PARSHVANATH CHARITABLE TRUST'S

A.P. Shah Institute of Technology

Thane, 400615

Academic Year: 2022-23
Department of Computer Engineering

CSL605 SKILL-BASED LAB COURSE: CLOUD COMPUTING

Mini Project Report

Title of Project: Codeginner (E-Learning Website)

Year and Semester: T.E. (Sem VI)

made by

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Abstract

The e-learning website is designed to provide an intuitive and interactive learning experience to students, teachers, and professionals. The website features an easy-to-use interface that enables users to access learning content and course materials, as well as to engage with other users through discussion forums and interactive exercises.

The website's backend is built using Django, a powerful and flexible web framework that provides a robust and scalable platform for creating complex web applications. The website's frontend is designed using modern web development technologies such as HTML, CSS, and JavaScript. Additionally, the website's hosting infrastructure is built on the cloud using AWS services, ensuring high scalability, reliability, and security.

The website offers a range of features, including course creation and management, student registration and enrollment, course materials, quizzes and assessments, discussion forums, and progress tracking. The website is designed to be easily customizable, allowing educators and institutions to create and deliver personalized learning experiences that meet their unique needs and requirements.

In conclusion, the e-learning website created using Django and hosted on the cloud using AWS is a powerful and flexible platform for delivering engaging and interactive learning experiences to students, teachers, and professionals. With its robust backend, modern frontend, and scalable hosting infrastructure, the website is well-suited to meet the needs of a wide range of users, from individual learners to large educational institutions.

Introduction

The increasing demand for e-learning platforms has led to the emergence of several platforms that offer interactive and engaging learning experiences. Among these platforms, Codeginner is an e-learning website that provides an interactive and intuitive learning experience for individuals who want to learn coding. The platform is built on the Django framework, Bootstrap, and PostgreSQL and is hosted on AWS cloud using services such as EC2 and RDS.

Codeginner is designed to provide an innovative approach to learning coding, which includes animation-based videos, an integrated code editor, and an admin panel to manage the content of the chapters. This report discusses the key features of the Codeginner e-learning platform, including its architecture, functionality, and user experience.

Codeginner is an e-learning website that is designed to provide an interactive and engaging learning experience for individuals who want to learn coding. The platform is built on the Django framework, Bootstrap, and PostgreSQL and is hosted on AWS cloud using services such as EC2 and RDS. The platform provides several unique features, including animation-based videos, an integrated code editor, and an admin panel to manage the content of the chapters.

The primary objective of the Codeginner e-learning platform is to provide an innovative approach to learning coding. The platform aims to make learning coding more accessible and engaging for individuals by providing a user-friendly interface that includes video tutorials, code editor, and admin panel to manage the content of the chapters.

The website is built on the Django framework, a powerful and flexible web framework that provides a robust and scalable platform for creating complex web applications. The frontend of the platform is designed using Bootstrap, a popular open-source toolkit for developing responsive and mobile-first websites. The platform's database is built on PostgreSQL, a powerful and open-source relational database management system.

The Codeginner e-learning platform is hosted on the AWS cloud, using services such as EC2 and RDS. EC2 provides virtual servers in the cloud, which allow the platform to scale up or down based on demand. RDS provides a managed relational database service that allows the platform to store and retrieve data easily.

The Codeginner e-learning platform provides several unique features that are designed to provide an innovative approach to learning coding. One of the key features of the platform is animation-based videos. The videos provide a visual representation of the coding concepts, making it easier for learners to understand complex coding concepts.

Another unique feature of the Codeginner e-learning platform is the integrated code editor. The code editor is designed to provide learners with a platform to practice coding skills. The platform includes a code editor that supports several programming languages, including Python, Java, and JavaScript. Additionally, the platform provides learners with a workspace to save and run their code.

The platform also includes an admin panel that allows educators and institutions to manage the content of the chapters. The admin panel provides a platform to upload the content of the chapters, including the video tutorials, quizzes, and assessments. The admin panel is designed to be easy to use and allows educators to create and deliver personalized learning experiences that meet their unique needs and requirements.

The website provides a user-friendly interface that is designed to be intuitive and easy to use. The platform's homepage provides a clear and concise overview of the platform's features and benefits, allowing learners to quickly and easily access the content they need. The platform's user interface is designed using Bootstrap, a popular open-source toolkit for developing responsive and mobile-first websites. This means that the platform is optimized for use on a range of devices, including desktop computers, tablets, and smartphones.

The platform is designed to provide a highly engaging learning experience. The platform's animation-based videos, integrated code editor, and admin panel provide learners with a unique and interactive way to learn coding. The platform is also designed to be highly engaging, with features such as quizzes and assessments, which allow learners to test their knowledge and progress through the learning experience.

The Codeginner website is an innovative and engaging platform for learning coding. The platform's unique features, including animation-based videos, integrated code editor, and admin panel, provide learners with an interactive and engaging learning experience. The platform is built on the Django framework, Bootstrap, and PostgreSQL and is hosted on AWS cloud using services such as EC2 and RDS, providing a highly scalable and reliable platform for delivering e-learning content.

Problem Statement

Despite the increasing popularity of e-learning websites, there are still several challenges that need to be addressed to ensure that these platforms are effective and engaging for learners. One of the main problems facing e-learning websites is the lack of interactivity and engagement in the learning experience. Many e-learning websites rely on static content, such as text-based tutorials or videos, which can be dry and unengaging for learners. This can lead to a lack of motivation and interest in the learning process, which can ultimately lead to low completion rates and poor learning outcomes.

A further challenge with e-learning websites is the lack of opportunities for hands-on learning. Coding, for example, is a highly practical skill that requires hands-on practice to master. However, many e-learning websites do not provide an integrated code editor or other tools to facilitate hands-on learning, which can limit the effectiveness of the learning experience.

The main problem facing e-learning websites is the lack of interactivity, personalization, and hands-on learning opportunities in the learning experience. These issues can limit the effectiveness of e-learning websites, and it is essential to address them to ensure that learners can achieve their learning objectives and reach their full potential.

Objective and Scope

The objective of the e-learning website is to provide learners with an engaging, interactive, and personalized learning experience that allows them to master new skills efficiently. The website will feature animation-based videos, an integrated code editor, quizzes, and an admin panel for uploading and editing content. The primary goal of the website is to provide learners with hands-on experience and practical learning opportunities that enable them to apply their knowledge effectively.

- To provide an engaging and interactive e-learning platform for learners to learn Python programming language effectively
- To offer high-quality learning materials that are easy to access and understand
- To provide practical hands-on learning opportunities with an integrated code editor
- To track learners' progress and provide personalized learning experiences
- To enable learners to apply their knowledge effectively in real-world scenarios

The e-learning website will focus on providing high-quality learning materials for learners of all levels, from beginners to advanced learners. The website's primary focus will be on coding and programming, but it will also cover other topics such as design, business, and marketing. The website will offer a wide range of learning resources, including animation-based videos, quizzes, interactive exercises, and a code editor, allowing learners to practice their skills in a practical and engaging way.

- The e-learning website will focus on teaching Python programming language
- The website will feature animation-based videos to explain complex concepts in a visually engaging way
- The integrated code editor will provide practical hands-on learning opportunities
- The admin panel will allow content creators to upload and edit learning materials, ensuring that the content is always up to date and relevant
- The website will offer quizzes to test learners' knowledge and provide feedback on areas for improvement
- The website will cater to learners of all levels, from beginners to advanced learners
- The website will cover a wide range of topics related to Python programming language, including syntax, data types, loops, functions, and more
- The personalized learning experience will allow learners to track their progress and receive tailored recommendations for learning materials based on their individual needs and preferences
- The website will enable learners to apply their knowledge effectively in real-world scenarios by providing practical examples and projects

Description

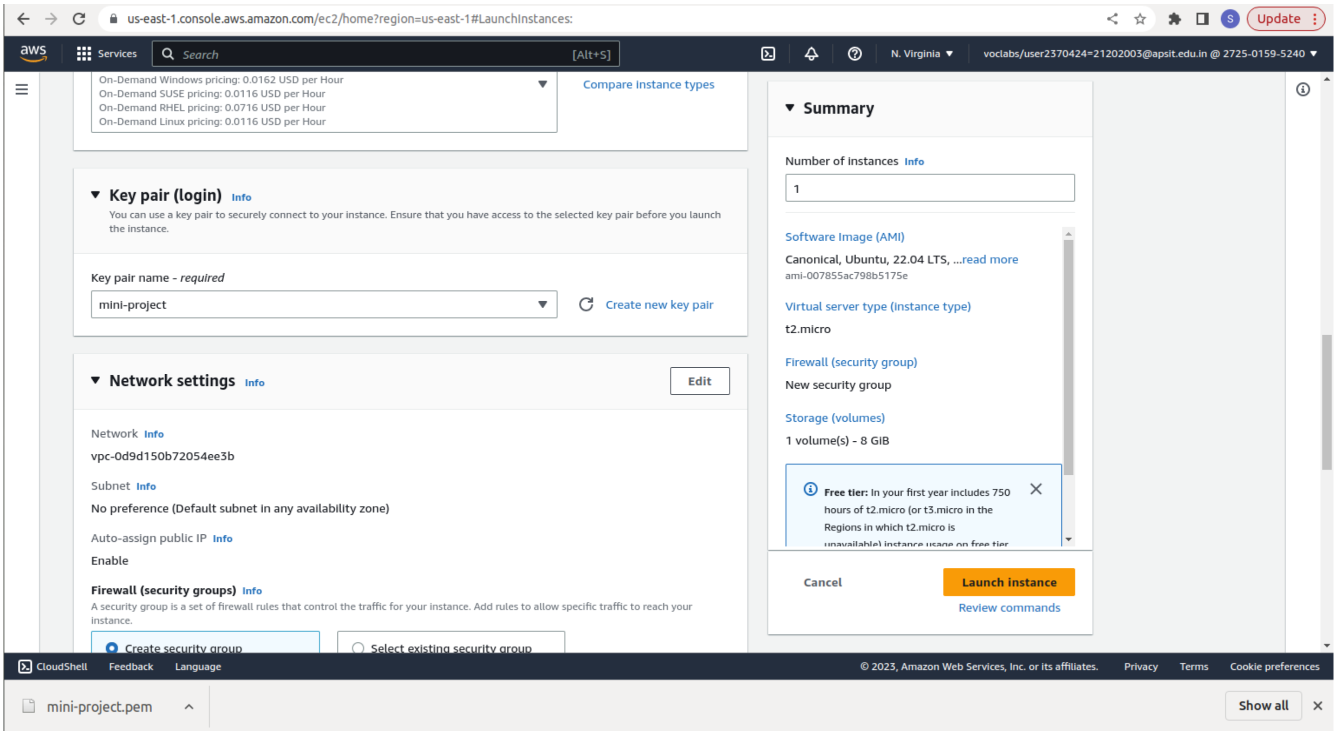
Cloud computing is the delivery of computing services, including servers, storage, databases, networking, software, analytics, and intelligence, over the internet to offer faster innovation, flexible resources, and economies of scale.
The cloud service we have used in this project is AWS Cloud Services.
Services used for the implementation of the Codeginner(E-Learning Website) are:

