

System Analysis & Design on Online Learning Platform

eLearn.com

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Introduction

Education is the backbone of a nation. Learning is the only way to develop anything. There is so many schools and universities providing the opportunity to learn and develop skills that will help people grow and live a happy life.

But it is not sufficient, not everyone gets this opportunity, nor the schools or universities are successful in teaching everyone.

That is why we need a learning system that will give everyone the opportunity to learn and teach.

We want a learning system that will give people the option to learn or teach from anywhere and anytime.

eLearn is such a learning system that provide people the option to learn and teach from anywhere and anytime.

eLearn

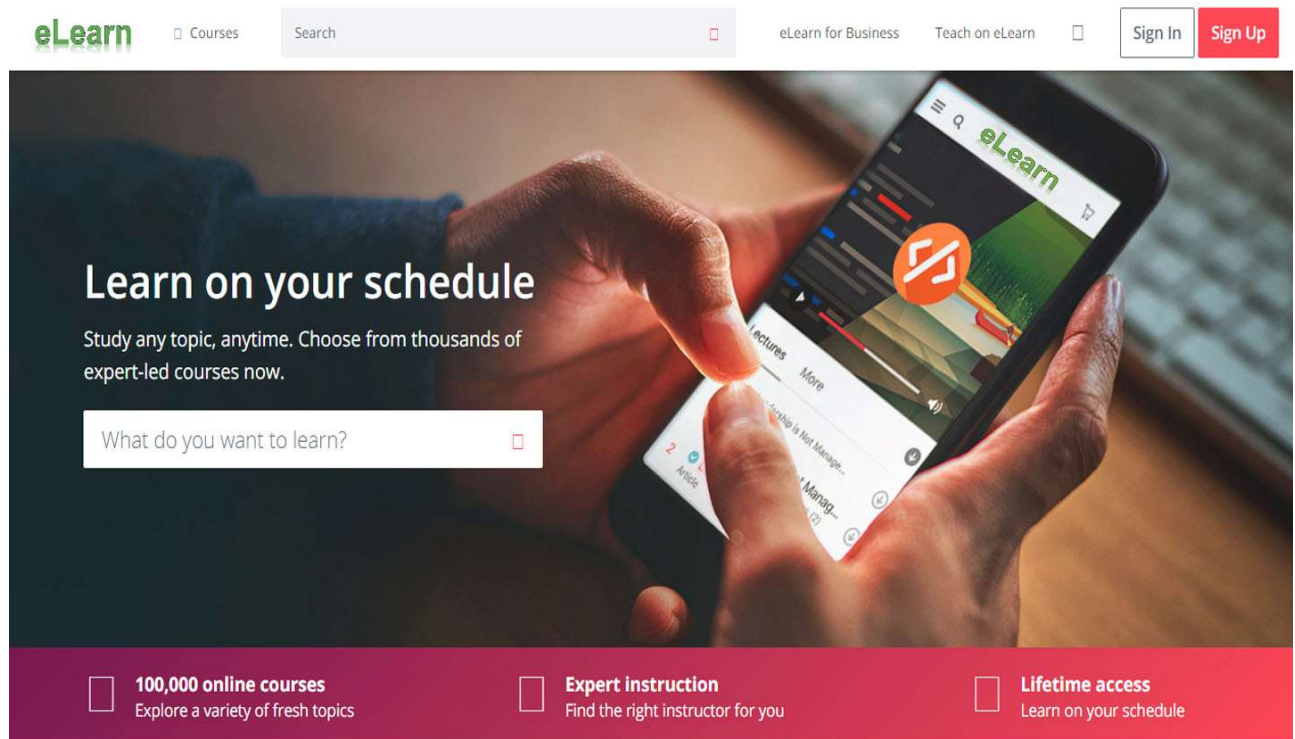


Figure: Sample eLearn Homepage



Required Features

1. Registration

People should be able to sign up as a learner or teacher. A registration features allows people to do just that by filling out necessary information like username, password, email etc. After finishing signing up people can sign in anytime using the username or email and password to enter in the eLearn system.

Registration form must have the following options:

- ✓ Username
- ✓ Email
- ✓ Password
- ✓ First Name
- ✓ Last Name

A sample sign-in form titled 'Sign In' with a close button (X) in the top right corner. It features two input fields: 'Username' with a person icon and 'Password' with a lock icon. Below the fields is a large green 'Sign In' button. At the bottom, there is a link 'Forgot Password?' and a footer link 'Don't have an account? Create one'.A sample sign-up form titled 'Sign Up' with the instruction 'Please fill in this form to create an account!'. It contains four input fields: 'Username' (person icon), 'Email Address' (envelope icon), 'Password' (lock icon), and 'Confirm Password' (lock icon). Below these is a checkbox for 'I accept the Terms of Use & Privacy Policy'. A large green 'Sign Up' button is positioned below the checkbox. At the bottom of the form, a link reads 'Already have an account? Login here'.

Figure: Sample Sign In & Sign Up Form

2. Users Profile

People who sign up successfully both as learner or teacher and able to sign in into the eLearn System should have a user profile features where people can store their profile information. They should be able to share their profile to other learners or teachers. User profile should include all badges and record of all exam that a learner or teacher has passed with the score.

User Profile must have the following options:

- ✓ Personal Information
- ✓ Educational Information
- ✓ Social Networks Links
- ✓ Earned Badges and Passed Exam Score

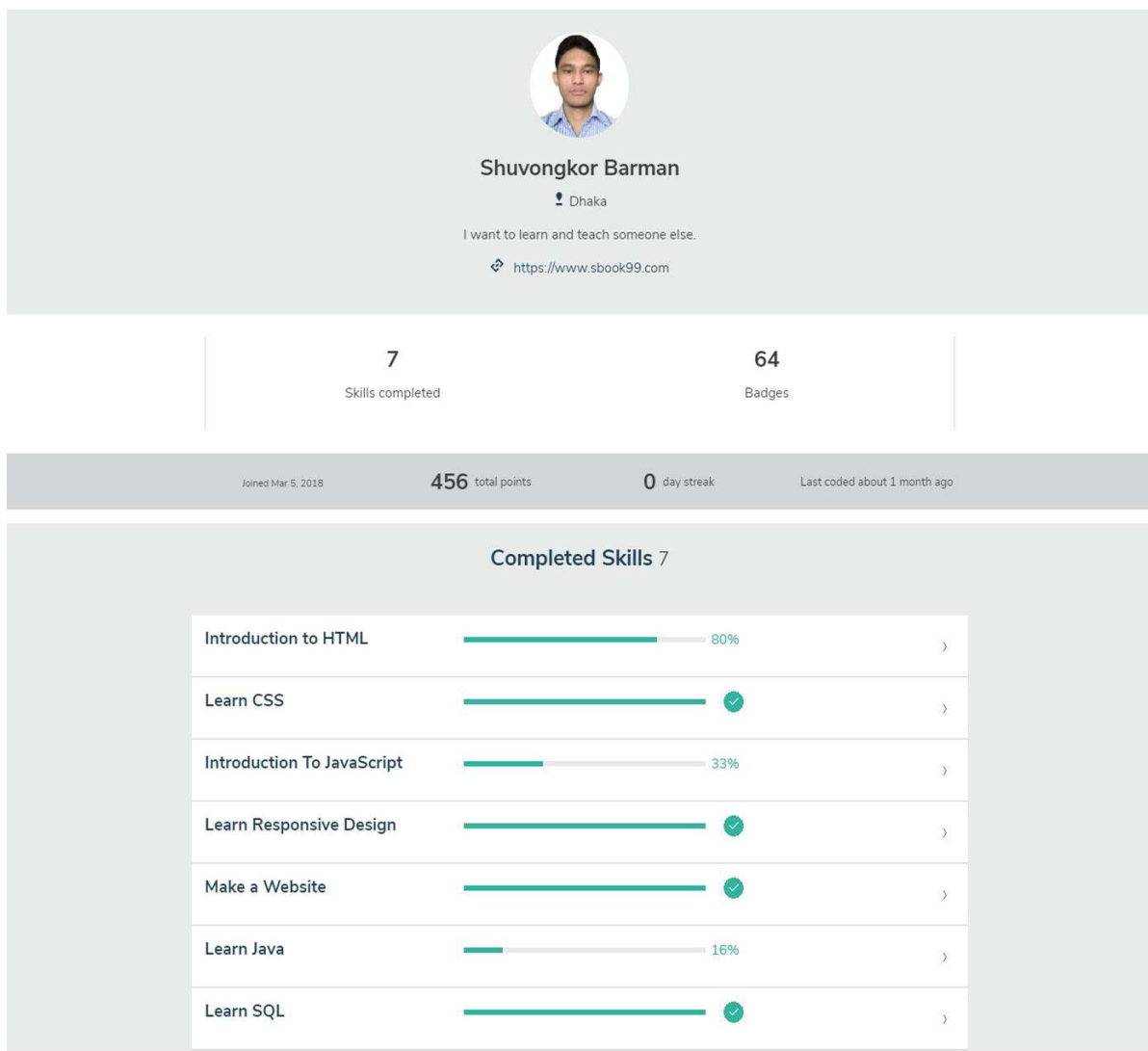


Figure: Sample User Profile

3. Learner Portfolio

Learners will pass many tests after finishing some course and they will obtain certificates. This certificate should be automatically added to their Learner Portfolio. They should also be able to add other certificates manually. Learners will work on various projects after they finished some course. This project should be saved and show in the Learner Portfolio. They can make as many projects as they want and include in their Learner Portfolio. They can also include project that they have learnt from somewhere else and done somewhere else.

