

e-Learning Management System

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This Report Presented in Partial Fulfillment of the Requirements for
the Degree of Bachelor of Computer Science and Engineering

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DECEMBER 2019

APPROVAL

This Project titled “e-Learning Management System” submitted by Md. Enamul Haque, ID No: 152-15-6318, to the Department of Computer Science and Engineering, Daffodil International University, has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of Bachelor of Science in Computer Science and Engineering and approved as to its style and contents. The presentation has been held on 05th December 2019

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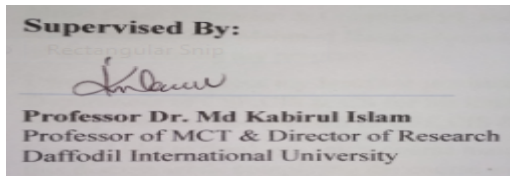
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DECLARATION

I hereby declare that this project has been done by me under the supervision of Professor Dr. Md Kabirul Islam Professor of MCT & Director of Research Daffodil International University. I also declare that neither this project nor any part of this project has been submitted elsewhere for the award of any degree or diploma.

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Acknowledgment

I express my profound gratitude to “Almighty God” for special blessings to give me the strength to complete this project in due time.

I would like to express my sincere thanks to Professor Dr. Md Kabirul Islam, Professor of MCT & Director of Research. Daffodil International University, 102 Sukrabad Dhaka-1207. His infinite patience, intellectual guidance, thoughtful suggestions, repetitive encouragement and support, regular and active supervising, positive criticism, valuable advice, reading many inferior drafts and correcting them at all stages have made it possible to complete this report.

I would like to thank all the staff of the Daffodil International Library for their supporting as well as cooperating with me whenever I need.

I would like to thank my entire coursemate at Daffodil International University, who took part in this discussion while completing the course work.

Finally, I would like to thank my honorable teachers who have supported me in all the entire education life and also my parents. Without their blessings and prayer for me to Almighty Allah completion of this work as well as my BSc Degree would not come into reality.

ABSTRACT

E-learning technologies are becoming familiar to the academic institutions, especially the universities as a result of the recent initiatives of Digital Bangladesh vision taken by the government of Bangladesh. It has created opportunities for moving towards technology-supported education in the country. Within the scope of this undergraduate project, I have developed an E-learning system to fulfill the demand of our teaching and learning communities.

The E-learning system was developed using the most popular Java programming language. for backend Java-based Spring Boot framework is used. MYSQL is used for Data Storage and management.hibernate framework is used for ORM(object-relational mapping). For drawing DFD, ERD, Use case diagram I'm using Lucidchart. Frontend: HTML, CSS,js, bootstrap is used.

The E-learning system has a lot of features for the teachers and the students. These are course information, lecture materials posting in the form of text, audio, and video, discussion blog for interaction between the students and the teachers and real-time communication facilities. At present, Daffodil International University and a few universities in Dhaka city are teaching several courses in a blended approach. So, this system may be used in the practical content as the system is very user-friendly and compatible to meet the needs of the users.

TABLE OF CONTENT

Page Content

Board of Examiner	ii
Declaration	iii
Acknowledgments	iv
Abstract	v
Table of Content	vi-ix
List of Figure	ix-xi

brief contents

CHAPTER 1: Introduction 1-4

1.1 Introduction	1
1.2 Motivation	1
1.3 Project goal	1
1.4 The objectives of the project	1
1.5 Report Layout	2-4

CHAPTER 2: e-Learning Overview and Background 5-8

2.1 Overview	5
2.2 Related organizations and features	5
2.3 Implementation Challenges	6
2.4 Conclusion	8

CHAPTER 3: Project EnamRa 09-11

3.1 Introduction of EnamRa	09
3.2 Why EnamRa	09
3.3 General Features of an EnamRa	09
3.4.1 What is Open Source software	10
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3.4.2 is EnamRa Open Source?	11
3.5 Course and its Variations	11
3.6 What does it cost to EnamRa	11
3.7 Who uses EnamRa	11
 CHAPTER 4: Language, Frameworks, Database for EnamRa	 12-13
4.1 Language and Framework	12
4.2 Database, ORM and technology stack	12
4.3 Development environment and tools	13
 CHAPTER 5: Security of EnamRa	 14-16
5.1 Introduction	14
5.2 User Role	15
5.3 User type and Access rights	15
5.4.1 List of unauthorized URLs	16
5.4.2 List of user authorize URLs	16
5.4.3 Admin authorize URLs	16
5.4.4 Manager and Hr authorize URLs	16
5.5 Conclusion	16
 CHAPTER 6: Installation and SetUp	 17-43
6.1 Install Ubuntu	17-33
6.2 Install JDK	34
6.3 Install Maven	35-36
6.4 Install MYSQL	37-43
 CHAPTER 7: Architectural Hierarchy and system design	 44-72
7.1 Architecture of EnamRa	44
7.2 Software Model for EnamRa	45-47
7.3.1 Use Case Diagram for User	48
7.3.2 Course Diagram	49
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7.3.3 Course and Types	50
7.3.4 Data flow diagram(DFD)	51
7.4.1 Use Case for Admin	52
7.4.2 ER Diagram	53
7.4.3 Welcome page	54
7.4.4 logo, search, auth, nav	55-56
7.5. Login and Registration page	57-58
7.6 User Profile page	59
7.7.1 Course, Chapter, Topic	61-63
7.7.2 Video lecture and comments	64
7.7.3 Recently added course	65
7.7.4 Blogging for course	66
7.7.5 Post view and create post	67
7.7.6 Resource for course	68-69
CHAPTER 8: Administration role	70-77
8.1 Admin Dashboard and roles	70-72
8.2 Manager Dashboard	72
8.3 Course, Section, Topic Creation by admin	73-76
8.4 Add and view recourse for course	77
CHAPTER 9: Testing EnamRa systems	78-90
9.0 Introduction	78
9.1 Testing and Quality management of EnamRa	78
9.2 Quality management plan	78
9.3 Test strategy	79
9.4 Test plan	79
9.5 Test case specifications	79
9.6 Test checklists	79
9.7.1 Software Testing Types	80-81
9.8 Test samples	81-86
9.9 Conclusion	87
REFERENCES	88-89
APPENDICES	90

LIST OF FIGURES

FIGURES	PAGE NO
Figure 6.1.1 ubuntu-welcome pages	18
Figure 6.1.2: choose to install Ubuntu.....	19
Figure 6.1.3: choose the language.....	20
Figure 6.1.4: click continue.....	21
Figure 6.1.5: select something else.....	22
Figure 6.1.6 click continue.....	23
Figure 6.1.7: volume size.....	24
Figure 6.1.8: create the home directory.....	25
Figure 6.1.9: create var directory.....	26
Figure 6.1.10: create a swap directory.....	27
Figure 6.1.11: volume size list	28
Figure 6.1.12: Select time zone.....	29
Figure 6.1.13: Fill user credentials	30
Figure 6.1.14: installing start	31
Figure 6.1.15: restart now.....	32
Figure 6.1.16: starting page.....	33
Figure 6.2.1: ubuntu terminal.....	34
Figure 6.2.2: type command.....	34
Figure 6.2.3 home directory.....	35
Figure 6.2.4: .bashrc file.....	35
Figure 6.3.1: opt directory.....	36
Figure 6.3.2: check maven version.....	36
Figure 6.4.1: update the package.....	37
Figure 6.4.2: enter password.....	38
Figure 6.4.3: type y.....	39
Figure 6.4.4: MySQL shell.....	40
Figure 6.4.5: grant table.....	41
Figure 6.4.6: MySQL status checking.....	42
Figure 6.4.7: MYSQL admin.....	43
Figure 7.1: management Hierarchy.....	44

Figure 7.2: agile software model.....	46
Figure 7.3.1: user use case diagram.....	48
Figure 7.3.2: course diagram.....	49
Figure 7.3.3: course types.....	50
Figure 7.3.4: system data flow diagram.....	51
Figure 7.4.1: admin use case diagram.....	52
Figure 7.4.2: entity-relationship model.....	53
Figure 7.4.3: welcome page.....	54
Figure 7.4.4.1: logo.....	55
Figure 7.4.4.2: search bar.....	55
Figure 7.4.4.3: authentication.....	56
Figure 7.4.4.4: slider.....	56
Figure 7.5.1: login page.....	57
Figure 7.5.2: Sign Up page.....	58
Figure 7.6.1: profile icon.....	59
Figure 7.6.2: User Profile.....	60
Figure 7.7.1.1: course view.....	61
Figure 7.7.1.2: course page.....	62
Figure 7.7.1.3: course chapter page.....	63
Figure 7.7.1.4: topic page.....	63
Figure 7.7.2: video lecture and comments page.....	64
Figure 7.7.3: recently added course.....	65
Figure 7.7.4.1: blog integrated with course.....	66
Figure 7.7.4.2: post list page.....	66
Figure 7.7.5.1: post view.....	67
Figure 7.7.5.2: post creation page.....	68
Figure 7.7.6.1: resource integrated with course.....	68
Figure 7.7.6.2: course resource list.....	69
Figure 8.1.1: admin dashboard page.....	70
Figure 8.1.2: Create and Manage Role for admin.....	70
Figure 8.1.3: admin manage and creation.....	71
Figure 8.1.4: manager role creation and manage.....	71
Figure 8.1.5: hr role creation and manage.....	72
Figure 8.2: manager dashboard page.....	72
Figure 8.3.1: course manage by admin.....	73
Figure 8.3.2: course creation page.....	73
Figure 8.3.3: course with all section.....	74

Figure 8.3.4: created course list.....	75
Figure 8.3.5: course details.....	76
Figure 8.4.1: add recourse page.....	77
Figure 8.4.2: resource upload page.....	77
Figure 9.8.1: testing dependency.....	82
Figure 9.8.2: Find all admin.....	82
Figure 9.8.3: Find all hr.....	83
Figure 9.8.4: get all manager.....	83
Figure 9.8.5: select last 4 courses.....	84
Figure 9.8.6: create admin.....	85
Figure 9.8.7: find all post.....	86

Chapter 1

1.1 Introduction

in this modern era, traditional learning systems can be replaced with eLearning technology. it's a modern way of learning and teaching and sometimes it can be more effective than traditional learning methods.

eLearning increases the efficiency and effectiveness of learning and teaching mechanism. it also covers distance learning and gives time flexibility in an interactive manner. increase learning accuracy for both students and teachers.

1.2 Motivation

In our University, most of the students come from villages or rural area and also I'm one of them. when we are in school or in college we faced we don't have good English/ math or science teacher who can teach us what are the effective way of learning, thinking and solving problems for math and science subject. sometimes it's very difficult for us to understand some simple topic for the scarcity of good quality teacher. then when I start to learn to programing that idea comes to my mind can we create or build something that can help us to learn and teach anything virtually with or without instructor/teacher. then after some sort of discussion with our teachers, seniors, and friends I decided to build this project.

1.3 Project goal

this project aimed to serve the purpose of learning and teaching virtually with as much closeness as the traditional classroom or conventional hall style. with the maximum efficiency to increase learning something quickly and effectively for the majority of the individuals across the globe.

1.4 The objectives of the project the objective of this project to develop and implementation of an eLearning system. which help us learning and teaching virtually with the removal of distance learning as well as gives us the flexibility of time to learn and teach with an interactive manner. and some key point is :

Live classroom with the record.

Live Questions and Answers

Quiz and assignment

Group Study
Pre-recorded class/lecture.
Tips and Tricks
Live call for discussion

1.5 Report Layout

Chapter 1: Introduction

in this modern era, traditional learning systems can be replaced with eLearning technology. it's a modern way of learning and teaching and sometimes it can be more effective than traditional learning methods.

Chapter 2: e-Learning Overview

electronic learning simplified as eLearning utilizing electronic technologies to access educational curriculum outside of a general classroom or conventional study hall.

Chapter 3: Overview of EnamRa

Project EnamRa is the implementation of eLearning systems. And it's the name of the project. EnamRa aims to give a better experience of eLearning. It also aimed to add different flavors of Learning. And in the future, it comes with an automated robot with the help of data science and machine learning. Which adds a new dimension of learning systems.

Chapter 4: Language, Frameworks, Database for EnamRa

Java is the primary programming language for EnamRa. Java's most popular web framework spring and spring-boot are used to build this project. Spring security framework is used here for this application security.

For templating engine we use thymeleaf.

Most popular CSS framework bootstrap used here for front end side.

Chapter 5: Security of EnamRa

In this chapter, we are discussing the Security of EnamRa systems. For security, we use one of the most defacto security framework called the Spring Security Framework. Spring Security is a framework that spotlights on giving both authentication and authorization to Java applications. Like all Spring projects, the genuine intensity of Spring Security is found in how effectively it tends to be stretched out to meet custom requirements.

Chapter 6: Installation and SetUp

In this chapter, we are discussing Install and SetUp for EnamRa. For that we have machine configuration see below

Chapter 7: Architectural Hierarchy and system design

In this chapter, we are discussing Architectural Hierarchy and system design. Architectural Hierarchy consists of Management Hierarchy. Now we see the management Hierarchy.

Chapter 8: Administration role

In this chapter, we show all the diagrams of the Administration model.

Chapter 9: Testing EnamRa systems

Software testing is a procedure, to evaluate the usefulness of a product application with a purpose to discover whether the created software met the specified requirements or not and to distinguish the defects to guarantee that the item is defect-free in order to produce the quality product. Software testing includes the execution of a product segment or framework part to assess at least one properties of interest.

Chapter 10: Conclusion

Now we are going to the conclusion of the project EnamRa. And finally completed our first minimal version of this project. Basically, it's a continuous project and we release the first iteration/phase of our project for deployment. And in the future, we continue adding new features as we do in the past. And this phase of release is fully free but in future when we add premium content then the only premium resources/content will cost you but all other contents are free as always.

CHAPTER 2

e-Learning Overview and Background

2.1 Overview

electronic learning simplified as eLearning utilizing electronic technologies to access educational curriculum outside of a general classroom or conventional study hall.

a lot of terms used to describe learning that is delivered online.on the web the definition of eLearning as courses that are specially delivered via the internet to somewhere other than the classroom where the professor is teaching.

2.2 Related organizations and features

here we discuss some of partial and full implementation of eLearning systems(Scott, T) and summarized their features.

Full flagged eLearning features contain:

- Reading Materials
- Video Lecture, Live class(streaming)
- Course road map and Practice
- Q & A and Group discussion
- Quiz and Assignment
- Integrated Blog
- Live call for live class or discussion
- Progress statistics of user

Features of standard eLearning systems in comparison with existing systems

Reading	W3Schools , Tutorialspoint , others.
Video Lecture	Udemy, Lynda, Khan Academy, MIT OpenCourseWare, Skillshare, Pluralsight
Live class (streaming)	Unknown
Q & A and Group discussion	Udemy, Lynda, Khan Academy, Skillshare, Pluralsight
Quiz & Assignment	Khan Academy, Pluralsight
Integrated Blog	Unknown
Live call for class or discussion	Unknown
Progress statistics of user	Khan Academy

2.3 Implementation Challenges

Full-featured eLearning systems implementation is quite difficult because of its dependency(Agrawal, M). The main challenges are given below.

- # Storage management
- # Content availability and Quality content
- # scarcity of Instructor/Professor
- # Continuous integration and monitoring

Live Streaming
User-Friendly UI and UX
System Performance

Storage management

Storage management is a big issue for eLearning systems. It takes a huge amount of storage for storing video lectures and live streaming. Upload video and live stream are the continuous processes for eLearning systems.

For handling large amounts of data this system takes continuous monitoring and adding storage devices.

Content availability and Quality content

Content availability and Quality content is another challenge for eLearning systems.

Content is the king for any systems and eLearning is not different from them. Quality content makes any systems can be successful. For successful eLearning systems, we need to ensure the quality of content.

Scarcity of Instructor/Professor

It's not like that in this era we have faced a lot of lacking for good quality Instructor/Professor/teacher. Rather than we have a lot of good quality Instructors/Professors/teachers. But why do they come into eLearning systems when they get low remunerations from eLearning systems. We need to have a proper business model or policy model to run eLearning systems. Where systems can earn revenue and spend on educator and entire system and structure. Otherwise system will fail to survive.

Continuous integration and monitoring

When we talk about Continuous integration and monitoring of an eLearning system one this comes to our mind, it's a huge task. For handling this type of task we need to have a good management hierarchy. And each of them is well known for their job role in the hierarchy. Then it's easy to handle the task "Continuous integration and monitoring"

Live Streaming

Live Streaming is popular day by. It can be used for live class or Discussion. But it's a challenging job for any of the systems. But nowadays we have lots of modern tools and technologies for Implementing live streams.

User-Friendly UI and UX

From the user point of view, it's equally important how easily we can find desired content. As well as the ease of use of the system's flexibility. We need to keep in mind User-Friendly UI and UX is one of the good points to make the systems successful.

System Performance

One of the key points for successful systems is the performance of the systems. When we design a system we need to keep in mind System Performance is equally important for successful eLearning systems.

2.4 Conclusion

Now here we come to a conclusion, to make successful eLearning systems we need to focus on the challenges for implementing eLearning systems.

And all the points are valid and equally important for any eLearning system. And in future eLearning systems implement virtual robot using data science and machine learning. And we hope it's more effective for the eLearning platform.

CHAPTER 3

Project EnamRa and it's details

3.1 Introduction of EnamRa

Project EnamRa is the implementation of eLearning systems. And it's the name of the project. EnamRa aims to give a better experience of eLearning. It also aimed to add different flavors of Learning. And in the future, it comes with an automated robot with the help of data science and machine learning. Which adds a new dimension of learning systems.

3.2 Why EnamRa

When we are talking about EnamRa one question comes to our mind there is a lot of implementations of eLearning systems in the market and they are quite popular, useful and easy to use. YES, we agree with you. But EnamRa comes here to add some ingredients of an eLearning system specification. It also comes to rewrite the specification of eLearning. Like eLearning need to contain some features like Live Streams, automated robots for teaching and monitoring. And we know existing popular implementation brings these features in future and that point EnamRa is ahead of them. When they told us that they bring these features in Future and EnamRa told them we bring these features now and we are working with them.

3.3 General Features of an EnamRa

Here we are talking about the feature of EnamRa. It comes with a lot of features. And here is the list of Features below :

- Reading Materials
- Video Lecture, Live class(streaming)
- Course road map and Practice
- Q & A and Group discussion

Quiz and Assignment
Course Resource Directory(like google classroom)
Integrated Blog for separated course
Live call for live class or discussion(work in progress)
Progress statistics of user
User Profile
Blogging
Group Chat for Discussion
Virtual Robot for teaching assistant(work in progress)
Flexible UI and UX
Progress Reminder
Instant messaging
Flexible Searching
Content Availability
Teaching Assistant
Personal note for User
Tips and Tricks for a better experience of learning
Various types of course categories

3.4.1 What is Open Source software

Open-source software is a sort of computer programming in which source code is discharged under a permit in which the copyright holder grants clients the rights to study, change, and disseminate the product to anybody and for any reason. Open-source programming might be created in a communitarian open way.

Difference between open source software and other types of software:

Some software has source code that solitary/only the person, team, or organization who make it—and maintains selective control over it—can modify. People call this kind of software "proprietary" or "restrictive" or "shut source" software.

Only the main authors of proprietary/restrictive software can legally copy, inspect, and alter that software. And in order to use restrictive software, computer users must agree

that they will not do anything with the software that the software's authors have not explicitly allowed. Microsoft Office & Adobe Photoshop are examples of restrictive software.

Open-source software is not like that. Its authors make its source code available to others who would like to view and modify that code, copy it, learn from it, alter it, or share it. LibreOffice & the GNU Image Manipulation Program are examples of open-source software.

As they do with proprietary software, users must accept the terms of a license when they use open source software/projects—but the legal terms of open source licenses differ dramatically from those of proprietary licenses.

3.4.2 is EnamRa Open Source?

Here in these systems most of the features are open for all. But EnamRa has some premium features and it has own business model for managing the system cost and we all know good product come with a lot of hard work and it pays off.

3.5 Course and its Variations

EnamRa has mainly four kinds of the Course structure. Those are listed below.

#Academic: according to the academic syllabus and its free of cost.

#General: full phase course with a lot of examples it's also free.

#Premium: Not FREE.

#Classroom: some are free and some are not.

3.6 What does it cost to EnamRa

It depends on course creation cost but we can say that it can be reasonable for everyone.

3.7 Who uses EnamRa

Everyone can use EnamRa systems there is no boundary. The system is designed for all classes of people.

CHAPTER 4

Language, Frameworks, and Database

4.1 Language and Framework

Java is the primary programming language for EnamRa. Java's most popular web framework spring and spring-boot are used to build this project.

Spring security framework is used here for this application security.

For templating engine we use thymeleaf.

Most popular CSS framework bootstrap used here for front end side.

4.2 Database, ORM and technology stack

Relational database is used here for main data storage and for caching we use no SQL database Redis. For ORM we use spring data JPA

Technology Stack :

Frontend :

- HTML5, CSS3, JAVASCRIPT, JQUERY
- BOOTSTRAP(CSS framework)
- Thymeleaf(template engine)

Backend :

- Java8+(main language)
- Spring Boot(framework)
- Spring Security(security framework)
- JPA(main ORM tools)
- MYSQL(relational database)
- REDIS(caching)

4.3 Development environment and tools

For developing EnamRa our primary OS is Ubuntu. We know ubuntu LTS Debian based most popular Linux distro. It's free and open-source Linux distros. Ubuntu mainly releases three edition Desktop, Server, Core, and all the editions can run on the computer alone.

Ubuntu is also popular for cloud computing with support for OpenStack.

Ubuntu 18.04 LTS Desktop is used while developing Enamra. With the Ubuntu GNOME environment.

Tools :

- Jdk8
- MYSQL server(relational database)
- Workbench (database tools)
- Maven(build tool)
- Intellij IDEA
- Tomcat(optional)
- Ubuntu Terminal

First, install jdk8 or higher. Then we set JAVA_HOME. Tomcat is the primary web server for java technology. It's mainly servlet container also said that web container. For developing EnamRa we use tomcat web server. Here tomcat installation is optional because we use Embedded tomcat alongside spring-boot.

For the database, we install Mysql server 8 and workbench as an IDE.

Maven is used to building tools because of its flexibility. And Intellij IDEA is our main IDE for developing EnamRa.

CHAPTER 5

Security of EnamRa Systems

5.1 Introduction and Security for EnamRa

In this chapter, we are discussing the Security of EnamRa systems. For security, we use one of the most defacto security framework called the Spring Security Framework.

Spring Security is a framework that spotlights on giving both authentication and authorization to Java applications. Like all Spring projects, the genuine intensity of Spring Security is found in how effectively it tends to be stretched out to meet custom requirements.

That provides authentication, authorization, and other security feature enterprise systems. It's an official spring sub-project.

Authentication key features :

- # Lightweight Directory Access Protocol(LDAP)
- # Single sign-on(SSO) using Central Authentication Service
- # Basic access authentication
- # Digest access authentication
- # "Remember-me" support via HTTP cookies.
- # Simultaneous session support, which restricts the number of synchronous logins allowed by a principal.
- # Full support for customization and plugging custom authentication implementations.

Authorization key features:

- # AspectJ method-level authorization.
- # Authorization of HTTP web request

Instance-based features:

- # Utilized for indicating access control records material to space objects.
- # Authorization features are given to uphold strategies when strategy summons.

Other features:

- # Software localization so UI messages can be in any language.
- # Channel security, to automatically switch among HTTP and HTTPS after gathering specific rules.
- # Caching in all database-contacting areas of the framework.
- # Distributing of messages to facilitate event-driven programming.
- # Support for performing joining/integration testing via JUnit.