- Amazon Elastic Compute Cloud (EC2): is a web service provided by Amazon Web Services (AWS) that enables users to launch and manage virtual servers in the cloud. With EC2, users can easily create and manage virtual machines (instances) to run their applications and services.EC2 provides users with flexible computing resources, allowing them to scale up or down their server capacity as needed. Users can choose from a variety of instance types, each optimized for different workloads, including compute-optimized, memory-optimized, storage-optimized, and GPU instances.EC2 instances are available in different operating systems, including Windows and Linux, and come pre-installed with a variety of software tools and applications. Users can also customize their instances by installing their own software and applications. EC2 allows users to control their instances using the AWS Management Console, CLI, or SDKs. Users can start, stop, and terminate instances, as well as configure security groups and network settings to control access to their instances. Overall, EC2 provides users with a scalable, flexible, and cost-effective way to launch and manage virtual servers in the cloud, allowing them to focus on developing and running their applications and services.

- Amazon Relational Database Service (Amazon RDS): is a fully-managed database service that makes it easy to set up, operate, and scale relational databases in the cloud. RDS provides support for several popular database engines, including PostgreSQL, MySQL, Oracle, and SQL Server.
  In Codeginner, we used AWS RDS with PostgreSQL as the database engine to store and manage data related to user accounts, learning progress, quizzes, and content management. By using RDS, we were able to quickly and easily set up and manage a highly available and scalable database infrastructure, without the need for significant administrative overhead.
  Overall, AWS RDS with PostgreSQL provided us with a highly reliable, scalable, and cost-effective way to manage our application data, enabling us to focus on delivering high-quality learning experiences to our users.

In Codeginner, we used Amazon Web Services (AWS) Elastic Compute Cloud (EC2) to host our application servers in the cloud. EC2 provides us with a scalable and flexible way to run our application, allowing us to quickly and easily add or remove instances to handle fluctuations in user traffic.we used Relational Database Service (RDS) to manage our application's database infrastructure. RDS provides us with a fully managed, highly available, and scalable database infrastructure. With RDS, we were able to easily scale our database infrastructure to meet the demands of growing user traffic and data storage requirements, without having to worry about managing the underlying infrastructure ourselves.

Implementation



us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#LaunchInstances:

On-Demand Windows pricing: 0.0162 USD per Hour
On-Demand SUSE pricing: 0.0116 USD per Hour
On-Demand RHEL pricing: 0.0716 USD per Hour
On-Demand Linux pricing: 0.0116 USD per Hour

Compare instance types

Key pair (login) Info

You can use a key pair to securely connect to your instance. Ensure that you have access to the selected key pair before you launch the instance.

Key pair name - *required*: mini-project

Create new key pair

Network settings Info

Edit

Network Info
vpc-0d9d150b72054ee3b

Subnet Info
No preference (Default subnet in any availability zone)

Auto-assign public IP Info
Enable

Firewall (security groups) Info
A security group is a set of firewall rules that control the traffic for your instance. Add rules to allow specific traffic to reach your instance.

● Create security group ○ Select existing security group

Summary

Number of instances Info: 1

Software Image (AMI)
Canonical, Ubuntu, 22.04 LTS, ...read more
ami-007855ac798b5175e

Virtual server type (instance type)
t2.micro

Firewall (security group)
New security group

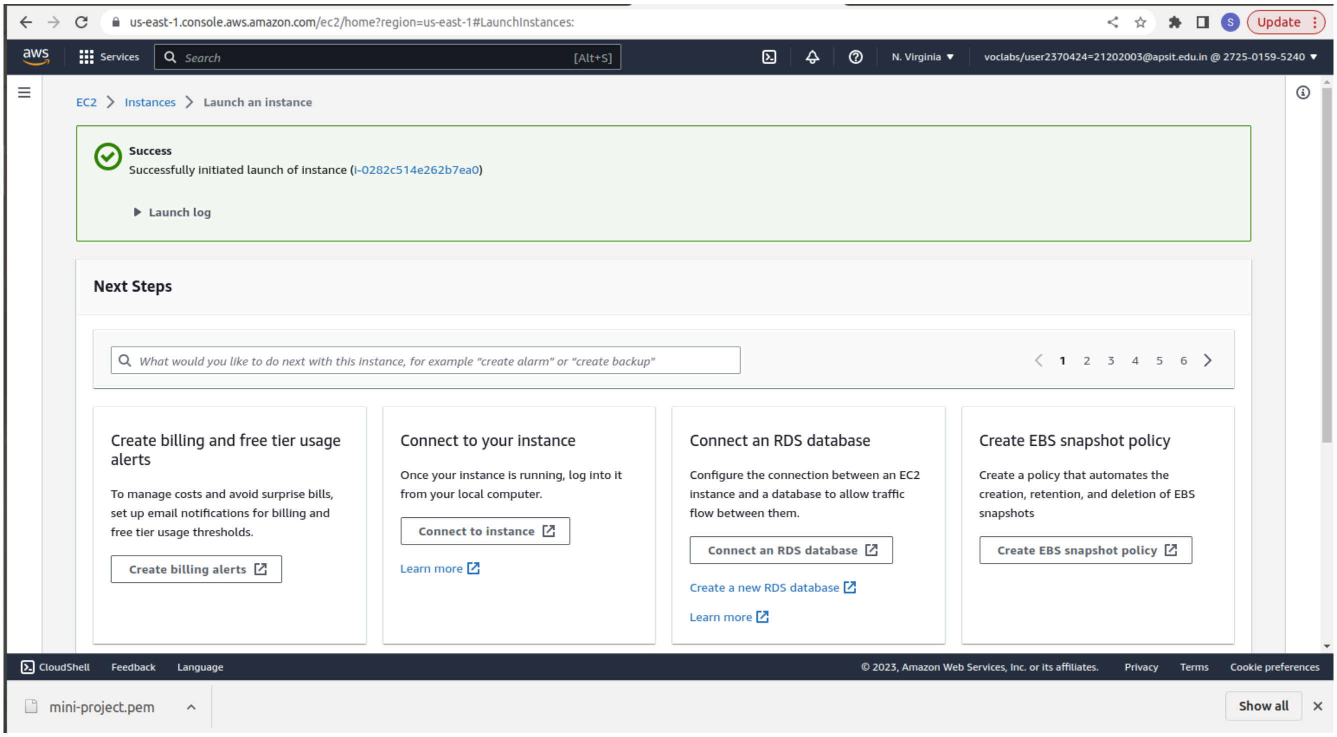
Storage (volumes)
1 volume(s) - 8 GiB

Free tier: In your first year includes 750 hours of t2.micro (or t3.micro in the Regions in which t2.micro is unavailable) instance usage on free tier

Cancel | Launch instance | Review commands

mini-project.pem

creating instance in ec2 panel and adding required values and rules



us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#LaunchInstances:

EC2 > Instances > Launch an instance

Success
Successfully initiated launch of instance (i-0282c514e262b7ea0)

Launch log

Next Steps

What would you like to do next with this instance, for example "create alarm" or "create backup"

Create billing and free tier usage alerts
To manage costs and avoid surprise bills, set up email notifications for billing and free tier usage thresholds.
Create billing alerts

