IITB Summer Internship 2013
Software Requirement Specification
edX Development

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1. Introduction

The EdX is a MOOC (Massive Open Online Course) platform started by MIT and Harvard in collaboration for making a revolution in online education. The Edx is getting popularity because of the advance features it provides for making online education of student fruitful and more effective worldwide which also provides the author an effective way to design a course. The EdX is new platform based on Django framework (web application framework written in python). The system being considered here for development is a MOOC based on edX.

1.1 Purpose:

The purpose of this Software Requirement Specification (SRS) document is to describe the overall behavior of the EdX (LMS and CMS). This SRS defines and describes the operations, performance and quality assurance requirements of the EdX, which is to be developed here. This document also describes the nonfunctional requirements. It also describes the design constraints and technologies that are to be considered when the system is to be designed, and other factors necessary to provide a complete description of the requirements for the system. This Software Requirements Specification (SRS) captures the complete software requirements for the system. Requirements described in this document will be used as guidelines to develop the EdX.

1.2 Document Conventions:

In general this document prioritizes in writing the requirements of the system and analyzing in details the tools being provided to its users. Every requirement is having its own priority (non conflicting). In addition few figures are also being provided to make requirements more clear to the reader.

1.3 Intended Audience and Reading Suggestions

This document is intended for any individual user, developer, tester, project manager or document writer that needs to understand the basic system architecture and its specifications. Here are the potential uses for each one of the reader types:
**Developer:** The developer who wants to read, change, modify or add new requirements into the existing program may need first to consult this document and update the requirements in appropriate manner so as not to change the actual purpose of the system or make the system inconsistent with the actual requirement and can be successfully passed to next phase of the development.

**User:** The user of this program reviews the diagram and the specification provided in the document and check to determine whether the software has all the suitable requirements and if the software developer has the implemented all of them.

**Tester:** The tester needs this document to validate that the initial requirements of this programs actually corresponds to correctly executable program.

### 1.4 Project Scope:

This system or platform provides an easy and effective way for students and others to opt for free online courses (fee may be charged in case of certification). The benefits of this is that the traditional learning methods (like classrooms with black boards) are upgraded with online interactive support using computers as a tool to provide all kind of courses in interactive manner.

It also provides an interactive platform for the author to make/design a high quality online course with different kinds of grading systems and other facilities.

The main objective is distant learning with effective interactive method and provides self assessments through various kind of test, discussions with the experts and also the facility of online virtual laboratory. The system also provides the notion of certification (there is possibility that some courses don’t provide it). The goal is not just to provide an efficient platform for online education system but also aims for assessment of this system through analyzing the responses, test and option taken by its user to form a statistic result of the successfulness of the system and upgrading of the same to serve the needs. Also it aims to provides various types of analytics to different users.

### 1.5 References:

The reader can refer the following sites to acquire the basic understanding of the interface:

1. https://www.edx.org/
2. https://github.com/edx/
3. Getting_Started_with_Studio.pdf
2. Overall Description:

2.1 Product Perspective:

The product is supposed to be an open source, under the GNU general Public License. It is a web based system implementing client-server model. The basic components of EdX consist of three parts known as: EdX studio, Edge and Main EdX LMS.

**EdX Studio**: This part of EdX is designed especially for Instructors or Authors. This provide whole structure and features to facilitates the designing of the course by the author. This provides interface for uploading video, books, design test and grading system.

**Edge**: This part of EdX is designed for designer and for special user which allows the designer to preview the course being designed by them. This platform imitates all features of the LMS but it is just a dummy LMS to serve its own purpose.

**LMS**: The main LMS of the system of the EdX which provides its user a online Education system with various features to learn through the courses being designed by the author of the course.

2.2 Product Features:

The major features of this system are enlisted as follows:

**General Perspective**:
- **Cross platform support**: Offers operating support for most of the known and commercial operating systems.

- **Language Support**: offers multiple language support for global use.

- **User account**: The system allows the user to create their accounts in the system and provide many features to update and maintain it.

- **User being supported by the system**: Though the number is precisely not mentioned but the system is able to support a large number of online users at a time.
LMS Perspective:

- **Online Test and assignments:** Offers adaptive online test system, which provides machine evaluated grades. And allows the user to give tests a number of times to improve their grades and hence improve the quality of understanding.

- **Online Laboratory:** It offers virtual online simulated laboratory system for making the experimental viewpoint to student strong.

- **Group discussion:** It offers the facility to the users to ask any query, share their experiences and discuss on the topics or doubts in the forums, also provide option for commenting and also has provision for liking the comments and the post etc.

- **Wiki-edit collaborative learning:** It offers the facility to wiki edit some of the contents (on the basis of the rights provided by the author) and also can add articles.

- **Calendar based scheduling:** The courses provided by the system are scheduled based on calendar dates. Few assignments also have time bounds. Assessments can also be based on the time required to certain activity, all these kinds of features is decided by the author of the content. This calendar can also be viewed by the users.