5.2 User Role

In this system, there are various types of a role for the user and there is the list for a role. And one user has multiple roles.

ADMIN
USER
MANAGER/COORDINATOR
HR(Human Resource Executive)
CHIEF INSTRUCTOR(CI)
INSTRUCTOR
Assistant INSTRUCTOR
Teaching Assistant
STUFF
EMPLOYEE

5.3 User type and Access rights

User type	Access URLs
USER	./,./user,/blog, /course/user/**, /resource/**, /your_Dashboard,
ADMIN	/admin,/admin/**,/hr/**,/manager/** /admin_Dashboard
MANAGER	/manager/**, /manager_dashboard
HR	/hr/**
CI	/course/ci/**

INSTRUCTOR	/course/inst/**
TA	**/unknown/***

5.4.1 List of unauthorized URLs

Guest USER access URLs List :

/course_resources/**, /academic/**, /, /entry /blog/**,
/user/login, /user/logout, /user/signup, /user/login?error=true,
/professional/**, /general/**

5.4.2 List of user authorize urls

Authenticated urls: /home , /comment/create, /blog/file_upload, /comment/**

5.4.3 Admin authorize urls

/admin,/admin/**,/hr/**,/manager/**, /admin_Dashboard

5.4.4 Manager and Hr authorize urls

/manager/** ,/manager_dashboard , /hr/**

5.5 Conclusion

Here we saw how the user role is defined and how their individual access rights. We are addingUrl requests continuously as its necessity.

CHAPTER 6

Installation and SetUp

In this chapter, we are discussing Install and SetUp for EnamRa. For that we have machine configuration see below

CPU

Processor: Intel Core i5-6500 with 6mb cache.

Memory: 8GB DDR4 memory 2133 MHz

Motherboard: GIGABYTE GA-Z170X-UD5

Storage : 240 GB SSD

Graphics: Radon 1GB DDR5 graphics

6.1 Install Ubuntu 18.04 LTS

For installing ubuntu 18.04 LTS we follow below steps:

Step 1. Download Ubuntu 18.04 LTS ISO File

Download ubuntu 18.04 from the official website:

<https://www.ubuntu.com/download/desktop>

Step 2. Create a Bootable Disk

When the ISO is downloaded then the next step is to burn ISO Image into the USB/DVD drive to boot the PC from that drive.

Step 3. Boot from USB/DVD or Flash Drive

Once the system is booted using the bootable disk, you can see the following screen presented before you with options including “Try Ubuntu” and “Install Ubuntu” as shown in the image below,



Fig 6.1.1: ubuntu-welcome page

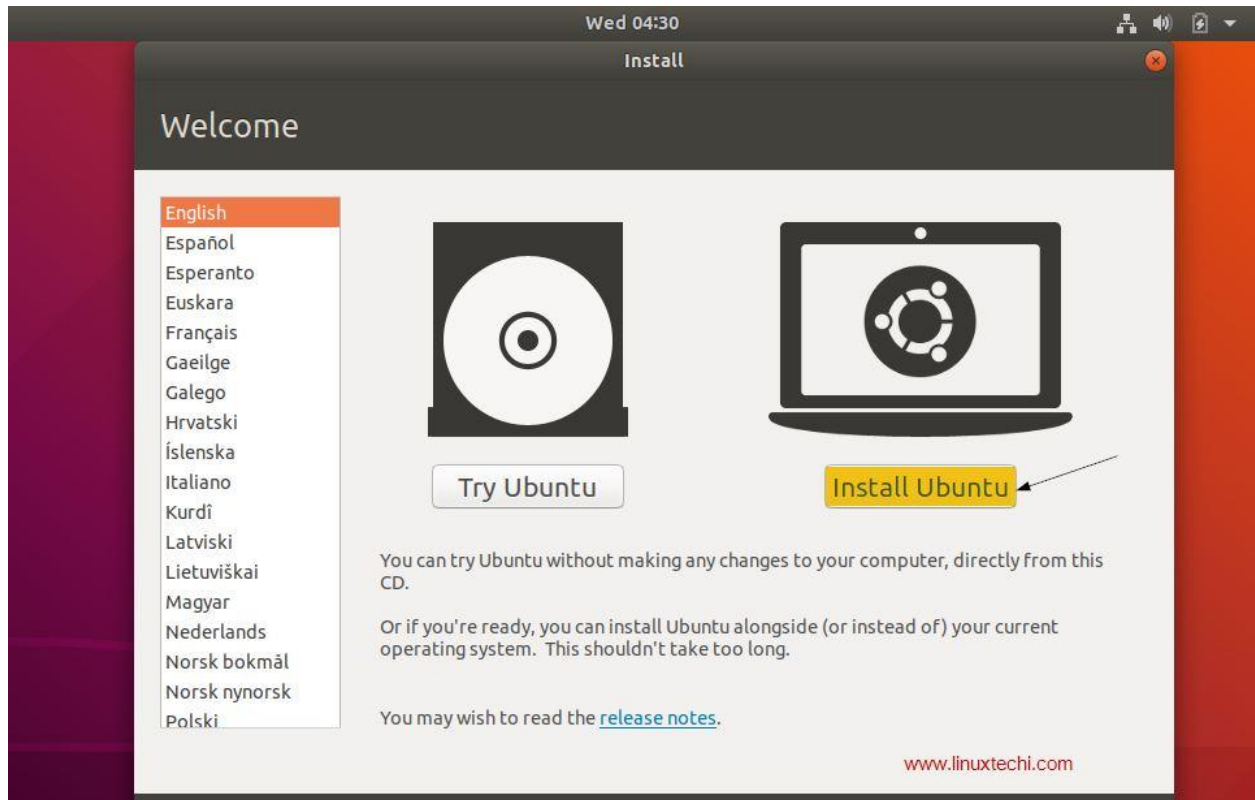


Fig 6.1.2: choose to install Ubuntu

Step 4. Choose your Keyboard layout

Choose your favorite keyboard layout and click “Continue”. By default English (US) keyboard is selected and if you want to change, you can change here and click “Continue”,

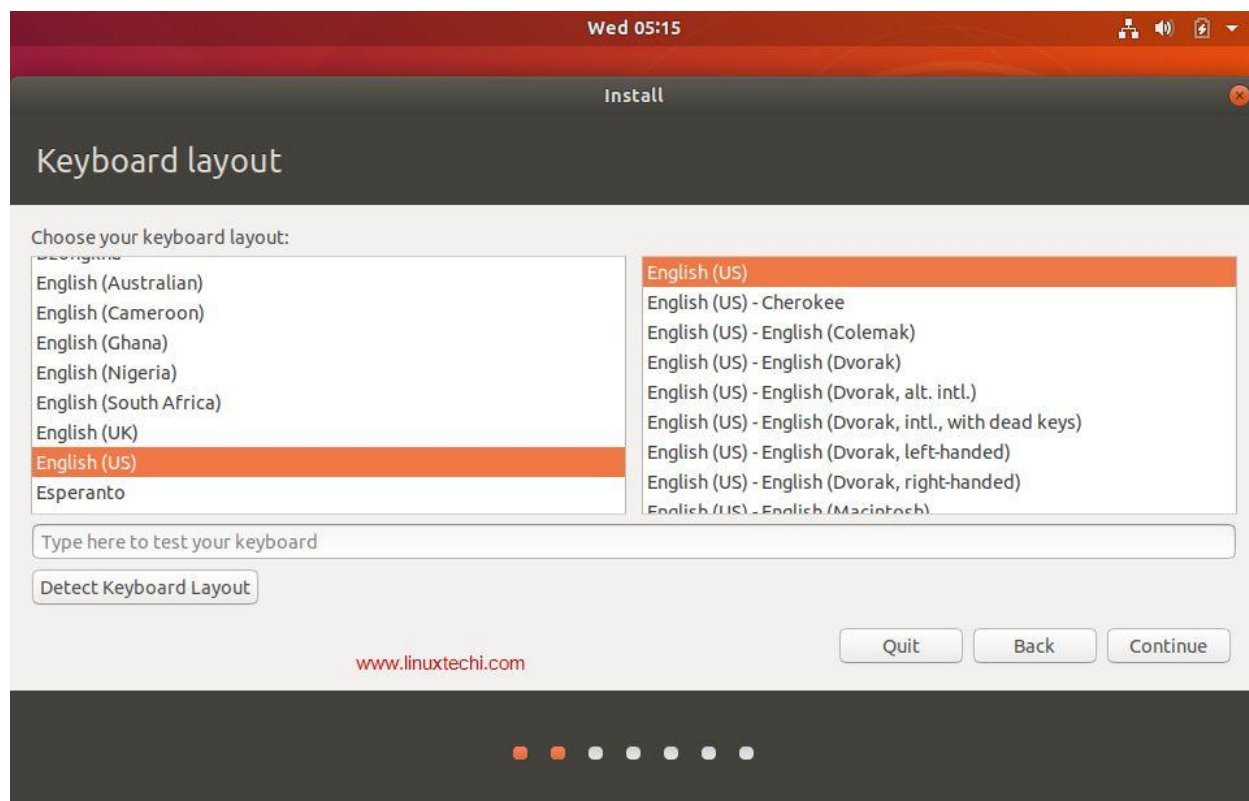


Fig 6.1.3: choose the language

Step 5. Preparing to Install Ubuntu and other Software

In the next screen, we provided following beneath options including:

Type of Installation: Normal Installation or Minimal installation, If you want a minimal installation then select the second option otherwise go for the Normal Installation. In my case, I am doing Normal Installation

Download Updates While Installing Ubuntu (select this option if your system has internet connectivity during installation)

Install third-party software for graphics and Wi-Fi hardware, MP3 and additional media formats Select this option if your system has internet connectivity)

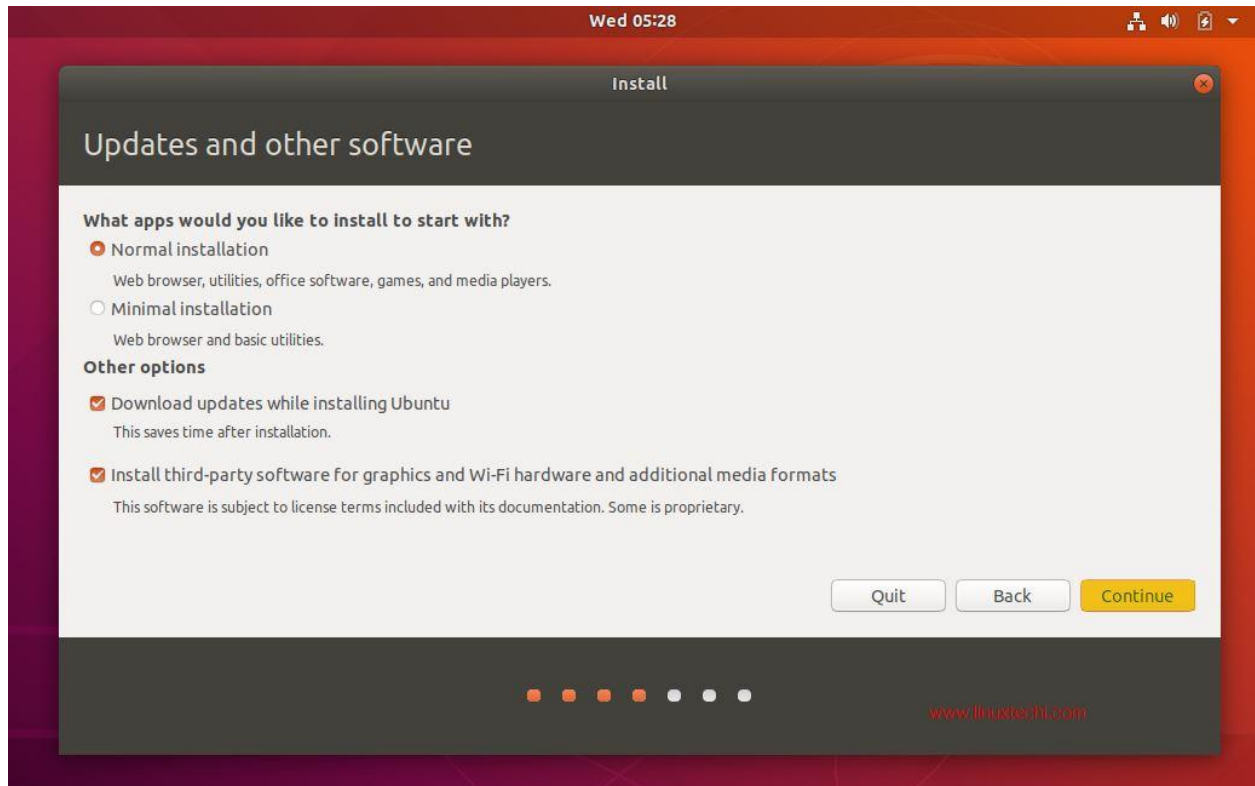


Fig 6.1.4: click continue

Click on “Continue” to proceed with the installation

Step 6. Select the appropriate Installation Type

Next, the installer presents you with the following installation options including:

- Erase Disk and Install Ubuntu
- Encrypt the new Ubuntu installation for security
- Use LVM with the new Ubuntu installation
- Something Else

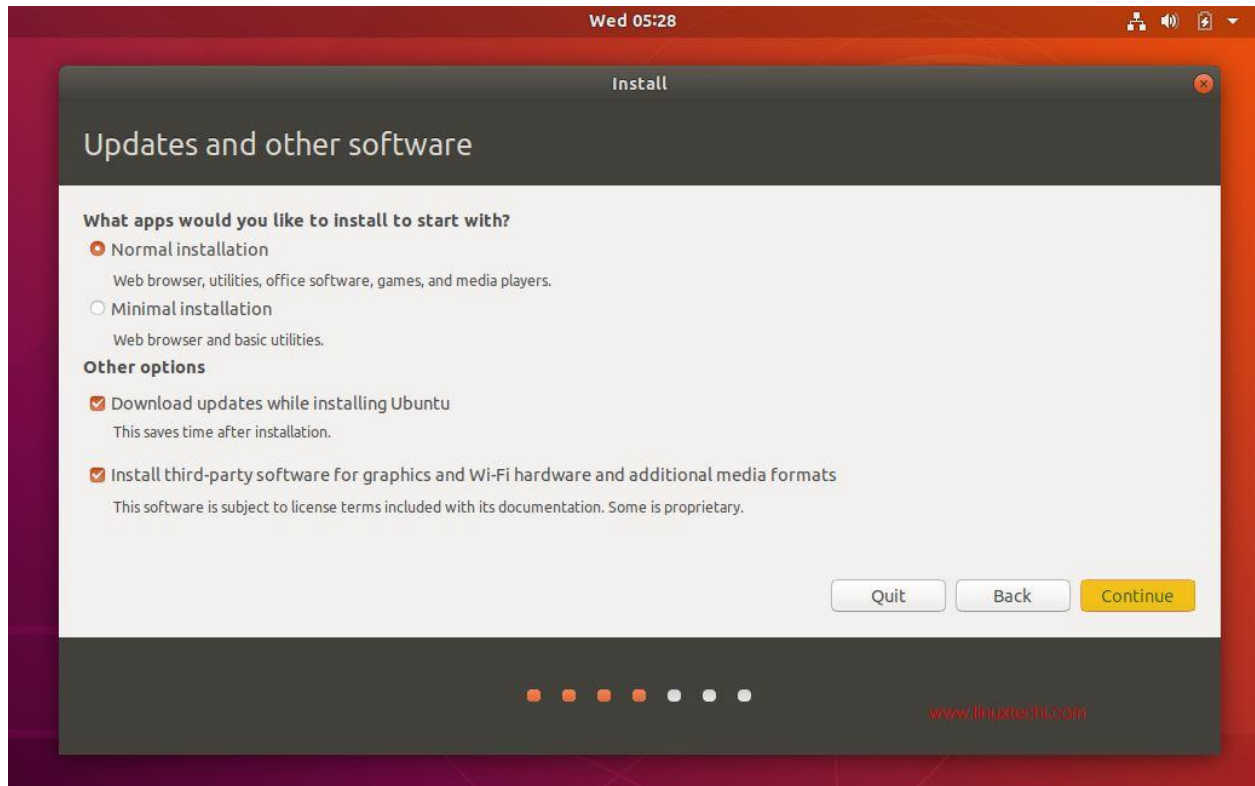


Fig 6.1.5: select something else

Now, Choose “Something Else” and Click on continue

You can see the available disk size for Ubuntu in the next window as shown below:

Now in order to create your own partitions, click on “New Partition Table”

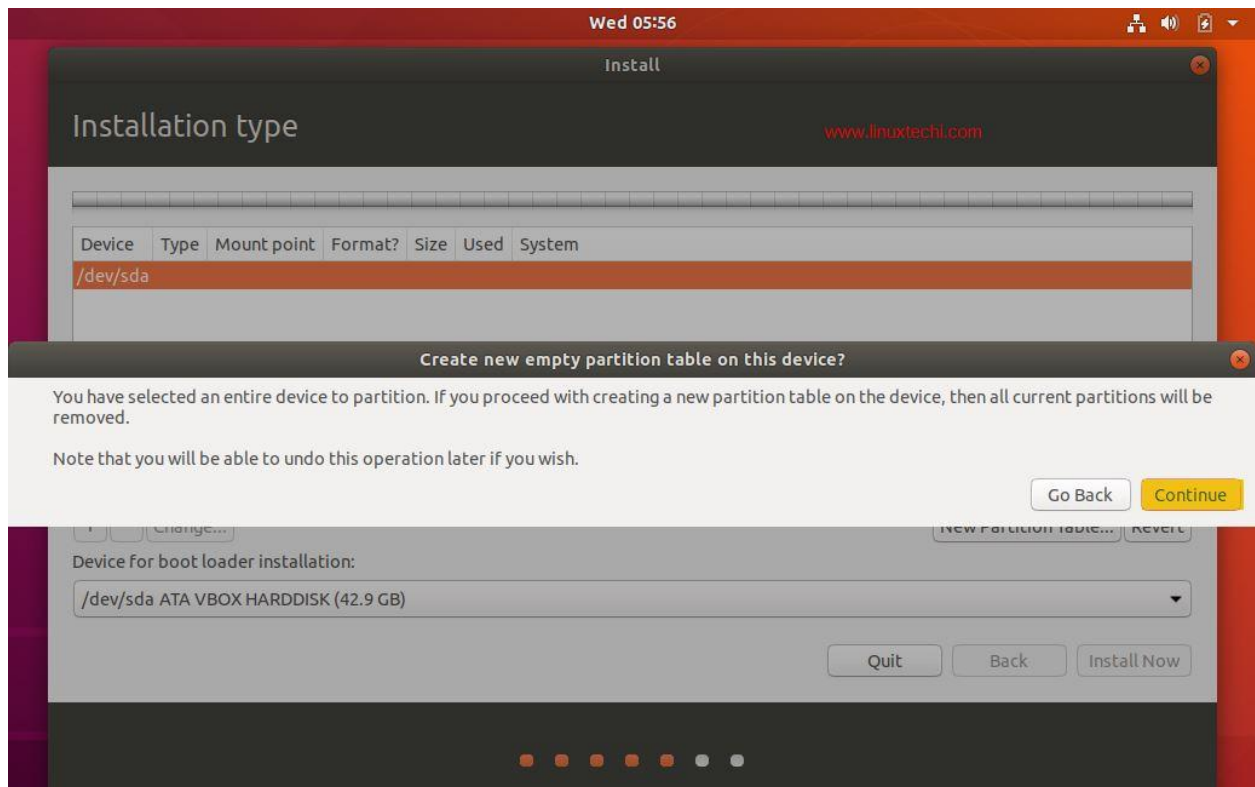
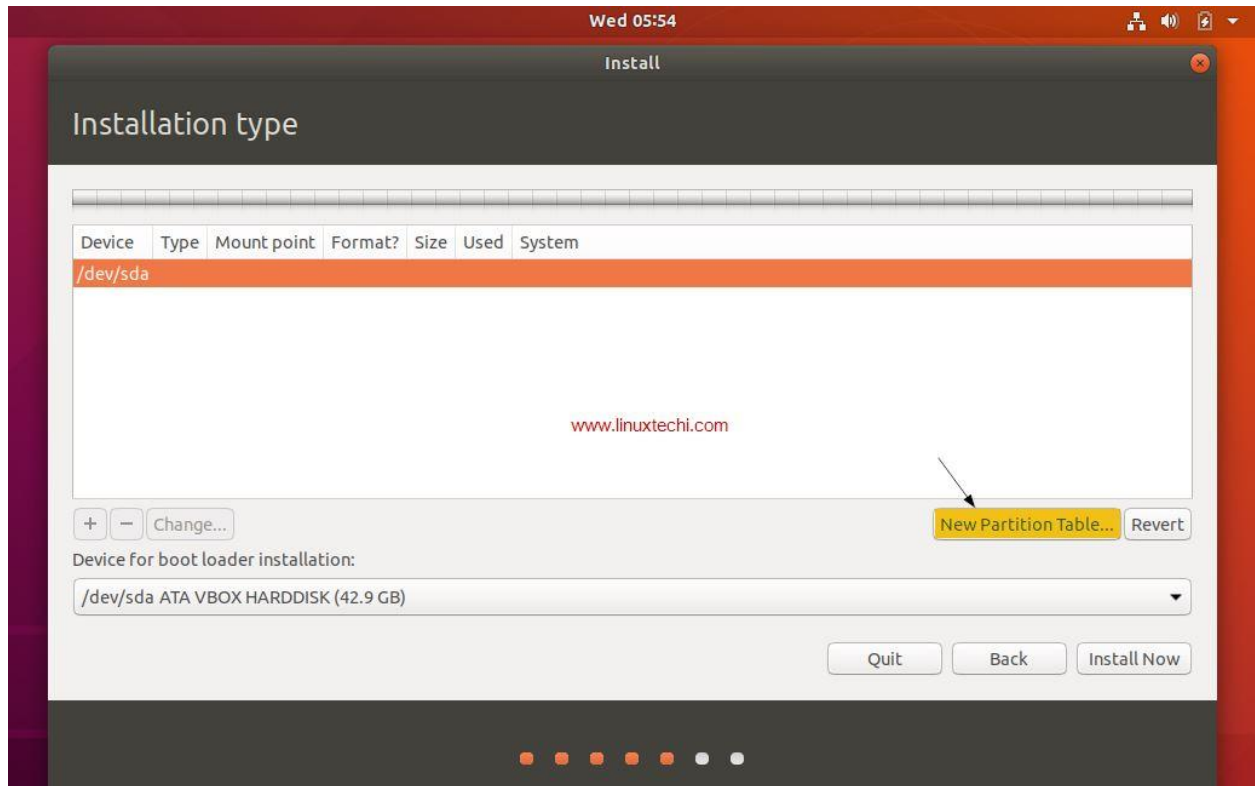


Fig 6.1.6 click continue

Click on Continue

Create /boot partition of size 1GB, Select the free space and then Click on the “+” symbol to create a new partition