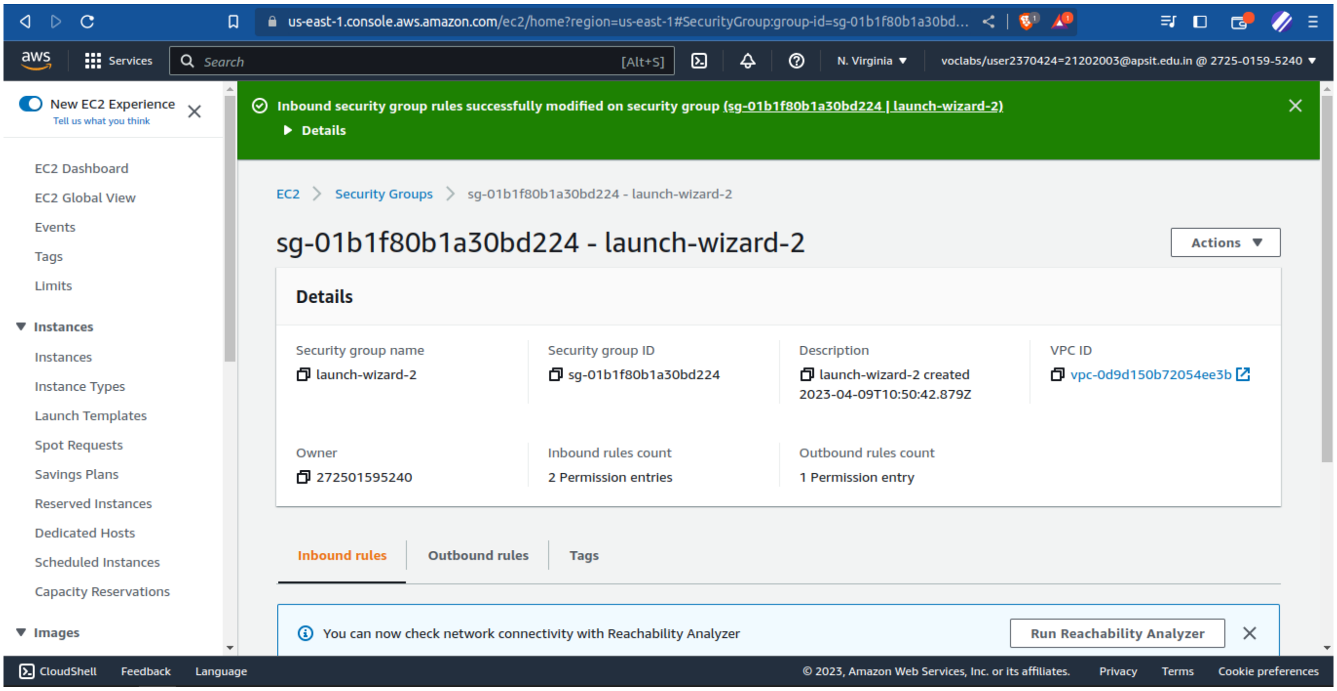
Connect to your instance
Once your instance is running, log into it from your local computer.
Connect to instance
Learn more

Connect an RDS database
Configure the connection between an EC2 instance and a database to allow traffic flow between them.
Connect an RDS database
Create a new RDS database
Learn more

Create EBS snapshot policy
Create a policy that automates the creation, retention, and deletion of EBS snapshots
Create EBS snapshot policy

mini-project.pem

successfully initializing and launching the instance



Inbound security group rules successfully modified on security group (sg-01b1f80b1a30bd224 | launch-wizard-2)

Details

EC2 > Security Groups > sg-01b1f80b1a30bd224 - launch-wizard-2

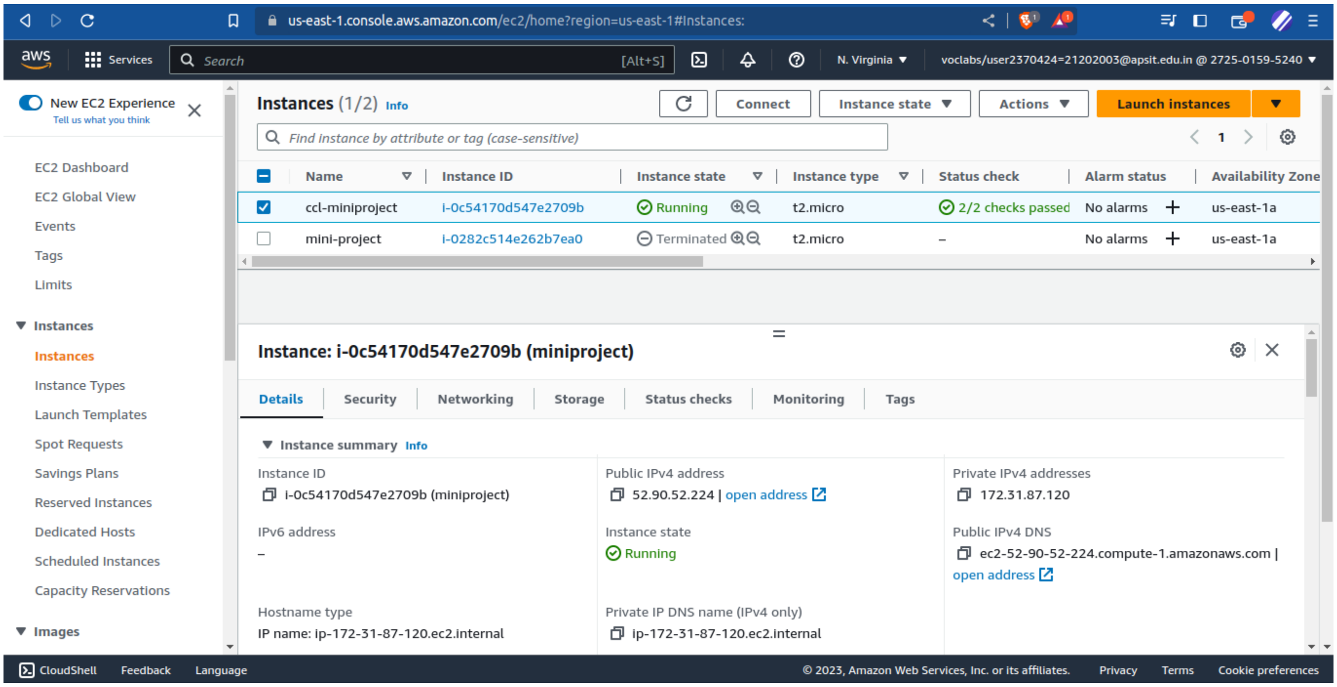
sg-01b1f80b1a30bd224 - launch-wizard-2

Details

Security group name	Security group ID	Description	VPC ID
launch-wizard-2	sg-01b1f80b1a30bd224	launch-wizard-2 created 2023-04-09T10:50:42.879Z	vpc-0d9d150b72054ee3b
Owner	Inbound rules count	Outbound rules count	
272501595240	2 Permission entries	1 Permission entry	

You can now check network connectivity with Reachability Analyzer

Changing Inbound rules for the instance



Instances (1/2) Info

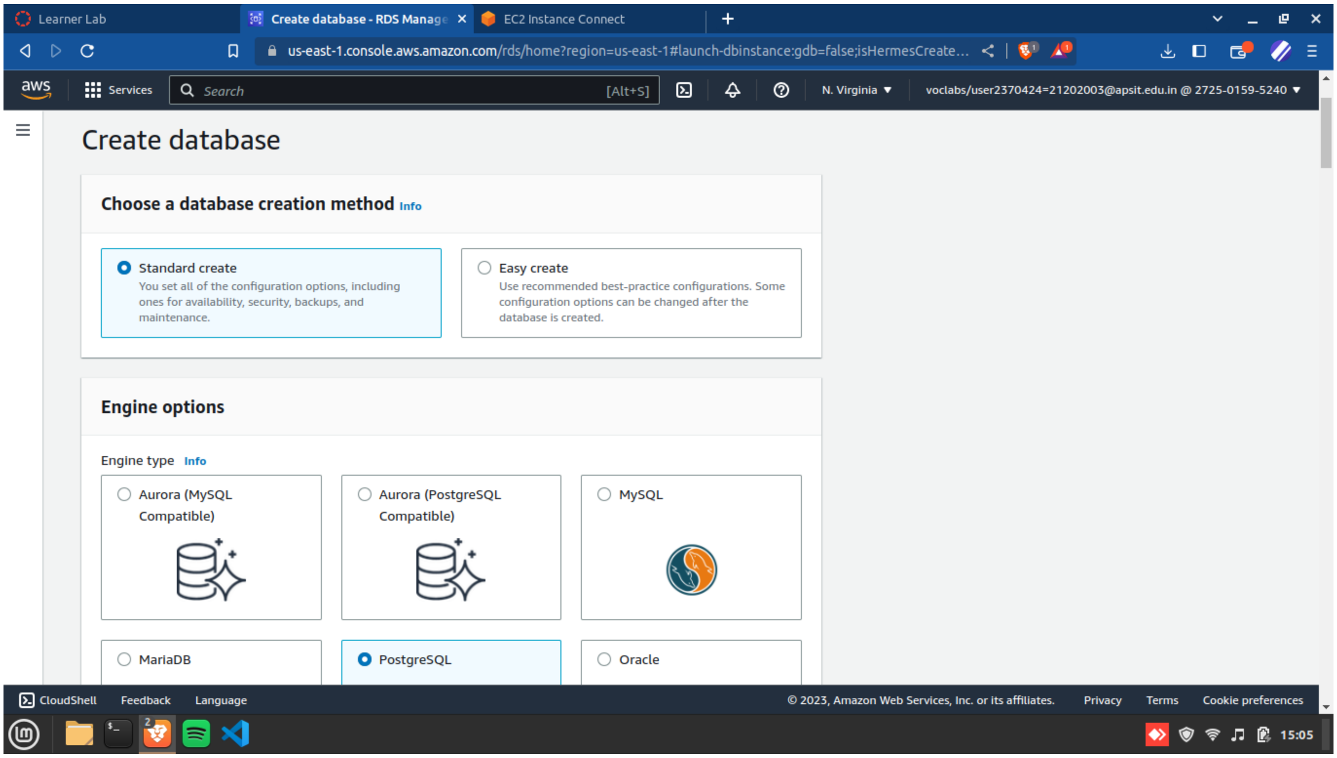
	Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone
☑	ccl-miniproject	i-0c54170d547e2709b	Running	t2.micro	2/2 checks passed	No alarms	us-east-1a
□	mini-project	i-0282c514e262b7ea0	Terminated	t2.micro	–	No alarms	us-east-1a

Instance: i-0c54170d547e2709b (miniproject)

Instance summary Info

Instance ID	Public IPv4 address	Private IPv4 addresses
i-0c54170d547e2709b (miniproject)	52.90.52.224 | open address	172.31.87.120
IPv6 address	Instance state	Public IPv4 DNS
–	Running	ec2-52-90-52-224.compute-1.amazonaws.com | open address
Hostname type	Private IP DNS name (IPv4 only)	
IP name: ip-172-31-87-120.ec2.internal	ip-172-31-87-120.ec2.internal	

selecting the instance and checking the details



Learner Lab
Create database - RDS Manage
EC2 Instance Connect
us-east-1.console.aws.amazon.com/rds/home?region=us-east-1#launch-dbinstance:gdb=false;isHermesCreate…
aws
Services
Search [Alt+S]
N. Virginia
voclabs/user2370424=21202003@apsit.edu.in @ 2725-0159-5240
CloudShell
Feedback
Language
© 2023, Amazon Web Services, Inc. or its affiliates.
Privacy
Terms
Cookie preferences
15:05

Create database

Choose a database creation method Info

● Standard create
You set all of the configuration options, including ones for availability, security, backups, and maintenance.

