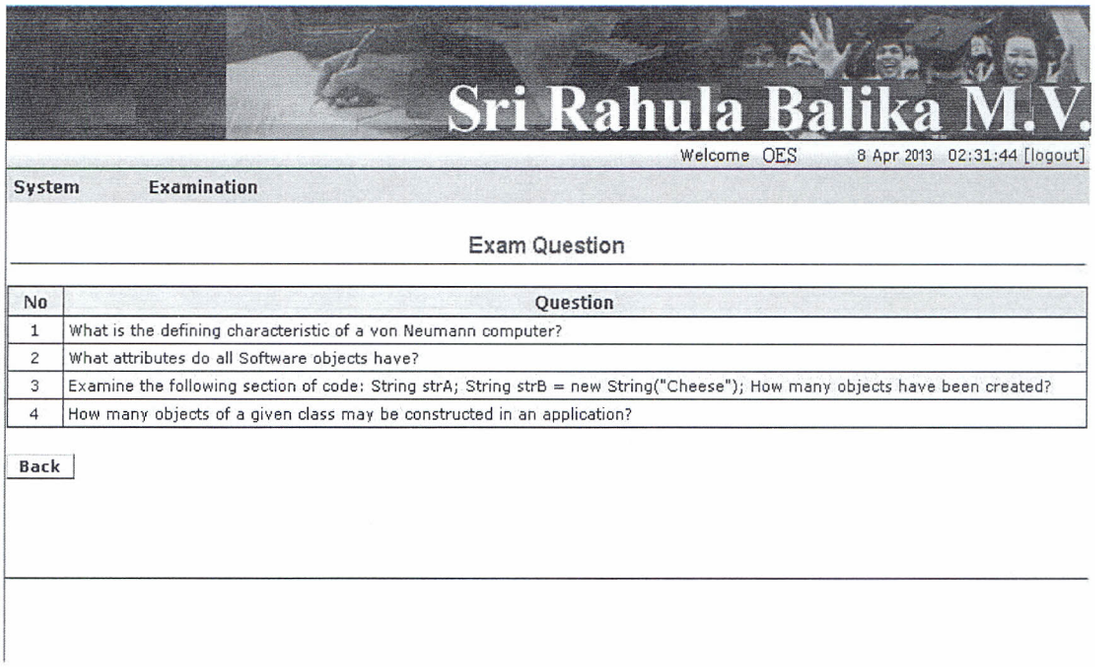


Figure above shows the list of questions that student had answered in a particular examination.