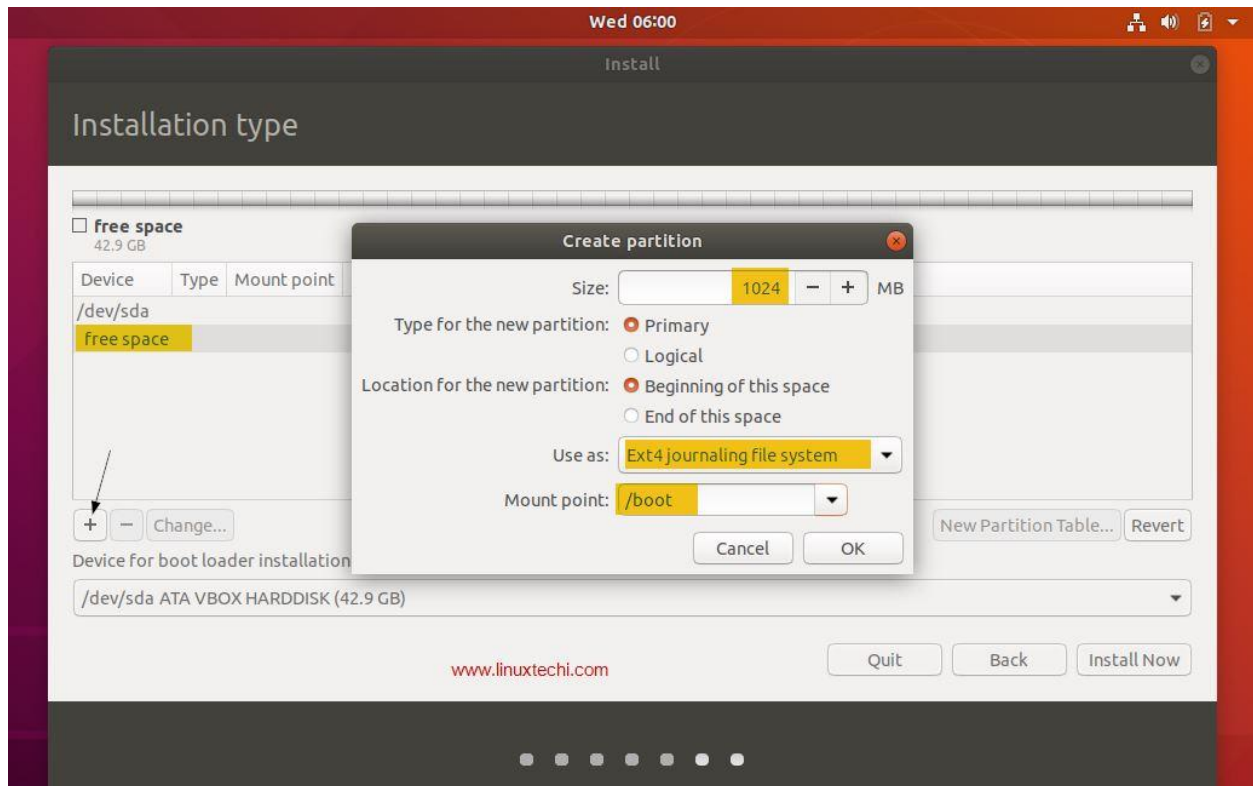


Fig 6.1.7: volume size

Click on “OK”

Let's create /home partition

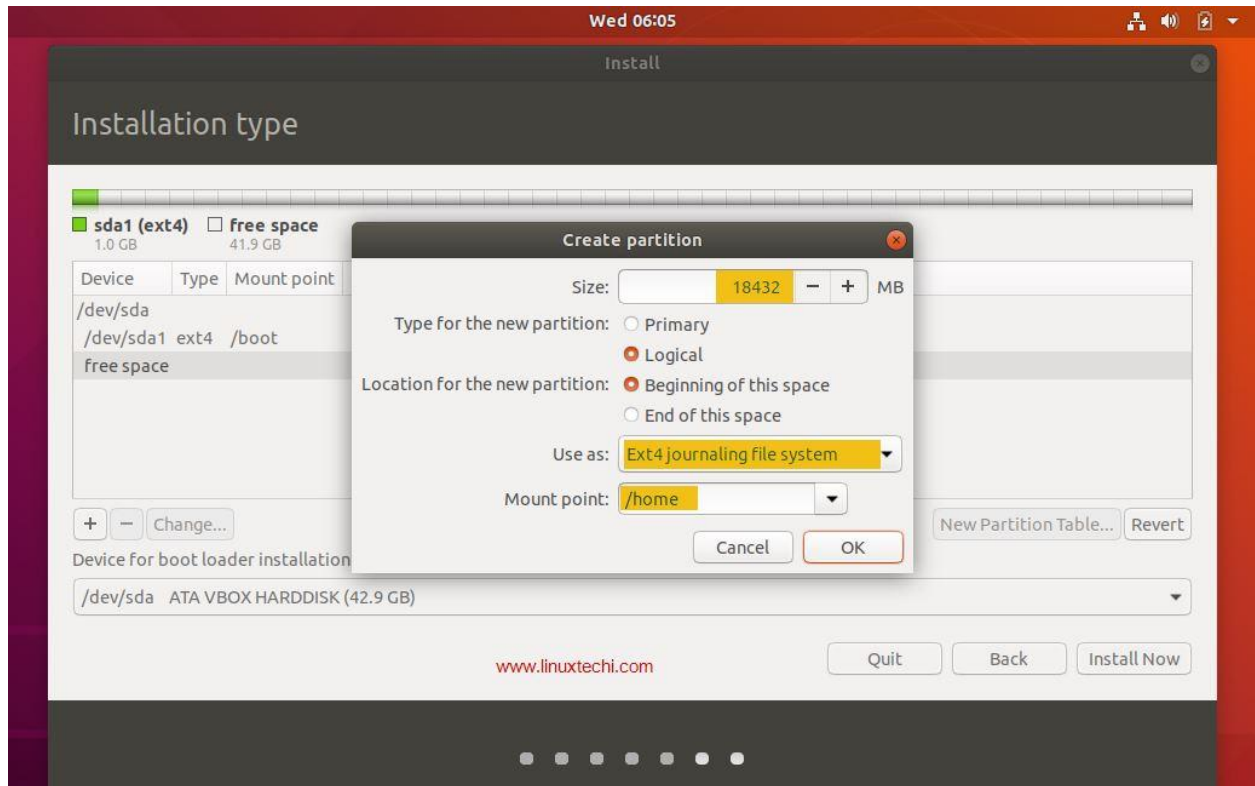


Fig 6.1.8: create the home directory

In the same way create / & /var file system respectively

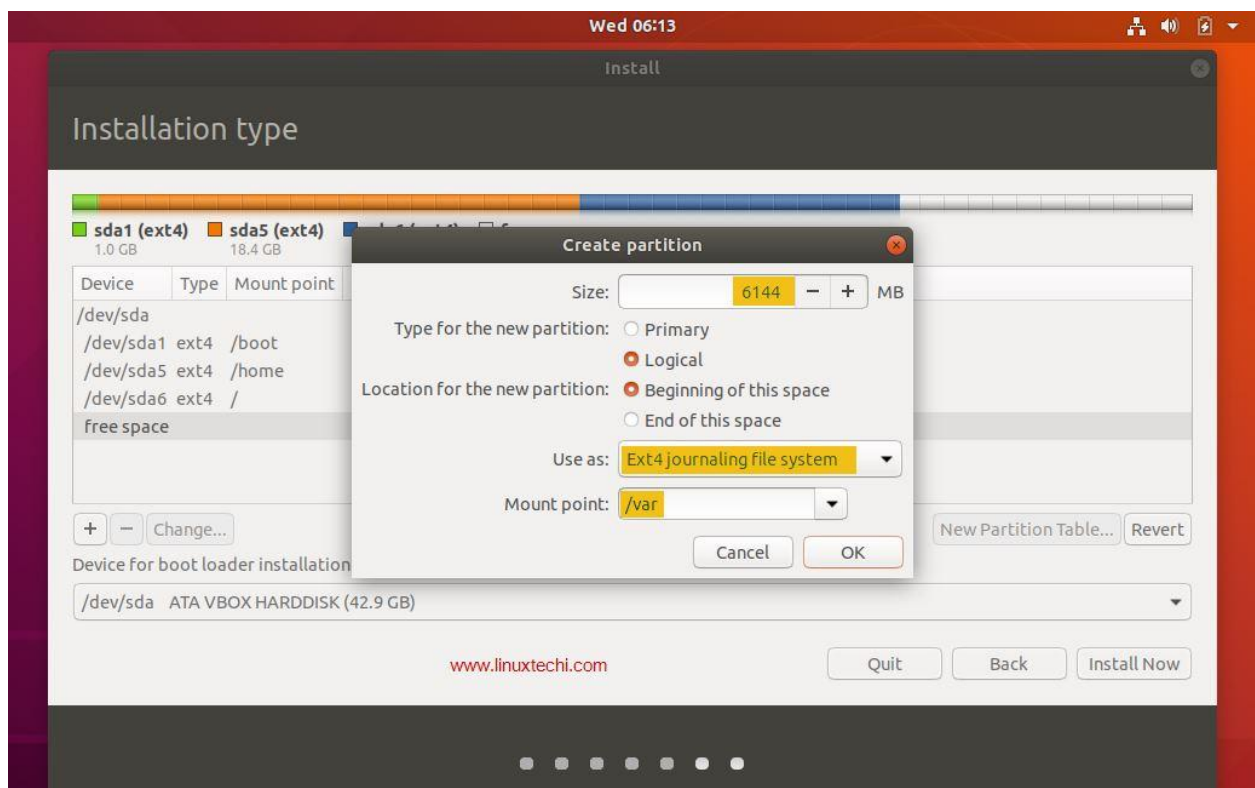
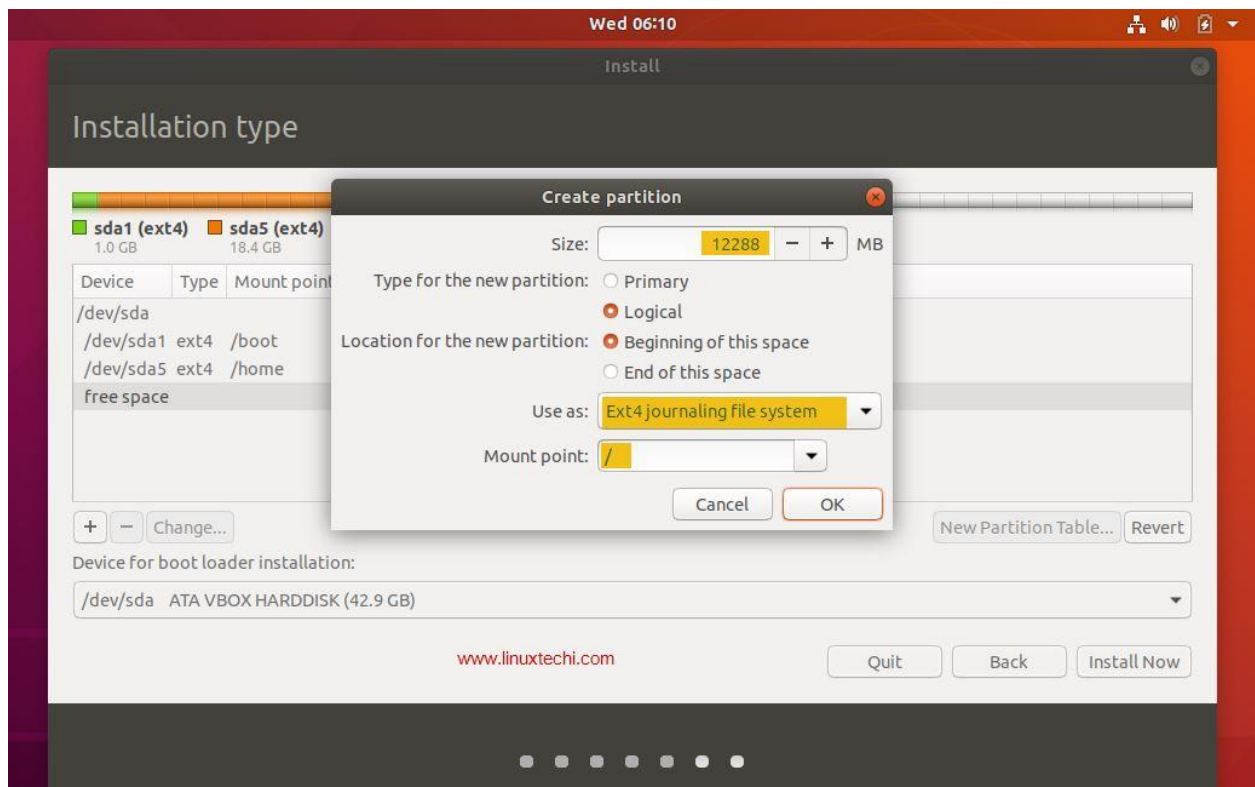


Fig 6.1.9: create var directory

Now create the last partition as a swap of size 2 GB,

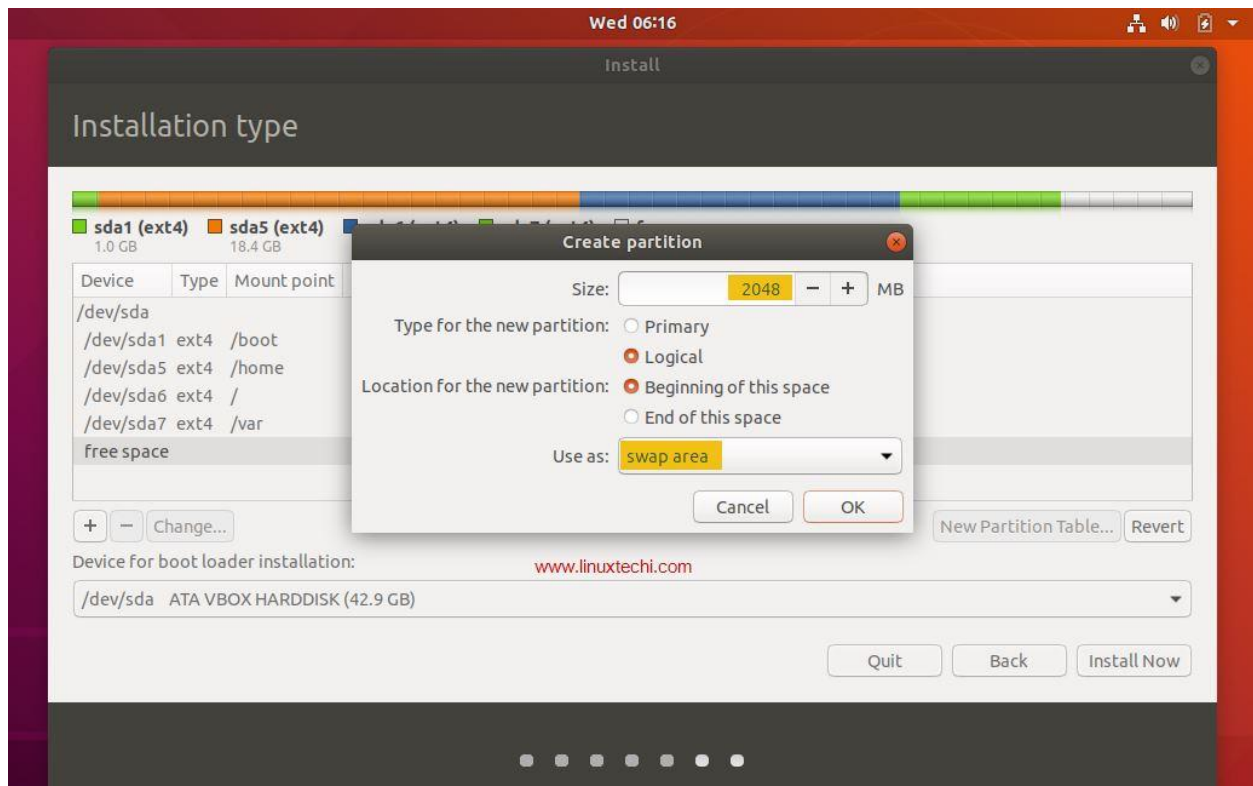


Fig 6.1.10: create a swap directory

Click on OK

Once you are done with the partition creation task, then click on “Install Now” option to proceed with the installation

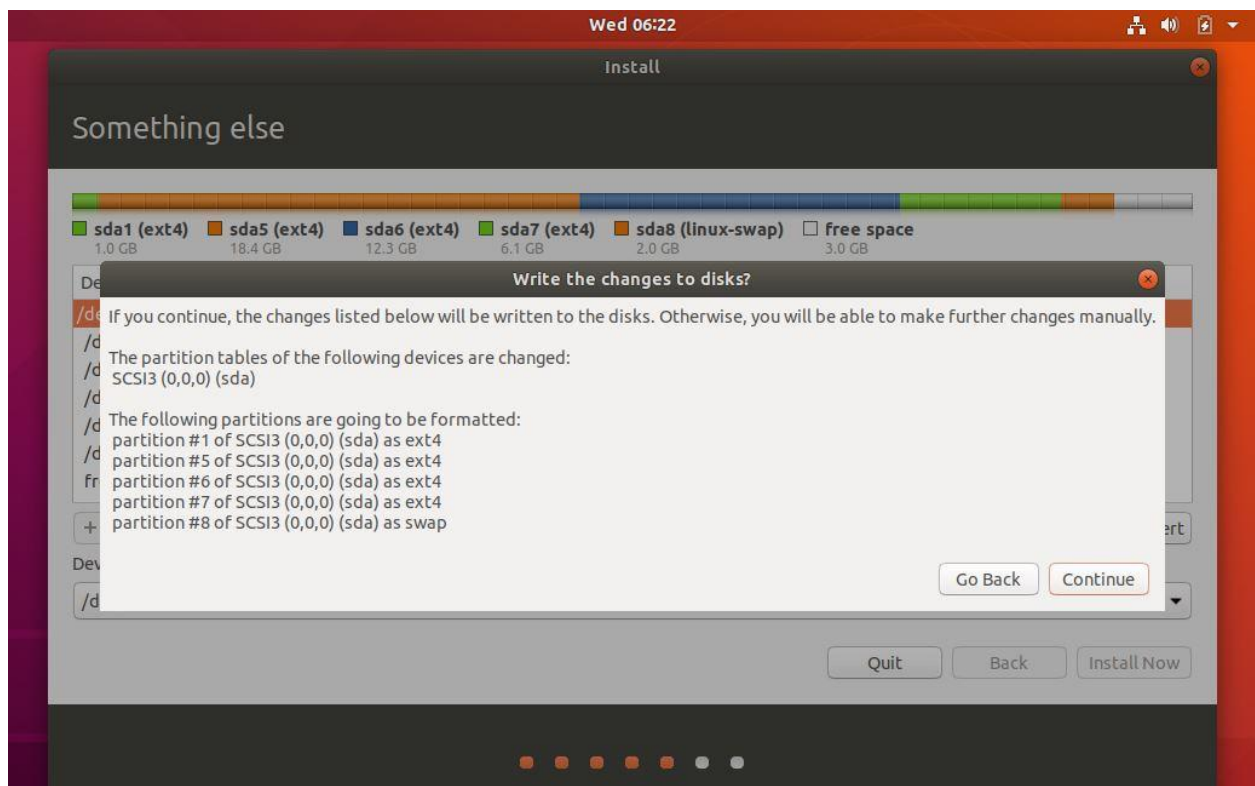
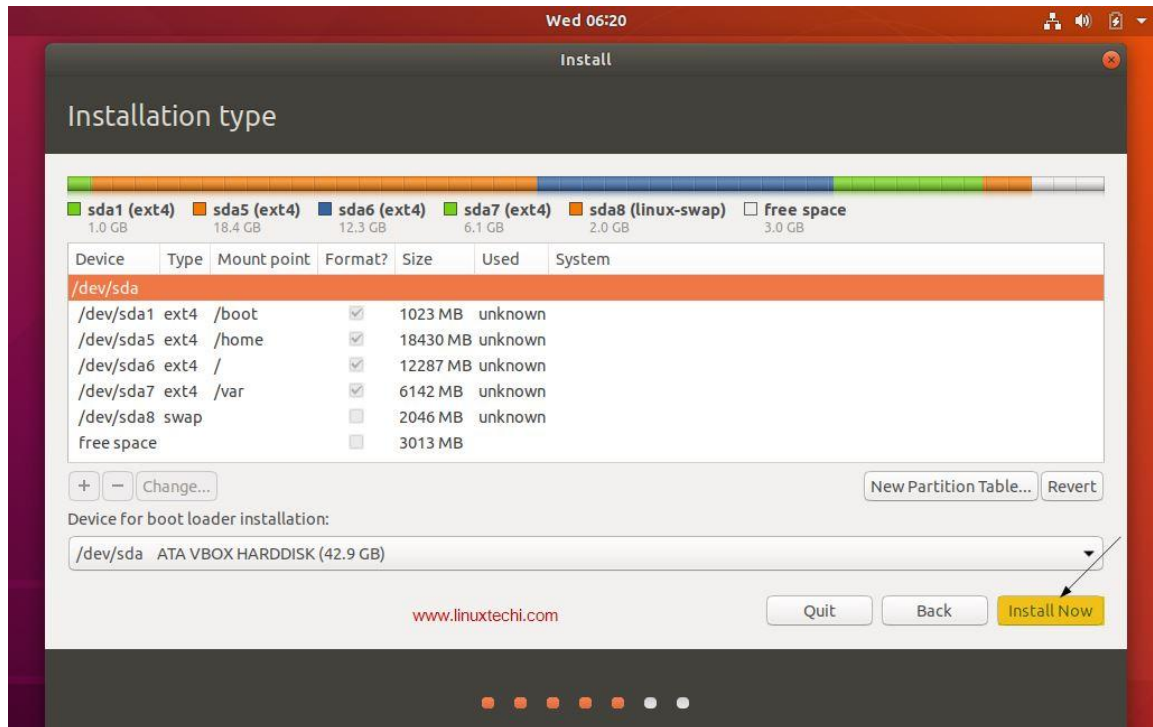


Fig 6.1.11: volume size list

Step 7: Select Your Time zone

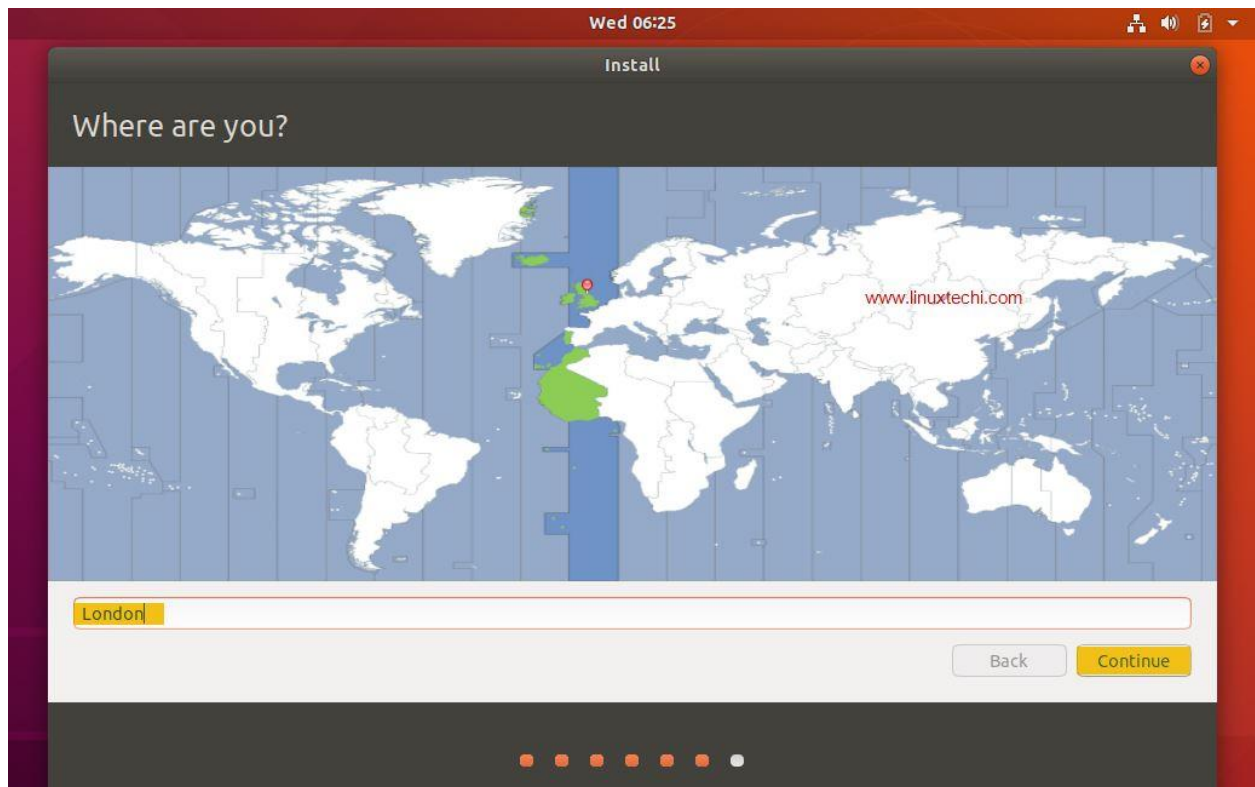


Fig 6.1.12: Select time zone

Step 8 Provide your User Credentials

In the next screen, we will be prompted to provide your user credentials. In this screen provide name, computer name, username, and password to login into Ubuntu 18.04 LTS.