- **EdX Meetups:** The EdX system provides a platform to all its users for planning meetings in different part of world where all users meet to discuss on some issues as decided in planning of the event, the authors and institute providing courses on this platform can also join the meetings.

- **Downloadable materials:** Few of the lecture notes, books etc are downloadable (depends upon the author of the content). The results of the assessments and certificates being provided is downloadable.

- **Subtitles of videos:** The lectures being provided through video also contains subtitles to avoid the accent problem.

- **Search:** Two types of search is provided first filters the course according to the subjects and colleges and second is simply local search engine based on key words.
• **Saved sessions:** Every test and activity sessions can be saved in a log file and studied further. Particular session of interest can be archived.

• **Registering and unregistering of the courses:** The user can register for any course of interest which is either scheduled for future or currently going on and also have the option to unregister for the course if they don’t want to continue.

• **Notification and emails:** The changes in the course, notification of getting answers to the posted questions, likes on comments etc types of information should be provided to the users timely either through mails or through notifications in users accounts.

• **Merging 2 version of wiki edits:** The system provides the features to merge 2 versions (the user and the other previous version from the history) through help of wiki edit.

• **Progress Report:** The system provides the progress reports of the user on the basis of test assessments and assignment evaluation both week wise and individual test/assignment wise through help of graphs and numerical scores.

• **Essay Assessments(through both machine and peer grading):** The system provides features of online essay assessments of the assignments requiring theoretical explanations.

• **Video embedded quiz and other interactive options:** The online test feature of the system also have provision of video embedded quiz, video jump through subscripts etc.

**CMS (Studio Perspective):**

• **Directly uploading video in youtube:** The author gets the facility of uploading the video through the CMS on the youtube server to simplify the task of the author.

• **Design Rubric:** The author has the facility to interactively design the rubric for the assignment made by him. He can also apply various kinds of grading system on the same assignment (like AI and peer grading simultaneously).

• **Redefining the Grading weight age on various test:** The author has the provision to define grade system for his course on various test/exams through a interactive slider.
• Adding and deleting other Authors

• Preview the course: The author has the option to preview the course element or whole course structure before it gets activated in actual LMS.

• Editor for designing quiz and test: The author is being provided with a editor kind of interface where he can design the quiz questions and also define its type and solution.

• Calendar Schedule design: The studio provides Google calendar that should include all release dates and due dates and can be linked to the actual course.

• Adding updates/notification: The author is provided with interface to add notifications, generate emails to student etc.

• Export or Import a Course: Studio has an Import tool and an Export tool that allow you to import and export courses.

• BuiltIn components: The author is provided with many builtin components to make the development process of a course easier like: Html component, discussion component, video etc where each component is associated with its own editing/designing interface.

2.3 User Classes and Characteristics:

The user group (also called as the actors) of the system being generated can be examined as below

Physical Actors:

• Students: The student is one who opts for the courses through the system and evaluates themselves. Multiple students can connect to the server and can opt for any course of which he/she has the right to. It is considered that the user do have the basic knowledge of operating the internet and to have access to it.

• Teachers/Author: He/she is the one that uses the system server as an editor to create the database of the course materials, the test and assignments, set the calendar schedule, define the grading system and response to the query or the doubts posted by the students.
System Actors:

- **Clients:** The client is the system that connects to the server and handles the tests and labs simulation based on the session and finally submits the information back to the server.

- **Server:** The server is the system that accepts multiple connections form the clients and produces the results of the test and the process the lab simulations on the basis of the inputs and also saves the grades obtained by the student on basis of the submissions or tests and also generates automatic emails and notifications.

- **Database Editor:** The database editor handles all the course material, questions and assignments database tools used to construct, modify and save the same. It is also responsible for logging the session info and restore them for better study.

2.4 Operating Environment:

This is a web based system and hence will require the operating environment for a client and server GUI. This will be operating in the following operating environment:

- Apple Mac OS X(Universal)
- Linux/Unix(Source Code)
- Microsoft Windows(Installer)

2.5 Design and Implementation constraints:

This system is provisioned to be built on the Django framework (On python language) also as the size of data being exchanged or stored is large, so the proper type of data management system should be adopted for efficient performance. For language support apart from the basic English language it also requires to have multilingual support for making its use worldwide in convenient. For successful running of program with a desirable speed requires a minimum ram and hard disk space provided by the a standard system (normally available).
3. System Features:
   This section concentrates on all of the system features are provided by the system:

General Requirements provided by LMS:

3.1 Registration of the user: REQ1

3.1.1 Description and priority:
   To use the system, user first registers in the site by filling a simple form, the link of which is provided in the home page.
   Priority: High

3.1.2 Stimulus and Response:
   Precondition: User in home page, clicked ‘register’
   1. User fills the form
   2. Clicks submit button
   3. If username already exist or if required field is not filled or if information is wrong show error and submission fails.
   4. Confirmation mail goes to user email.
   5. The user get registered and his account get created.
   6. The home page gets opened.
   Post condition: The user get its account interface.