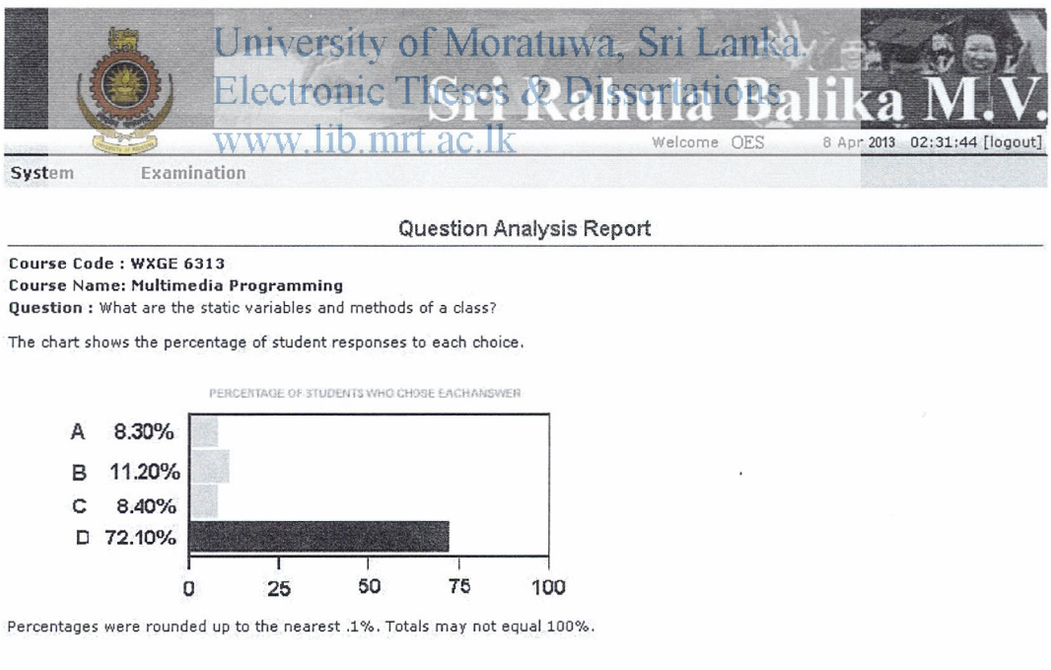


Figure above shows the percentage of student responses to each choice.

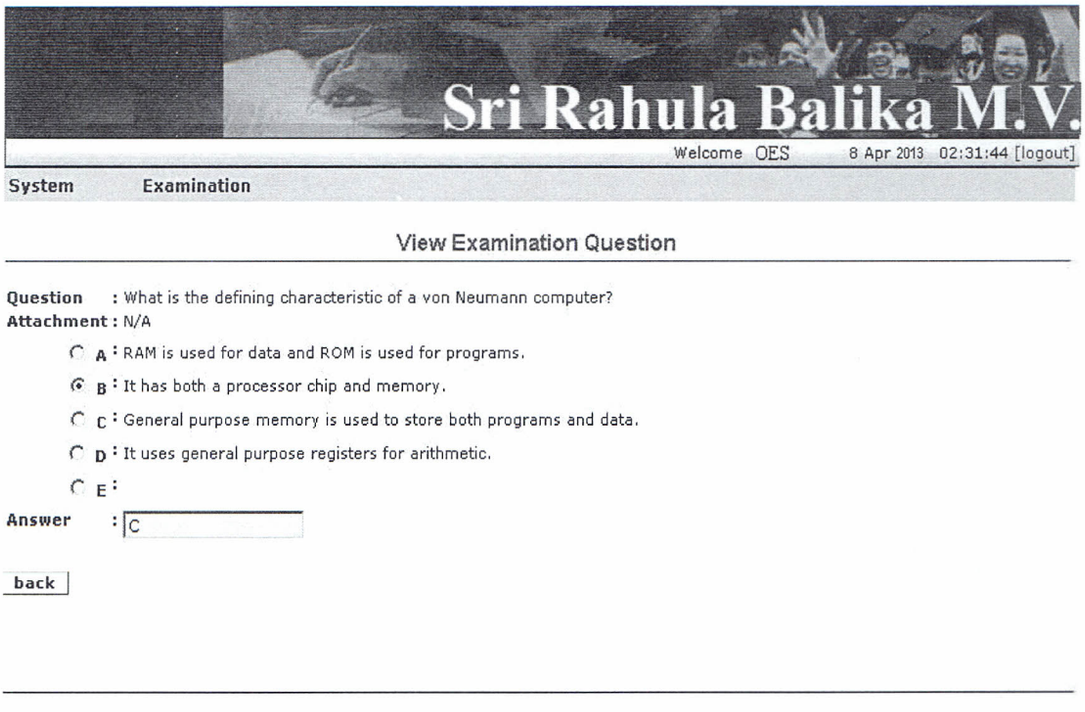


Figure above shows the student's answer for a particular question in the examination.