○ Easy create
Use recommended best-practice configurations. Some configuration options can be changed after the database is created.

Engine options

Engine type Info

○ Aurora (MySQL Compatible)

○ Aurora (PostgreSQL Compatible)

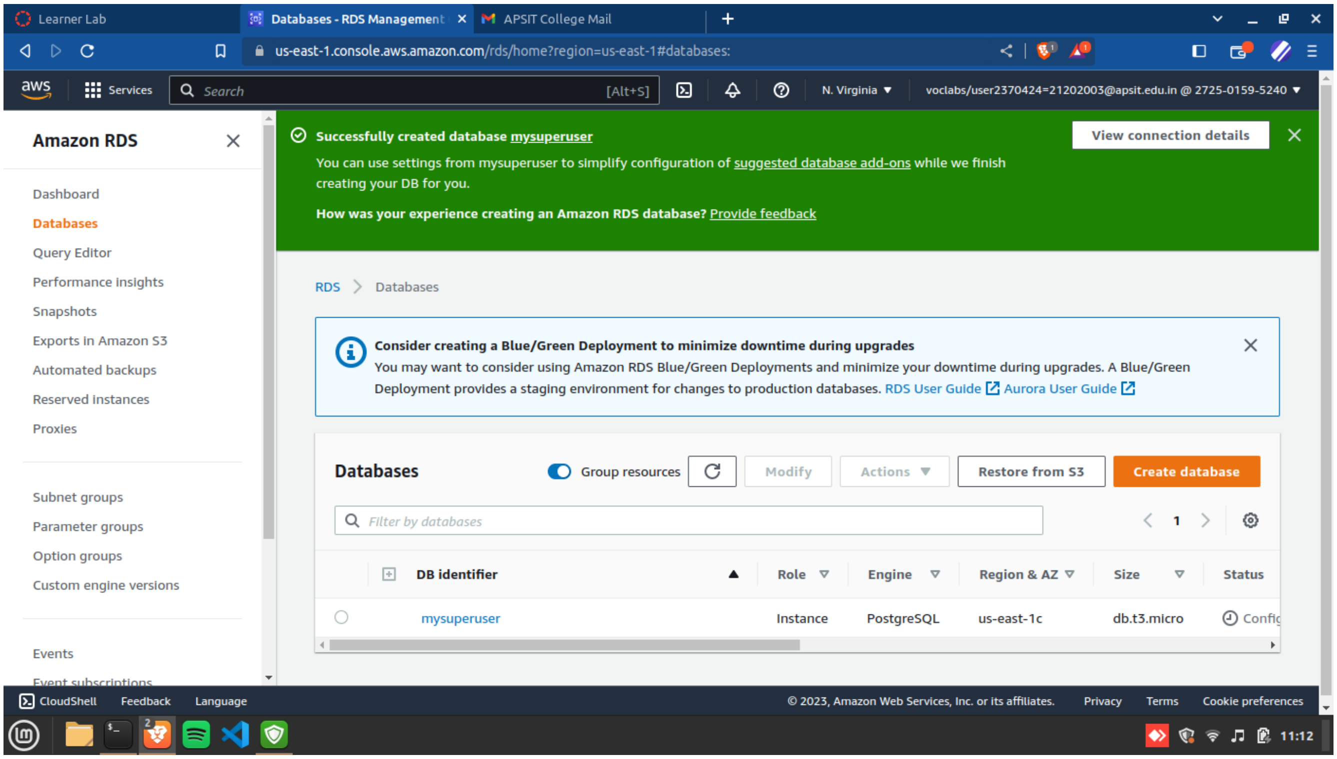
○ MySQL

○ MariaDB

● PostgreSQL

○ Oracle

Creating the database and adding requires values



Successfully created database mysuperuser

You can use settings from mysuperuser to simplify configuration of suggested database add-ons while we finish creating your DB for you.

How was your experience creating an Amazon RDS database? Provide feedback

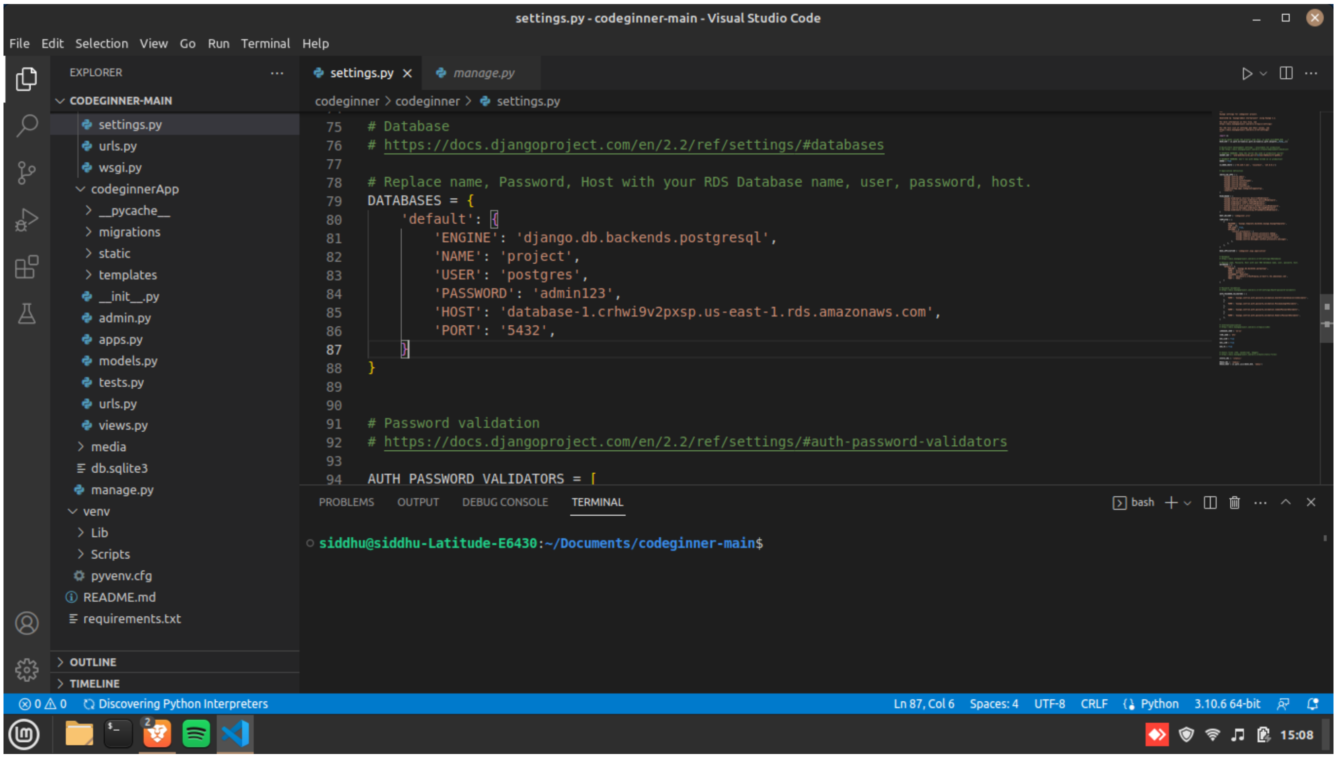
Consider creating a Blue/Green Deployment to minimize downtime during upgrades

You may want to consider using Amazon RDS Blue/Green Deployments and minimize your downtime during upgrades. A Blue/Green Deployment provides a staging environment for changes to production databases. RDS User Guide Aurora User Guide

Databases

DB identifier	Role	Engine	Region & AZ	Size	Status
mysuperuser	Instance	PostgreSQL	us-east-1c	db.t3.micro	Config