3.2 User Login: REQ2

3.2.1 Description and Priority
   The user login in the login window provided in home page or through login navigation link in home page to access its account.
   Priority: High

3.2.2 Stimulus and Response:
   Precondition: None
   1. User fill login form
   2. Submit it
   3. If login info is not correct or all fields are not filled, submission fails and resubmission is required.
   4. If successfully submitted redirect to users account.
   Post condition: The user gets logged in
3.3 Search Engine: REQ3

3.3.1 Description and priority:
The 2 types of search engine is provided for searching courses.
1. Search by keywords(not in edX).
2. Search by course and school.

Priority: Medium

3.3.2 Stimulus/Response
Precondition: user logged in the account.
1. If user opt to search by keywords the other search should get disabled and vice versa.
2. Typing letters in the search should provide available options from database.
3. Typing letters in the search should provide available options from database.
Post condition: User gets a list of course as search results.

3.4 Getting Enrolled in course: REQ4

3.4.1 Description and priority:
After clicking to any search result the user gets redirected to that course home window with introduction (text and video), other kind of info and option to register (if registration not closed) to get himself enrolled.
Priority: High

3.4.2 Stimulus/Response:
Precondition: User clicked the listed option of search result and is in the home page of the course.
1. User Click “Register Button” and gets enrolled in the course.
2. The User info gets changed to show that he/she got enrolled in particular subject.
3. The email/notifications get started (Refer REQ) related to course.
Post condition: User gets enrolled and now can access the lectures and other things, after registering User gets redirected to the course page.

3.5 Editing User Information: REQ5

3.5.1 Description and Priority:
Provides an interface for editing user information (the developer decides which info can be edited)
Priority: High

3.5.2 Stimulus/Response:
Precondition: The User decides to Edit few of the info provided by the them and for this he clicks “Edit” button at the home page of its account.
1. User fills/ changes the required information in the edit form.
2. After he/she submit the form.
3. If all of the conditions are valid then the user database is changed to incorporate the changes made by the user.
4. If changes is made in the email then confirmation mail is send to new email

Post condition: The User after successful completion gets a popup message informing the completion process and redirected to home page of the user’s account.

3.6 Unregister the enrolled course: REQ6

3.6.1 Description and priority:
If the user doesn’t find the course according to his/her requirement the user can also unregister himself from the course to stop receiving the notification/emails about that course and to also clean his dashboard.
Priority: Low

3.6.2 Stimulus/Response:
Precondition: Either the user is in home page of particular course from whom he/she wants to unregister or is in his/her dashboard
1. The user click “unregister” button being provided with the list of enrolled courses or at the home page of that course.
Post condition: The user receives the information about successful completion of the process and redirected to his/her dashboard.

3.7 Email/ Notifications: REQ7

3.7.1 Description and priority:
If the user gets enrolled in particular course or gets a reply of general queries and comments, he/she should get facility of regular email/notification facility providing information about any changes or events.
Priority: Low

3.7.2 Stimulus/Response:
Precondition: None
1. Server generated emails/notifications if any information is to be conveyed to the user
Post condition: None

Requirements related to facility associated with a course in LMS:
3.8 Video lectures: REQ8

3.8.1 Description and priority:
According to this requirement the user will be able to stream the posted video lectures.
Priority: medium

3.8.2 Stimulus/response:
Precondition: None
As when the lecture is posted by the author, the following should be possible:
1. Email/notification to user about new lecture video being posted.
2. It should be accessible through side menu bar.
3. On click event it should get connected to the server for streaming of the video.
4. It should provide the option of stop, pause close and download (if the author provides the permission to do so).
5. It should also have provision to show subtitles along with the video (if provided by the author)
Post condition: The user is able to watch the video.

3.9 Study materials/assignments (Read and download): REQ9

3.9.1 Description and priority:
When the author posts any new study material or assignment, it should also generate email/notification. Allows the users to view the material and download (if allowed by the user).
Priority: medium

3.9.2 Stimulus/Response:
When the study materials/assignments get uploaded by the author, then it should be visible in the left menu (under the week it is uploaded). The user should be able to do the following.
1. When the user clicks on the material or the assignment it should be loaded in the window, allows to minimize and close.
2. Should also provide navigation along the document.
3. Should also search facility along the document.

3.10 Submission of assignment: REQ10

3.10.1 Description and priority:
The user submits the assignment (if required multiple times) for self assessment.
Priority: Low

3.10.2 Stimulus/Response:
Precondition: The user is connected to the server.
1. User clicks “Submit” button associated with each assignment.
2. A small form gets uploaded with browse button.
3. Click the browse button, select file and click upload.
4. Status of submission gets changed in the database.
5. Server evaluates the assignment and shows the result.
Post condition: Check symbol is shown in front of the respective assignment. The evaluation is done by the server and grades obtained are added to final grades.

3.11 Online Test start session: REQ11

3.11.1 Description and Priority:
The user can give test online (multiple times) for self assessment
Priority: High

3.11.2 Stimulus/Response:
Precondition: The User clicks “Start test” on the test list provided in the left menu.
1. With the click event the session gets established and timer (if required) starts and the test interface is displayed in the screen.
2. The user is provided with the option of selecting difficulty level.
3. Question gets displayed according to the difficulty level selected.
4. Include REQ12.
   Post Condition: The user starts with the online test.