Learner Portfolio must have the following options:

- ✓ Adding Certificates
- ✓ Adding Project

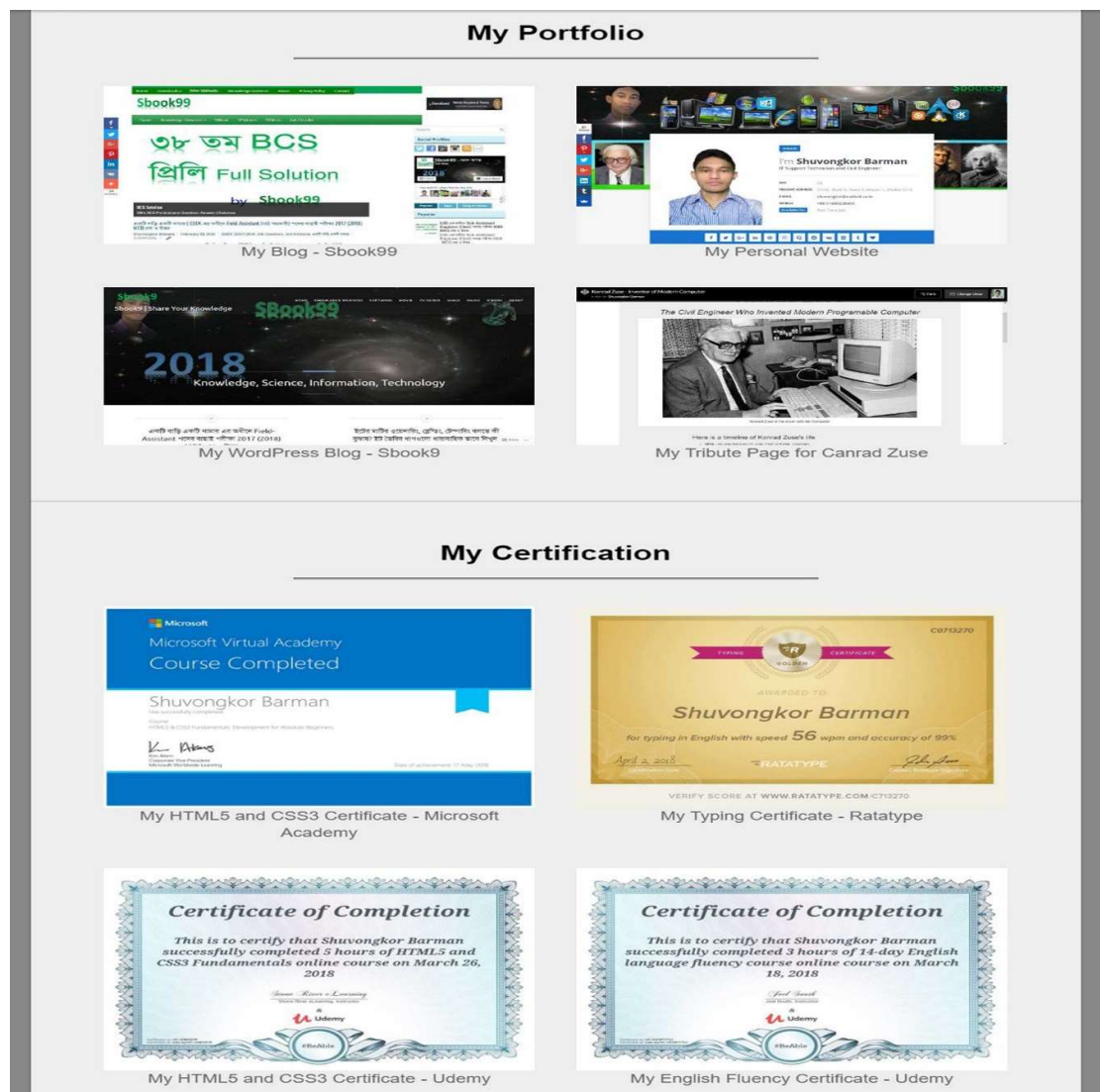


Figure: Sample Learner Portfolio

4. Teacher Portfolio

Teacher must pass at least one test in order to become a teacher after finishing sign up process as a teacher. After that they can pass as many tests as they want. The tests are for specific course that they want to teach.

After passing each test they will obtain certificates. This certificate should be automatically added to their Teacher Portfolio. They should also be able to add other certificates manually. Teacher will work on various projects during teaching a course. This project should be saved and show in the teacher Portfolio. They can make as many projects as they want and include in their Portfolio. They can also include project that they have learnt from somewhere else and done somewhere else.

Teacher Portfolio must have the following options:

- ✓ Adding Certificates
- ✓ Adding Project

5. Course Creation

Teachers should be able to create courses that they want to teach. Course creation feature will do just that. They should be able to upload videos or other files relevant to their courses.

Course Creation feature must include the following options:

- ✓ Course Name
- ✓ Course Topics
- ✓ Course Duration
- ✓ Course Price

6. Course







Learners should be able to see all the available courses using an option called Course.


Couse feature must have the following options:

- ✓ Group by Subject
- ✓ Free Courses
- ✓ Paid Courses
- ✓ Top Rated Courses
- ✓ Most Learned Courses

Featured courses

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 <p>Complete Python Bootcamp: Go from zero to hero Jose Portilla, Pierian Data Intern...</p> <p>★★★★★ 4.5 (142,912)</p> <p>\$194.99 \$32.99</p>	 <p>Java Programming Masterclass for Software Engineers Tim Buchalka, Tim Buchalka's Le...</p> <p>★★★★★ 4.6 (70,552)</p> <p>\$194.99 \$32.99</p>	 <p>The Python Mega Course: Build 10 Real World Projects Arin Sulce</p> <p>★★★★★ 4.4 (24,178)</p> <p>\$199.99 \$32.99</p>	 <p>The Complete Node.js Developer Course (3rd Edition) Andrew Mead, Rob Percival</p> <p>★★★★★ 4.6 (29,258)</p> <p>\$84.99 \$32.99</p>	 <p>Learning Python for Data Analysis and Visualization Jose Portilla</p> <p>★★★★★ 4.3 (9,984)</p> <p>\$194.99 \$32.99</p>	 <p>React - The Complete Guide (incl Hooks, React Router, Redux) Academind by Maximilian Schw...</p> <p>★★★★★ 4.7 (35,486)</p> <p>\$189.99 \$32.99</p>
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Featured course

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Figure: **Sample Course Menu**

7. Search

Learners should be able to find the course they want to learn using an option called Search.

Search features must include the following options:

- ✓ Filter
 - By
 - ✓ Free Course
 - ✓ Top rated Course
 - ✓ Last Added Course

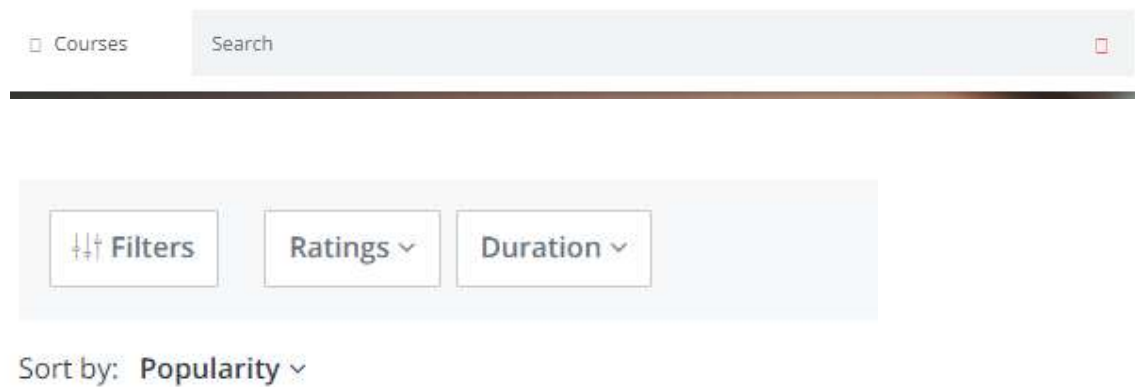


Figure: **Sample Search and Filter By**

8. Lecture

Teachers should be able to share their lecture using this feature and Learners should be able to watch and download those lectures from here. This lecture can be either free or paid.

Lecture features must include the following options:

- ✓ Free Lectures
- ✓ Paid Lectures
- ✓ Top Rated Lectures
- ✓ Most Viewed Lectures

9. Downloads

Users should be able to able to download any video lectures or files from eLearn.

Download features must include the following options:

- ✓ Downloading Video Files
- ✓ Downloading Audio Files
- ✓ Downloading PDF Files

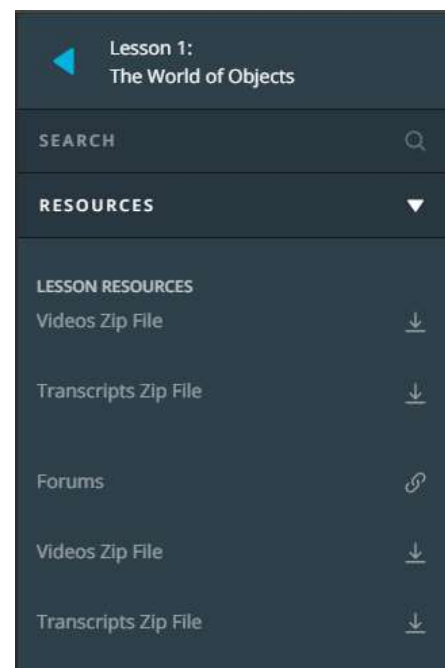


Figure: **Sample Download Option**

10. Notification

Users should get all notification about their activity and other relevant messages for example earning a badge, earning a high score, passed a test, earn a certificate, teachers' message, learners' messages etc.