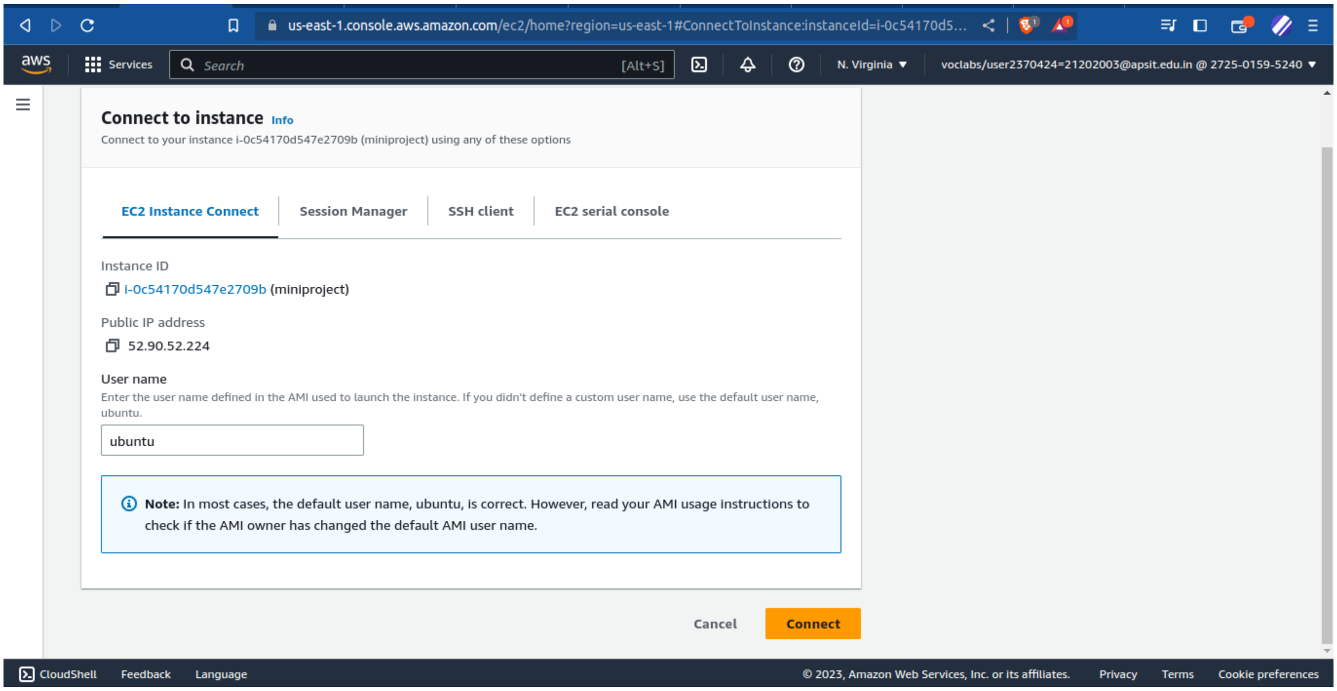
successfully creating the database in rds



```
# Database
# https://docs.djangoproject.com/en/2.2/ref/settings/#databases

# Replace name, Password, Host with your RDS Database name, user, password, host.
DATABASES = {
    'default': {
        'ENGINE': 'django.db.backends.postgresql',
        'NAME': 'project',
        'USER': 'postgres',
        'PASSWORD': 'admin123',
        'HOST': 'database-1.crhwi9v2pxsp.us-east-1.rds.amazonaws.com',
        'PORT': '5432',
    }
}


# Password validation
# https://docs.djangoproject.com/en/2.2/ref/settings/#auth-password-validators

AUTH_PASSWORD_VALIDATORS = [
```

```
siddhu@siddhu-Latitude-E6430:~/Documents/codeginner-main$
```

making changes in the django web app according to the rds


us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#ConnectToInstance:instanceId=i-0c54170d5...
aws
Services
Search
[Alt+S]
N. Virginia ▼
voclabs/user2370424=21202003@apsit.edu.in @ 2725-0159-5240 ▼
EC2 Instance Connect
Session Manager
SSH client
EC2 serial console
Cancel
Connect
CloudShell Feedback Language
© 2023, Amazon Web Services, Inc. or its affiliates. Privacy Terms Cookie preferences

Connect to instance Info

Connect to your instance i-0c54170d547e2709b (miniproject) using any of these options

Instance ID

i-0c54170d547e2709b (miniproject)

Public IP address

52.90.52.224

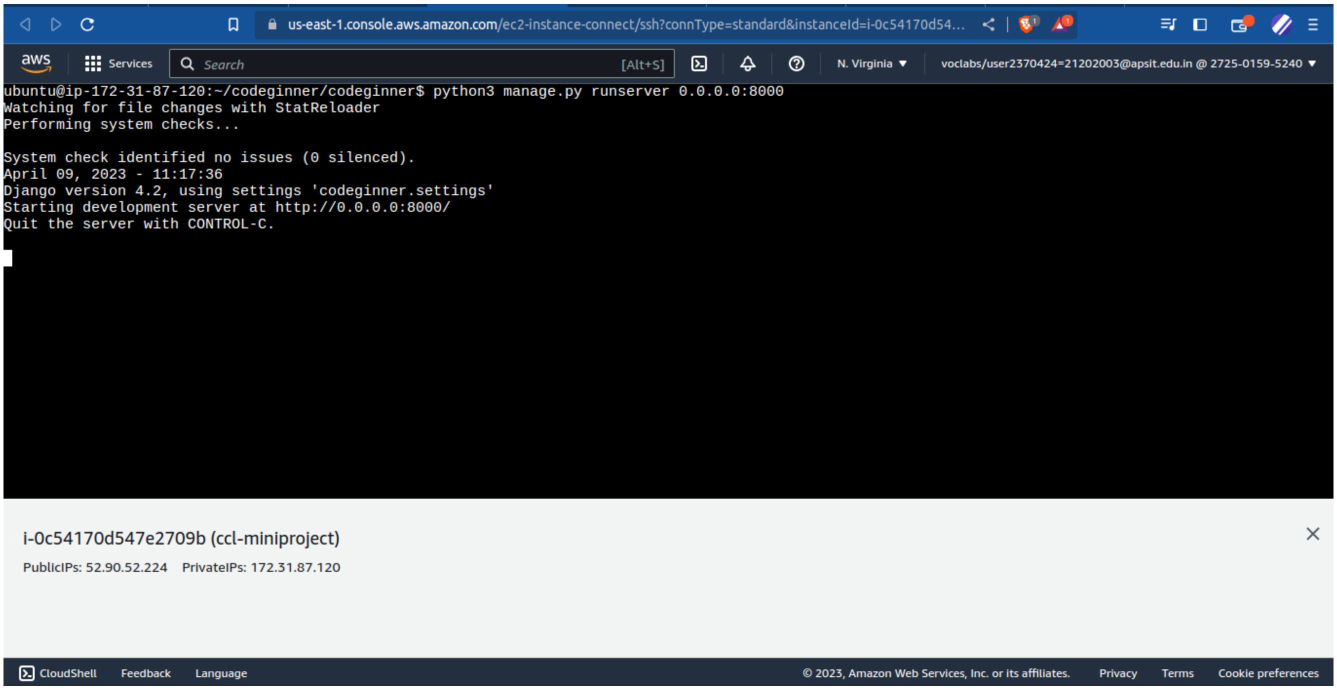
User name

Enter the user name defined in the AMI used to launch the instance. If you didn't define a custom user name, use the default user name, ubuntu.

ubuntu

Note: In most cases, the default user name, ubuntu, is correct. However, read your AMI usage instructions to check if the AMI owner has changed the default AMI user name.

connecting to the selected instance

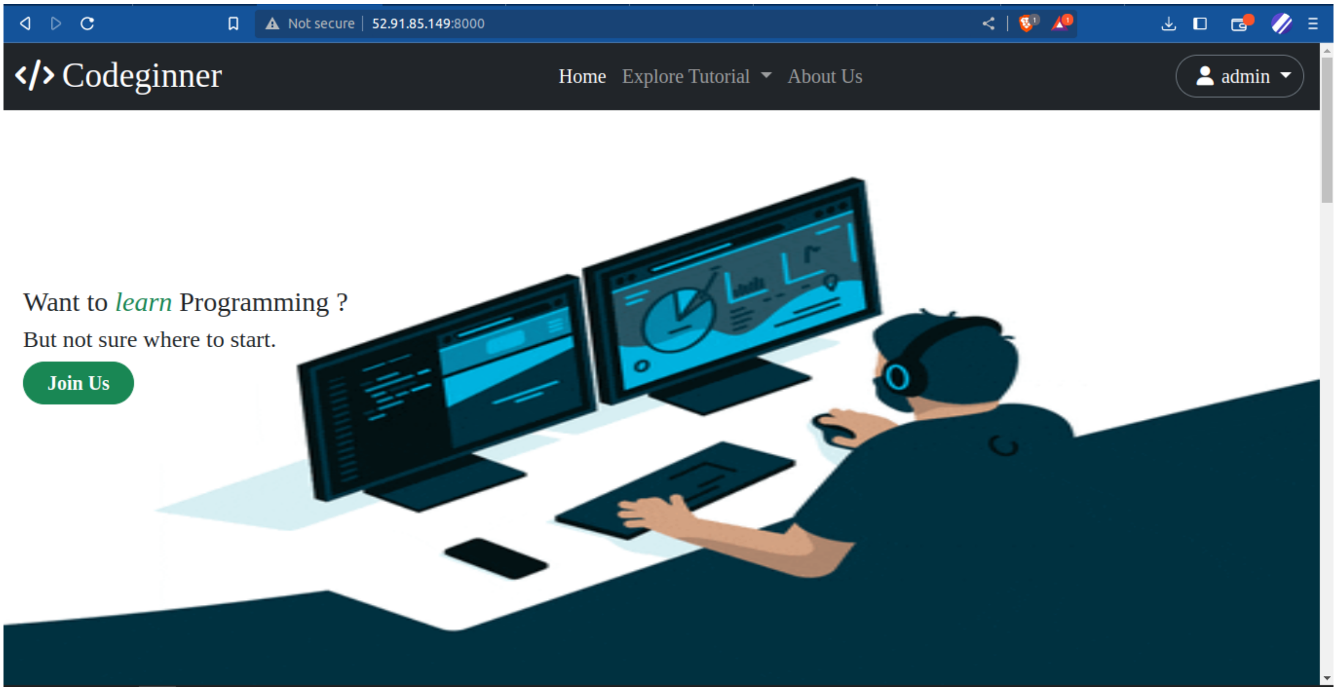

us-east-1.console.aws.amazon.com/ec2-instance-connect/ssh?connType=standard&instanceId=i-0c54170d54...
aws
Services
Search
[Alt+S]
N. Virginia ▾
voclabs/user2370424=21202003@apsit.edu.in @ 2725-0159-5240 ▾

```
ubuntu@ip-172-31-87-120:~/codeginner/codeginner$ python3 manage.py runserver 0.0.0.0:8000
Watching for file changes with StatReloader
Performing system checks...

System check identified no issues (0 silenced).
April 09, 2023 - 11:17:36
Django version 4.2, using settings 'codeginner.settings'
Starting development server at http://0.0.0.0:8000/
Quit the server with CONTROL-C.
```

i-0c54170d547e2709b (ccl-miniproject)