3.12 Submission of Answers: REQ12

3.12.1 Description and Priority:
The user submits answers for evaluation either individually or collectively.
Priority: Medium

3.12.2 Stimulus/Response:
Precondition: The test session is already established.
1. If author defines the test with individual question answer system then the user will submit answers of the question individually.
2. Before submission confirmation is done.
3. After click event of the “submit” button, answer is evaluated and result is displayed.
4. The user can also reattempt the question.
Post Condition: The test session continues and result is evaluated simultaneously with each submission.

3.13 Submit the test: REQ13

3.13.1 Description and Priority:
The user will end the test by clicking “Submit” button
Priority: High
3.13.2 Stimulus/Response:
Precondition: The test session is continued.
1. The user clicks “submit” button.
2. The confirmation popup is displayed.
3. The user confirm the process.
4. The test session is closed.
5. The overall grade is displayed.
6. The grade is stored in database and session information in log files.

3.14 Result Display : REQ14

3.14.1 Description and Priority:
The user will access the results using “Progress” navigation provided in main menu.
Priority: Medium

3.14.2 Stimulus/Response:
Precondition: The user is logged in.
1. On clicking “Progress” the user will be redirected to page displaying the user’s grade so obtained during the period of the course.
2. The results are shown in form of graphs (test vs score).
3. Also the individual test result and associated data (no of questions, no of correct answers etc) is also shown.
4. If user can reattempt the test or assignment then it is shown with different color.
5. If user click on this kind of links , it will redirect to the test , where the user can start the test session

3.15 Wiki Edit: REQ15

3.15.1 Description and Priority
The system provides the feature for wiki edit the content, which have the permission to get edited by the user.
Priority: Low

3.15.2 Stimulus/Response:
Precondition: The User is logged in.
1. The user clicks “Wiki” option of the menu provided to the users.
2. The user is taken to the wiki edit interface with option of ‘View’, ‘Edit’, ‘changes ’ and “see all children”.
3. If the author provides the permission then the user will be able to change the content using “Edit” option.
4. Include REQ15.
5. If user got right to add article to the content, it can do so using “add article” option provided by the Interface.
3.16 Submit Wiki edits and Preview:REQ16

3.16.1 Description and Priority:
This will leads to change in the permissible content of the articles and links and
the server records all the changes made, date and time etc.
Priority: Low

3.16.2 Stimulus/Response
Precondition: User will have a form kind of interface.
1. The user will make the required changes to the system.
2. Optionally add summary to it.
3. Will have 3 options with them “save changes”, “Preview”, “Delete Article”.
4. With save change option the changes will be saved after a confirmation.
5. The previous version is stored as history and can be access through
   “changes” option of wiki edit interface.
6. Previous version can be restored through “restore” option (Include REQ17).
7. “Preview” option with provide the view of how the content will look like
   after changes are made.
8. From preview user can either move back to Editing Interface (Include REQ16)
    or can Opt for “Saving changes”.
Post condition: The changes are made in server and shown in user’s window.

3.17 Restore and Delete article(Wiki Edits):

3.17.1 Description and Priority:
The users have option to restore the previous version of article and also to
delete some article (if permitted by the author) through wiki edits.
Priority: Low

3.17.2 Stimulus/Response:
Precondition: The user is presently at wiki edit interface of the system.
1. When user click on “changes” option.
2. The list of previous version is available to the user.
3. It provides the option of viewing the previous version of the content.
4. All can restore or has the option to merge with their changes.
5. The User can also delete the article totally(if author permits)
6. The confirmation is required for saving the changes made.
7. Else in case the changes can’t be done a sorry message is displayed.
Post Condition: The changes are made in server and shown in user’s window and
the info about the person making the changes, time and date of changes get
automatically stored.

3.18 Group Dissuasion(commenting):REQ18

3.18.1 Description and Priority:
The system provides feature of having group discussion. It can take two forms
1. Discussion among the students and authors of particular course.
2. General discussion group for all registered users of the system
Though the features provided by both of them are same.
Priority: Medium

3.18.2 Stimulus/Response:
Precondition: User is logged in.
1. The user opts for user discussion option.
2. He/she is redirected to discussion forum.
3. The side (Left) menu provides the list of all posts with number of comments and likes.
4. The user can comment on ongoing discussion by clicking on side menu on that discussion.
5. The user submits the comment through clicking submit button.
6. The confirmation for submission is required.
7. The user can like the post and comments of others.
Post Condition: The comment of the user is posted in the discussion forum and visible to all in the group with the username, date and time. This information is also stored in server.