Notification features must include the following features:

- ✓ Remove Notification
- ✓ Mark Notification
- ✓ Mark All as Read

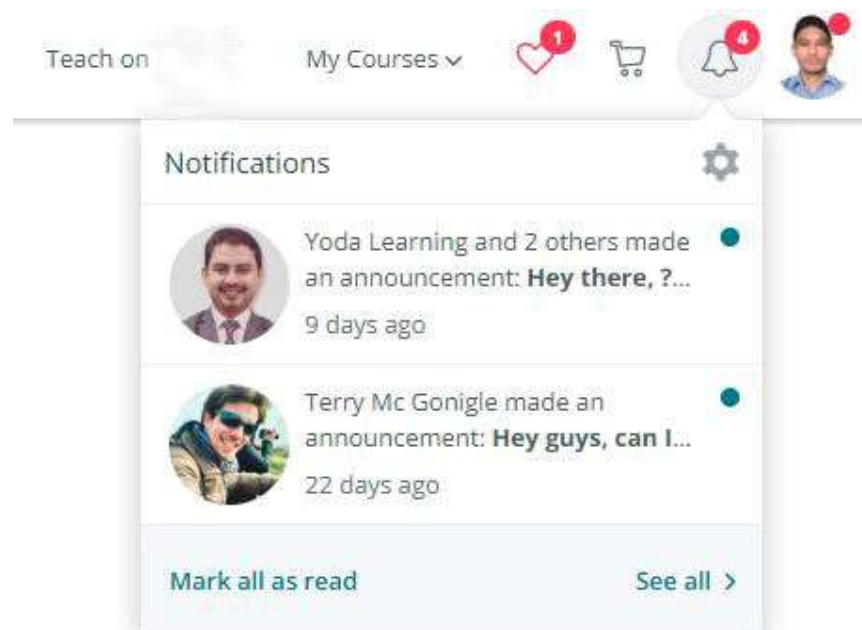


Figure: **Sample Notification Fature**

11. Gamification

Gamification is a feature that will help the learners learn in a gaming way and achieved their goal. Every course will contain some badges, points. There will be certain levels that Learners can achieve by earning points and badges. Teacher can also earn points and grow their levels.

This feature will make eLearn is like playing a game. Learning while having fun.

Gamification feature must have the following option:

- ✓ Earn Points by Learning
- ✓ Earn Points by Passing Tests
- ✓ Earn Points by Making Projects
- ✓ Earn Points by Solving Problems
- ✓ Earn Badges by Completing Courses
- ✓ Level Up
- ✓ Ranking System

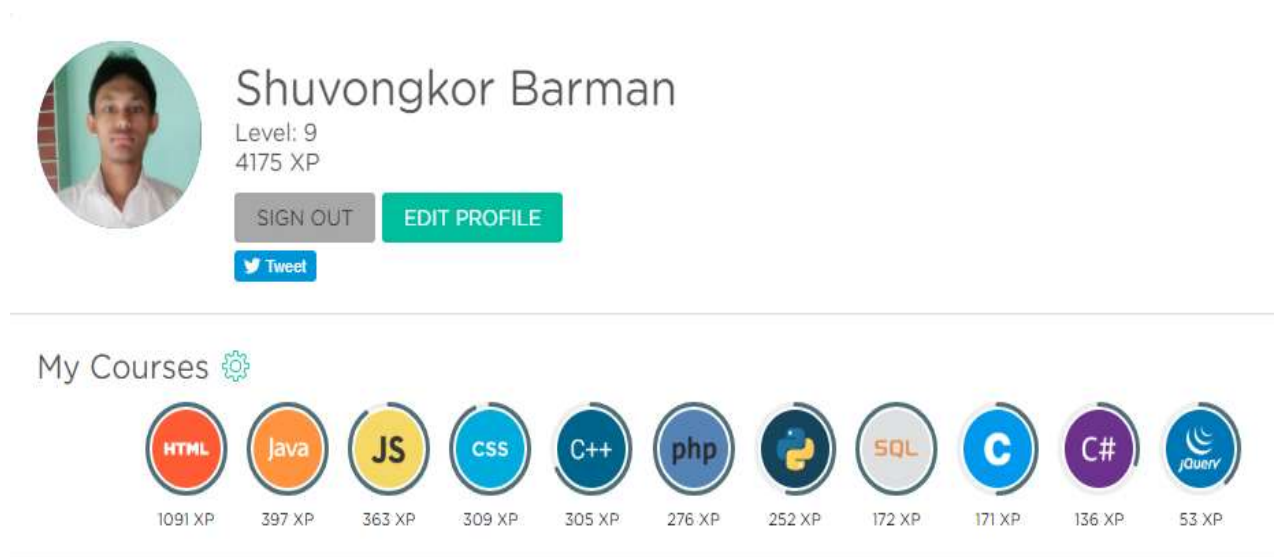


Figure: **Sample Gamification System**

12. Testing and assessment

Test and assessment are an essential part a learning system. Learners should be able to test their knowledge through some test and assessments. This will help improve their skills and knowledge. This will also improve learners confident in themselves.

Testing and assessment must include the following features:

- ✓ Take Tests
- ✓ Complete Assessment
- ✓ Retake Test

13. Certification

Certification is a feature that is essential for an Online Learning System. This feature will enable the Learners to obtain a certificate after finishing a course successfully. Learners will be able to share their achievement to their friends. This will also help them for future development of their learning life.

Certification feature must have the following option:

- ✓ Download Certificate as PDF
- ✓ Download Certificate as Image
- ✓ Share Certificate

My Certificates



Figure: **Sample Certification System**

14. Free eBook

Learners should be able to download and read free eBook from eLearn for better learning experience. Teachers should be able to upload free eBooks to the eLearn system.

Free eBook feature must have the following option:

- ✓ Download as PDFs
- ✓ Read Online
- ✓ Add to Favorite

15. Mobile Learning

eLearn should have the feature mobile learning which mean eLearn should run on mobile devices. So that learners can continue learning in their mobile devices even if they started learning from a computer.

eLearn website will be fully responsive. It will automatically fit across all kind of devices.

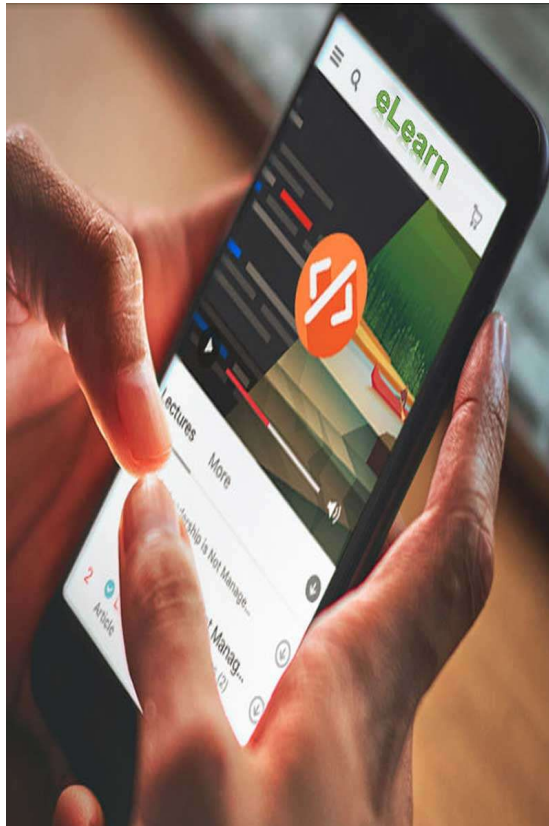


Figure: **Learning on a Mobile Device**

16. Discussion Forum

A discussion forum is needed for the learners and teachers to discuss about learning things. Learners should be able to share their problems in the forum and get help from the forum community.

Discussion Forum should have the following options:

- ✓ Upload Screenshot of the Problem
- ✓ Ask Solution
- ✓ Provide Solution

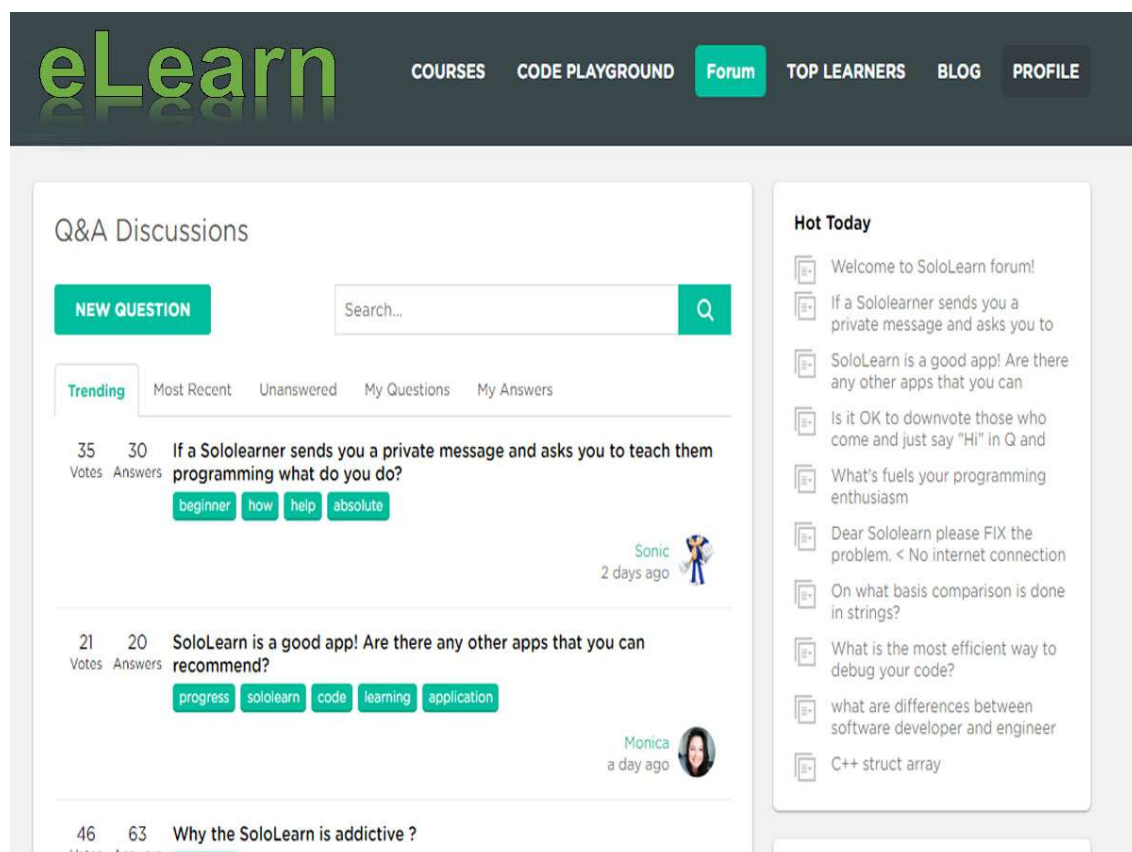


Figure: Sample Discussion Forum

Feasibility Study

Problem Analysis

Current System:

The current system of education and learning is very limited. It has limitation of resources. Students all over the world are not getting enough opportunity to get knowledge. They only learn from the lecturer's lectures, books that are given to them. This is very unfortunate that student only get knowledge from lectures in class. And all student can not join all class all the time. Which is a major problem for those who are unable to join every class.

Here are some of the major problems found in the current system:

- The current system at a university or school does not have the features of downloading lectures or lecture references for student or for teacher.
- Students only have the option for submitting assignment through hard copies which is a waste of paper.
- Students only get help from lectures in a single university.
- Students learn from very limited number of teachers.
- Students must be physically present in the classroom in order to gain knowledge, there is no other way.
- Students are unable to share resources effectively and hold group discussions that are monitored or supervised by lecturers.
- The current system at a university is very limited to its own area or country, it can not help students far away, or student that lives in other country.
- Student have to buy physical books while studying in the current system at a university which is costly.
- Student has to pay a lot of money in order to obtain a certificate, which is not possible of everyone.

The Future System:

The future system eLearn will hopefully solve most of the problem of the current system. Students all over the world will be able to learn through the eLearn system and teacher will be able to teach student all over the world. No one have to worry about the learning place, because it is virtual and everyone can use it through the internet. Users will be able to communicate and share necessary information anytime and from anywhere using the future system.

Here are some expected results of the future system:

- ✓ Users will be able to download lectures or other education resources both for learning and teaching.
- ✓ Students will be able to submit assignment online directly.
- ✓ Teacher from all over the world will be able to teach through the eLearn system.
- ✓ User don't have to be physically present to gain knowledge because the system is virtual.
- ✓ Student who lives far away or even in other country will not matter.
- ✓ Students will not have to buy physical books, eLearn System will provide eBook download option for free or at a cheap price.
- ✓ Student will be able to obtain a certificate for free by passing the test and summitting assignment.
- ✓ Learner all over the world will be able to share their ideas and thoughts and communicate with each other and help each other.

Objective of The Project

E-Learning represents an innovative shift in the field of learning, providing rapid access to specific knowledge and information. It offers online instruction that can be delivered anytime and anywhere through a wide range of electronic learning solutions such as Web-based courseware, online discussion groups, live virtual classes, video and audio streaming, Web chat, online simulations, and virtual mentoring. E-Learning enables organizations to transcend distance and other organizational gaps by providing a cohesive virtual learning environment. Companies must educate and train vendors, employees, partners, and clients to stay competitive and E-Learning can provide such just-in-time training in a cost-effective way. Developing and deploying effective E- Learning programs may require products and services supplied by a variety of vendors, leaving

one to connect the dots. One way to start is to define the goals of the desired learning solution.

Definition of the goals of an E-Learning solution is driven by the following factors:

To perform task analysis

Determine the tasks to be taught, identify subtasks and other elements involved, and identify the knowledge, skills, and attitudes required to complete the tasks efficiently and effectively.

To perform training needs analysis

Identify the target audience for the training. Identify the shortfall in knowledge, skills, and attitudes of this audience and determine what the target learners need to know.

To review existing capabilities

Review existing methods and infrastructure for providing training or meeting learning needs.

To determine expectations

Identify concrete expectations and/or ROI requirements from the desired E-Learning solution. The development of an E-Learning strategy begins by setting goals. What will the E-Learning strategy accomplish? Without a true understanding of the goals of the E-Learning strategy, it will be difficult, if not impossible, to be successful.

Before implementing E-Learning, organizations need to set common goals or objectives.

Common goals and objectives include the following:

To reduce learning costs

As a small business owner, you know that online transactions cost a fraction as much those requiring paper or staff. It's the same with E-Learning because there are no papers, no delays, and no travel expenses. Such learning enables employees to take what they have just learned from their computer screens and apply it to the tasks at hand.

To motivate employees

E-Learning is considered an effective way to keep up with new technology, to generate new ideas, and to keep your workforce fresh and inspired.

To improve flexibility of course delivery

Smaller businesses don't have the staff to manage their training and development initiatives. E-Learning technologies can overcome these administrative restrictions

Significance of e-Learn System

Technology has the power to transform education. It is essential to bring it into the classroom to empower learning. Here are some of the reasons (significance/importance).

1. Students need to be engaged with what they are doing to improve learning outcomes
2. Enables students to become thinkers/learners/risk takers in a sheltered environment.
3. Learn not to rely on the teacher...be accountable themselves...become independent!
4. Broadens the horizons of many students as it exposes students to the world outside their city or country town.
5. Fits in with Rural Education where students in small rural schools need no longer be disadvantaged by distance and isolation, as technology allows them to learn virtually and maintain their subject choices, allows e.g. LOTE (languages other than English) and other specialist subjects to be taught across schools by a virtual teacher.
6. Allows a mobile learning environment – anywhere, anytime, anyhow.

Delimitation and Scope of Study

Although e-Learning has many benefits for students and organizations alike, it also has limitations.

Here are some of the limitation that we should mention:

◆ **Computer literacy and access to equipment.** Any e-Learning system involves basic

equipment and a minimum level of computer knowledge in order to perform the tasks required by the system. A student that does not possess these skills, or have access to these tools, cannot succeed in an e-Learning program.

◆ **Some topics are not appropriate for e-Learning.** Certain subjects that require physical exertion and practice, such as sports and communication skills, are not good candidates for e-Learning. However, e-Learning can be a useful companion to traditional education for teaching background and technical information.

◆ **Students themselves can be a limitation to e-Learning.** The flexibility and student-centered nature of e-Learning requires a high level of student responsibility. A successful e-Learning student must be well organized, self-motivated, and have good time management skills. What you get out of an e-Learning program is directly related to the amount of effort you put in.

Best Learning Management System Defined

- **Cost effectiveness:** the total cost figures included in this report represent a current snapshot of the LMS expenditures excluding self-hosting and migration cost, is reported to the Assessment team. The benefits of the LMS is expected to be more than cost such as hosting maintenance and other cost that may be incurred.

- **Support and Training:** the system must have a virtual learning community provides students orientates templates and professionals, development resources for faculty by providing online help desk services for students and faculty that includes chat, email, telephone and a personalized support portal available 24/7/365.

- **Ease of Use:** the LMS must have ease of use components and no additional instrument questions were developed the system should have a higher level of instructor and administrator perceived application functionality.

- **Scalability:** the LMS must be able to report on the number of active courses, users, and average course size and storage capacity on their LMS. It should be able to hold a lot of actives but still be able to use a less storage capacity.

- **Sustainability:** The sustainability of an LMS is paramount to the future growth of distance learning in the university. The system-wide capability to support LMS-centric learning technology is challenging in both the short and long terms. Information from the success NC listening tour notes indicate that: -
 - (1) Colleges differ on LMS preferences but want continued support from the System Office.
 - (2) Learning technology offers an effective and flexible means to facilitate learning.
 - (3) Increased enrollments have negatively affected instructors, strained facilities, and encouraged creative interventions to maximize resources.

Requirements

Requirement for running or using the System:

- ✓ PC/Mobile/Tablet
- ✓ Internet

Since, **eLearn** is an online Web-Based Application Software a user only needs a PC or Mobile device or any other device that can runs a Web Browser and internet connection.

- ✓ All Web Browser with HTML5 & JavaScript support.

Recommended Browser:

- ✓ Firefox
- ✓ Google Chrome
- ✓ Microsoft Edge

Minimum Device Requirements:

- ✓ 1 GB RAM
- ✓ 1 GHz Processor
- ✓ 720p Resolution Display
- ✓ Mouse
- ✓ Keyboard
- ✓ Touch Capability [For Touch Devices]

Requirements for Developing the System:

Language/Technology:

- ✓ HTML5
- ✓ CSS
- ✓ JavaScript
- ✓ NodeJS

Database:

- ✓ MySQL and MariaDB

Local Development Environment:

- ✓ XAMPP

Browser:

- ✓ Chrome, Firefox

IDE:

- ✓ Visual Studio Code

Machine:

- ✓ Windows 10 Desktop PC

Budget: 100 million US Dollar

Time: 1 Year

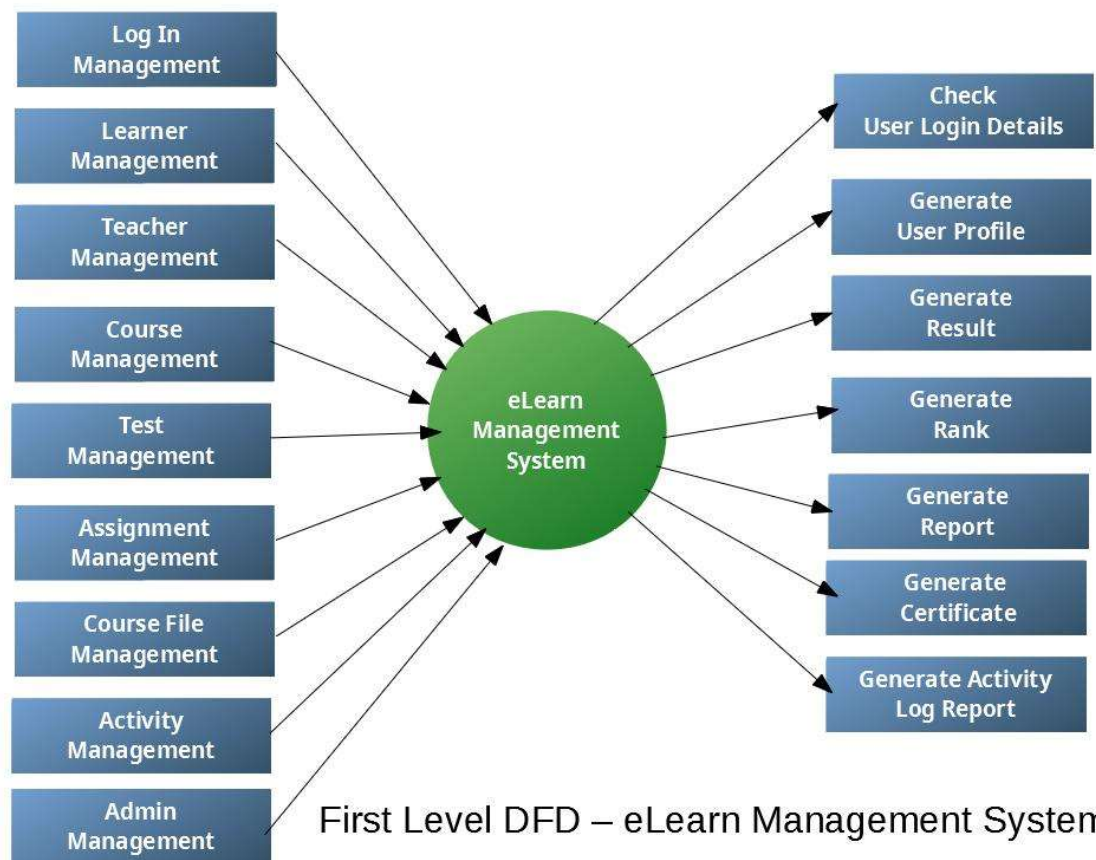
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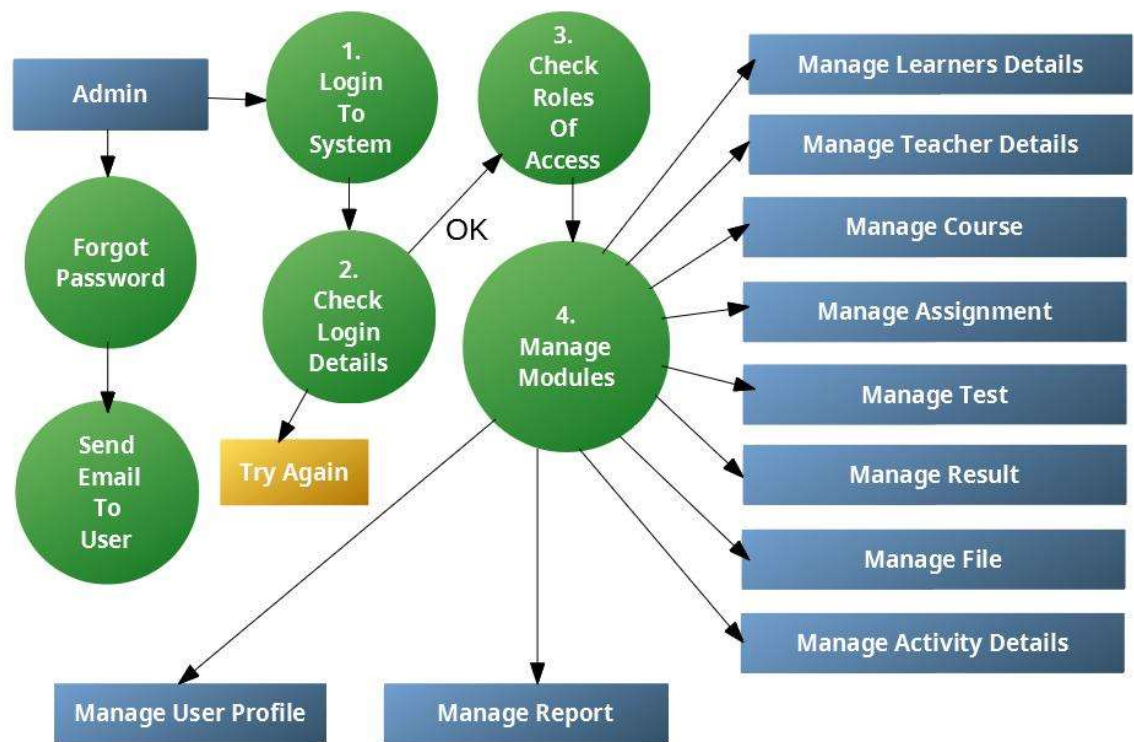
Project End Date: 01/01/3000

Data Flow Diagram

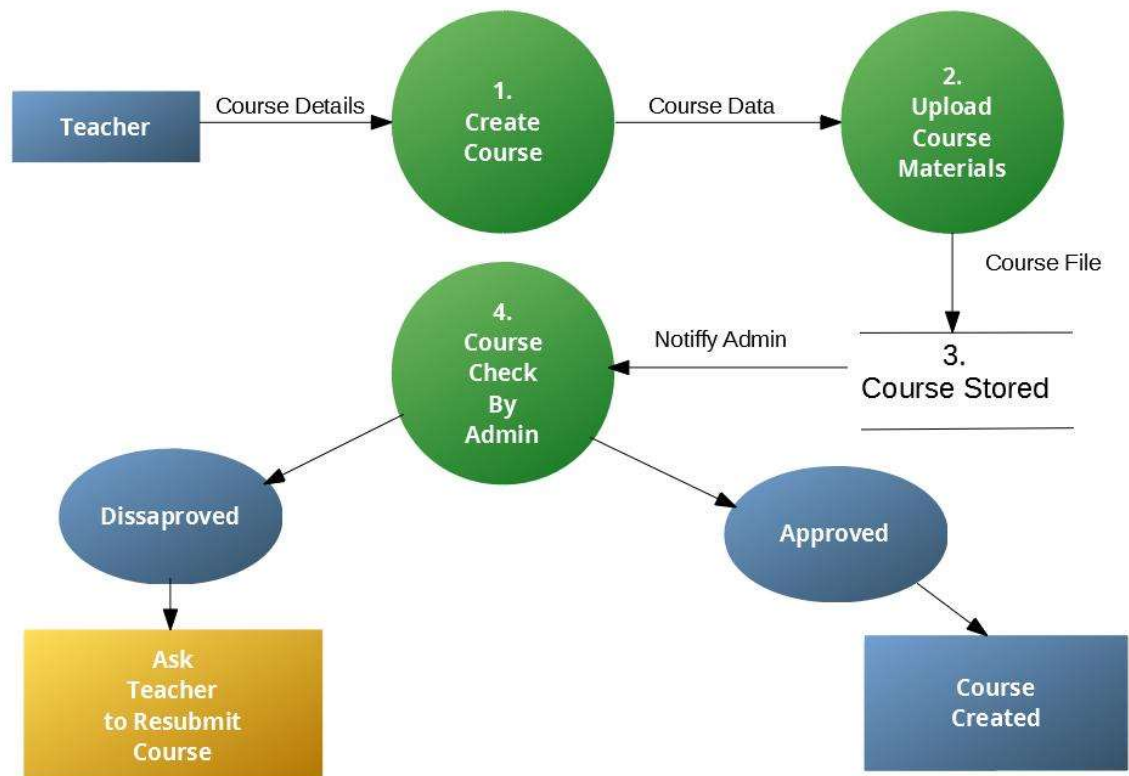


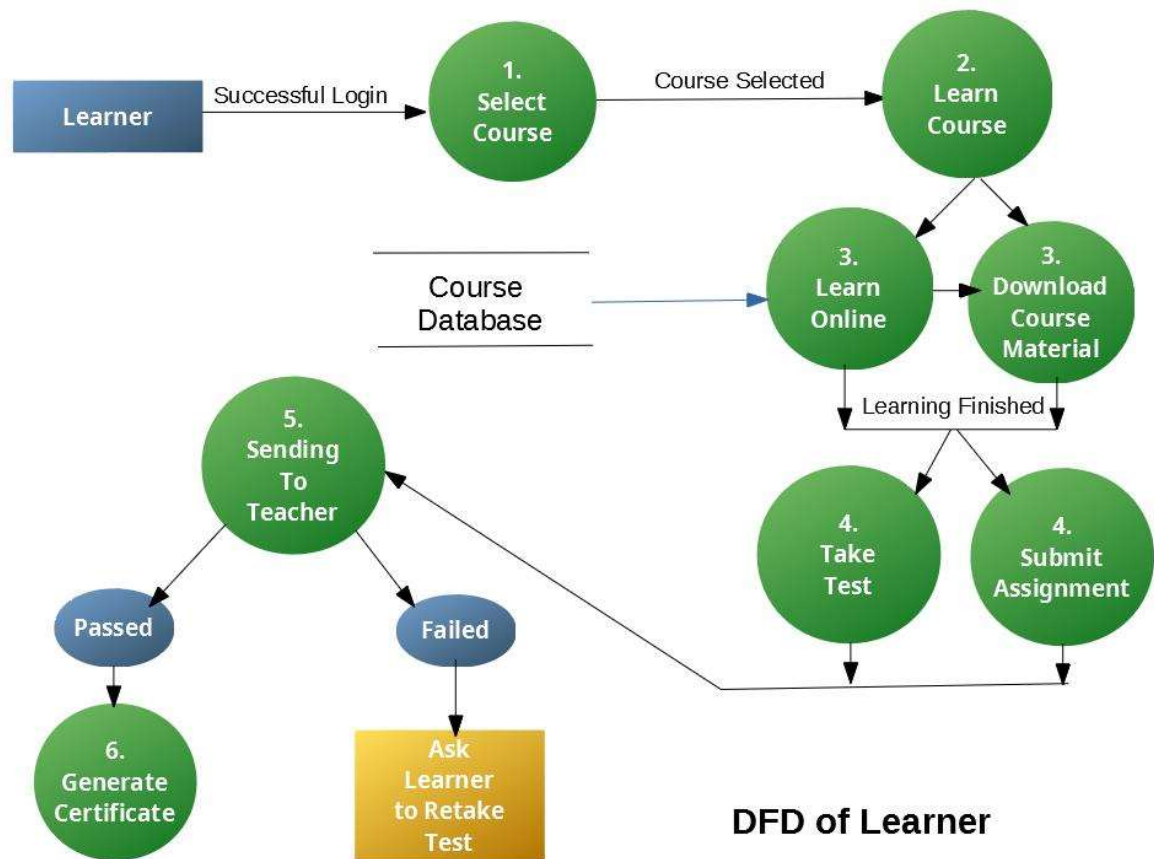
Zero Level DFD – eLearn Management System

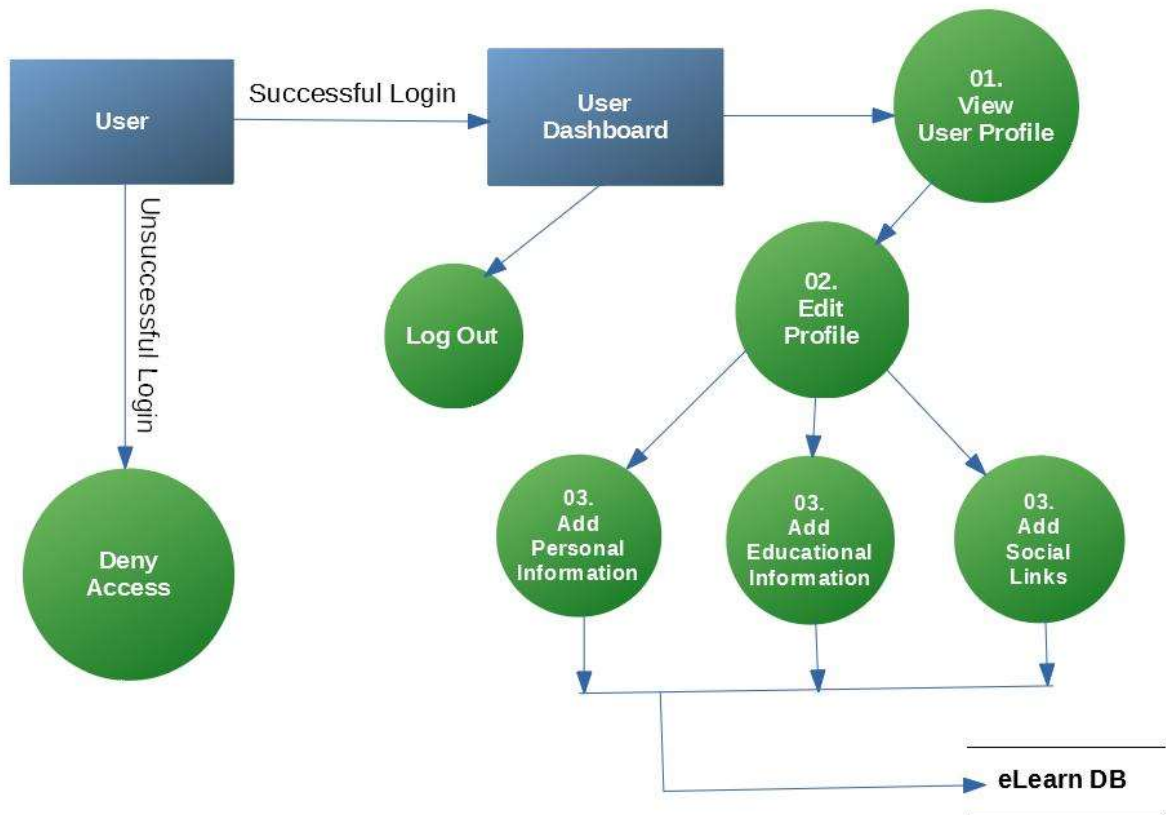




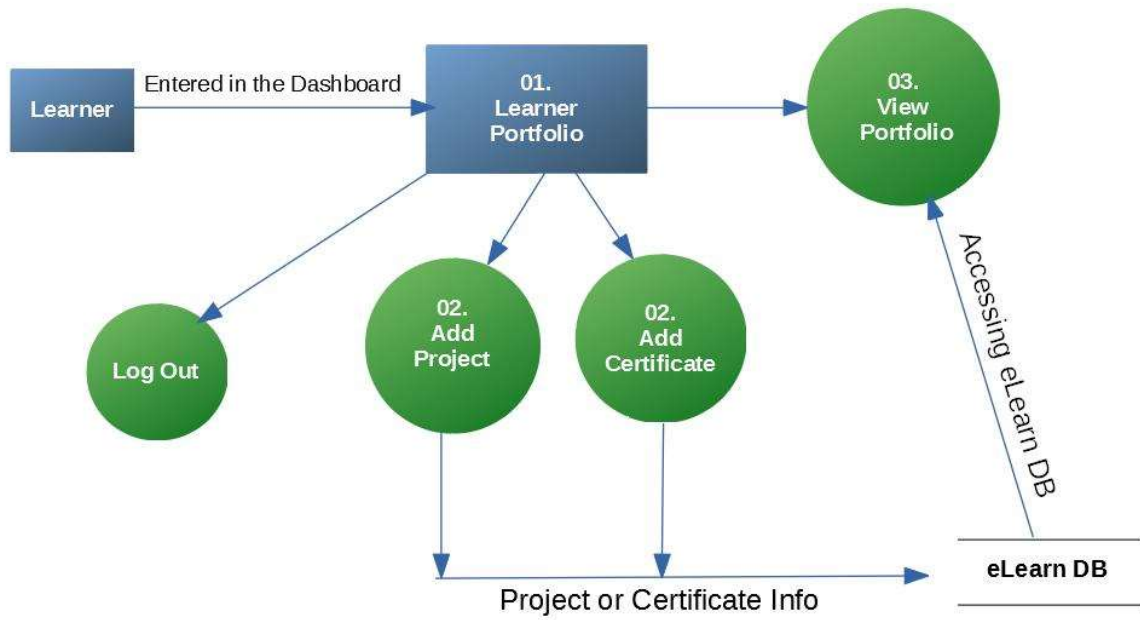
Second Level DFD – eLearn Management System

**DFD of Teacher**

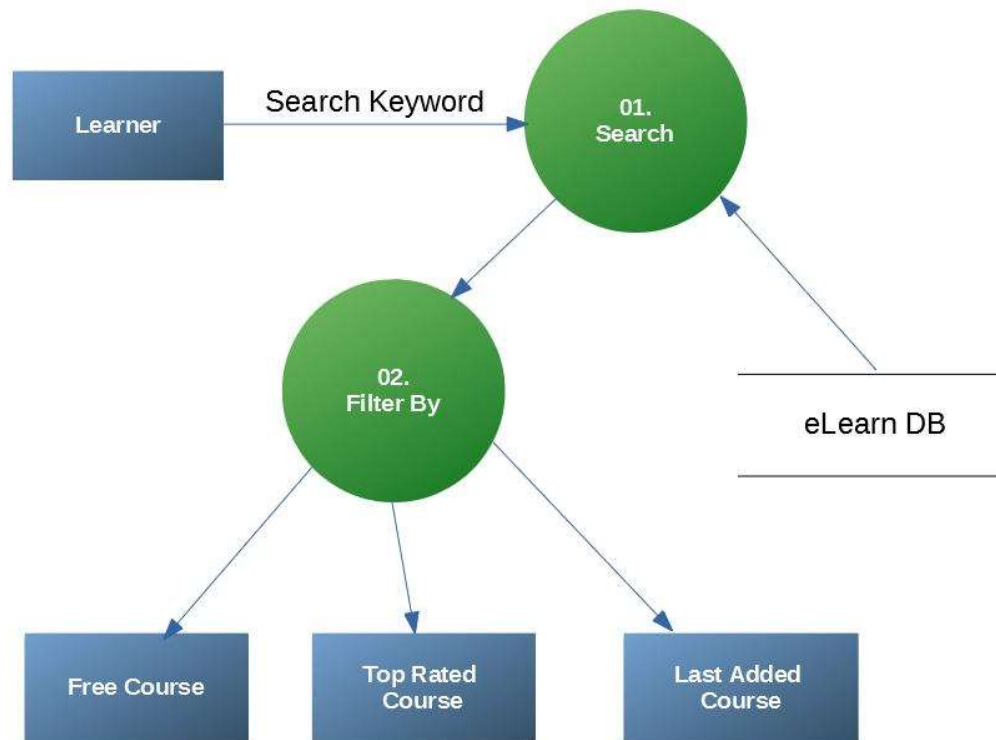




DFD of User Profile Process



DFD of Learner Portfolio



DFD of Search

Process Specification

Structured English: Process Login

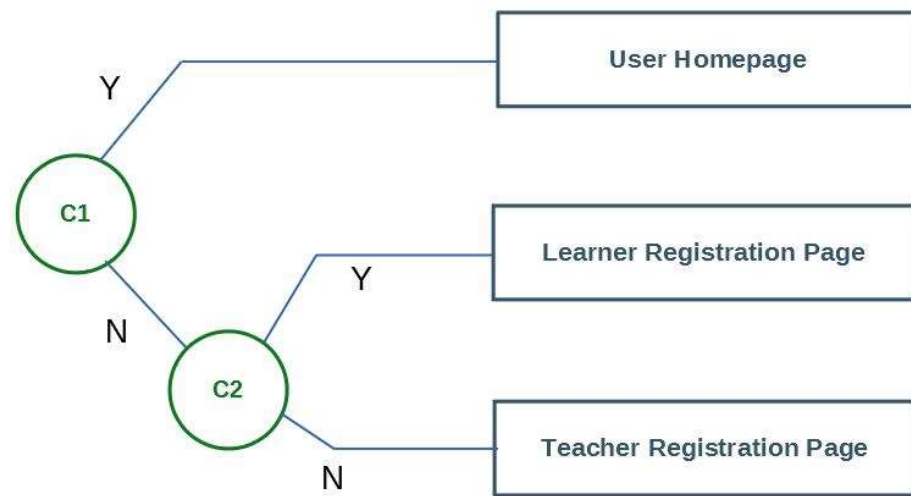
```

if login detail is correct
    then
        provide User Homepage
    else
        Provide registration page
        if user clicks Sign Up as a Learner
            then
                Provide Learner Registration Page
            else
                if user clicks Sign Up as a Learner
                    then
                        Provide Teacher Registration Page
                    end if
                end if
            end if
        end if
    end if

```

Decision Table: Process Login

Condition	R1	R2	R3
Login details is correct	Y	N	N
User clicked Sign Up as a Learner	-	Y	N
User clicked Sign Up a Teacher	-	-	Y
Actions			
Provide User Homepage	X	-	-
Provide Registration Page for Learner	-	X	-
Provide Registration Page for Teacher	-	-	X



C1 = Login details is correct

C2 = Clicked Sign Up as a Learner

Decision Tree for Login Process

Structured English: Process Admin Login

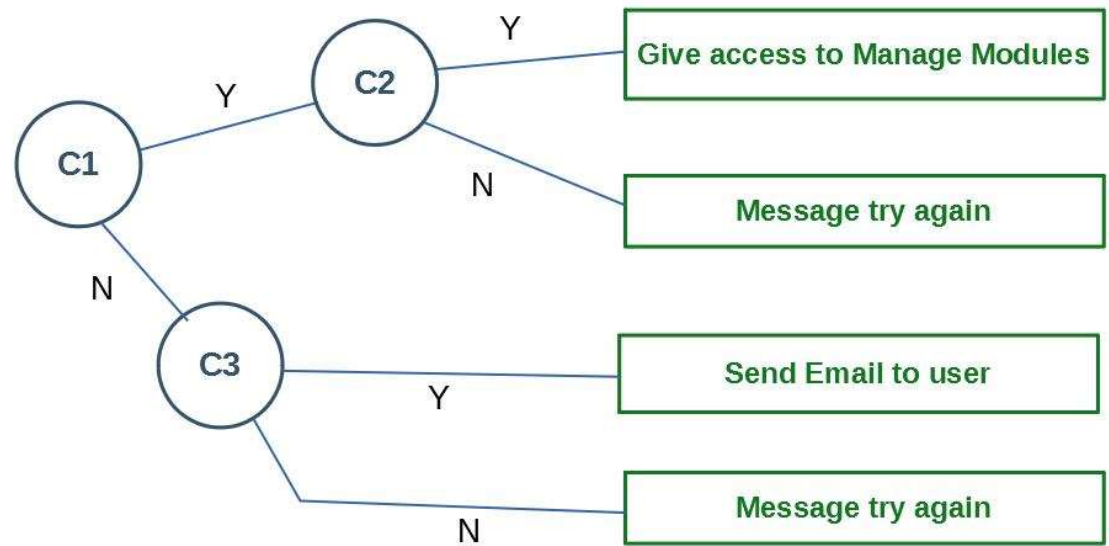
```

if admin login detail is correct
  then
    if Roles of access checked out
      then
        Give access to Manage Modules
      else
        message try again
      end if
    else
      if Forgot Password
        then
          Send Email to user
        end if
      end if
    end if
  end if

```

Decision Table: Process Login

Condition	R1	R2	R3
Admin login details is correct	Y	N	N
Roles of access checked out	Y	N	N
Forgot Password	-	Y	N
Wring Password	-	-	Y
Actions			
Give access to Manage Modules	X	-	-
Send Email to user	-	X	-
Message Try Again	-	-	X



C1 = Admin login details is correct

C2 = Roles of access checked out

C3 = Forgot Password

Decision Tree for Admin login

Structured English: Process Creating Course by Teacher

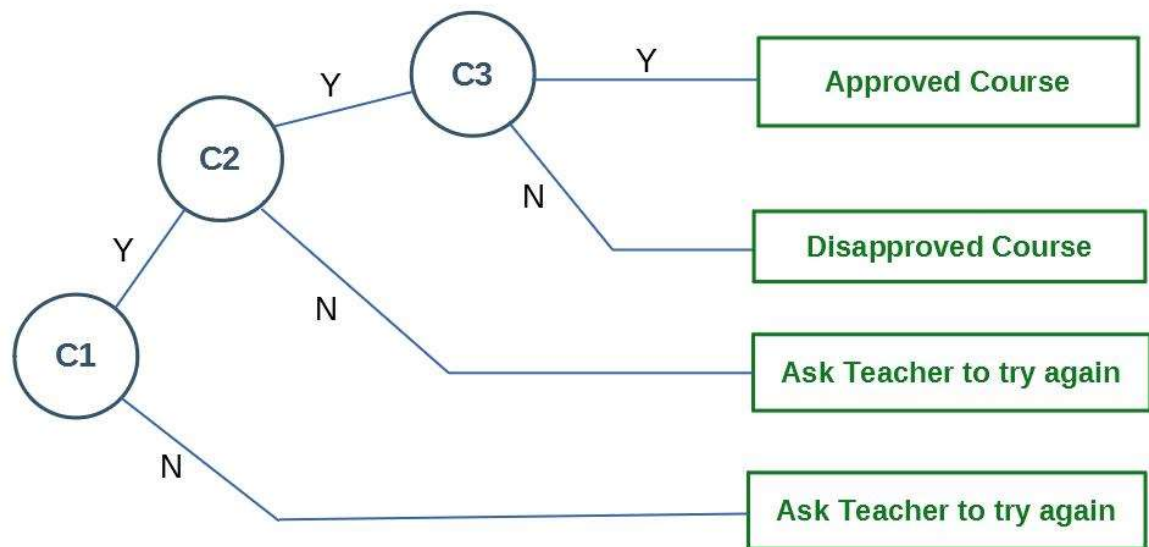
```

if Provided course details
  then
    if Uploaded course materials
      then
        if Checked out okay by admin
          then
            Approved Course
          else
            Disapproved course
          end if
        end if
      end if
    else
      Ask Teacher to try again
    end if
  end if
end if

```

Decision Table: Process Creating Course by Teacher

Condition	R1	R2	R3
Provided Course Details	Y	Y	Y
Uploaded Course Materials	Y	Y	N
Check out okay by admin	Y	N	N
Actions			
Approved Course	X	-	-
Disapproved Course	-	X	-
Ask Teacher to try again	-	-	X



C1 = Provided Course Details
C2 = Uploaded Course Materials
C3 = Check out okay by admin

Decision Tree for Creating Course by Teacher

Structured English: Process Learning by Learner

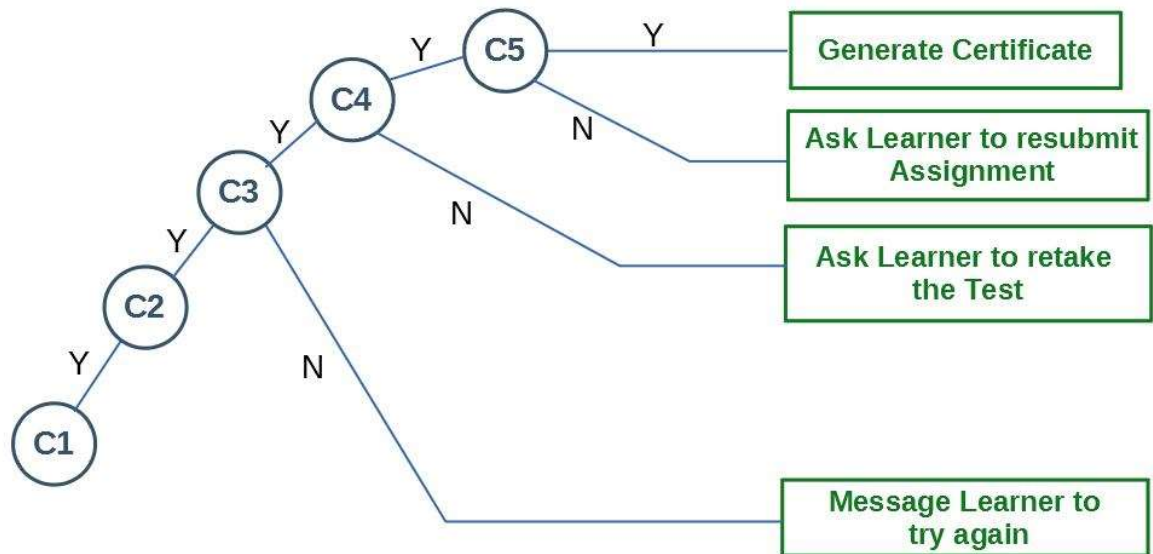
```

if Login successful
  then
    if A course is selected
      then
        if Learning finished
          then
            if Passed the test
              then
                if Assignment submitted and approved
                  then
                    Generate Certificate
                  else Ask Learner to resubmit assignment
                  end if
                else
                  Ask Learner to retake the Test
                end if
              else
                Message Learner to try again
              end if
            end if
          end if
        end if
      end if
    end if
  end if
end if

```

Decision Table: Process Learning Course by Learner

Condition	R1	R2	R3	R4
Login successful	Y	Y	Y	Y
A course is selected	Y	Y	Y	Y
Learning finished	Y	Y	Y	N
Passed the Test	Y	N	Y	N
Assignment submitted and approved	Y	Y	N	N
Actions				
Generate Certificate	X	-	-	-
Ask Learner to Retake Test	-	X	-	-
Ask Learner to resubmit assignment	-	-	X	-
Message Learner to try again	-	-	-	X



C1 = Login successful
 C2 = A Course is selected
 C3 = Learning Finished
 C4 = Passed the Test
 C5 = Assignment submitted and approved

Decision Tree for Learning Process by Learner

Structured English: Process User Profile Management

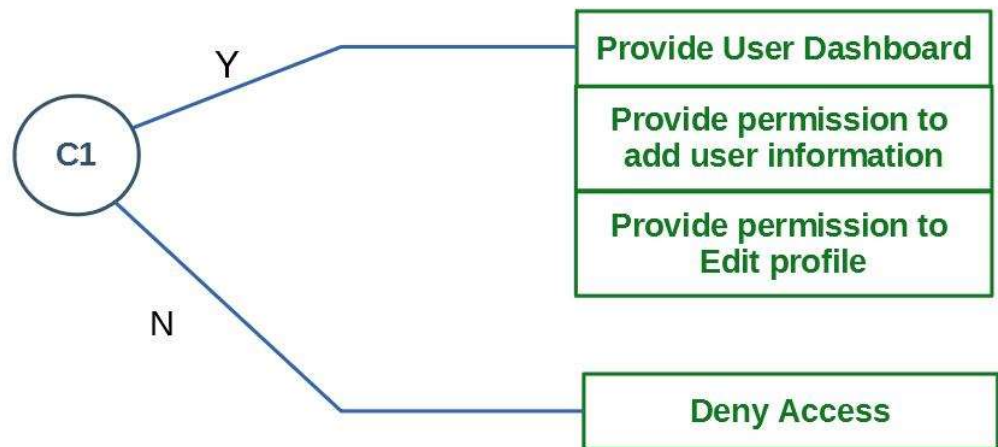
```

if User login successful
    then
        Provide User Dashboard
        Provide permission to edit profile
        Provide permission to add user information
    else
        Deny access
end if

```

Decision Table: Process User Profile Management

Condition	R1	R2
User Login Successful	Y	N
Actions		
Provide User Dashboard	X	-
Provide permission to edit profile	X	-
Provide permission to add user information	X	-
Deny access	-	X



C1 = Login successful

Decision Tree for User Profile Process

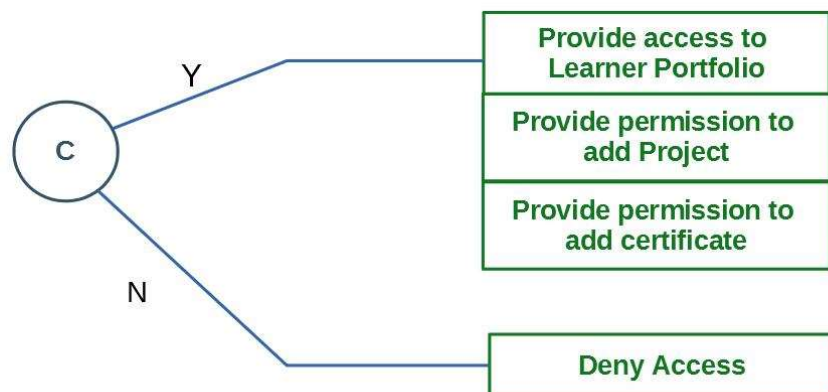
Structured English: Process **Learner Portfolio**

```

if User entered the Dashboard
    then
        Provide access to Learner Portfolio
        Provide permission to add project
        Provide permission to add certificate
    else
        Deny access
end if
  
```

Decision Table: Process **Learner Portfolio**

Condition	R1	R2
User entered the Dashboard	Y	N
Actions		
Provide access to Learner Portfolio	X	-
Provide permission to add project	X	-
Provide permission to add certificate	X	-
Deny access	-	X



C = User entered the Dashboard

Decision Tree for **Learner Portfolio**

Structured English: Process Searching Course

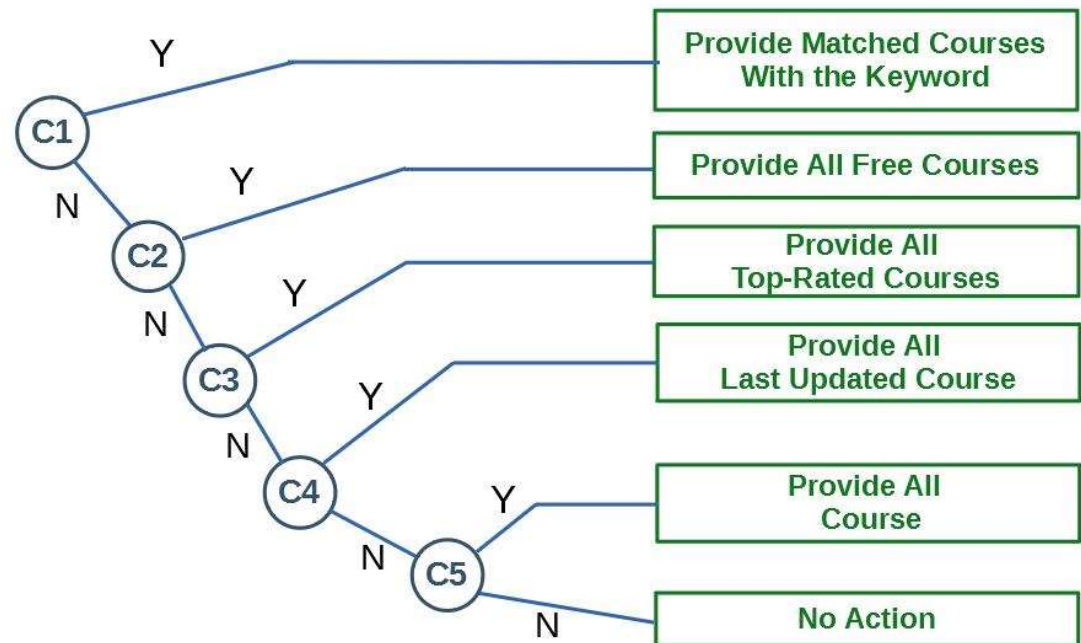
```

if User entered search keyword
    then
        Provide Matched Courses with the Keyword
    else
        if Filter by Free Course
            then
                Provide All Free Courses
            else
                if Filter by Top-Rated Course
                    then
                        Provide All Top-Rated Courses
                    else
                        if Provide All Last Updated Courses
                            Then
                                Provide All Last Updated Courses
                        else
                            if just clicked Search
                                then
                                    Provide all courses
                            else
                                No action
                        end if
                    end if
                end if
            end if
        end if
    end if

```

Decision Table: Process Searching Course

Condition	R1	R2	R3	R4	R5
User entered search keyword	Y	N	N	N	N
Filter by Free Course	-	Y	N	N	N
Filter by Top-Rated Course	-	-	Y	N	N
Filter by Last Updated Course	-	-	-	Y	N
Just Clicked Search	-	-	-	-	Y
Actions					
Provide Matched Courses with the Keyword	X	-	-	-	-
Provide All Free Courses	-	X	-	-	-
Provide All Top-Rated Courses	-	-	X	-	-
Provide All Last Updated Courses	-	-	-	X	-
Provide All Courses	-	-	-	-	X



C1 = User entered search keyword
C2 = Filter by Free Course
C3 = Filter by Top-Rated Course
C4 = Filter by Last Updated Course
C5 = Just Clicked Search

Decision Tree for Searching Course