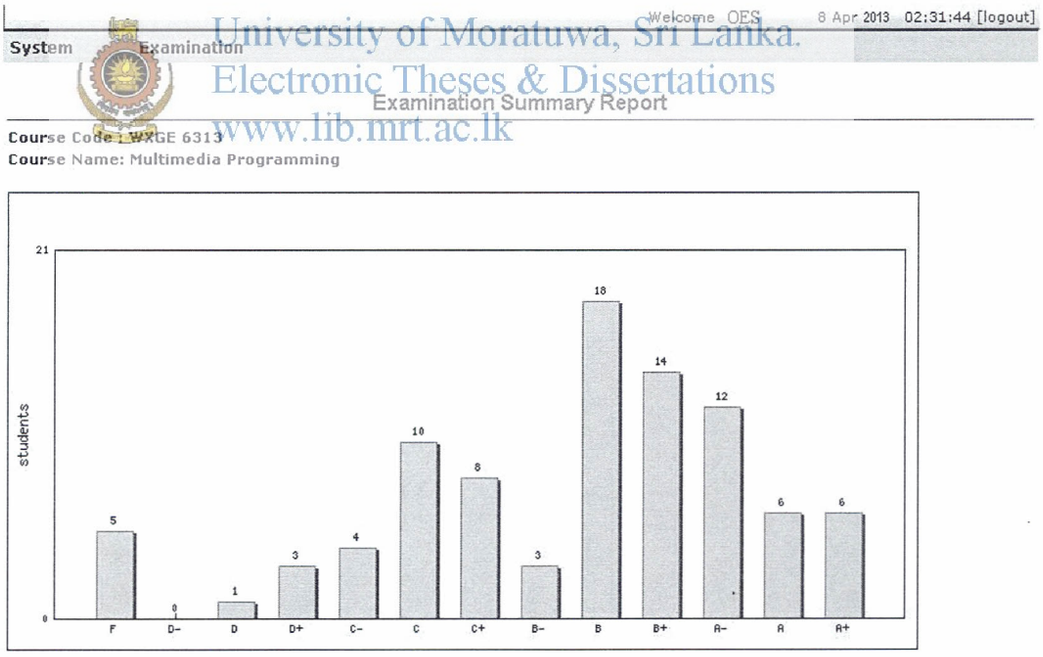


Figure above shows the student's performance for a particular course in the examination

Appendix F

WP/JAYA/Sri Rahula Balika Maha Vidyalaya

Sri Rahula Balika Maha Vidyalaya is located in Colombo District of the Western Province. Within the the Kaduwela division of Sri Jayawardanapura Zone. This was founded in 1800 by Rev. Sobitha Thero, the chief incumbent of Korathota Raja Maha Viharaya as a primary vernacular mixed school. In 1869 it became a government school. Later, in 1960, it has become a girls' school and gained tremendous achievements in co-curricular, and extra-curricular activities. At present the school consists of a 3,300 student population .The classes are conducted from grade 1 to grade 13. Its affliated school is WP/ JAYA/ Subodhi Kanishta Vidyalaya. The great enthusiasm of the parents towards the school is evidence for its present popularity under the guidance of its principal Mrs. W.A.S.P. Jayarathna.

Rahula Balika has shown much considered endeavor and dedication to be using ICT in the teaching learning process. The School leadership emphasizes the importance of developing ICT talents from school level. The overall spectrum of activities of Rahula Balika is aimed at providing a wide range of services to its students through ICT. A balanced personality through the process of education. Mastering skills and inculcating good attitudes also to be happy, steady and confident to face the challenges in the changing world. THE CHANGE; driven by technological and breakthroughs, demands modifications and changes even in the teaching methodologies.

Thus ICT has become a special and essential component in school curriculum. The school undertake a series of activities aimed at expanding the reach of ICT among students. Enthusiastic students carryout a range of computer based activities. Our students have brought fame to the school and to the country through their achievements in curricular and extra-curricular activities.

Appendix G

Test Plan

G.1 Test Plan : Features to be Tested

After identifying the test items, the important features to be tested under each item were selected as follows.