3.19 Starting a discussion: REQ19

3.19.1 Description and Priority:
The user can start the conversation by posting in discussion forums.
Priority: High

3.19.2 Stimulus/Response:
Precondition: User is logged in.
1. The user opts for “POST” in the forum window.
2. The user is given a form kind of interface to write a post (in possibly a text editor).
3. The user submits the Post by clicking “Submit” button.
4. The post is posted in the forum after confirmation by the user.
5. The post also denotes the username, time and date of the post.
Post Condition: The post is visible to all in group. And other members of the group is enable to comment and like on the post.

3.20 Online Lab Exercise: REQ20

3.20.1 Description and Priority:
The system provides the feature of virtual lab exercise to its user.
Priority: Medium

3.20.2 Stimulus/Response:
Precondition: User logged in the course account.
1. The author provides the lab exercise and the essential interface for virtual lab simulation of the exercise
2. The user enters in the virtual lab interface through the link provided by the author in the side menu.
3. The author provides the basic instructions of the lab with the diagrams
4. The interface for virtual lab is drag and drop based.
5. The elements are defined by the author.
6. The user simply drag and drop the elements to set the apparatus and can see the results by clicking on element or by submit button.
7. The connection gets established with the server for interactive evaluation of the apparatus.

Post condition: The user establishes a connection with the server for evaluation of the apparatus and showing result on the same window and allows retrying.

3.21 AI evaluation of Essay and test/quizzes::REQ21

3.21.1 Description and Priority:
The system provides the feature of machine evaluation for essay assessment and grade the submitted test/quiz.
Priority: High

3.21.2 Stimulus/ Response:
Precondition: The user has submitted the test/quiz/assignment (essay).
1. The system will take input from the submissions of the user.
2. Generate training set.
3. Evaluate it according to the grading system provided by author.
4. Stores the result in user database and displays result to the user.
5. Make changes to grades of student in database.
6. Include: REQ22.
Post Condition: The Result of evaluation is shown on the screen.

3.22 Self Assessment of submitted assignment::REQ22

3.22.1 Description and Priority:
The system feature enables the student to grade their submissions themselves and provide the option for resubmission of assignment.
Priority: High

3.22.2 Stimulus/ Response:
Precondition: The user has submitted the assignment (essay).
1. The system will provide interface to grade themselves based on rubric.
2. On submission of self grading form the system generates the grades based on rubric and grading system.
3. Show option of resubmission if grades are low.
4. Provide some hint regarding the correction of mistakes committed by the student.
5. Save the final assignment grades.
Post Condition: The Result of evaluation is shown on the screen and saved in database.

3.23 Peer assessment of Essay::REQ23

3.23.1 Description and Priority:
The system provides the feature of peer assessment to grade subjective answer/
Priority: High

3.23.2 Stimulus/Response:
Precondition: The user has submitted the assignment (essay).
1. The system will take input from the submissions of the user.
2. Include REQ22
3. Provide essay for grading to students for calibration round.
4. After the user clears the calibration round, provide the student 3 essay to
   grade (the main peer grading round).
5. Generate final grade for the student graded by the peer.
6. Save the grades so obtained.
Post Condition: Evaluation result is saved in system and changes are made to report.

3.24 Calculate the Progress Report::REQ24

3.24.1 Description and Priority:
The system calculates the overall grades and forms the progress report of the
user
Priority: Medium

3.24.2 Stimulus/Response:
Precondition: The user submitted some assignment/quiz/test
1. The system takes the grades of the user obtained throughout till the latest
   one
2. The system calculates the overall grades (according to the weightage
   assigned to the test) stores it and plots the graph.
Post condition: Changes are recorded in the progress report.
LMS Feature Specific for Authors:

3.25 View Student Grade (grade book with search) ::REQ25

3.25.1 Description and Priority:
This system feature allows the author to view the Student grades of all who are enrolled in that course.
Priority: Medium

3.25.2 Stimulus/Response:
Precondition: This author is present in the course page.
1. Search feature is inherited to find particular student grades
2. The details of grades scored by the students is shown in tabular form
Postcondition: None.

3.26 Download CSV of students ::REQ26

3.26.1 Description and Priority:
This system feature is used by author to download CSV of the student enrolled in his course
Priority: Medium

3.26.2 Stimulus/Response:
Precondition: This author is present in the course page.

1. The search for the student who’s CSV he wants to access.
2. The opt to download.
Postcondition: The document is downloaded.

3.27 Course Statistics ::REQ27

3.27.1 Description and Priority:
This system feature allows the author to view statistics regarding course (like no to student enrolled, total no. of authors)
Priority: High

3.27.2 Stimulus/Response:
Precondition: This author is present in the course page.
1. The author is provided many tabs through which he can view the data in tabular form according to particular parameter.
2. Basic search may be associated with tables result.
Postcondition: The data is shown to user in tabular form

3.28 Enroll/Unenroll a student ::REQ28

3.28.1 Description and Priority:
This system feature provides the author with interface to add new student in his course through email id of student.
Priority: Medium

3.28.2 Stimulus/Response:
Precondition: This author is present in the course page.

1. The interface is provided to author for adding(either single or multiple) students to their course through their email id.
2. The provision should be made to add even students who are not registered in the system.

Postcondition: The changes made are saved and the student is added to the course.