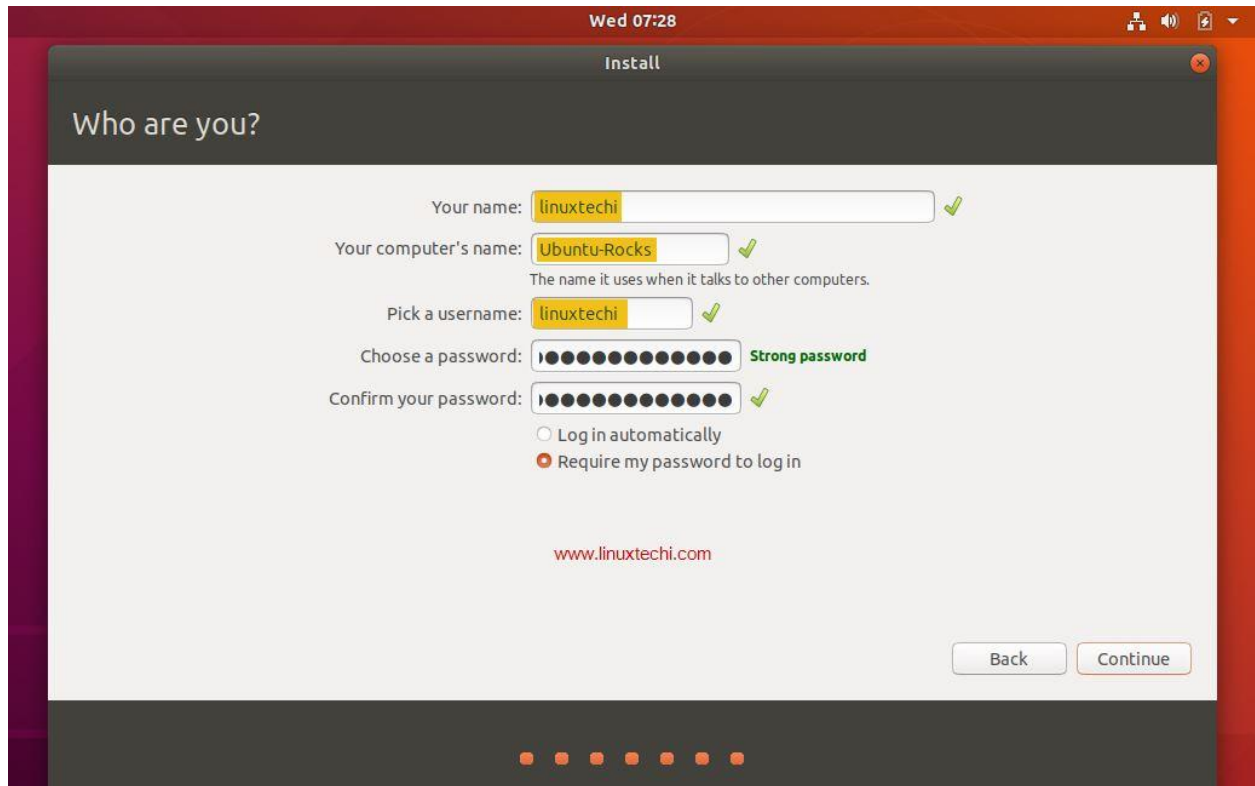


Fig 6.1.13: Fill user credentials

Click "Continue" to begin the installation process.

Step 9 Start Installing Ubuntu 18.04 LTS

The installation of Ubuntu 18.04 LTS starts now and will take around 5-10 mins depending on the speed of our computer,

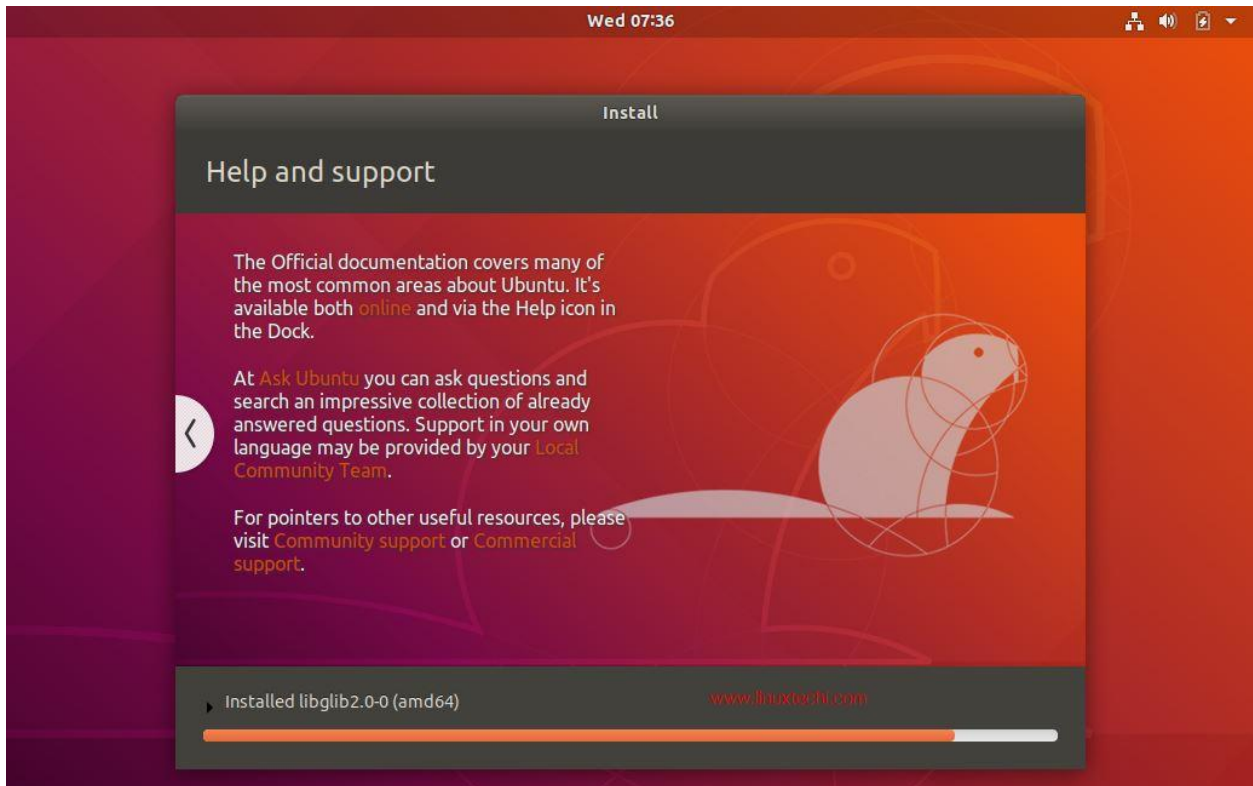


Fig 6.1.14: installing start

Step 10 Restart Your System

Once the installation is completed, remove the USB/DVD from the drive and click "Restart Now" to restart our system.

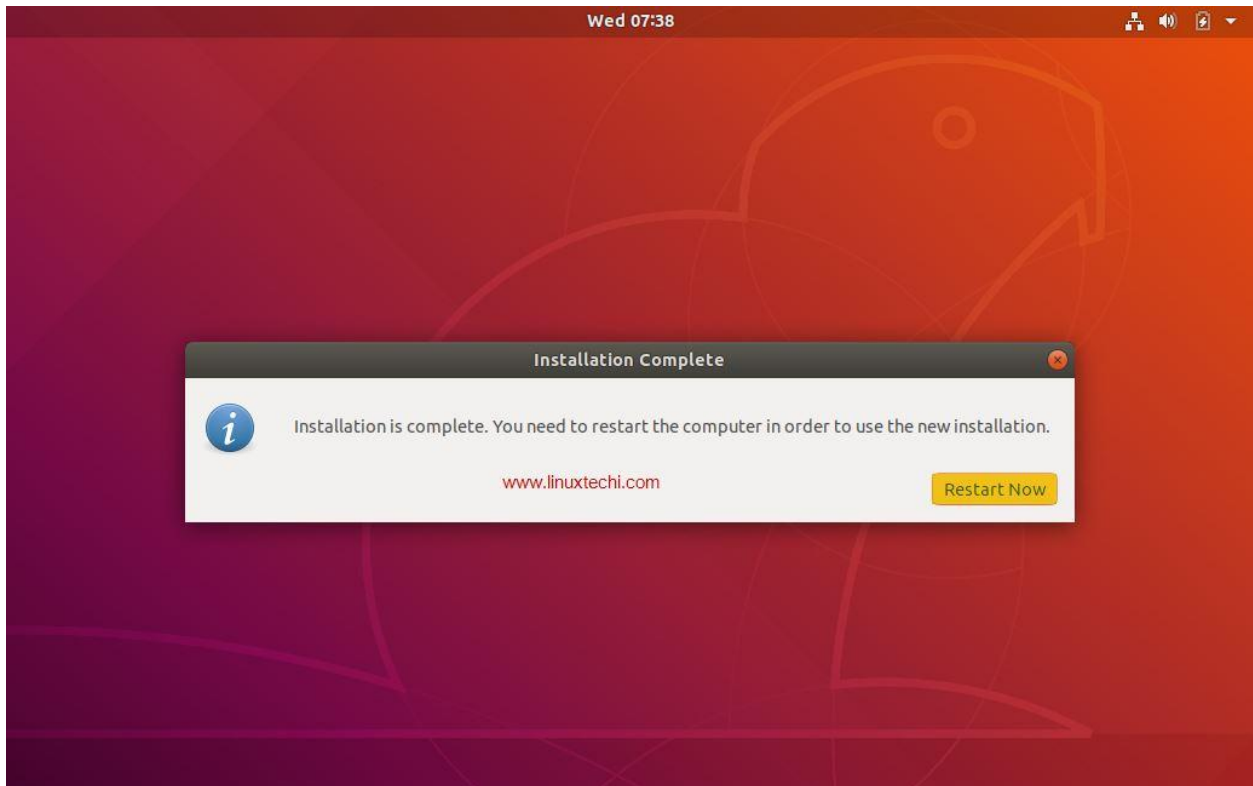


Fig 6.1.15: restart now

Step:11 Login to Your Ubuntu 18.04 desktop

Once we system has been rebooted after the installation then we get the beneath login screen, enter the User name and password that we have set during installation (Step 8)

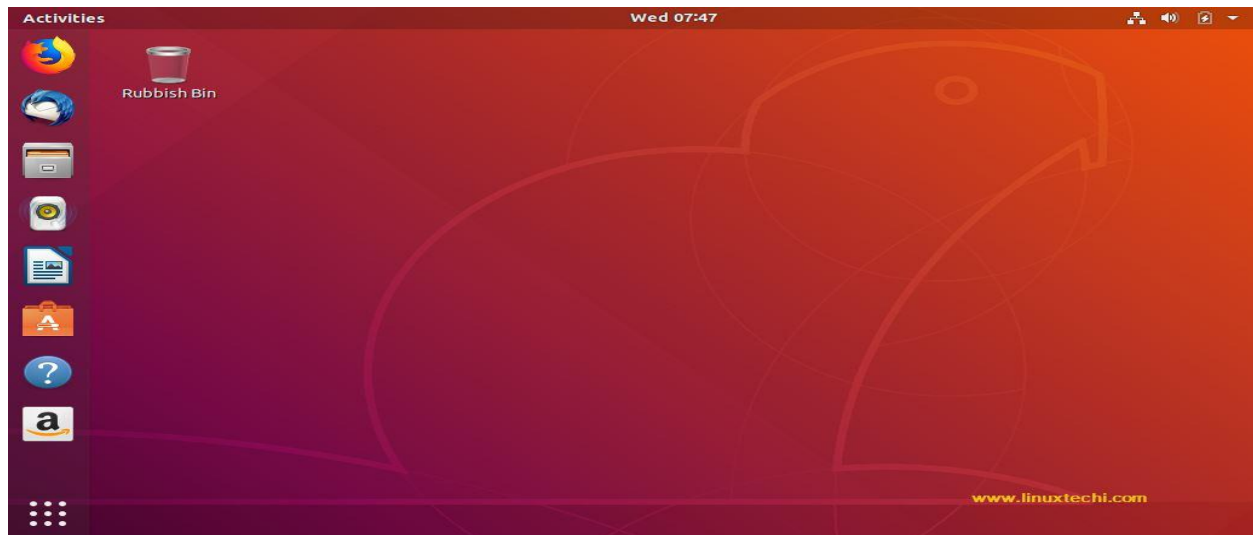
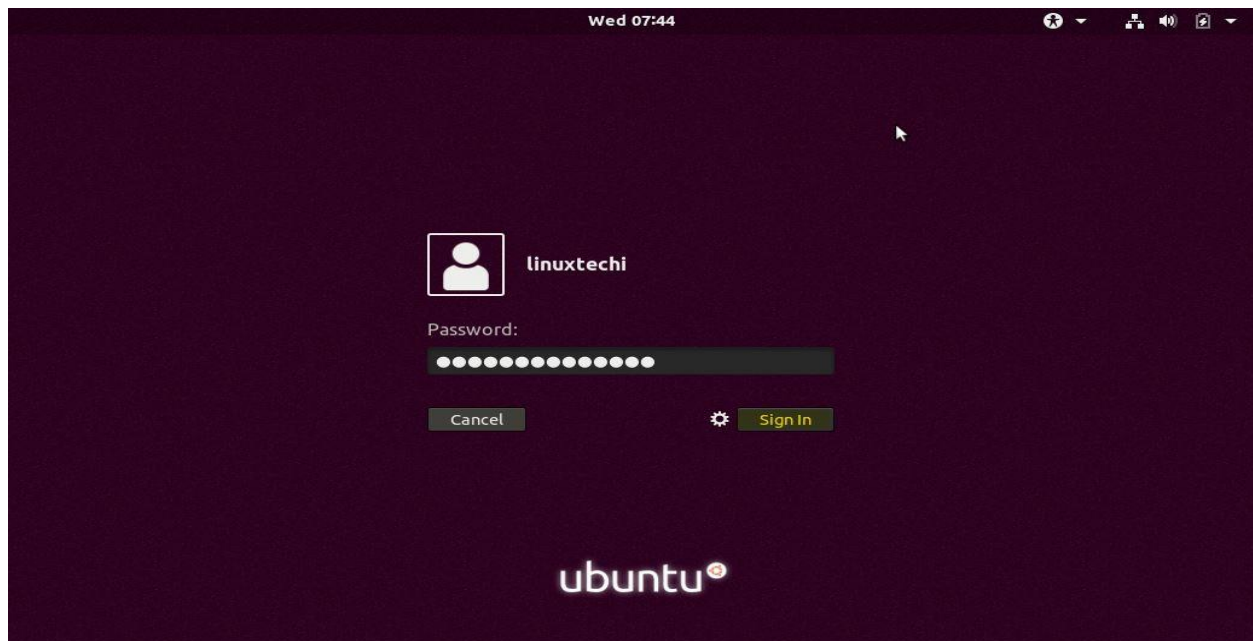


Fig 6.1.16: starting page

And that concludes our step by step installation guide for Ubuntu 18.04 LTS and it's all up to you now to explore the exciting features of Ubuntu 18.04 LTS.

6.2 Install JDK

Installing JDK 8 in ubuntu 18.04 LTS.

Step 1 Install JDK 8 on Ubuntu

Press ctrl+alt+t to Open Ubuntu Terminal and Type

```
sudo apt update
```

```
sudo apt install openjdk-8-jdk openjdk-8-jre
```

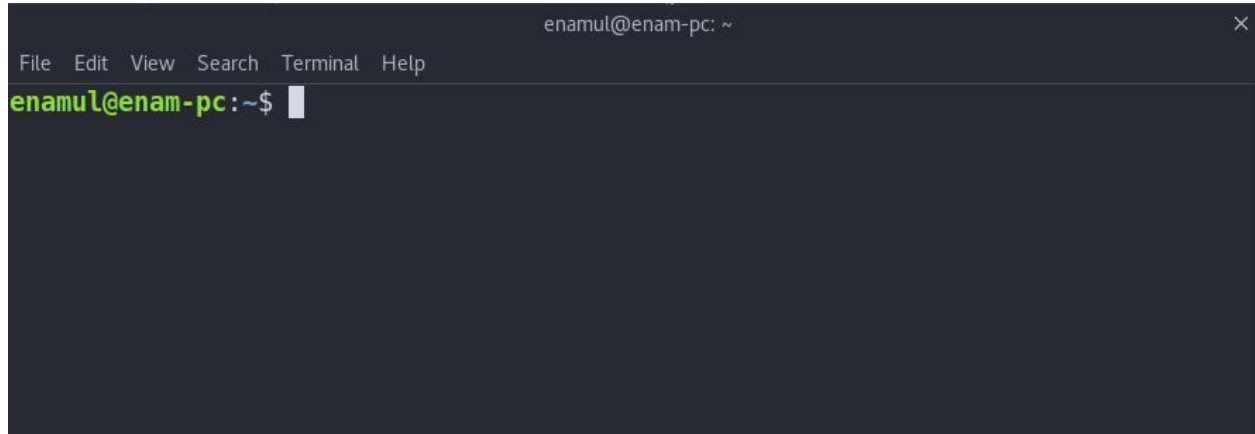


Fig 6.2.1: ubuntu terminal

Step 2 Verify Installation

Type java -version in terminal

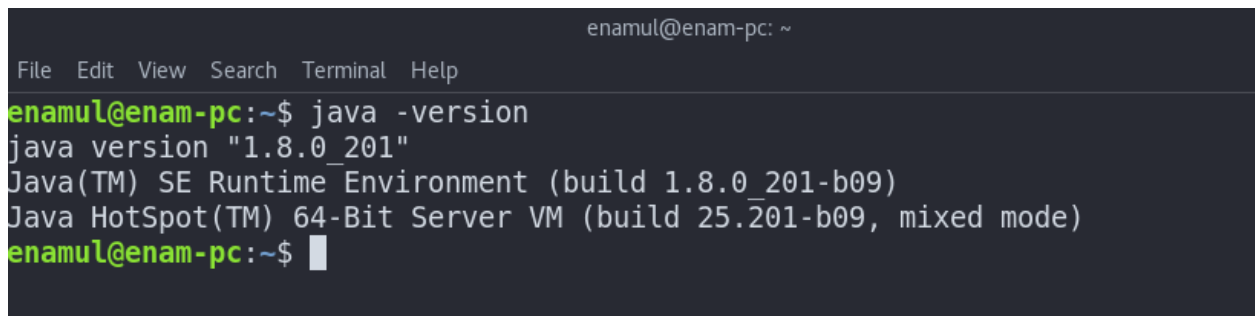


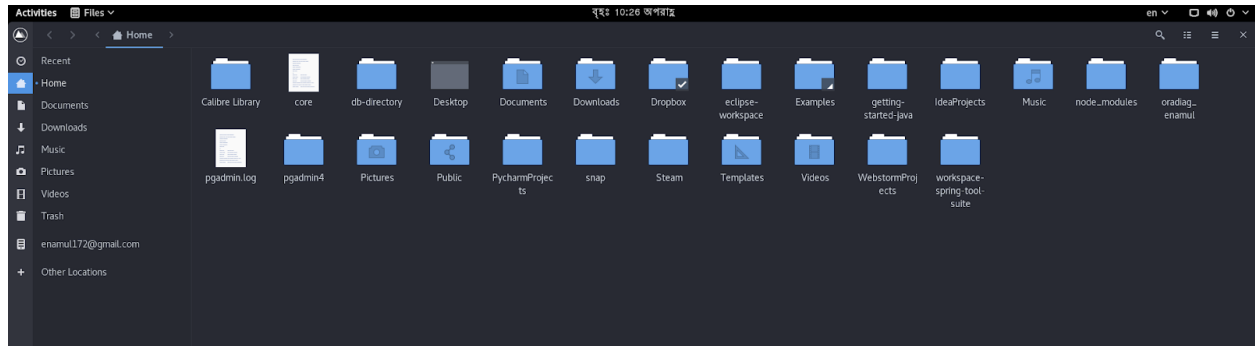
Fig 6.2.2: type command

Step 3 Set JAVA_HOME

After installing jdk8 we need to set JAVA_HOME environment variable.

Now go to **Home** Directory in our ubuntu OS

See the picture below



Now press ctrl+h in keyboard to see

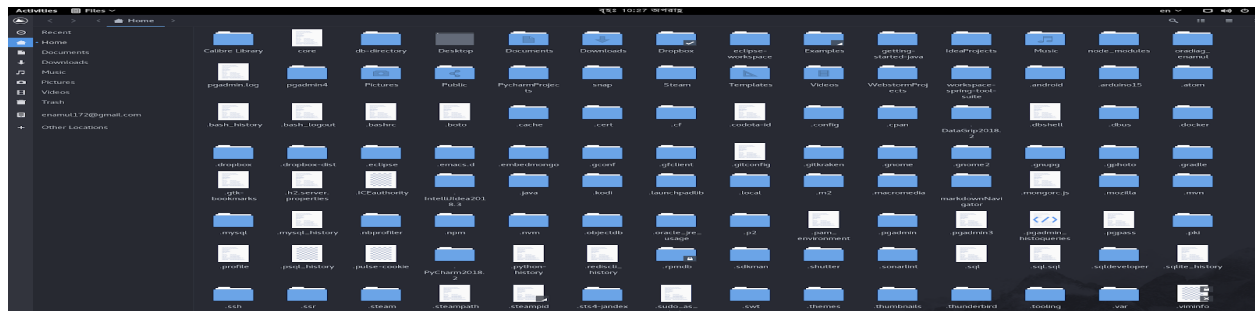


Fig 6.2.3 home directory

then find and open `.bashrc` file

And write

```
export JAVA_HOME=/usr/lib/jvm/java-8-oracle
```

```
PATH=$PATH:$JAVA_HOME
```

```
export PATH
```

See the image below

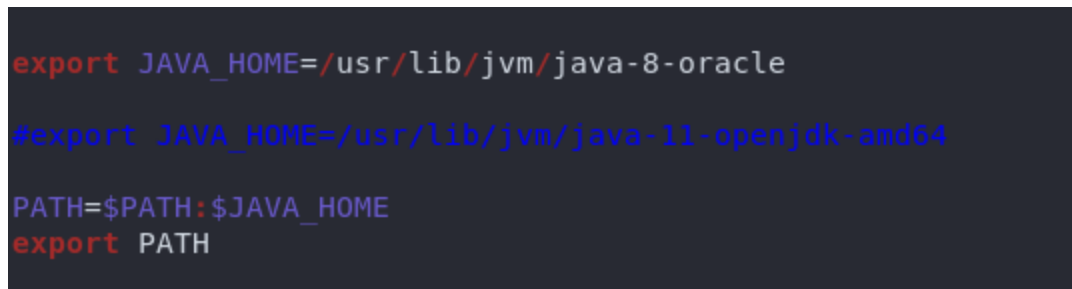


Fig 6.2.4: .bashrc file

6.3 Install Maven

Now we see how to install Apache Maven on Ubuntu 18.04 LTS.