PublicIPs: 52.90.52.224 PrivateIPs: 172.31.87.120

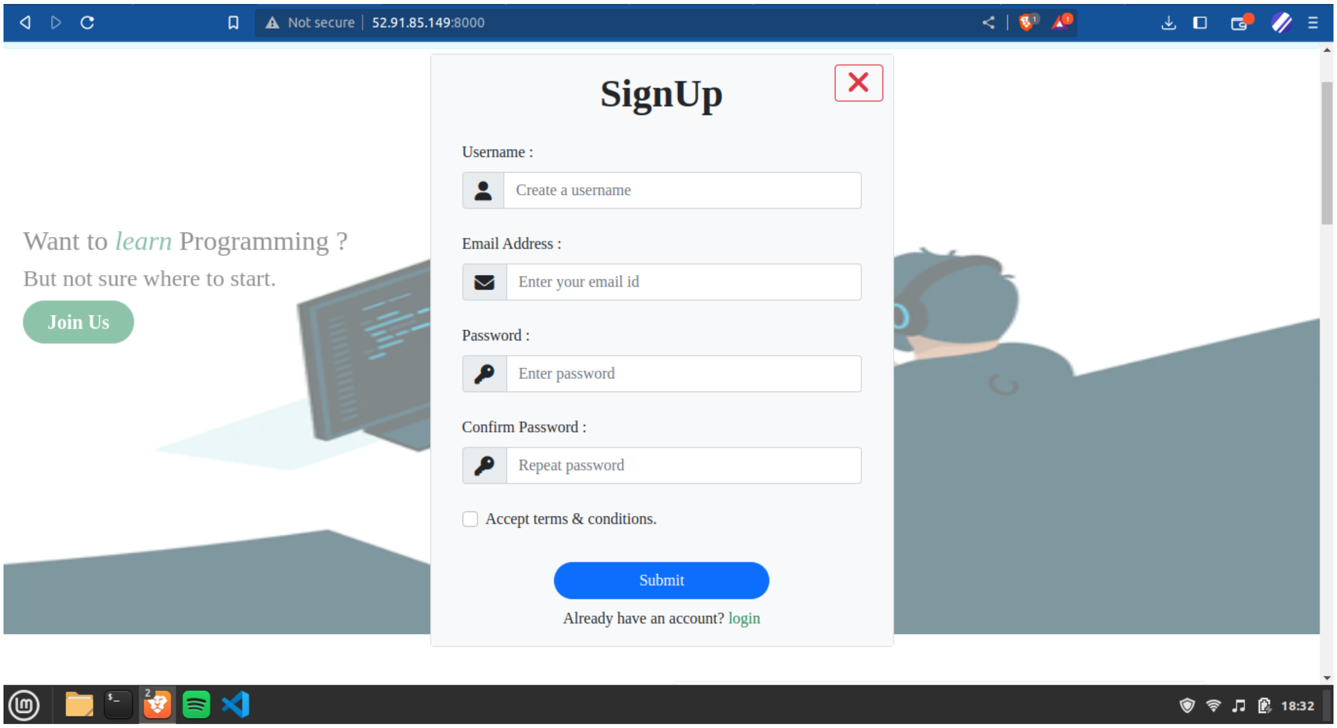
running the django web app on ec2 instance



Want to *learn* Programming ?

But not sure where to start.

Successfully running website on AWS



Want to *learn* Programming ?

But not sure where to start.

SignUp

Username : Create a username

Email Address : Enter your email id

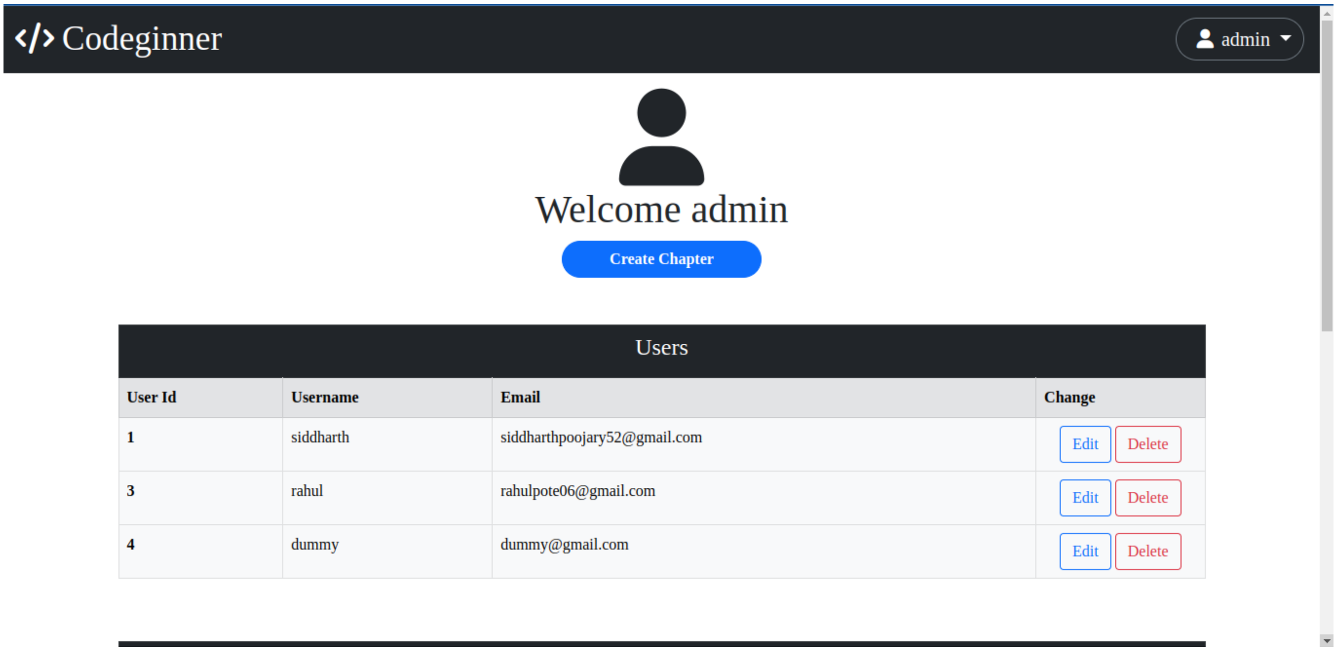
Password : Enter password

Confirm Password : Repeat password

□ Accept terms & conditions.

Already have an account? login

Signup Page for users to create Account and Login

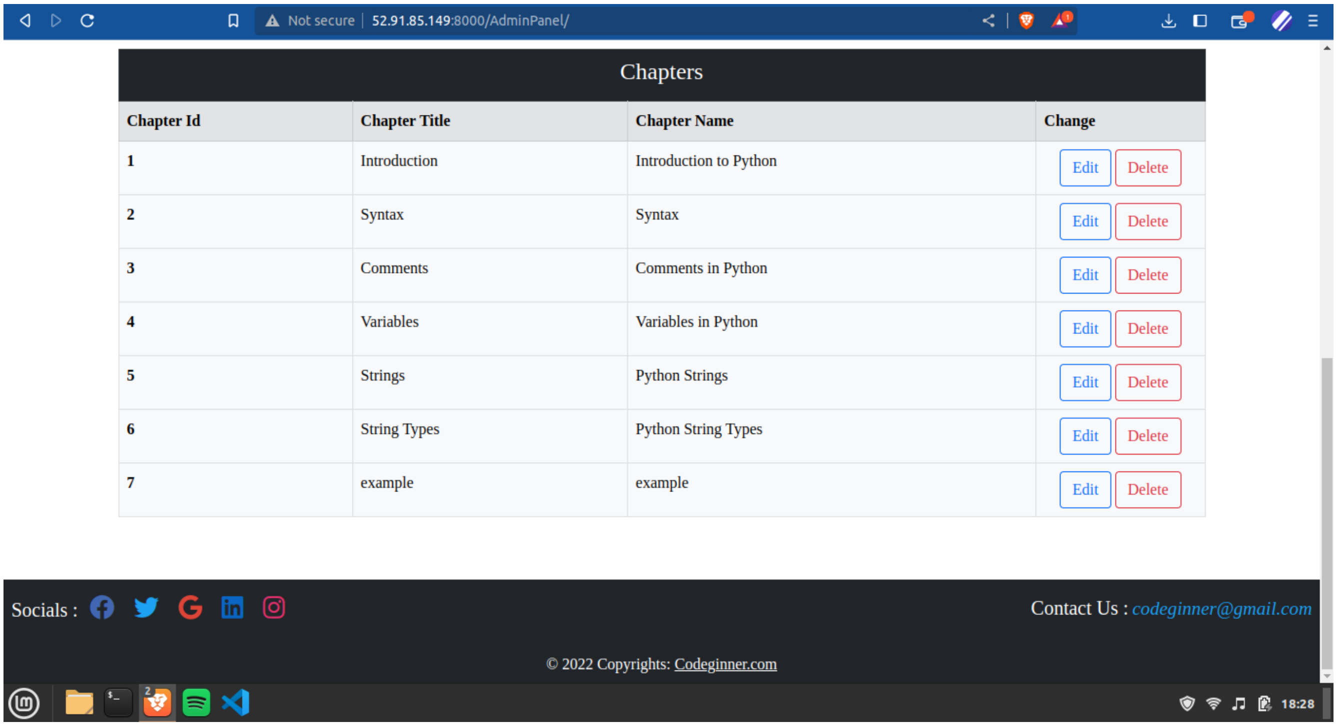


Welcome admin

Users

User Id	Username	Email	Change
1	siddharth	siddharthpoojary52@gmail.com	Edit Delete
3	rahul	rahulpote06@gmail.com	Edit Delete
4	dummy	dummy@gmail.com	Edit Delete