3.29 View full profile of Enrolled students ::REQ29

3.29.1 Description and Priority:
This system feature is provides a tabular view to the profile of the Enrolled students in the course to the author of the course.
Priority: High

3.29.2 Stimulus/Response:
Precondition: This author is present in the course page.

1. The tabular view is shown to the author.
2. The basic search is provided to search for individual student or to filter the result.

Postcondition: None

3.30 Special Analytics ::REQ30

3.30.1 Description and Priority:
This system feature provide the author to view any special kind of analytics he can demand for while designing the course
Priority: High

3.30.2 Stimulus/Response:
Precondition: This author is present in the course page.

3. The tabular view is shown to the author.
4. The basic search is provided to search for individual student or to filter the result.
Postcondition: None

System Features for Studio:

3.31 Register and Login(Author)::REQ31

3.31.1 Description and Priority:
This system feature is same as that of LMS.
Priority: High

3.31.2 Stimulus/Response:
This can be referred from the REQ1 and REQ2

3.32 Create Course::REQ32

3.32.1 Description and Priority:
This system feature allows the author to create a new course.
Priority: High

3.32.2 Stimulus/Response:
Precondition: This author is logged and present in his dashboard
1. The author click on create course button.
2. Feed basic details about the course (like course name, number organization).
3. Submit the details about course.
Postcondition: The author will be redirected to dash board of course outlines.

3.33 Creating a section::REQ33

3.33.1 Description and Priority:
This system feature allows the author to create a new section in a course.
Priority: High

3.33.2 Stimulus/Response:
Precondition: This author is logged and present in his dashboard and has created a course and present in 1 of the course outline
1. The author click on create section button.
2. Feed basic details about the section (like section name).
3. Submit it.
4. Set the start date

Postcondition: The author will be redirected to dash board of course outlines with section created.

3.34 Create Subsection::REQ34

3.34.1 Description and Priority:
This system feature allows the author to create subsection.
Priority: High

3.34.2 Stimulus/Response:
Precondition: This author is logged and present in his dashboard
1. The author click on create subsection button.
2. Feed basic details about the subsection (like course name, number organization).
3. Submit the details about course.
4. Feed the start date
Postcondition: The author will see the subsection with specified name in his course online dashboard in the particular section.

3.35 Adding course unit ::REQ35

3.35.1 Description and Priority:
This system feature allows the author to create a new course unit.
Priority: High

3.35.2 Stimulus/Response:
Precondition: This author is present in the course outline with a section and sub section already created.
1. The author click on create unit button in a section.
Feed basic details about the course (like course name, number organization).
3. Submit the details about course.
Postcondition: The author will see the subsection with specified name in his course online dashboard under particular subsection.
3.36 Create a video unit in a course ::REQ36

3.36.1 Description and Priority:
This system feature allows the author to upload as a new course unit directly on youtube.
Priority: High

3.36.2 Stimulus/Response:
Precondition: This author is present in the course outline with a section and sub section already created.
1. The author specifies the details of video to be uploaded along with author google account details.
2. Specify the accessibility (like public private)
Postcondition: The video unit is created in course outline.

3.37 Problem unit in a course ::REQ37

3.37.1 Description and Priority:
This system feature allows the author to create a new problem or assignment as course unit.
Priority: High

3.37.2 Stimulus/Response:
Precondition: This author is present in the course outline with a section and sub section already created.
1. Author is provided with options of different type of requirement.
2. User select one of it
Postcondition: The author will be directed to interface for creating problem components.

3.38 Designing test as a problem unit ::REQ38

3.38.1 Description and Priority:
This system feature allows the author to create a new problem unit in a course.
Priority: High

3.38.2 Stimulus/Response:
Precondition: This author created a problem unit.
1. Author is provided with text editor type interface where he can specify question, answers and explanation.
2. Also a predefined html format editing area from where user can change some characteristics of text(like color, font)
Postcondition: The author is redirected to subsection of the course and problem unit is saved.

3.39 HTML unit in a course ::REQ39

3.39.1 Description and Priority:
This system feature allows the author to create a textual matter (introduction of course) or some images.
Priority: High

3.39.2 Stimulus/Response:
Precondition: This author is in course outline under a course and subsection
1. Author should have an option for selecting a blank or some standard formatted HTML component (both editable)
2. Provision to change include images or other HTML components
Postcondition: The HTML component is saved.

3.40 Section specific discussion unit in a course ::REQ40

3.40.1 Description and Priority:
This system feature allows the author to create a new discussion component for that subsection.
Priority: medium

3.40.2 Stimulus/Response:
Precondition: This author is present in the course outline with a section and subsection already created.
1. Author is provided with a discussion component.
2. Author specifies the topic of the discussion
Postcondition: The discussion unit is created for that subsection.