To install maven open terminal and type some command.

Step 1 : `sudo apt-get update`

Step 2 : now go to opt directory type `cd /opt`

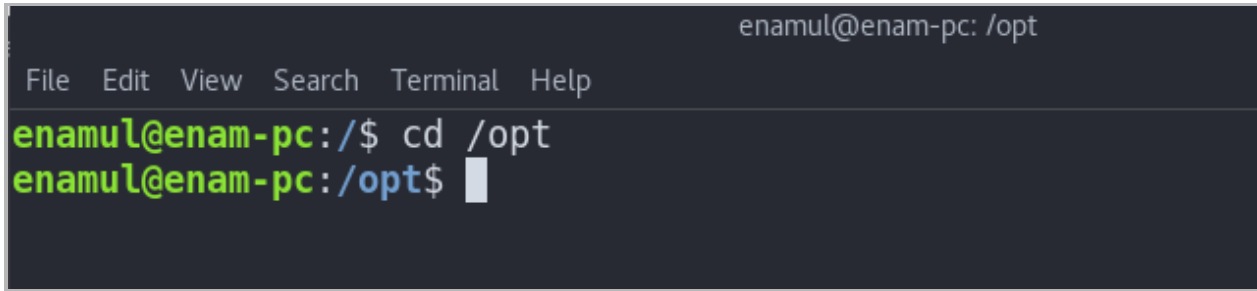
A terminal window titled 'enamul@enam-pc: /opt' with a menu bar (File, Edit, View, Search, Terminal, Help). The prompt is 'enamul@enam-pc:/\$' and the command 'cd /opt' has been entered. The new prompt is 'enamul@enam-pc:/opt\$' with a cursor.

Fig 6.3.1: opt directory

Step 3 : type `sudo wget`

`http://www-eu.apache.org/dist/maven/maven-3/3.6.0/binaries/apache-maven-3.6.0-bin.tar.gz`

Now to extract type : `sudo tar -xf apache-maven-3.6.0-bin.tar.gz`

Step 4 : To verify installation type `mvn -v` in your terminal like below

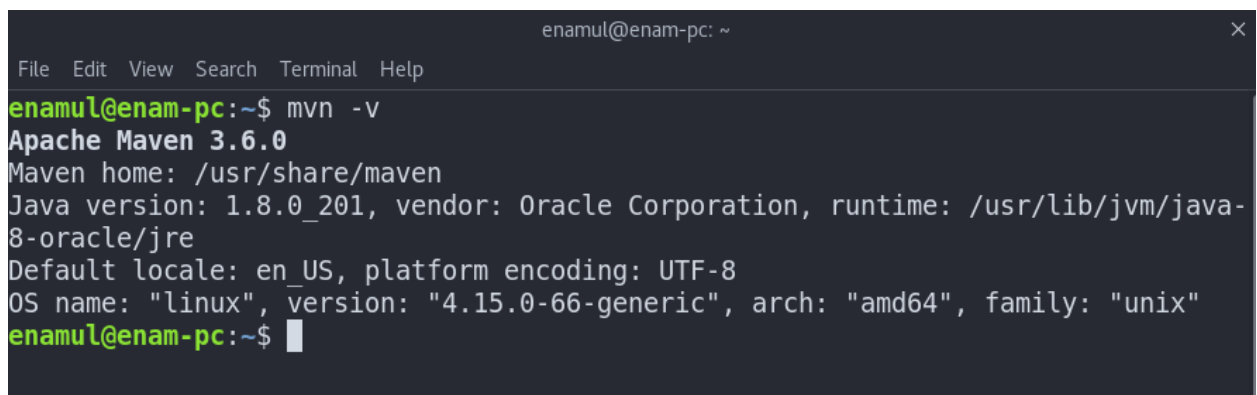
A terminal window titled 'enamul@enam-pc: ~' with a menu bar (File, Edit, View, Search, Terminal, Help). The prompt is 'enamul@enam-pc:~\$' and the command 'mvn -v' has been entered. The output is: 'Apache Maven 3.6.0', 'Maven home: /usr/share/maven', 'Java version: 1.8.0_201, vendor: Oracle Corporation, runtime: /usr/lib/jvm/java-8-oracle/jre', 'Default locale: en_US, platform encoding: UTF-8', 'OS name: "linux", version: "4.15.0-66-generic", arch: "amd64", family: "unix"'. The prompt returns to 'enamul@enam-pc:~\$'.

Fig 6.3.2: check maven version

6.4 Install MYSQL

To install MYSQL server open a Terminal window and type some command step by step.

Step 1

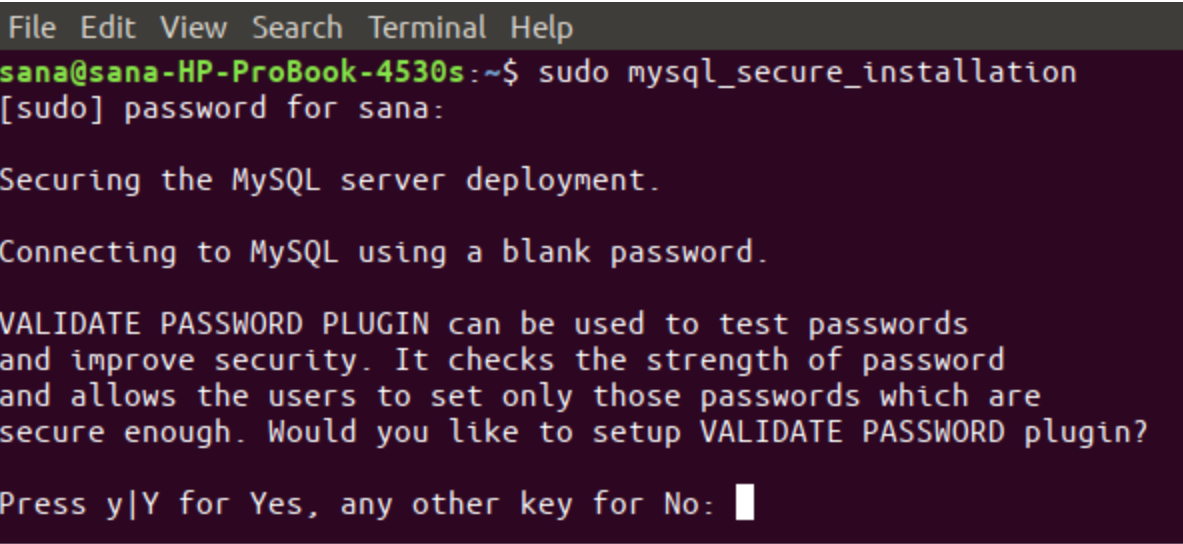
To update the package type `sudo apt-get update`

Then type `sudo apt install mysql-server`

Step 2

To run security script type `sudo mysql_secure_installation`

Now follow images instruction for details installation procedure.

A terminal window with a dark background and light-colored text. The terminal shows the command 'sudo mysql_secure_installation' being executed. It prompts for a password, then displays instructions for securing the MySQL server deployment. It mentions connecting to MySQL with a blank password and explains the 'VALIDATE PASSWORD PLUGIN'. It asks if the user wants to set up the plugin and shows a cursor waiting for input.

```
File Edit View Search Terminal Help
sana@sana-HP-ProBook-4530s:~$ sudo mysql_secure_installation
[sudo] password for sana:

Securing the MySQL server deployment.

Connecting to MySQL using a blank password.

VALIDATE PASSWORD PLUGIN can be used to test passwords
and improve security. It checks the strength of password
and allows the users to set only those passwords which are
secure enough. Would you like to setup VALIDATE PASSWORD plugin?

Press y|Y for Yes, any other key for No: █
```

Fig 6.4.1: update the package

```
There are three levels of password validation policy:

LOW      Length >= 8
MEDIUM  Length >= 8, numeric, mixed case, and special characters
STRONG Length >= 8, numeric, mixed case, special characters and dictionary
        file

Please enter 0 = LOW, 1 = MEDIUM and 2 = STRONG: 1
```

Enter your number of choice for password strength and hit Enter. The system will then ask you for the new password of root. Enter and then re-enter the password on the following prompts.

```
Please set the password for root here.

New password:

Re-enter new password:
```

The system will then display the strength of the password you provided and also ask you if you want to continue with the password.

```
Estimated strength of the password: 50
Do you wish to continue with the password provided?(Press y|Y for Yes, any other
key for No) :
```

Enter Y for Yes and hit Enter.

Fig 6.4.2: enter password

The system will now present you with a series of questions, one by one, and you can set the security of your system depending on your answers to these questions.

Series of questions:

The first question will ask you if you want to remove the anonymous test users.

```
By default, a MySQL installation has an anonymous user,
allowing anyone to log into MySQL without having to have
a user account created for them. This is intended only for
testing, and to make the installation go a bit smoother.
You should remove them before moving into a production
environment.

Remove anonymous users? (Press y|Y for Yes, any other key for No) : y
Success.
```

Press y and hit Enter.

The second question will ask if you want to disallow root login from a remote system. This should normally be your choice because, for a secure system, root should only be allowed to connect from the localhost.

```
Normally, root should only be allowed to connect from
'localhost'. This ensures that someone cannot guess at
the root password from the network.

Disallow root login remotely? (Press y|Y for Yes, any other key for No) : y
Success.
```

Thus, we recommend entering y.

The 3rd question will ask you if you want to remove the default MySQL database named “test” from your system and also remove the access to it.

```
By default, MySQL comes with a database named 'test' that
anyone can access. This is also intended only for testing,
and should be removed before moving into a production
environment.

Remove test database and access to it? (Press y|Y for Yes, any other key for No)
: y
```

Fig 6.4.3: type y

Enter y to remove this test database.

In order for all your above-configured changes to take effect, the system needs to reload the privilege tables. Enter y and all your security changes will be committed.

```
Reloading the privilege tables will ensure that all changes
made so far will take effect immediately.

Reload privilege tables now? (Press y|Y for Yes, any other key for No) : y
Success.

All done!
```

Configuring Root to use MySQL shell

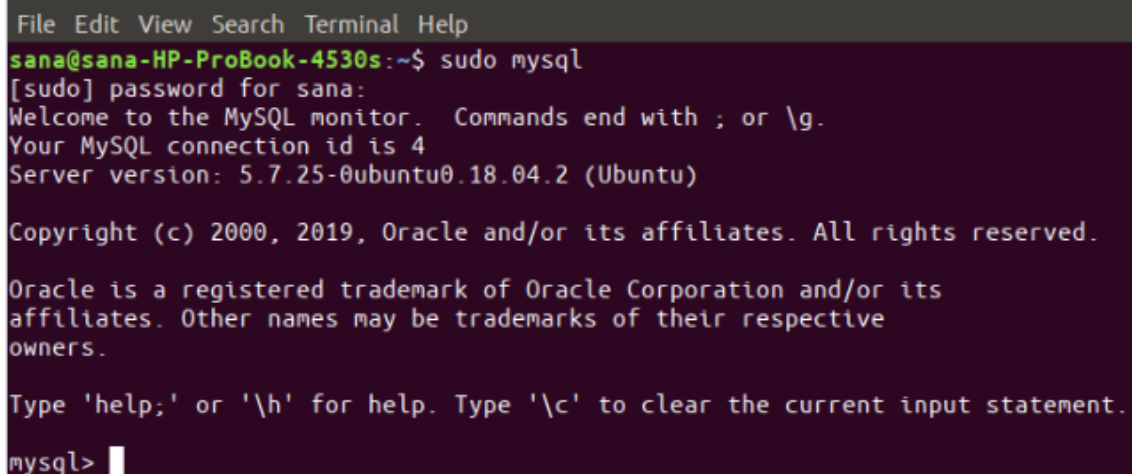
While running the security script, you provided a password for root. This user, however, is not allowed to connect to the MySQL shell using the same password. You can change configure root to use the MySQL shell by changing its authentication method from the default "auth_socket" to "mysql_native_password".

Here is how you can do it:

Step 1: Start MySQL shell

First, start the MySQL shell by running the following command as sudo:

```
$ sudo mysql
```

A screenshot of a terminal window with a dark background. At the top, there is a menu bar with 'File', 'Edit', 'View', 'Search', 'Terminal', and 'Help'. The terminal shows the command 'sana@sana-HP-ProBook-4530s:~\$ sudo mysql' being entered. The prompt changes to '[sudo] password for sana:', followed by 'Welcome to the MySQL monitor. Commands end with ; or \g.' and 'Your MySQL connection id is 4'. The server version is '5.7.25-0ubuntu0.18.04.2 (Ubuntu)'. Copyright and trademark notices for Oracle are displayed. A prompt 'mysql>' is shown at the bottom with a cursor.

```
File Edit View Search Terminal Help
sana@sana-HP-ProBook-4530s:~$ sudo mysql
[sudo] password for sana:
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 4
Server version: 5.7.25-0ubuntu0.18.04.2 (Ubuntu)

Copyright (c) 2000, 2019, Oracle and/or its affiliates. All rights reserved.

Oracle is a registered trademark of Oracle Corporation and/or its
affiliates. Other names may be trademarks of their respective
owners.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

mysql> █
```

This will start the MySQL shell so that you can work on the MySQL prompt.

Fig 6.4.4: MySQL shell

Step 2: Check authentication method for MySQL users

In the MySQL prompt, enter the following command that lets you check the authentication method/plugin that all your MySQL accounts are currently using:

```
mysql> SELECT user,authentication_string,plugin,host FROM mysql.user;
```

```
mysql> SELECT user,authentication_string,plugin,host FROM mysql.user;
+-----+-----+-----+-----+
| user          | authentication_string | plugin          | host      |
+-----+-----+-----+-----+
| root          |                       | auth_socket    | localhost |
| mysql.session | *THISISNOTAVALIDPASSWORDTHATCANBEUSEDHERE | mysql_native_password | localhost |
| mysql.sys     | *THISISNOTAVALIDPASSWORDTHATCANBEUSEDHERE | mysql_native_password | localhost |
| debian-sys-maint | *05E34D2E3074CAE393CBC5A212D391CED4D12229 | mysql_native_password | localhost |
+-----+-----+-----+-----+
4 rows in set (0.00 sec)

mysql>
```

In the above output, you can see that root is using the auth-socket plugin for authentication by default.

Step 3: Change the authentication method for root

Our purpose here is that the root user should authenticate with a password on MySQL. To do this, run the following command that lets the root be identified by a mysql_native_password. Please remember that this password has to be very strong.

```
mysql> ALTER USER 'root'@'localhost' IDENTIFIED WITH mysql_native_password BY
'password';
```

```
mysql> ALTER USER 'root'@'localhost' IDENTIFIED WITH mysql_native_password BY '!@aA12345';
Query OK, 0 rows affected (0.00 sec)

mysql>
```

From now on your root will not have the password you specified while running the included security script, but this strong password you specified in the above-mentioned command.

Step 4: Reload grant tables

Now is the time to tell the server to use the new privilege settings from now on. Run the following command in the MySQL prompt to reload the grant tables and register your changes:

```
mysql> FLUSH PRIVILEGES;
```

Fig 6.4.5: grant table

```
mysql> FLUSH PRIVILEGES;
Query OK, 0 rows affected (0.00 sec)

mysql>
```

Step 5: Recheck authentication method for MySQL users

Now, when you recheck the authentication method for your MySQL user accounts through the following command, you will see that your root user is now using the mysql_native_password plugin for authentication:

```
mysql> SELECT user,authentication_string,plugin,host FROM mysql.user;
```

```
mysql> SELECT user,authentication_string,plugin,host FROM mysql.user;
+-----+-----+-----+-----+
| user                | authentication_string | plugin             | host |
+-----+-----+-----+-----+
| root                | *AF4711D12EEDD416FB3C7FB149F2AAF7FF6D521 | mysql_native_password | localhost |
| mysql.session       | *THISISNOTAVALIDPASSWORDTHATCANBEUSEDHERE | mysql_native_password | localhost |
| mysql.sys           | *THISISNOTAVALIDPASSWORDTHATCANBEUSEDHERE | mysql_native_password | localhost |
| debian-sys-maint    | *05E34D2E3074CAE393CBC5A212D391CED4D12229 | mysql_native_password | localhost |
+-----+-----+-----+-----+
4 rows in set (0.00 sec)

mysql>
```

Now that your root user is setup to connect to the MySQL shell through a secure password, you can exit the shell using the exit command as follows:

```
mysql> exit
```

Test if MySQL is Up and Running

In order to check if MySQL is running on your system or not, you can use one of the following methods:

Method 1: Check the status of mysql.service

After you have installed MySQL on your system, the mysql.service should most probably be automatically running. The output of the following command should verify the active status of the service:

```
$ systemctl status mysql.service
```

```
File Edit View Search Terminal Help
sana@sana-HP-ProBook-4530s:~$ systemctl status mysql.service
● mysql.service - MySQL Community Server
   Loaded: loaded (/lib/systemd/system/mysql.service; enabled; vendor preset: en
   Active: active (running) since Wed 2019-03-20 23:31:12 PKT; 50min ago
     Main PID: 8047 (mysqld)
       Tasks: 29 (limit: 4583)
      CGroup: /system.slice/mysql.service
              └─8047 /usr/sbin/mysqld --daemonize --pid-file=/run/mysqld/mysqld.pid

Mar 20 23:31:11 sana-HP-ProBook-4530s systemd[1]: Starting MySQL Community Serve
Mar 20 23:31:12 sana-HP-ProBook-4530s systemd[1]: Started MySQL Community Server
lines 1-10/10 (END)
```

Fig 6.4.6: MySQL status checking

If for any reason, the service is not running you can use the following command as sudo to start the service:

```
$ sudo systemctl start mysql
```

The following command will help you in stopping the service whenever you have to:

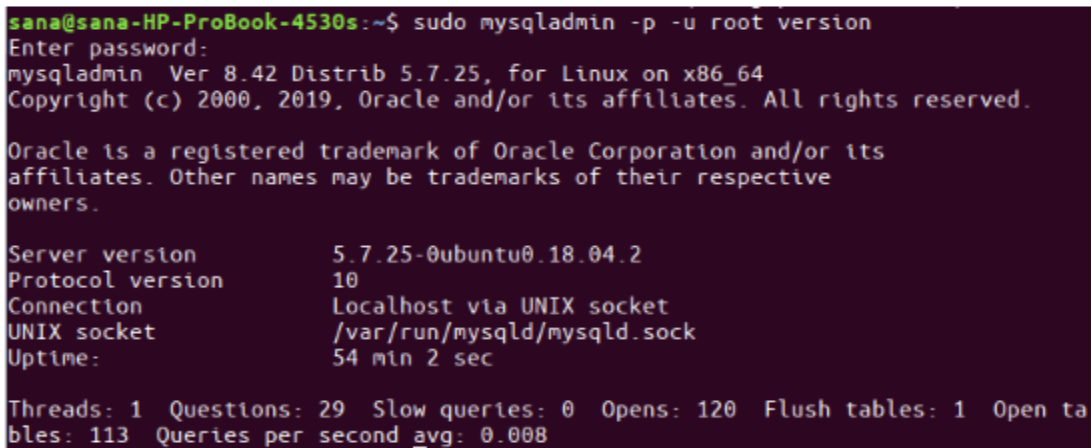
```
$ sudo systemctl stop mysql
```

Method 2: By connecting to MySQL Admin as root and running any administrative command

MySQL Admin is a client that lets you perform administrative operations on MySQL. Let us run one of the administrative commands through it as an example to check if the system is running properly and our root is configured to use it.

```
$ sudo mysqladmin -p -u root version
```

This command is meant to connect to MySQL as root, prompt for root password and then return the version number of MySQL admin.



```
sana@sana-HP-ProBook-4530s:~$ sudo mysqladmin -p -u root version
Enter password:
mysqladmin Ver 8.4.2 Distrib 5.7.25, for Linux on x86_64
Copyright (c) 2000, 2019, Oracle and/or its affiliates. All rights reserved.

Oracle is a registered trademark of Oracle Corporation and/or its
affiliates. Other names may be trademarks of their respective
owners.

Server version          5.7.25-0ubuntu0.18.04.2
Protocol version        10
Connection              Localhost via UNIX socket
UNIX socket             /var/run/mysqld/mysqld.sock
Uptime:                 54 min 2 sec

Threads: 1  Questions: 29  Slow queries: 0  Opens: 120  Flush tables: 1  Open ta
bles: 113  Queries per second avg: 0.008
```

If the command does what it is required to and produces output similar to the above one, you can be sure that your MySQL is up and running.

The process of installing and setting up MySQL on Ubuntu might seem cumbersome to some, especially using the command line. If you, however, use the above mentioned steps carefully one by one, you will have no problem in having a reliable, secure and stable installation of MySQL running on your Ubuntu.