Admin panel showing existing users



Chapters

Chapter Id	Chapter Title	Chapter Name	Change
1	Introduction	Introduction to Python	Edit Delete
2	Syntax	Syntax	Edit Delete
3	Comments	Comments in Python	Edit Delete
4	Variables	Variables in Python	Edit Delete
5	Strings	Python Strings	Edit Delete
6	String Types	Python String Types	Edit Delete
7	example	example	Edit Delete

Socials :

Contact Us : *codeginner@gmail.com*

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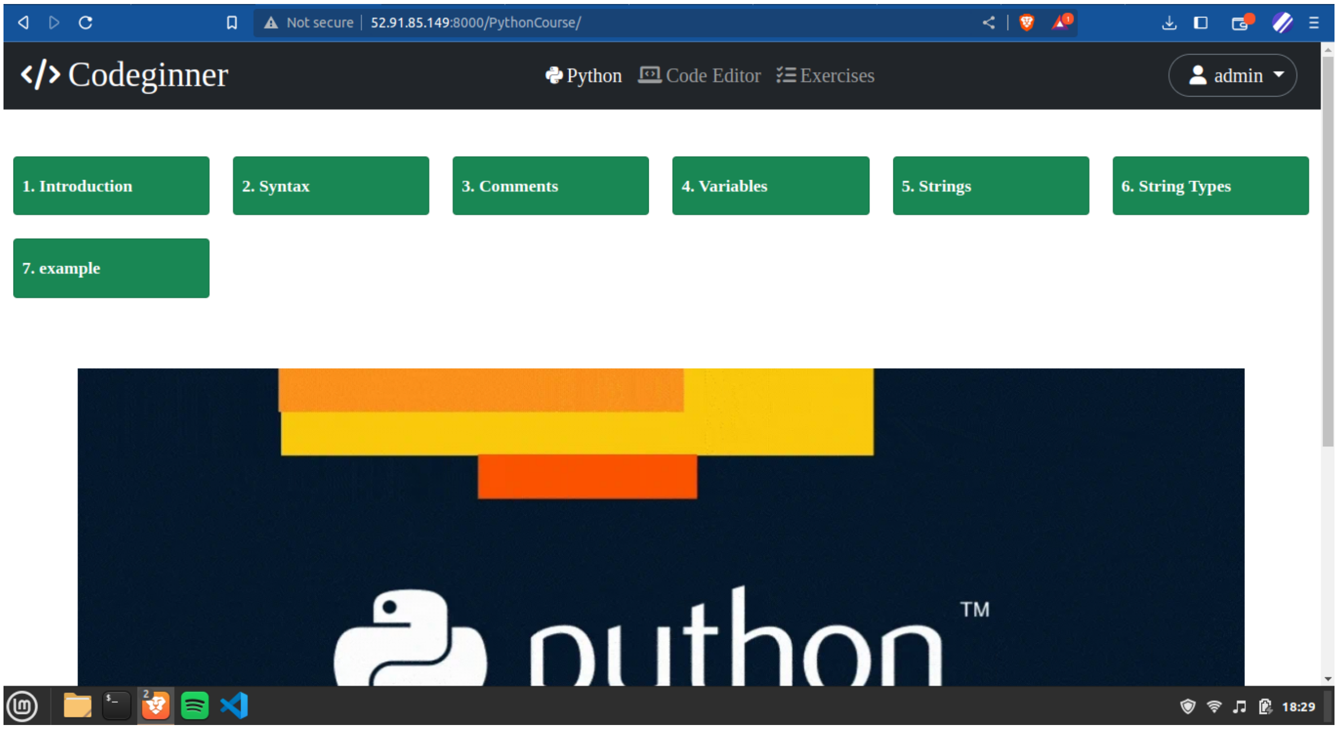
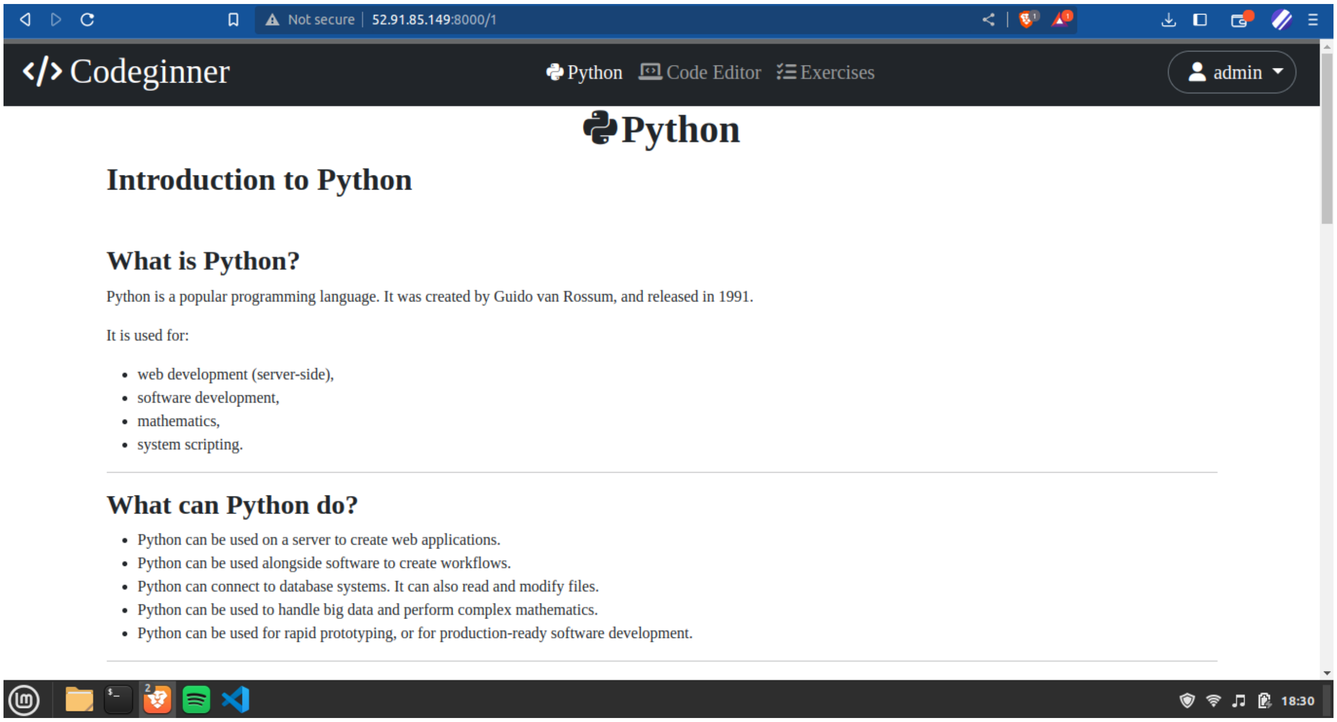
Admin panel Available Chapters



Python Course Page



Python

Introduction to Python

What is Python?

Python is a popular programming language. It was created by Guido van Rossum, and released in 1991.

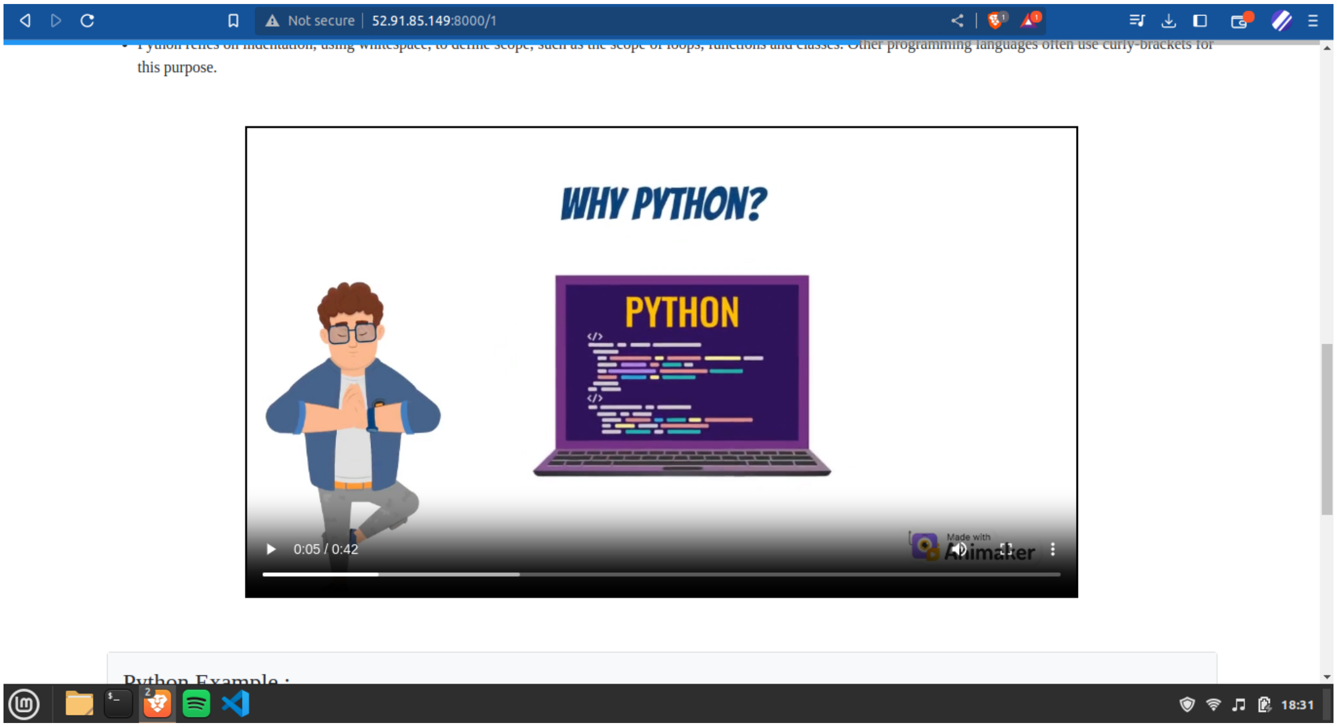
It is used for:

- web development (server-side),
- software development,
- mathematics,
- system scripting.

What can Python do?

- Python can be used on a server to create web applications.
- Python can be used alongside software to create workflows.
- Python can connect to database systems. It can also read and modify files.
- Python can be used to handle big data and perform complex mathematics.
- Python can be used for rapid prototyping, or for production-ready software development.

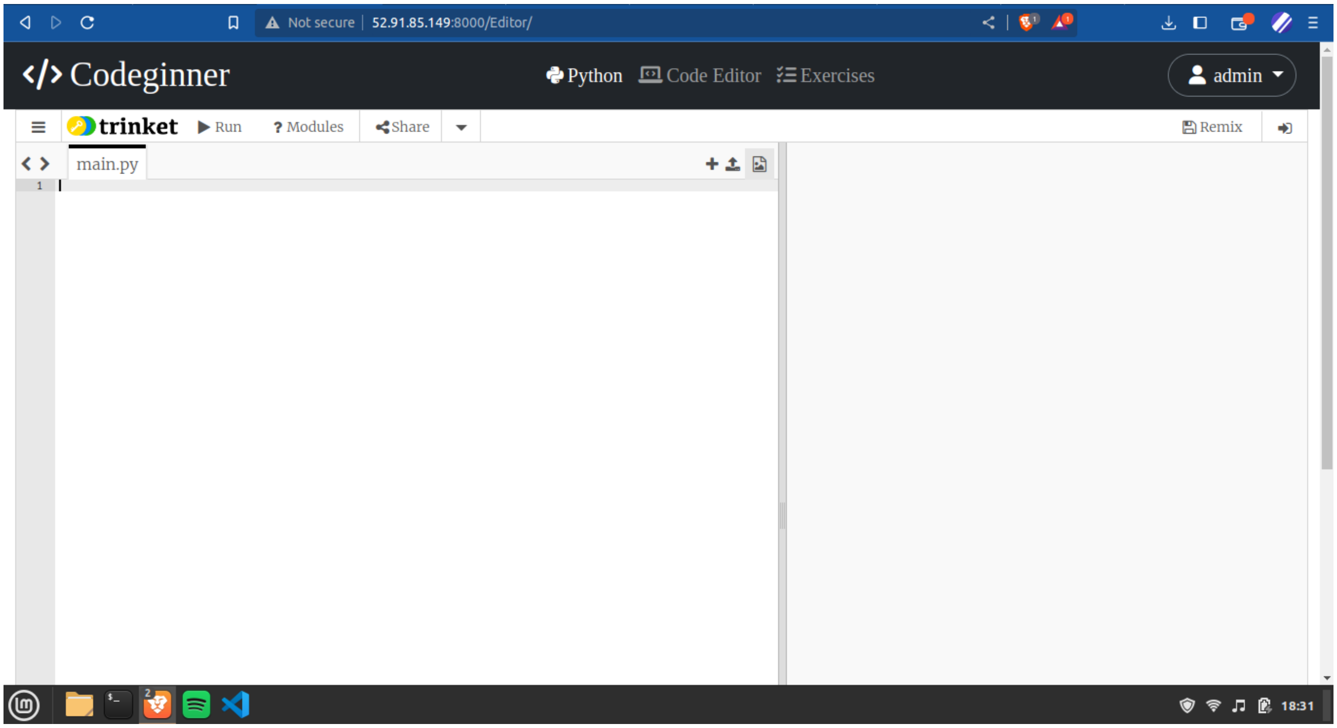
Theory Course Content of chapters



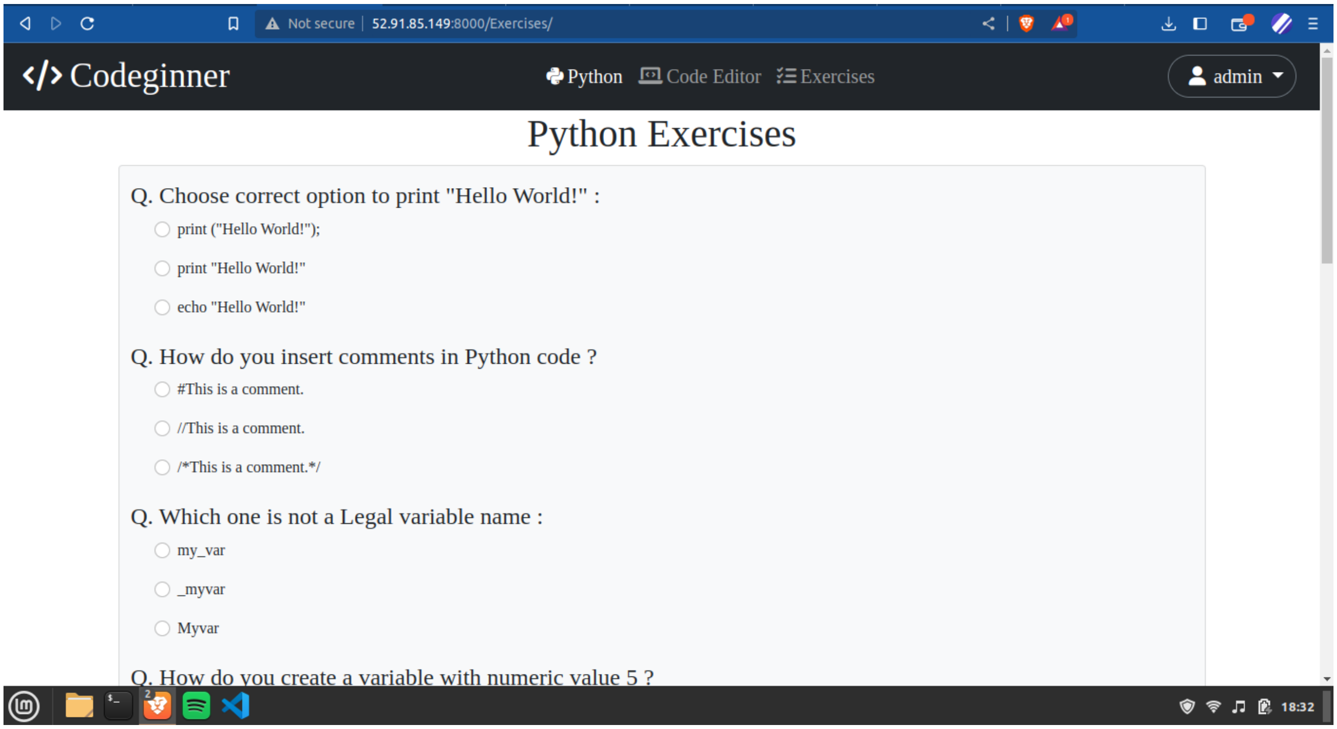
- Python relies on indentation, using whitespace, to define scope; such as the scope of loops, functions and classes. Other programming languages often use curly-brackets for this purpose.

Python Example :

Animated Video Course Content of Chapters



Integrated Code Editor for practicing Programming



Python Exercises

Q. Choose correct option to print "Hello World!" :

○ print ("Hello World!");

○ print "Hello World!"

○ echo "Hello World!"

Q. How do you insert comments in Python code ?

○ #This is a comment.

○ //This is a comment.

○ /*This is a comment.*/

Q. Which one is not a Legal variable name :

○ my_var

○ _myvar

○ Myvar

Q. How do you create a variable with numeric value 5 ?

Exercises for user to test their Knowledge

Learning Outcomes

Codeginner is an e-learning website designed to teach users Python programming language through animated videos, integrated code editor, quizzes, and an admin panel for uploading and editing content. One of the key features that made Codeginner possible was our use of Amazon Web Services (AWS) Elastic Compute Cloud (EC2) and Relational Database Service (RDS).

By using EC2, we were able to provide a highly scalable and reliable environment for hosting our application servers. This allowed us to easily handle fluctuations in user traffic and ensure that our application was always up and running. Additionally, by using EC2, we were able to take advantage of AWS's built-in monitoring and management tools, which helped us to ensure that our application was performing optimally at all times.

Similarly, by using RDS, we were able to manage our application's database infrastructure in a fully managed, highly available, and scalable environment. This allowed us to easily scale our database infrastructure to meet the demands of growing user traffic and data storage requirements, without having to worry about managing the underlying infrastructure ourselves.

As a result of our use of AWS EC2 and RDS, Codeginner was able to provide a highly reliable, scalable, and cost-effective learning platform for users. Users could easily access the platform, learn Python programming language, and practice coding exercises with the integrated code editor. The platform's admin panel made it easy for us to manage and update content, ensuring that users always had access to the latest information. Furthermore, the quizzes enabled users to test their knowledge and track their progress, ensuring that they were always engaged and motivated to learn.

Overall, our use of AWS EC2 and RDS enabled us to create a high-quality learning platform that provided a range of benefits to users, including ease of use, scalability, reliability, and cost-effectiveness. By using these AWS services, we were able to create a platform that truly delivered on our learning outcomes, providing users with a comprehensive and effective learning experience for Python programming language.

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