3.41 Setting Date/time for course ::REQ41

3.41.1 Description and Priority:
This system feature is a kind of setting tools provided to author for setting date and time of the activation of the course in LMS.
Priority: High

3.41.2 Stimulus/Response:
Precondition: This author is present in the course outline panel.
1. Interface for settings various parameters.
2. The author set details.
3. Save it
Postcondition: The changes made are saved

3.42 Setting Course requirements and introduction Page for course ::REQ42

3.42.1 Description and Priority:
This system feature is a kind of setting tools provided to author for designing the introduction page of the course which is visible to all user of the site (registered or unregistered).
Priority: High

3.42.2 Stimulus/Response:
Precondition: This author has created a course.
1. He will be provided with the interface to upload 1 logo for course, uploading a intro video, providing prerequisites, author details and course brief outline.
2. The author fills the details.
3. The author save to the details or changes made.

Postcondition: The changes made are saved and introduction page of course is created (a success message is shown).

3.43 Adding/Delete author for course ::REQ43

3.43.1 Description and Priority:
This system feature is a kind of setting tools provided to author inviting other registered author in CMS (studio) to take part in course as author. And should also have the provision to delete them
Priority: High

3.43.2 Stimulus/Response:
Precondition: The author is present in the course panel and know the email ID of the other author (he wants to add or delete).
1. Interface for providing add/delete option for author.
2. The author provides the email Id of other author and choose add/delete option.
3. The success/error/warning message is shown.

Postcondition: The changes made are saved with proper message at user interface and the author will be redirected to course outline.

3.44 Setting grades for assignments ::REQ44

3.44.1 Description and Priority:
This system feature is a kind of setting tools provided to author for setting the grades for each assignment type. Also allows user to specify types of grades to be given to student at particular score.

Priority: Medium

3.44.2 Stimulus/Response:

Precondition: The author is present in the course outline panel and have designed problems in course.

1. Interface for settings various parameters (like No of grades for particular assignment, Grades to be given on particular score, Grading levels).
2. The author set details.
3. Save it.

Postcondition: The changes made are saved and reflected.

3.45 File upload ::REQ46

3.45.1 Description and Priority:

This system feature provide an interface to the author uploading files like pdf files etc

Priority: High

3.45.2 Stimulus/Response:

Precondition: This author is present in the course outline panel.

1. Interface for browsing through the file system of author’s machine.
2. Upload button to upload the material.
3. Save it.

Postcondition: The file is uploaded in the course.

3.46 Exporting course ::REQ47

3.46.1 Description and Priority:

This system feature is a advanced tool being provided to the author to export the course being designed by the them in a suitable format.

Priority: Medium

3.46.2 Stimulus/Response:

Precondition: This author has created a course.
1. Interface is author to specify name and id of the course to be exported
2. The Export button is clicked.
3. All files are downloaded in Zip format.

Postcondition: The success/error message is shown.

3.47 Importing Course ::REQ48

3.47.1 Description and Priority:
This is an advanced system feature provided to the user to import a course (in proper format)
Priority: Medium

3.47.2 Stimulus/Response:
Precondition: The author has a proper course files to be imported and present in his dashboard.
   1. Interface for importing the course is presented to the user.
   2. The author browses through the file and import the course file.
   3. Save it.

Postcondition: The required files are imported and changes are shown in the user dashboard.

3.48 Setting Calendar Schedule for course ::REQ49

3.48.1 Description and Priority:
This system feature is a kind of setting tools provided to author preparing calendar type schedule for course.
Priority: Medium

3.48.2 Stimulus/Response:
Precondition: The author has created a course.
   1. The author is provided a google powered interface for scheduling the course.
   2. Here the author can also provide hyperlink type of content to the various parts of the course in calendar schedule.
   3. He plan whole schedule of the course.
   4. Fill the details.
   5. Save the schedule.
Postcondition: The changes made are saved.
4. External Interface Required:

4.1 User Interface For LMS and CMS(Studio)

4.1.1 Login Interface:

![Login Interface Image]

- E-mail *
  
  example: username@domain.com

- Password *

- Forgot password?

- Remember me *

  log into my edx account + access my courses
4.1.2 Registration interface:

WELCOME!
Register below to create your edX account.

Please complete the following fields to register for an account. Required fields are noted by **bold text and an asterisk (**).

**E-mail** *
sonamgupta1020@gmail.com

**Password** *

**Public Username** *
sonam123

Will be shown in any discussions or forums you participate in.

**Full Name** *
SONAM GUPTA

Needed for any certificates you may earn (cannot be changed later)

**Highest Level of Education Completed**
Secondary/high school

**Gender**
Female

**Year of Birth**
1992

**Mailing Address**
Powai, Mumbai Maharashtra

Please share with us your reasons for registering with edX

I agree to the **Terms of Service** *
I agree to the **Honor Code** *

create my edX account
4.1.3 Information Editing Interface:

![Image of the Change Your Name dialog box]

4.1.4 Wiki Edit Interface:

![Image of the Wiki edit interface]

Welcome to the wiki for "Berkeley's Introduction to Artificial Intelligence! This is a collaborative space for students to share their knowledge of the course. You are welcome and encouraged to make edits. See the *Wiki Editing Guide* for instructions. To experiment with the features before making real edits, please use the [Wiki Playground](wiki.berkeley.edu/Playground).