1. Single sign-on facility

(a) Automatic login and transfer of data from the RBV LMS to the OES System

(b) Automatic login to the appropriate classroom of the ITS

2. Knowledge assessment module

(a) Answers given for each question consisted of feedback

(b) Overall test consisted of detailed feedback with links to learning materials and practice tests

(c) Provided only a limited number of attempts (eg: 3 attempts) to obtain the required pass mark

(d) An attempt had to be completed within a given time limit

(e) Questions within each attempt were provided in a randomized manner

(f) Marks were stored for each attempt

(g) Highest mark was considered as the final mark

(h) Needed to obtain a given mark (eg: 50%) to qualify in the test

(i) If the final mark is less than the given mark, students were directed back to the practice tests

3. Skill assessment module

(a) Answer given for each question consisted of a feedback

(b) Provided only a limited number of attempts (eg: 3 attempts) to obtain the required pass mark

(c) An attempt had to be completed within a given time limit

(d) Questions within each attempt were provided in a randomized manner

(e) Marks were stored for each attempt

(f) Highest mark was considered as the final mark

(g) Needed to obtain a final mark of 50% or more to qualify in the test

(h) Highest mark obtained was transferred to the OES System (to the particular activity and the grade book)

4. Progress Bar

(a) The color policy expected: green = tests completed on time, red = tests not completed on time, white = tests to be completed

(b) All tests including the tests given using the ITS tool appeared and counted in the progress bar

(c)"Now" button appeared on the correct position based on where the rest of the class was at that particular moment

(d) Overall progress was showed to each student as a percentage

(e) Mouse over each test block showed the name and the overall status of that test such as; graded or not, and the expected date with time

(f) Summary of all students were displayed only to administrators and teachers

5. Competencies module

(a) Allowed only administrators and teachers to upload the subjects and related competencies through an XML file

(b) Then, teachers were allowed to select the appropriate subjects and topics

(c) Based on the activities given, teachers were allowed to select the appropriate competencies

(d) Teachers were allowed to select the competencies for each student based on the marks obtained

(e) The competencies obtained were displayed to the students as a list and as a Percentage

6. Grade book

(a) The highest marks obtained for each test was displayed

(b) Highest marks were transferred from the ITS to the grade book through the communication link

(c) Overall grade qualifications of students were displayed to the teachers

(d) Teachers were allowed to select appropriate outcomes based on the grades obtained by students

(e) Students were displayed with their own qualifications as a user report including grades and outcomes for each activity, total grade obtained for the course along with the final outcome.

Then the test cases identified were tested based on a given input and testing whether they satisfied the expected result. If test cases failed, the respective modifications were done and tested again.

G.2 Test Plan : Test Cases

Test Cases	Procedure / Inputs	Expected Results	Pass/Fail
1.Automatic login and transfer of data from the RBV LMS to the OES System	Login to RBV LMS, move to appropriate course and then access the OES system through the given link	Login to OES system without any problems or errors	Passed
Automatic login to the appropriate classroom of the ITS	Click on the link to access the ITS	Direct students to the correct classroom	Failed
User was directed to the wrong classroom	Fixed "DomainID" and "EpcMenuID" in the RBV classroom		Passed
Answer given for each question consisted feedback	Select an answer for a question and submit	Feedback based on the answer	Passed
Overall test consisted of detailed feedback with links to learning materials and practice tests	Attempt the questions within a test and submit	Overall detailed feedback with links to test(based on marks) and learning materials	Passed
Provided a given number of attempts	Attempt the test several times	For each attempt load a new test	Passed
An attempt had to be completed within a given time limit	Attempt the test	Display of a countdown timer from the first access to the test	Passed

Appendix H

Table

Table H.1: programtype

Field	Type	Comment
Id	String	System generated unique id
Name	String	Program type name
CreatedDate	Date	
CreatedDBy	String	
ModifiedDate	Date	
ModifiedBy	String	

Table H.2: classschedule

Field	Type	Comment
Id	String	System generated unique id
ClassId	String	Classroom unique id
StartDateTime	Date	
EndDateTime	Date	
CreatedDate	Date	
CreatedDBy	String	
ModifiedDate	Date	
ModifiedBy	String	

Table H.3: country

Field	Type	Comment
Id	String	System generated unique

		id
Name	String	Country name
CreatedDate	Date	
CreatedDBy	String	
ModifiedDate	Date	
ModifiedBy	String	

Table H.4: course

Field	Type	Comment
Id	String	System generated unique id
Code	String	Course code
Name	String	Course name
ProgramId	String	Program unique id
SemesterId	String	Semester unique id
GradeId	String	Grade unique id
LecturerId	String	Lecturer unique id
CreditHours	String	Course credit hours
CreatedBy	String	
ModifiedDate	Date	
ModifiedBy	String	

Table H.5: courseenrolment

Field	Type	Comment
Id	String	System generated unique id
StudentId	String	Student unique id
CourseId	String	Course unique id
SemesterDateId	String	Semester date unique id

CreatedDate	Date	
CreatedDBy	String	
ModifiedDate	Date	
ModifiedBy	String	

Table H.6: coursetype

Field	Type	Comment
Id	String	System generated unique id
Name	String	Course type name
CreatedDate	Date	
CreatedBy	String	
ModifiedDate	Date	
ModifiedBy	String	

Table H.7: department

Field	Type	Comment
Id	String	System generated unique id
Name	String	Department name
FacultyId	String	Faculty unique id
CreatedDate	Date	
CreatedBy	String	
ModifiedDate	Date	
ModifiedBy	String	

Table H.8: exam

Field	Type	Comment
ExamId	String	System generated unique

		id
SemesterDateId	String	Semester date unique id
ProgramId	String	Program unique id
CourseId	String	Course unique id
GradeId	String	Grade unique id
Description	String	
NoOfQuestion	Integer	
Duration	String	
StartDate	Date	
StartTime	String	
EndTime	String	
Status	String	
CreatedDate	Date	
CreatedBy	String	
ModifiedDate	Date	
ModifiedBy	String	

Table H.9: exammanager

Field	Type	Comment
Id	String	System generated unique id
ExamId	String	Exam unique id
StudentId	String	Student unique id
QuestionPass	Integer	Question correct/wrong flag
QuestionFail	Integer	Question correct/wrong flag
Grade	String	
QuestionId	String	Question unique id
Level	String	
isAnswer1	Integer	

isAnswer2	Integer	
isAnswer3	Integer	
isAnswer4	Integer	
isAnswer5	Integer	
CreatedDate	Date	
CreatedBy	String	
ModifiedDate	Date	
ModifiedBy	String	

Table H.10: examsummary

Field	Type	Comment
Id	String	System generated unique id
ExamId	String	Exam unique id
StudentId	String	Student unique id
Level	String	
Status	String	
QCounter	Integer	Question Counter for each student exa
CreatedDate	Date	
CreatedBy	String	
ModifiedDate	Date	
ModifiedBy	String	

Table H.11: faculty

Field	Type	Comment
Id	String	System generated unique id
Name	String	Faculty name
CreatedDate	Date	
CreatedDBy	String	

ModifiedDate	Date	
ModifiedBy	String	

Table H.12: gender

Field	Type	Comment
Id	String	System generated unique id
Name	String	Gender name(e.g. Male/Female
CreatedDate	Date	
CreatedDBy	String	
ModifiedDate	Date	
ModifiedBy	String	

Table H.13: gradedetail

Field	Type	Comment
Id	String	System generated unique id
MasterId	String	Office address of the provider
FromMark	Integer	Mark range from
ToMark	Integer	Mark range to
Grade	String	
Cgpa	String	
Description	String	
Status	String	Pass/Fail
CreatedDate	Date	
CreatedDBy	String	
ModifiedDate	Date	
ModifiedBy	String	

Table H.14: intake

Field	Type	Comment
Id	String	System generated unique id
IntakeNo	String	Intake No
StartDate	Date	Intake start date
EndDate	Date	Intake end date
CreatedDate	Date	
CreatedBy	String	
ModifiedDate	Date	
ModifiedBy	String	

Table H.15: teacher

Field	Type	Comment
Id	String	System generated unique id
Code	String	Lecturer code
Name	String	Lecturer name
Qualification	String	
Address	String	
Email	String	
TelNo	String	
FaxNo	String	
CreatedDate	Date	
CreatedBy	String	
ModifiedDate	Date	
ModifiedBy	String	

Table H.16: levelofdifficulty

Field	Type	Comment
Id	String	System generated unique id

QuestionId	String	
WeightFactor1	Integer	
WeightFactor2	Integer	
WeightFactor3	Integer	
NoOfCondition	Integer	
NoOfDownwardEdges	Integer	
NoOfUpwardEdges	Integer	
CreatedDate	Date	
CreatedBy	String	
ModifiedDate	Date	
ModifiedBy	String	

Table H.17: questionbank

Field	Type	Comment
Id	String	System generated unique id
ProgramId	String	Program unique id
CourseId	String	Course unique id
ChapterId	String	Chapter unique id
TopicId	String	Topic unique id in knowledge map
ProblemType	String	
Parameter	String	
Answers	String	
DifficultyId	String	Question difficulty unique id
SubQuestionListID	String	
SubQuestionParameters	String	
IsMultiple	Integer	Question is of type multiple choice
Question	String	
Option1	String	Answer option 1

Option2	String	Answer option 2
Option3	String	Answer option 3
Option4	String	Answer option 4
Option5	String	Answer option 5
FileName	String	
Mark	String	
IsOption1	Integer	
IsOption2	Integer	
IsOption3	Integer	
IsOption4	Integer	
IsOption5	Integer	
CreatedDate	Date	
CreatedBy	String	
ModifiedDate	Date	
ModifiedBy	String	

Table H.18: student

Field	Type	Comment
StudentId	String	System generated unique id
Status	String	
DateEnrolled	Date	Enrolment date
Name	String	
SalutationId	String	Salutation unique id
StudentNo	String	
IsLocal	Integer	
ICPassport	String	
CreatedDate	Date	
CreatedBy	String	

ModifiedDate	Date	
ModifiedBy	String	

Table H.19: studentcourse

Field	Type	Comment
Id	String	System generated unique id
StudentId	String	Student unique id
CourseId	String	Course unique id
SemesterId	String	Semester unique id
Status	String	
SemesterDateId	String	Semester date unique id
CreatedDate	Date	
CreatedBy	String	
ModifiedDate	Date	
ModifiedBy	String	

Table H.20: studentdetails

Field	Type	Comment
StudentId	String	Student unique id
Age	Integer	
MaritalStatusId	String	Marital status unique id
GenderCode	String	
DateOfBirthId	Date	
PlaceOfBirthId	String	Place of birth unique id
ReligionId	String	Religion unique id
RaceId	String	Race unique id
NationalityId	String	Nationality unique id

ContactAddress	String	
ContactPostcode	String	
ContactTown	String	
ContactCountry	String	
ContactTelNo	String	
HomeAddress	String	
HomePostCode	String	
HomeTown	String	
CreatedDate	Date	
CreatedBy	String	
ModifiedDate	Date	
ModifiedBy	String	

Table H.21: chapter

Field	Type	Comment
Id	String	System generated unique id
Name	String	Chapter name
CourseId	String	Course unique id
CreatedDate	Date	
CreatedBy	String	
ModifiedDate	Date	
ModifiedBy	String	

Table H.22: program

Field	Type	Comment
Id	String	System generated unique id
Name	String	Program name

Code	String	Program code
FacultyId	String	Faculty unique id
DepartmentId	String	Department unique id
ProgramTypeId	String	Program type unique id
CreditHours	String	Credit Hours
CoordinatorId	String	Lecturer unique id
CreatedDate	Date	
CreatedBy	String	
ModifiedDate	Date	
ModifiedBy	String