Fig 6.4.7: MYSQL admin

CHAPTER 7

Architectural Hierarchy and system design

7.1 Architecture of EnamRa

In this chapter, we are discussing Architectural Hierarchy and system design. Architectural Hierarchy consists of Management Hierarchy. Now we see the **management Hierarchy**

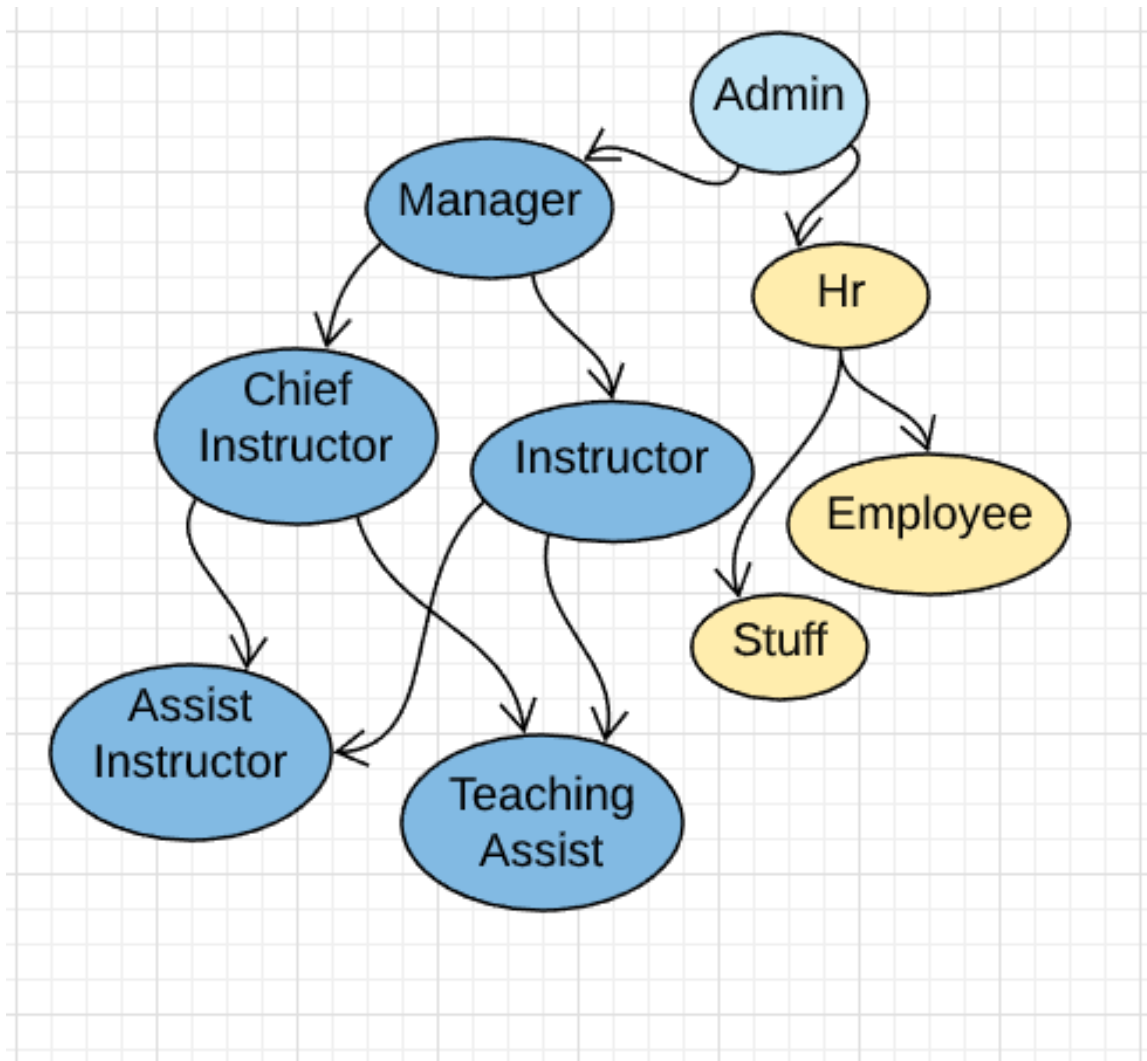


Fig: 7.1: management Hierarchy

7.2 Software Model for EnamRa

The software model or software development model is the various processes or techniques for the development of the project depending on the project's goals. many development life cycle models are available in the market. that have been developed in order to achieve different required objectives/goals. And The models specify the differing stages of the process and the order in which they are carried out.

The software model has a very high impact on the testing that is carried out. There are different Software development models that are listed below.

- Waterfall model
- V model
- Incremental model
- RAD model
- Agile model
- Iterative model
- Spiral model
- Prototype model

Here we are not discussing all software models. We only discussing **Agile model** because of EnamRa systems uses this model for developing their project.

Agile Software model/methodologies

The agile software development model refers to a group of software development methodologies based on iterative development. This model believes that every project needs to be handled differently and the existing methods must need to be tailored to the best fit for the project requirements.

For agile the tasks are divided into time boxes or sprint (small time frames) to deliver specific features for a release.

Iterative approach is performed and working software build is delivered after each iteration. Each build is incremental in terms of features; the final build holds on to all the features required by the consumer. We draw a diagram here that shows how agile models work.

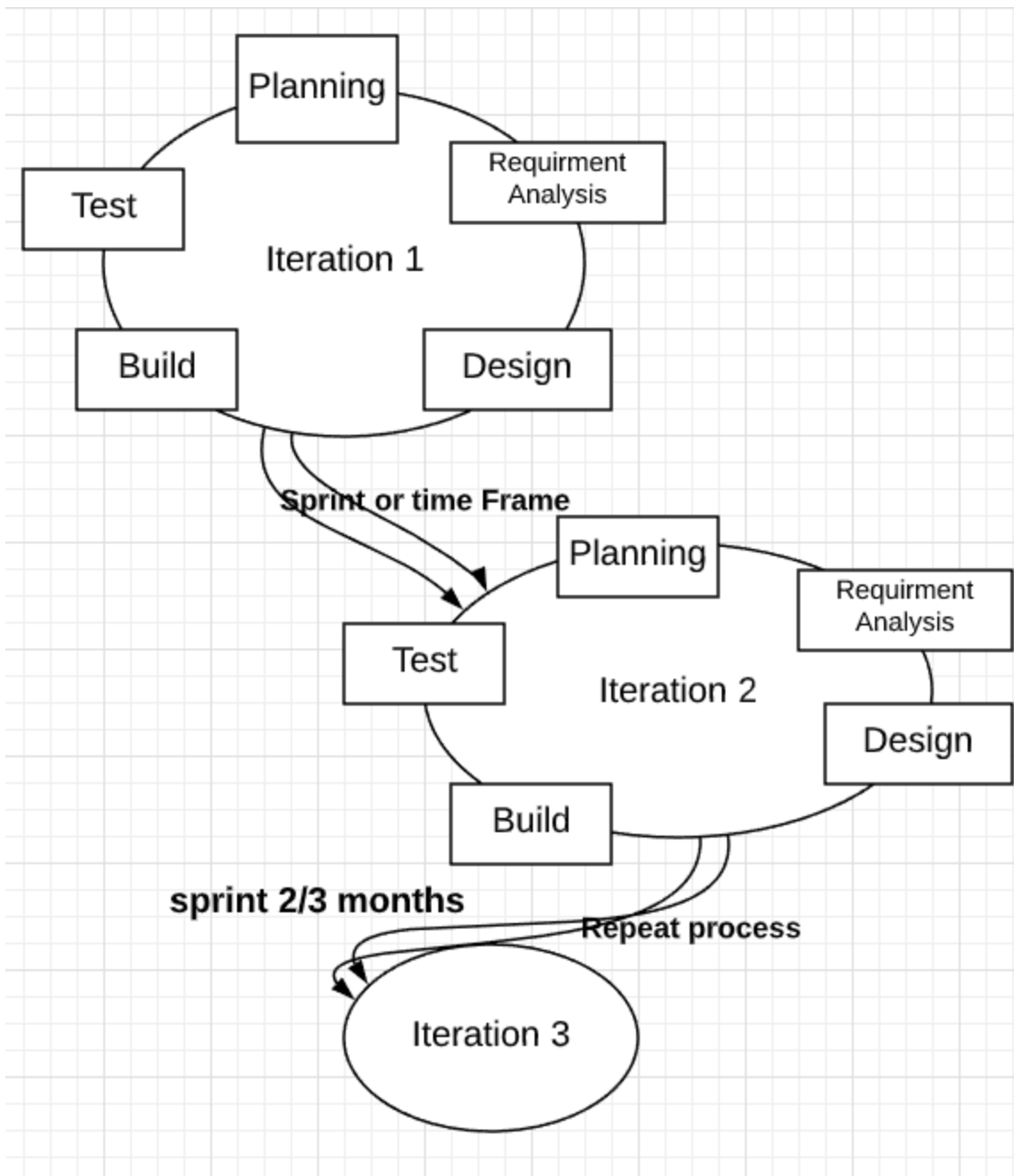


Fig 7.2: agile software model

Agile Model Advantage and Disadvances: now we are discussing the pros and cons of the agile software model. Since these methods are being widely accepted in the software world recently. But this method may not always be suitable for all projects/products.

The **advantages** of the Agile Model are listed below:

- # It's a realistic approach to software development systems.
- # It Promotes teamwork and cross-training.
- # Functionality can be developed quickly and expressed.
- # Resource requirements are very low.
- # Suitable for any like fixed or changing requirements.
- # Release delivery early and partial working solutions.
- # Minimum rules, documentation can be written easily.
- # Gives flexibility and efficiency to the developer.

The **disadvantage** of the Agile Model:

- # Not suitable for handling or managing complex dependencies.
- # More risk of sustainability, maintainability, and extensibility.
- # There is a very high separate dependency since there is a minimum documentation generated.
- # Transfer or shifting of technology to new team members maybe quite challenging due to a lack of documentation.

7.3.1 Use Case Diagram for User

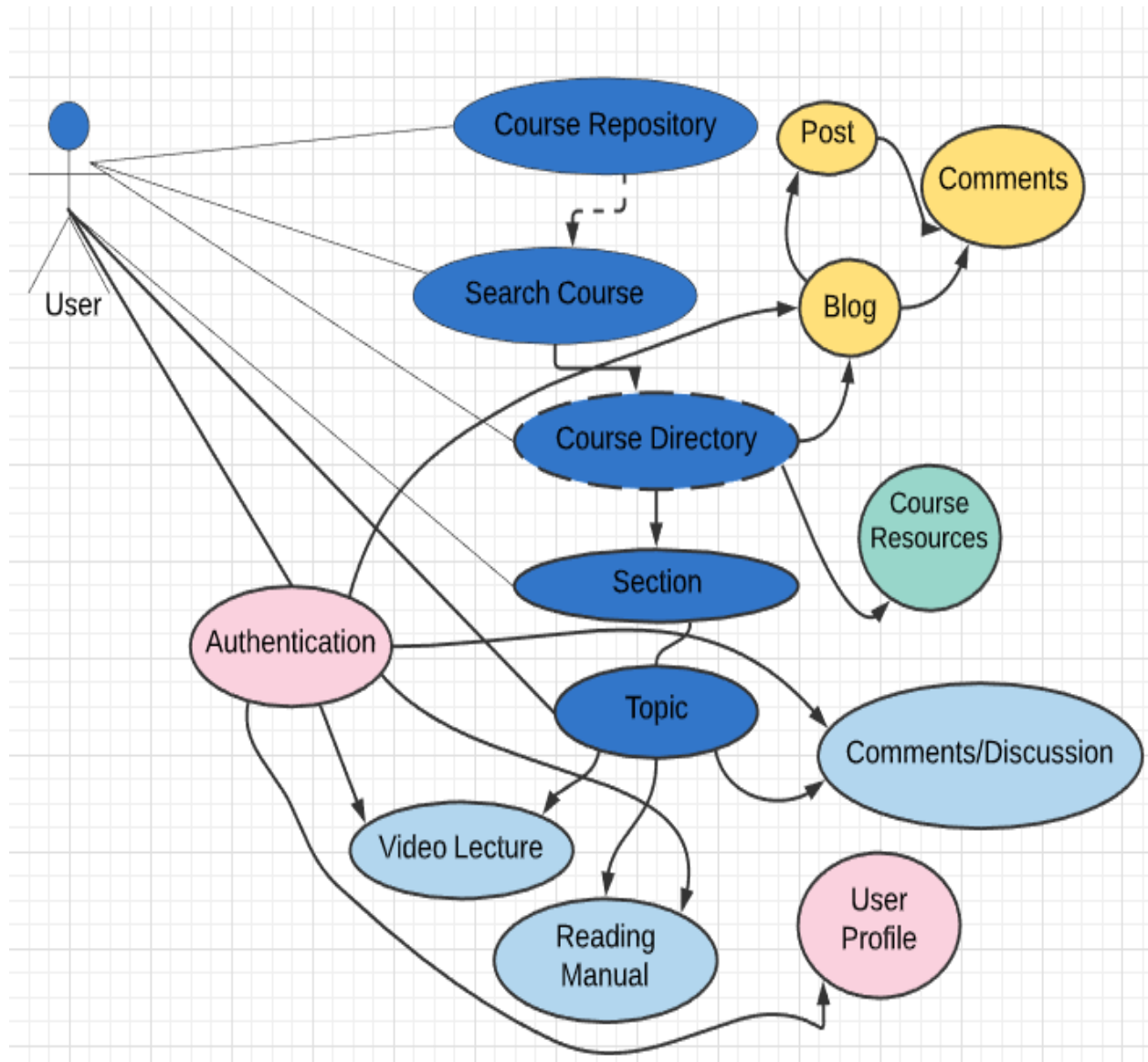


Fig 7.3.1: user use case diagram

7.3.2 Course Diagram

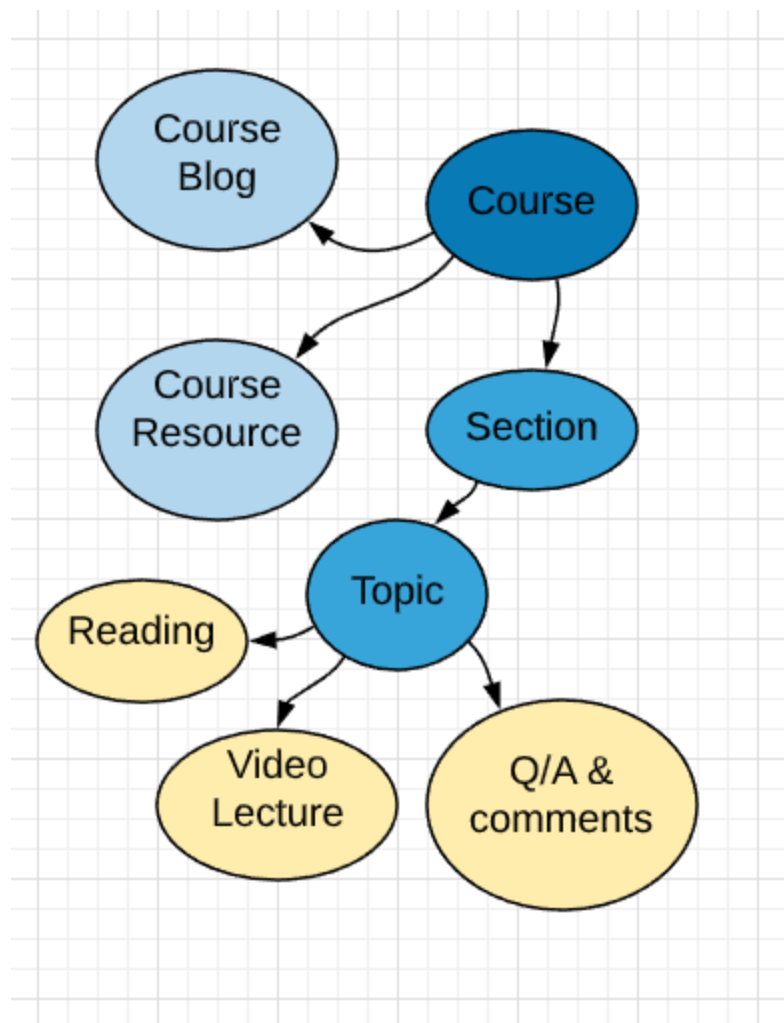


Fig 7.3.2: course diagram

7.3.3 Course and Types

In these systems, we have four types of course that are listed below

- # Academic: According to the academic syllabus.
- # General: full phase courses like a book with all chapters and topics.
- # Classroom: design by an instructor, chief instructor.
- # Professional: not necessarily full phase course like a book but with the most effective way with tips & tricks with all premium features.

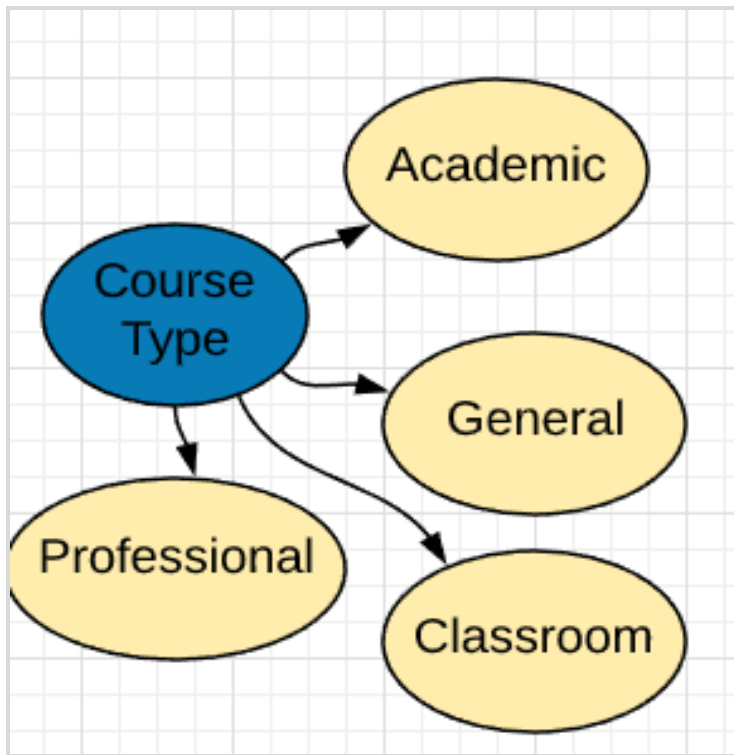


Fig 7.3.3: course types

7.3.4 Data flow diagram(DFD)

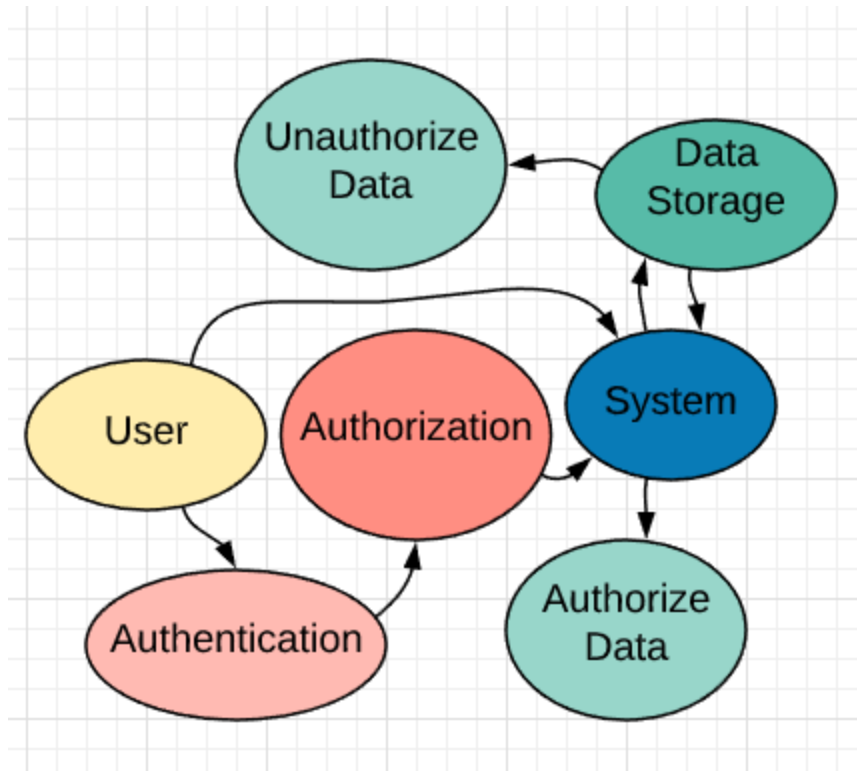


Fig 7.3.4: system data flow diagram

7.4.1 Use Case for Admin

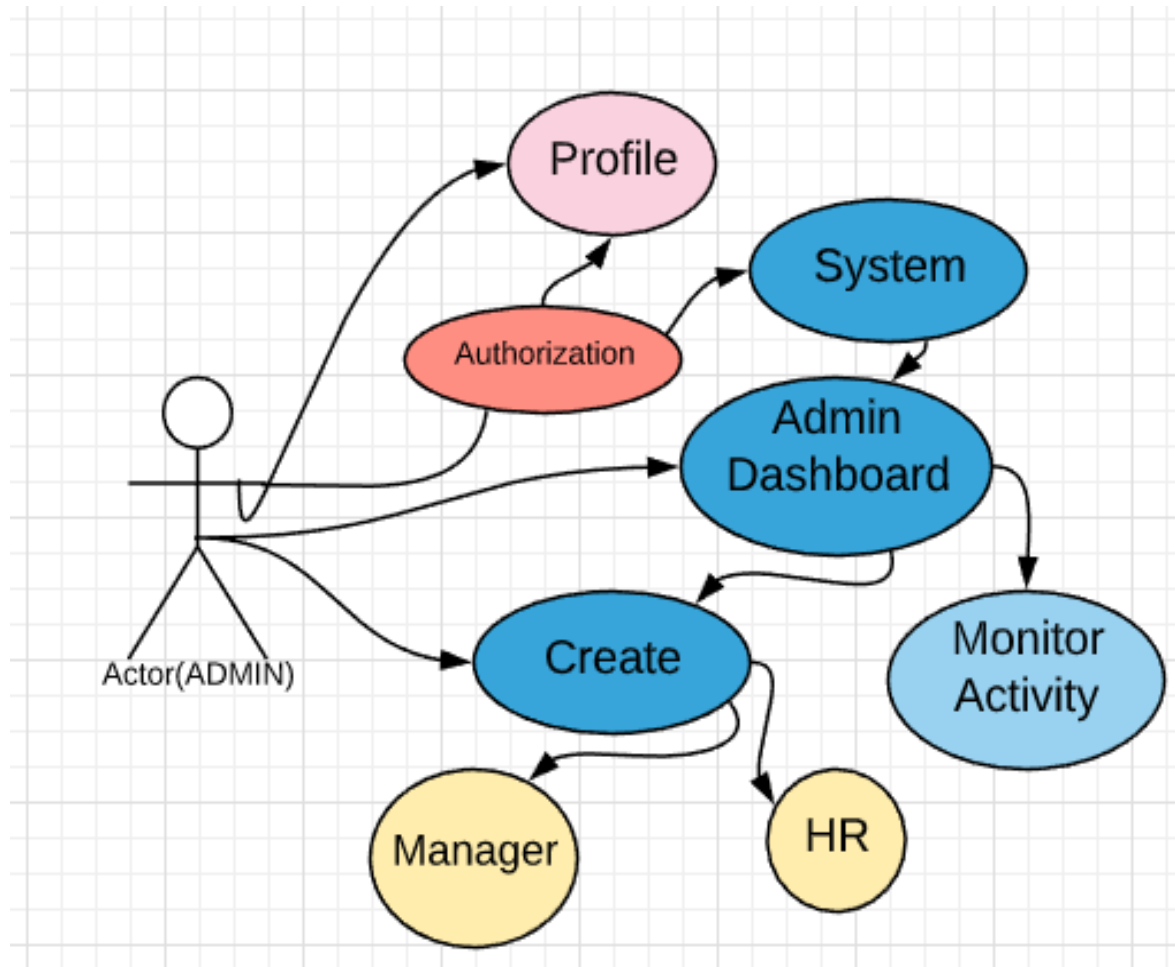


Fig 7.4.1: admin use case diagram

7.4.2 ER Diagram

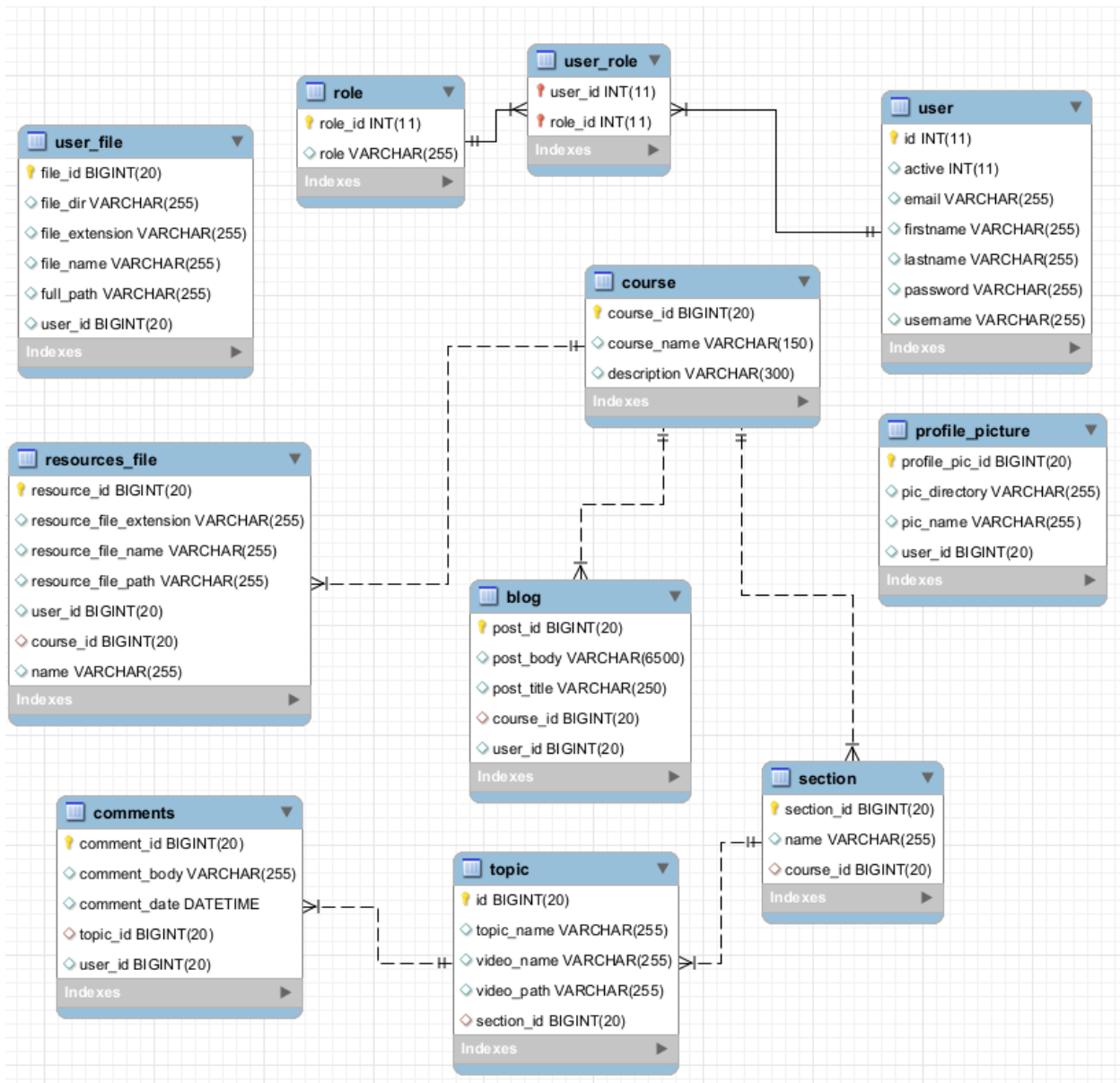
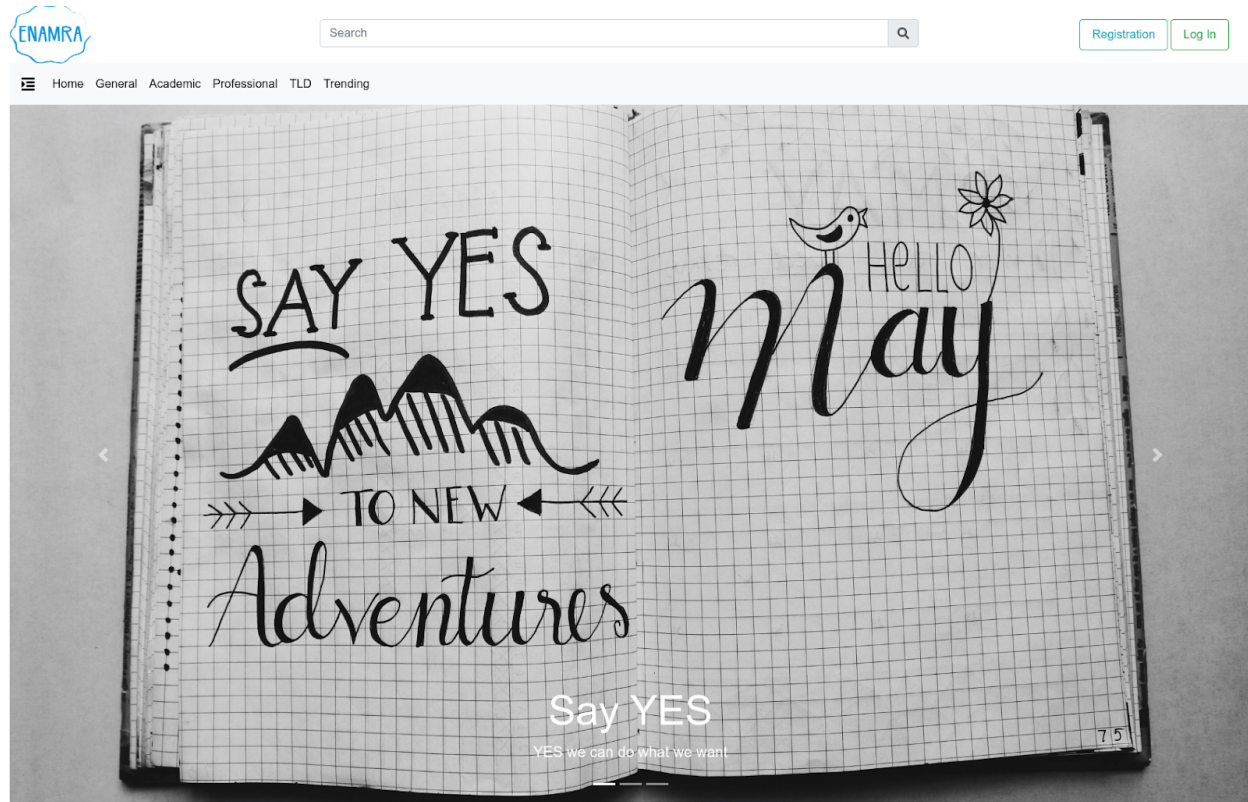


Fig 7.4.2: entity relationship model

7.4.3 Welcome page



Recently Added Course

Statistics 101 Statistics 101 Statistics 101Statistics 101Statistics 101Statistics 101Statistics 101Statistics 101Statistics 101Statistics 101Statistics 101Statistics 101Statistics 101Statistics 101Statistics 101Sta See All Full Course	Physics 101 Lorem ipsum dolor sit amet consectetur adipiscing elit. Neque, eveniet earum. Sed accusantium eligendi molestiae quo hic velit nobis et, tempora placeat ratione rem blanditiis volutates vel ipsam? Facilis, earum! See All Full Course	Math 101 It's basically the first-semester course. This course covers linear equation complex variable, parabola, matrix and so on. See All Full Course	cc 1 Up Updated UpdatedUpdatedUpdatedUpdatedUp datedUpdatedUpdatedUpdatedUpdatedUpda ted See All Full Course
Rewire Change Your Brain to Break Bad Hab - Richard O'Connor See All Full Course	Complex Enterprise Architecture A New Adaptive Systems Approach — John D. McDowall See All Full Course	Effective Java Effective Java - By Joshua Bloch See All Full Course	Digital Electronics Digital Electronics Digital Electronics Digital Electronics Digital Electronics Digital Electronics Digital Electronics Digital Electronics Digillectronics Digital Electronics Digital Electronics See All Full Course

Academic Domain

Professional

Language

Automata	Computer Graphics	Artificial Neural Network	Design and Analysis of Algorithms
Accounting	System Alalysis and Design	Biometrics	DBMS
Econmics	Artificial Intelligence	Control Systems	Digital Communication
Operating System	Porta ac consectetur ac	Data Mining	Digital Circuits
Algorithms	Ecommerce and Web Application	Cryptography	Digital Signal Processing

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COMPANY NAME	PRODUCTS	USEFUL LINKS	CONTACT
Here you can use rows and columns to organize your footer content. Lorem ipsum dolor sit amet, consectetur adipisicing elit.	Enamra 1 Enamra 2 Enamra 3 Bootstrap Angular	Your Account Become an Affiliate Enamra Portal Help	🏠 Mirpur, Dhaka, Bangladesh ✉ info@enamra.com 📞 + 01 234 567 88 📠 + 01 234 567 89

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Fig 7.4.3: welcome page

7.4.4 logo, search, auth, nav

#logo :



Fig 7.4.4.1: logo

#Search:

Fig 7.4.4.2: search bar

#Authentication



Fig 7.4.4.3: authentication

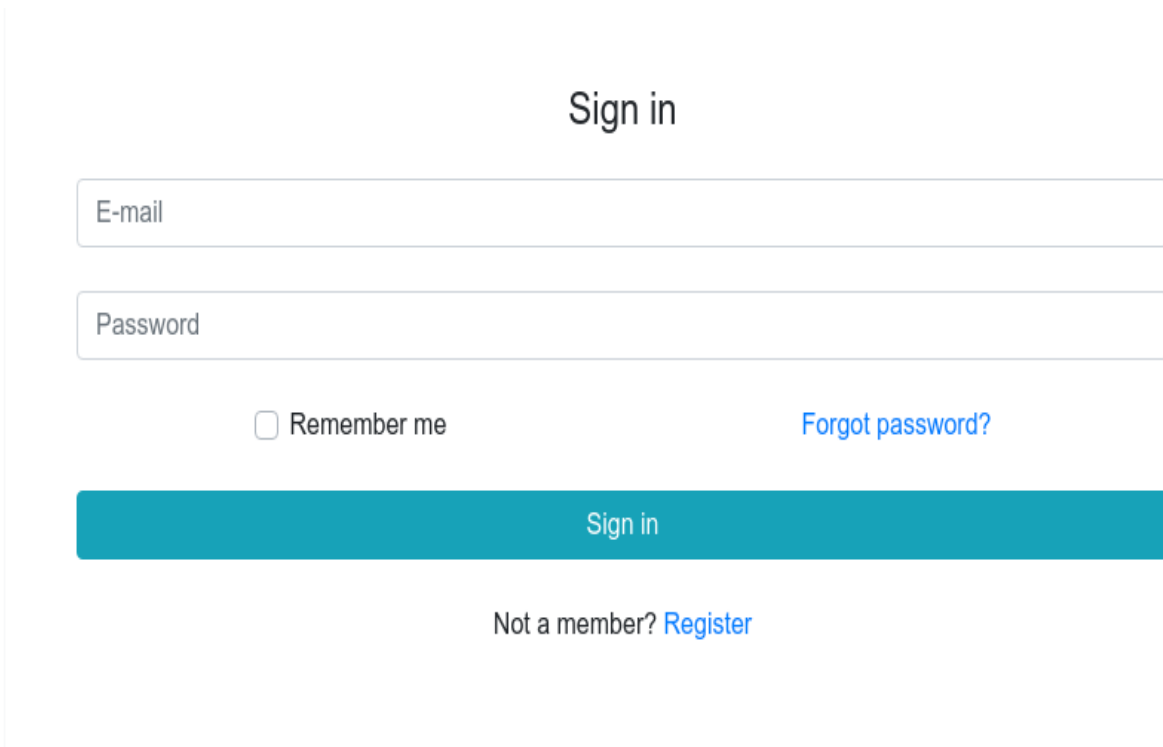
Slide



Fig 7.4.4.4 slider

7.5. Login and Registration

#login page



The image shows a login page layout. At the top, the text "Sign in" is centered. Below it are two input fields: "E-mail" and "Password". Under the "E-mail" field is a checkbox labeled "Remember me". To the right of the checkbox is a link "Forgot password?". Below these elements is a large teal button labeled "Sign in". At the bottom, centered, is the text "Not a member? Register" with "Register" as a link.

Sign in

E-mail

Password

☐ Remember me [Forgot password?](#)

Sign in

Not a member? [Register](#)

Fig 7.5.1: login page

#Registration page

Sign up

First name	Last name
username	
E-mail	
Password	
At least 8 characters and 1 digit	
confirm password	

☐ Subscribe to our newsletter

Sign up

By clicking *Sign up* you agree to our [terms of service](#)

Fig 7.5.2: sign Up page

7.6 User Profile

enamul172@gmail.com

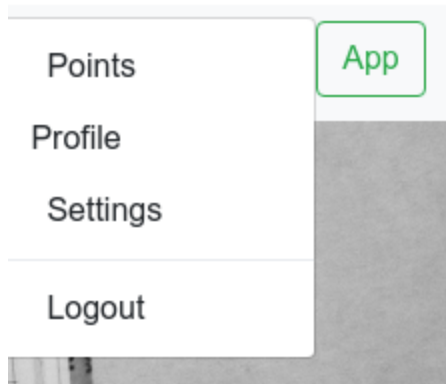
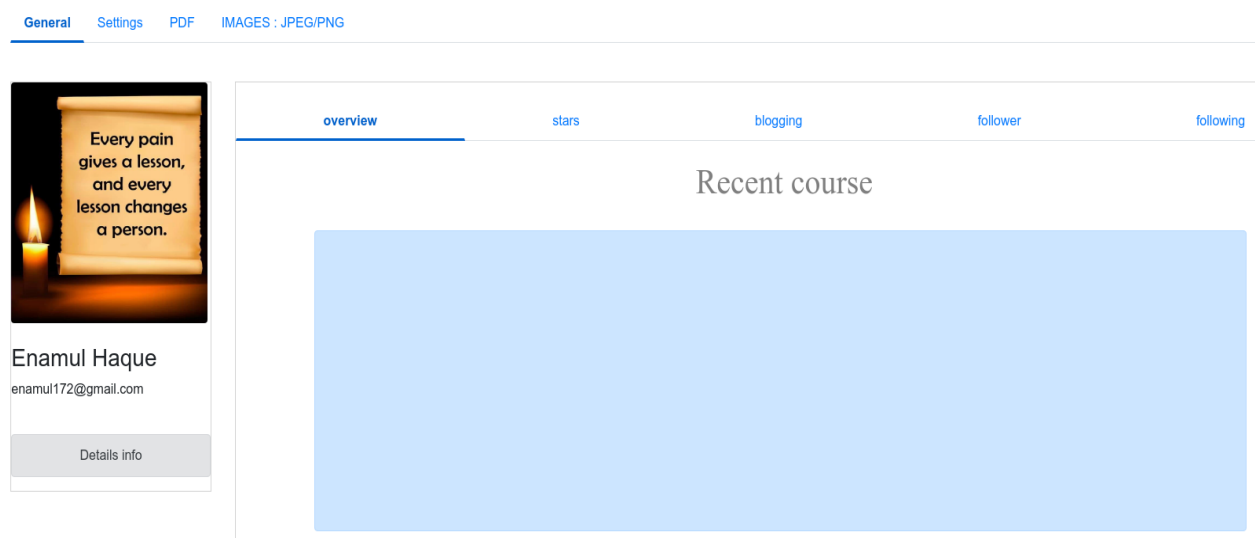


Fig 7.6.1: profile icon



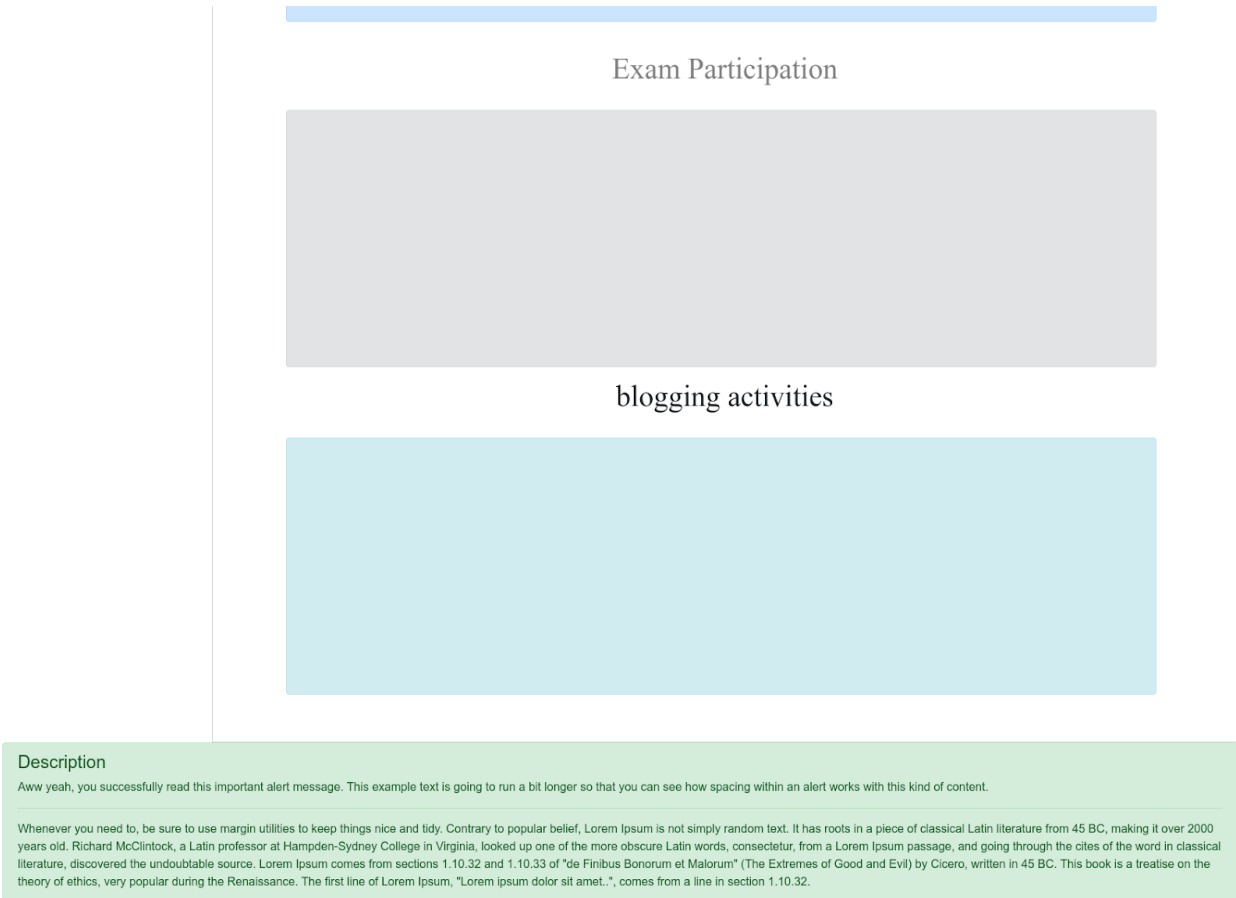


Fig 7.6.2: User Profile

7.7.1 Course, Chapter, Topic

#Course

Physics 101

Lorem ipsum dolor sit amet consectetur
adipiscing elit. Neque, eveniet earum. Sed
accusantium eligendi molestiae quo hic velit
nobis et, tempora placeat ratione rem
blanditiis voluptates vel ipsam? Facilis,
earum!

[See All](#) [Full Course](#)

Fig 7.7.1.1: course view

#Course Page



Home

General

Academic

Professional

TLD

Trending

Course Details

Course Name: Math 101

Blog

Resources

Week : 01

Week : 02

Week : 03

Week : 04

Week : 05

Week : 06

Week : 07

Week : 08

Week : 09

Week : 10

Week : 11

Week : 12

Fig 7.7.1.2: course page

#Chapter

Chapter 1. Introduction
Chapter 2. Creating and Destroying Objects
Chapter 3. Methods Common to All Objects

Fig 7.7.1.3: course chapter page

#Course -> chapter -> Topic

Course Name: Effective Java
Sanam Re Female Cover by Shirley Setia ft. Kushal Chheda (Arijit Singh)
Test Topic 001
Test Topic 002
test 03
Nainowale_Ne_Full_Video_Song
Item 1: Consider static factory methods instead of constructors

Fig 7.7.1.4: topic page

7.7.2 Video lecture and comments

Course Name: Math 101

Chapter Name: Week : 01

Topic: Set Theory : Intro

Set Theory : Intro

Basic concepts and notation

Axiomatic set theory

Bean Validation Headline Features

- Ensuring data integrity

0:02 / 6:05

Write Comments about this topic

Comments

Topic Reading

Tips

bbc

Created: 09-Nov-2019 by

Enamul

gggg

Created: 21-Sep-2019 by

Enamul

gfdhsfdh

Created: 10-Sep-2019 by

Enamul

xcgbxfch

Created: 25-Jul-2019 by

Enamul

Fig 7.7.2: video lecture and comments page

7.7.3 Recently added course

Recently Added Course

Statistics 101

Statistics 101 Statistics 101Statistics
101Statistics 101Statistics 101Statistics
101Statistics 101Statistics 101Statistics
101Statistics 101Statistics 101Statistics
101Statistics 101Statistics 101Statistics
101Statistics 101Statistics 101Statistics
101Sta

[See All](#) [Full Course](#)

Physics 101

Lorem ipsum dolor sit amet consectetur
adipiscing elit. Neque, eveniet earum. Sed
accusantium eligendi molestiae quo hic velit
nobis et, tempora placeat ratione rem
blanditiis voluptates vel ipsam? Facilis,
earum!

[See All](#) [Full Course](#)

Rewire

Change Your Brain to Break Bad Hab -
Richard O'Connor

[See All](#) [Full Course](#)

Complex Enterprise Architecture

A New Adaptive Systems Approach — John
D. McDowall

[See All](#) [Full Course](#)

Fig 7.7.3: recently added course

7.7.4 Blogging for course

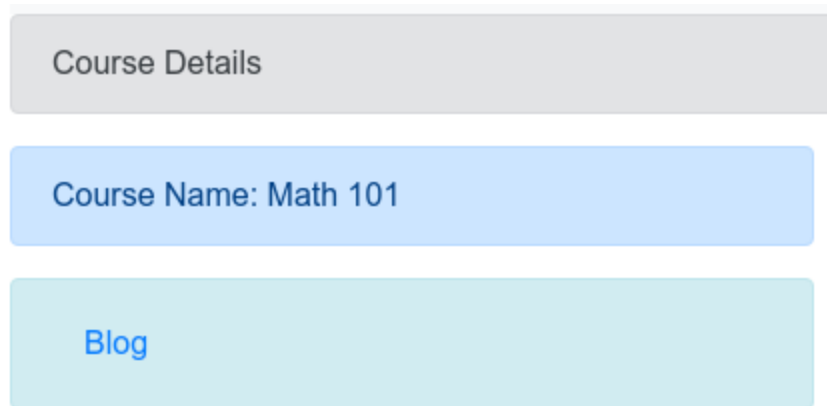


Fig 7.7.4.1: blog integrated with course

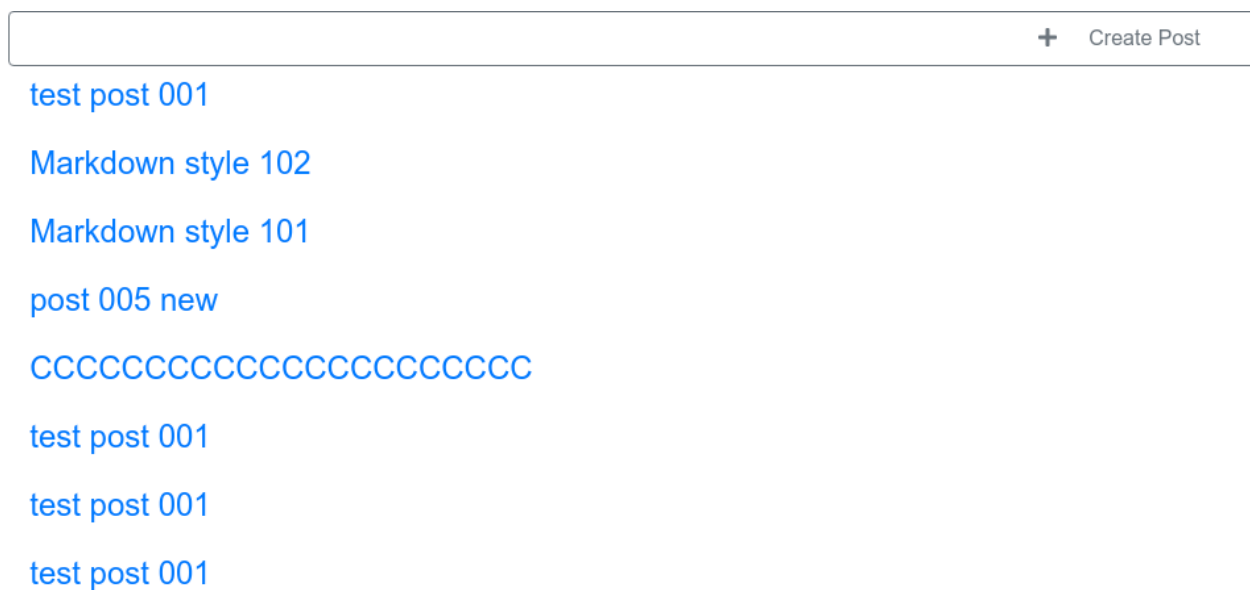


Fig 7.7.4.2 post list page

7.7.5 Post view and create post

#Post view

test post 001

This is an H1

This is an H2

etc...

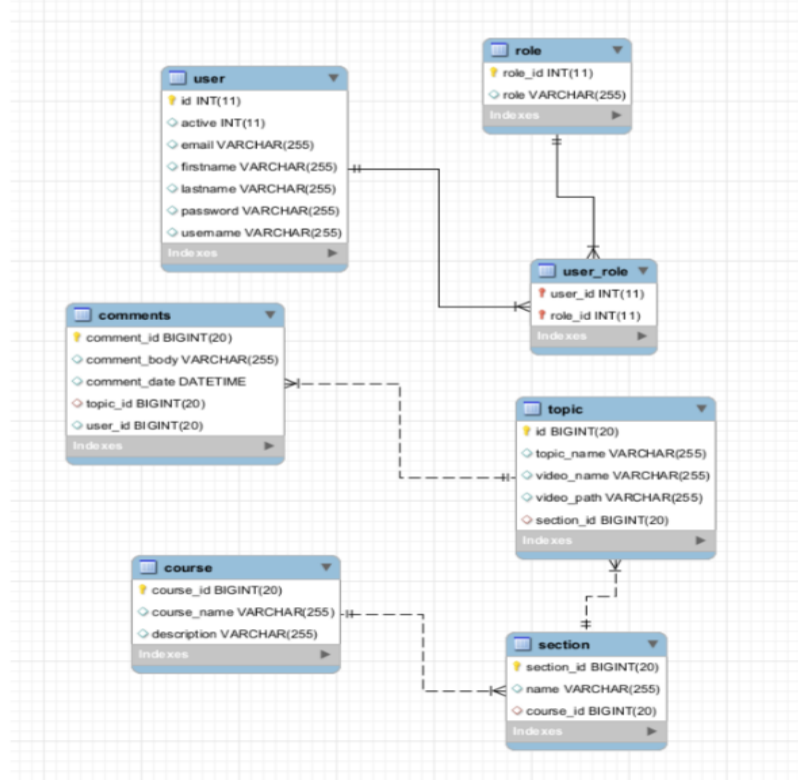
This is a blockquote

This is a nested quote This is a code block `This is a code snippet`

- This is an unordered list item
- 1. This is an ordered list item

Blank lines create paragraphs ----This is a horizontal rule *this has emphasis* **this is strong** \ Backslashes escape special characters

Link [Link](http://www.url.com Title) Link <http://www.url.com> someone@email.com 



Write Comments about this topic

[Comments](#)

Fig 7.7.5.1: post view

Create Post

Create Post

Post Title.....[Range 12-250 character]

Post Body Up to 6500 char Maximum...

Send

Fig 7.7.5.2: post creation page

7.7.6 Resource for course

Course Details

Course Name: Statistics 101

Blog

Resources

Fig 7.7.6.1: resource integrated with course

#Resource page

Welcome to Course Resources Directory		
Resource Name	File Extension	Resource File
video	mkv	Download/View
img	jpg	Download/View
clearance	docx	Download/View
ccna	pdf	Download/View
mmmm	pdf	Download/View
fgthjgjf	jpg	Download/View
guigug	pdf	Download/View
mmmmmmmmmmmmmmmm	docx	Download/View
gkfgjhj	jpg	Download/View
rrrrr	jpg	Download/View

Fig 7.7.6.2: course resource list

CHAPTER 8

Administration role

8.1 Admin Dashboard and roles

#Admin Dashboard

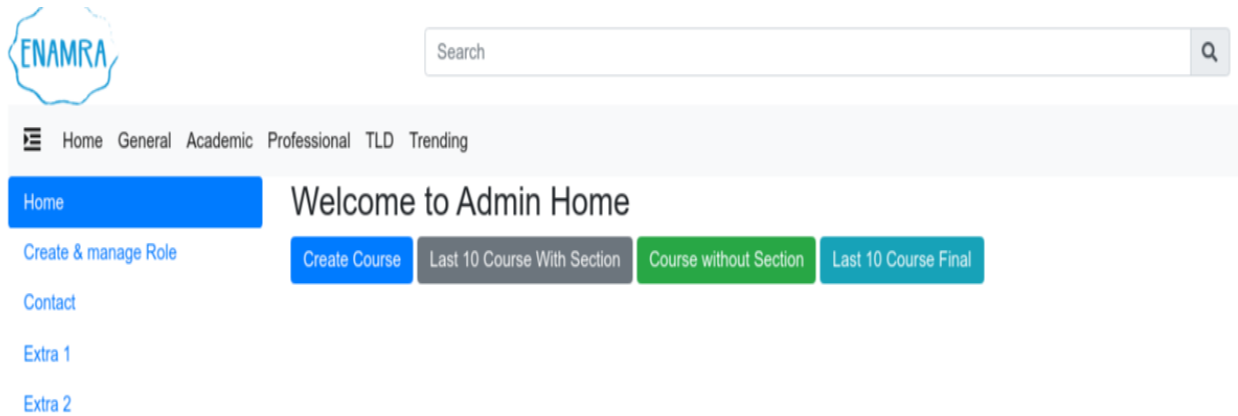


Fig 8.1.1: admin dashboard page

#Create and Manage Role



Fig 8.1.2: Create and Manage Role for admin

#Create Admin and manage ADMIN

All Admin

#ID	Name	Email	Update	Delete
4	Enamul Haque	admin@admin.com	Update	Delete

[Create Admin](#)

Fig 8.1.3: admin manage and creation

Create and manage MANAGER

Manager and coordinator

#ID	Name	Email	Update	Delete
19	manager007 cc	mng@vv.cc	Update	Delete
20	Enamul Haque	info@manager.com	Update	Delete

[Create Manager](#)

Fig 8.1.4: manager role creation and manage

#HR(Human Resource Executive) role creation and manage

Human Resource Executive					
#ID	Name	Email	Update	Delete	
17	hr007 cc	hr@007	Update	Delete	

[Create HR](#)

Fig 8.1.5: hr role creation and manage

8.2 Manager Dashboard

Welcome to Manager Dashboard

Home

Create & manage Role

Contact

Extra 1

Extra 2

Chief Instructor

#ID	Name	Email	Update	Delete
Create Chief Instructor				

Instructor

#ID	Name	Email	Update	Delete
Create Instructor				

Fig 8.2: manager dashboard page

8.3 Course, Section, Topic Creation by admin

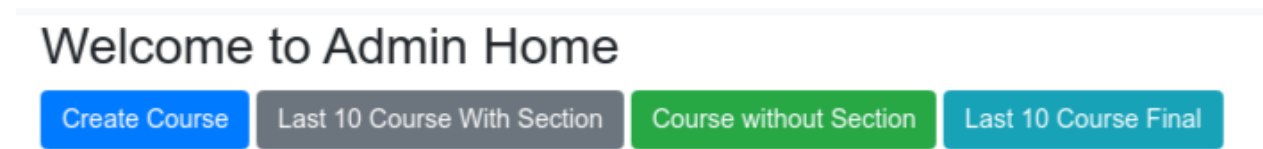


Fig 8.3.1: course manage by admin

#Create Course

Create Course

Course Name MIN : 06 MAX : 150 Character

Write something about course. Up to 300 Character maximum

Send

Fig 8.3.2: course creation page

#Course List With Section

Last 10 created Course		
#ID	Course Name	Single course with all section
19	Statistics 101	See all Section For This Course
18	Physics 101	See all Section For This Course
17	Math 101	See all Section For This Course
17	Math 101	See all Section For This Course
17	Math 101	See all Section For This Course
17	Math 101	See all Section For This Course
17	Math 101	See all Section For This Course
17	Math 101	See all Section For This Course
17	Math 101	See all Section For This Course

Fig 8.3.3: course with all section

#Course List

Last 10 Final Course		
#ID	Course Name	Details
19	Statistics 101	Details
18	Physics 101	Details
17	Math 101	Details
16	cc 1 Up	Details
15	Rewire	Details
13	Complex Enterprise Architecture	Details
12	Effective Java	Details

Fig 8.3.4: created course list

Course List Details

Last 10 created Course						
#ID	Course Name	Blog	Resources	Chapter	Update Course	Delete Course
19	Statistics 101	blog	resources	Add Section	Update	Delete
18	Physics 101	blog	resources	Add Section	Update	Delete
17	Math 101	blog	resources	Add Section	Update	Delete
16	cc 1 Up	blog	resources	Add Section	Update	Delete
15	Rewire	blog	resources	Add Section	Update	Delete
13	Complex Enterprise Architecture	blog	resources	Add Section	Update	Delete
12	Effective Java	blog	resources	Add Section	Update	Delete
11	Digital Electronics	blog	resources	Add Section	Update	Delete

Fig 8.3.5: course details

8.4 Add and view recourse for course

#Add resource

Welcome to Resources Directory

 Upload Resource

Fig 8.4.1: add recourse page

Upload Resource

Upload Resource

Choose File

No file chosen

Send

Fig 8.4.2: resource upload page

CHAPTER 9

Testing EnamRa systems

9.0 Introduction

Software testing is a procedure, to evaluate the usefulness of a product application with a purpose to discover whether the created software met the specified requirements or not and to distinguish the defects to guarantee that the item is defect-free in order to produce the quality product.

Software testing includes the execution of a product segment or framework part to assess at least one property of interest. In general, these properties show the degree to which the component or system under test:

- meets the prerequisites that guided its design and development,
- responds effectively to all kinds of inputs,
- performs its functions within a satisfactory time,
- it is adequately usable,
- can be introduced and run in its intended environments, and
- achieves the general outcome of its stakeholder's desire.

9.1 Testing and Quality management of EnamRa

In this system, more than 60% code and their usability are tested. And in this chapter, we are discussing show how we teste our code.

9.2 Quality management plan

A quality management plan is a simple of a necessity archive devoted to testing.standard for item quality and portrays the techniques to accomplish this level. testing activity for product/item managers, be that as it may, it is for the most part utilized for large-scale ventures projects.

9.3 Test strategy

A test strategy is a document that depicts the software testing approach to deal with accomplish testing goals. information/data about group structure and resource needs alongside what ought to be organized during testing. normally static as the technique is characterized by the whole advancement scope.

9.4 Test plan

A test plan, for the most part, comprises of a couple of pages and describes what should be tested at a given moment. This archive ought to contain:

The list of features to be tested

Testing strategies

Time periods Roles and responsibilities (for example unit tests might be performed either by the QA group or by engineers)

9.5 Test case specifications

A test case specifications document is a set of detailed activities to verify each feature or functionality of a product/item. Generally, a QA team writes a separate specifications document for each product unit. A decent practice is to simplify specifications description and avoid test case reiterations.

9.6 Test checklists

Test agenda is a list of tests that should be run at a specific time.

It represents what tests are finished and how many have failed. All focus on the test agendas should be defined effectively. Try to group test points in the checklists. This approach will help you keep track of them during your work and not lose any. If it helps testers to check the application correctly, we can include comments on our points on the list.

9.7.1 Software Testing Types

generally, Testing is classified into three categories.

- Functional Testing

- Non-Functional Testing or Performance Testing

- Maintenance (Regression and Maintenance)

#Functional Testing:

- Unit Testing

- Integration Testing

#Non-Functional Testing

- Performance

- Endurance

- Load

- Volume

- Scalability

- Usability

- So on.....

#Maintenance

- Regression

- Maintenance

Testing Approaches:

There are three types of testing approaches.

- White Box Testing

- Black Box Testing

- Grey Box Testing

#White Box Testing: It is likewise called as Glass Box, Clear Box, Structural Testing. White Box Testing is based on applications' internal/interior code structure. In white-box testing, an internal view of the system, as well as programming skills, are used to design test experiments. This testing is typically done at the unit level.

#Black Box Testing: It is also called behavioral/Specification-Based Testing. Black Box Testing is a software testing method in which testers evaluate the functionality of the software/project under test without looking at the internal code structure/design.

#Grey Box Testing: Grey box is the mix of both White Box and Black Box Testing. The analyzer who works on this type of testing needs to have access to design documents. This helps to create effective/better test cases in this process. Test agenda is a list of tests that should be run at a specific time. It represents what tests are finished and how many have failed. All focus on the test agendas should be defined effectively. Try to group test points in the checklists. This approach will help you keep track of them during your work and not lose any. If it helps testers to check the application correctly, we can include comments on your points on the list.

9.8 Test samples

Now here we show some test code samples with some description.

#Dependency for testing: we have two dependencies main framework and security

```

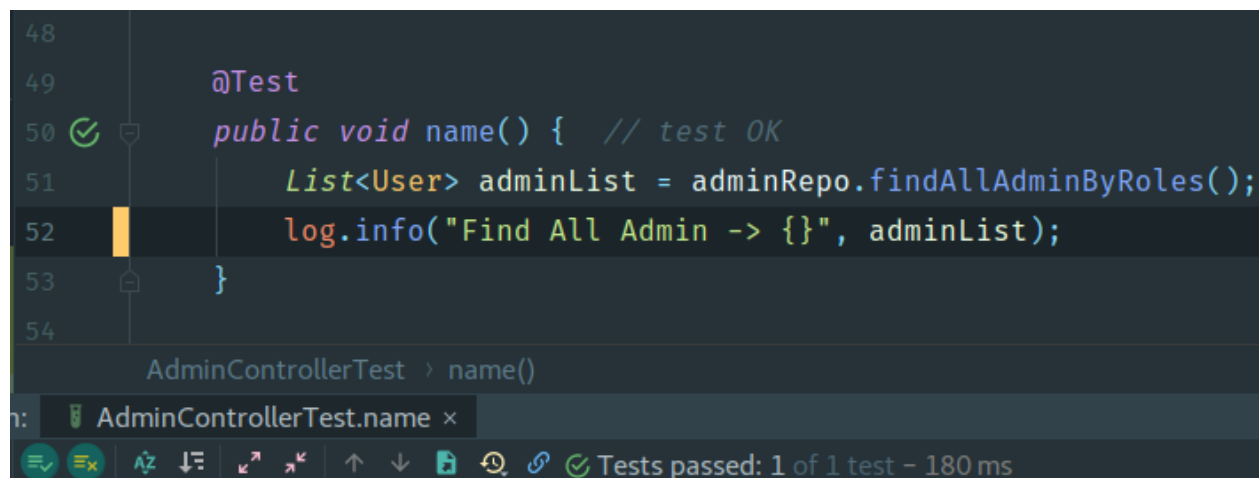
<dependency>
  <groupId>org.springframework.boot</groupId>
  <artifactId>spring-boot-starter-test</artifactId>
  <scope>test</scope>
</dependency>

<dependency>
  <groupId>org.springframework.security</groupId>
  <artifactId>spring-security-test</artifactId>
  <scope>test</scope>
</dependency>

```

Fig 9.8.1: testing dependency

#Test case to find all admin



```

48
49     @Test
50     public void name() { // test OK
51         List<User> adminList = adminRepo.findAllAdminByRoles();
52         log.info("Find All Admin -> {}", adminList);
53     }
54
    AdminControllerTest > name()
n: AdminControllerTest.name x
Tests passed: 1 of 1 test - 180 ms

```

Fig 9.8.2: Find all admin

#Test case to find all HR

```
56
57     @Test
58     public void getAllHr() { // test OK
59         List<User> hrList = adminRepo.findAllHR_By_Roles();
60         log.info("Find All HR -> {}", hrList);
61     }
```

AdminControllerTest > getAllHr()

AdminControllerTest.getAllHr x

Tests passed: 1 of 1 test - 208 ms

AdminControllerTest (com.app 208 ms) Hibernate: select * from user u in

getAllHr 208 ms 2019-11-11 01:58:46.896 INFO 12264

Fig 9.8.3: Find all hr

#Test case to find all Manager

```
64
65     @Test
66     public void getAllManager() { // test OK
67         List<User> managerList = adminRepo.findAllManagerByRoles();
68         log.info("All Manager -> {}", managerList);
69     }
70
```

AdminControllerTest

AdminControllerTest.getAllManager x

Tests passed: 1 of 1 test - 183 ms

AdminControllerTest (com.app 183 ms) Hibernate: select * from user u inner join

getAllManager 183 ms 2019-11-11 02:02:02.799 INFO 12691 --- [

Fig 9.8.4: get all manager

#Test case to find Last 4 Course

```
63      // ok
64      @Test
65      public void recently_added_first_four_course() {
66          List<Course> last_four = courseRepo.recently_added_first_four_course();
67          log.info("Find Last 4 course-> {}", last_four);
68      }
69  }
```

CourseControllerTest > recently_added_first_four_course()

CourseControllerTest.recently_add... x

Tests passed: 1 of 1 test - 186 ms

CourseControllerTest (c 186 ms) Hibernate: select * from course c order by course_id desc l

recently_added_first_186 ms 2019-11-11 02:07:21.934 INFO 13454 --- [main] c

Fig 9.8.5: select last 4 course

#Test case Create ADMIN

```
71
72     @Test
73     @Transactional
74     @DirtyContext
75     public void saveAdmin() {
76         User user = new User();
77         user.setFirstname("AA");
78         user.setLastname("BB");
79         user.setPassword(encoder.encode(rawPassword: "123"));
80         user.setEmail("admin02@enamra.com");
81         user.setActive(1);
82         Role adminRole = roleRepository.findByRole("ADMIN");
83         user.setRoles(new HashSet<Role>(Arrays.asList(adminRole)));
84         userRepository.save(user);
85         log.info("Create ADMIN : -> {}", userRepository.save(user));
86     }
87 }
```

AdminControllerTest > saveAdmin()

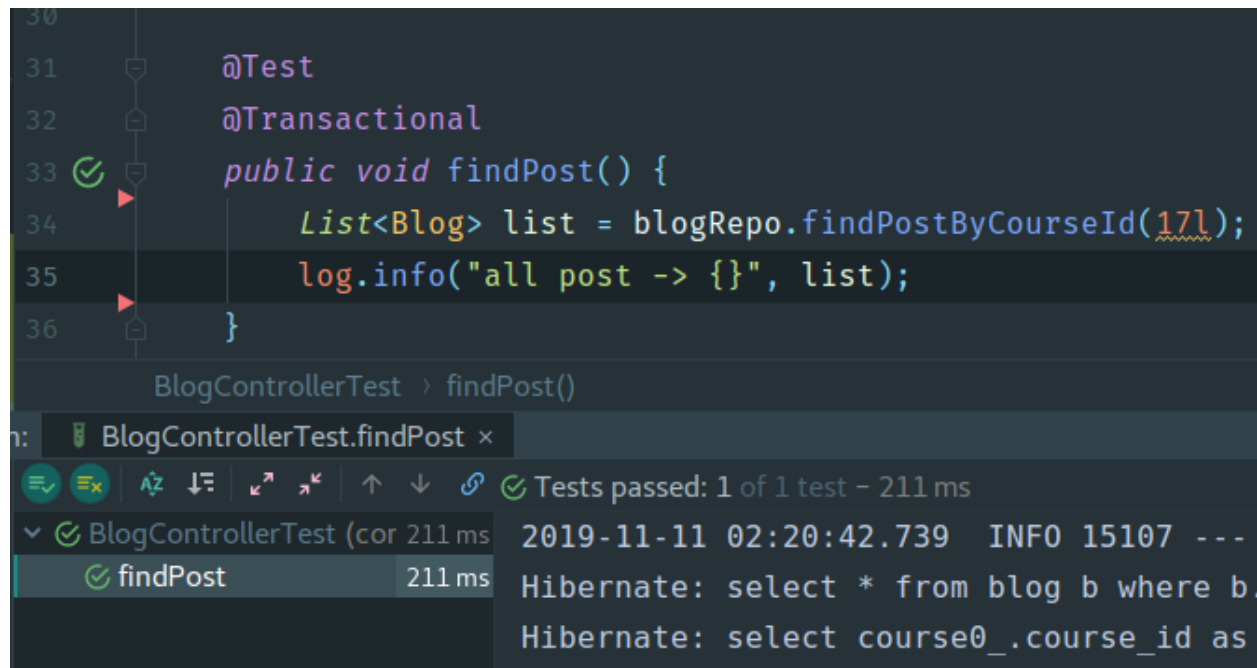
h: AdminControllerTest.saveAdmin x

Tests passed: 1 of 1 test - 549 ms

Test Case	Duration	Timestamp	Log Level	Log Message
AdminControllerTest (com.app	549 ms	2019-11-11 02:04:57.805	INFO	13080 --- [
saveAdmin	549 ms	2019-11-11 02:04:57.996	INFO	13080 --- [

Fig 9.8.6: create admin

#Test case find all post from specific course



```
30
31     @Test
32     @Transactional
33     public void findPost() {
34         List<Blog> list = blogRepo.findPostByCourseId(171);
35         log.info("all post -> {}", list);
36     }
```

BlogControllerTest > findPost()

h: BlogControllerTest.findPost x

Tests passed: 1 of 1 test - 211 ms

BlogControllerTest (cor 211 ms) 2019-11-11 02:20:42.739 INFO 15107 ---
findPost 211 ms Hibernate: select * from blog b where b.
Hibernate: select course0_.course_id as

Fig 9.8.7: find all post

9.9 Conclusion

Now we are going to the conclusion of the project EnamRa. And finally completed our first minimal version of this project. Basically, it's a continuous project and we release the first Iteration/phase of our project for deployment. And in the future, we continue adding new features as we do in the past. And this phase of release is fully free but in future when we add premium content then the only premium resources/content will cost you but all other contents are free as always.

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Ubuntu 18.04 LTS Desktop Installation Guide with Screenshots

<https://www.linuxtechi.com/ubuntu-18-04-lts-desktop-installation-guide-screenshots>

SCOTT, T(January 4, 2017)

8 Important LMS Features for Your E-Learning Program

<https://technologyadvice.com/blog/human-resources/8-important-lms-features>

For Drawing DFD, ERD, Use case diagram

Lucid chart was used to draw.

<https://www.lucidchart.com>

Data Storage, MYSQL database was used here.

<https://www.mysql.com>

Database Tools MYSQL workbench was used

Development tools :IntelliJ IDEA
<https://www.jetbrains.com/idea>

Build Tool: Maven was used
<https://maven.apache.org>

JDK : Java(JDK 8)
<https://www.oracle.com/technetwork/java/javase/downloads/jdk8-downloads-2133151.html>

APPENDICES

The purpose of this appendix is about project reflection. From fall 2018 semester, we started our journey to make this project. The main feature of our project is the course video lecture, course resource. and Integrated blog along with each course so that students and teachers interact with each other for discussion.

After a lot of hard work and time, I'm are releasing our first version of the project with minimalistic features.

currently, we are working on some module of the project which is released in the future. our upcoming feature is asynchronous messaging, live class and call for discussion.