The wiki was seeded with last semester's final wiki.

```markdown
### name="lectures:lecture"

[Caption Errata](wiki:caption-errata)

Lecture Downloads Provided by Instructors: from the Syllabus tab

[Download Video](wiki:download)

[Lecture video YouTube links](wiki:youtube-links)
```

SUMMARY

Give a short reason for your edit, which will be stated in the revision log.
4.1.5 Wiki changes interface:

4.1.6 User dashboard:
4.1.7 Discussion forum:

4.1.8 Online lab (drag drop interface):
4.1.9 Video lecture interface:

4.1.10 Online test interface:

**Course elements**

- **Units**
- **Subtitles**
Interface for Studio:

4.1.11 Home page of Studio

Welcome to edX studio
Studio helps manage your courses online, so you can focus on teaching them

Keeping Your Course Organized
The backbone of your course is how it is organized. Studio offers an Outline editor, providing a simple hierarchy and easy drag and drop to help you and your students stay organized.

Simple Organization For Content
Studio uses a simple hierarchy of sections and subsections to organize your content.

Change Your Mind Anytime
Draft your outline and build content anywhere. Simple drag and drop tools let you reorganize quickly.

Go A Week Or A Semester At A Time
Build and release sections to your students incrementally. You don’t have to have it all done at once.

4.1.12 Signup For Author:

Sign Up for edX Studio

Ready to start creating online courses? Sign up below and start creating your first edit course today.

Email Address *
sonamgupta@gmail.com

Password *

Public Username *
sonam123

This will be used in public discussions with your courses and in our edX support forums.

Full Name *
Sonam Gupta

Preferred Language
English

I agree to the Terms of service *

CREATE MY ACCOUNT & START AUTHORING COURSES
4.1.13 Creating Course Interface:

4.1.14 Adding new section in a course:
4.1.15 Interface to add new subsection:

![Image of edX studio interface for adding a new subsection.]

4.1.16 Interface for adding new unit:

![Image of edX studio interface for adding a new unit.]

The interface allows instructors to add new sections and units to their course content.
4.1.17 Interface to add new HTML component:
4.1.18 Interface to add new video:

![Image of interface to add new video]

4.1.19 Interface to add new author:

![Image of interface to add new author]
4.1.20 Interface to add new file:

LMS Based Specific Interface for Author:

4.1.21 Interface to add new student:
4.1.22 Interface for forum admin:

4.2 Hardware Interfaces

Storing devices (flash, optical disks etc.) for the client to take a test in offline mode. Also in case that the Edx runs behind a firewall the appropriate ports must be port forwarded or port triggered for the clients to connect.

4.3 Communications Interfaces

Setting up the server into server mode requires that there will be open ports for accepting connections from the clients. The connection between the client and the server uses Connection oriented communication, via TCP/IP—Transfer Control Protocol/Internet Protocol, implements reliable delivery of messages.
Connection-oriented communication makes programming easier because the protocol includes mechanisms for detecting and handling errors and an acknowledgment mechanism between client and service. For video streaming UDP connection is established between the client and the video server.

5. Other Nonfunctional Requirements

Here we specify some nonfunctional constraints that the program satisfies in order to be more concrete and stable.

5.1 Performance Requirements

Performance:
The system must be interactive and the delays involved must be less. So in every action-response of the system, there are no immediate delays. In case of opening windows forms, of popping error messages and saving the settings or sessions there is delay much below 2 seconds, In case of opening databases, sorting questions and evaluation there are no delays and the operation is performed in less than 2 seconds for opening, sorting, computing, posting > 95% of the files. Also when connecting to the server the delay is based on the distance of the 2 systems and the configuration between them so there is high probability that there will be or not a successful connection in less than 20 seconds for sake of good communication.

5.2 Consistency

All clients must be attachable to one server, so there would be appropriate control of the test statistics information, video etc. Also in case of a potential loss of connection between the client and the server in case of online test or lab the clients progress so far is lost. When the client finishes its operation (by pressing the finish button) then its progress is sent to the server and be logged. In case of a potential server breakdown only the so far finished operations are saved to the log file.

5.3 Security Requirements

The main security concern is for users account hence proper login mechanism should be used to avoid hacking. The confirmation mail is way to spam check for increasing the security. This program uses object oriented mechanisms to protect its data passed using methods.
5.4 Software Quality Attributes

**Availability:**
As the system always has something to function and always pop up error messages in case of component failure. In that case the error messages appear when something goes wrong so to prevail availability problems. It should be made available in all possible browser, OS and should be able to recover back from exceptional conditions.

**Usability:**
As the system is easy to handle and navigates in the most expected way with no delays. In that case the system program reacts accordingly and transverses quickly between its states.

**Reliability:**
As the system provide the right tools for editing course materials, videos streaming, creating session tests and analyzing the test sessions and evaluation. It must be made sure that the system is reliable in its operations and for securing the sensitive details.
6. Use Case Diagram for EdX system: