**Assignment 1**

**Title:** Install Google App Engine. Create hello world app and other simple web applications using python/java

**Theory:**

The [GCloud CLI](https://cloud.google.com/cli) manages authentication, local configuration, developer workflow, and general interactions with Google Cloud resources. With the Google Cloud CLI, it’s easy to perform many common cloud tasks like creating a Compute Engine VM instance, managing a Google Kubernetes Engine cluster, and deploying an App Engine application, either from the command line or in scripts and other automations.

SDK Client Libraries for popular programming languages

Cloud SDK provides language-specific Cloud Client Libraries supporting each language’s natural conventions and styles. This makes it easier for you to interact with Google Cloud APIs in your language of choice. Client libraries also handle authentication, reduce the amount of necessary boilerplate code, and provide helper functions for pagination of large datasets and asynchronous handling of long-running operations.

**Why Google Cloud**

### Run your apps wherever you need them

### Avoid vendor lock-in with Google Cloud’s commitment to open source, multicloud, and hybrid cloud—allowing you to use your data and run your apps on any cloud or in any environment. Our open cloud solutions provide consistency between public and private clouds, enabling businesses to modernize and developers to build faster in any environment.

### Make smarter decisions with the leading data platform

Maximize insights from your data with Google Cloud’s machine learning and advanced analytics capabilities. Our serverless data analytics and machine learning platform helps you automate processes, make intelligent predictions, and streamline management and operations.

* **Steps-**
  + Download python from- <https://www.python.org/downloads/>
  + Download Google Cloud SDK from- [https://cloud.google.com/sdk/docs/install#windows](https://cloud.google.com/sdk/docs/install)
  + Launch the installer and follow the prompts
  + Perform initial setup by running gcloud init
  + Grant authorization to Cloud SDK tools to access Google Cloud
* How to Run Application

Steps-

1. Write python file with hello world statement
2. Write app.yaml configuration file
3. Open the shell
4. Run the application with the following command in shell:
5. cmd> py google-cloud-sdk\bin\dev\_appserver.py <path to the directory where application reside>
6. Open the web browser and type http://localhost:8080

**Conlcusion:** Hence we are conclude that we are succefully developed a web application using Google App Engine

**Assignment 2**

**Title:** Use GAE launcher to launch the web applications

**Theory:**

The [GCloud CLI](https://cloud.google.com/cli) manages authentication, local configuration, developer workflow, and general interactions with Google Cloud resources. With the Google Cloud CLI, it’s easy to perform many common cloud tasks like creating a Compute Engine VM instance, managing a Google Kubernetes Engine cluster, and deploying an App Engine application, either from the command line or in scripts and other automations.

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* **Steps-**
  + Already you have installed google cloud SDK and python
  + Write the configuration file
  + Write the web application file
  + Deploy and run it
* How to Run Application

Steps-

1. Write python file

2. Write app.yaml configuration file

3. Write Index.html file

4. Write results.html file

5. Open the shell

6. Run the application with the following command in shell:

cmd> py google-cloud-sdk\bin\dev\_appserver.py <path to the directory where application reside>

7. Open the web browser and type http://localhost:8080

**Conlcusion:** Hence we are conclude that we are succefully Use GAE launcher to launch the web applications.

**Assignment 3**

**Title:** Simulate a cloud scenario using CloudSim and run a scheduling algorithm that is not present in CloudSim

**Theory:**

**CloudSim** is an open-source framework, which is used to simulate cloud computing infrastructure and services. It is developed by the CLOUDS Lab organization and is written entirely in Java. It is used for modelling and simulating a cloud computing environment as a means for evaluating a hypothesis prior to software development in order to reproduce tests and results.

For example, if you were to deploy an application or a website on the cloud and wanted to test the services and load that your product can handle and also tune its performance to overcome bottlenecks before risking deployment, then such evaluations could be performed by simply coding a simulation of that environment with the help of various flexible and scalable classes provided by the CloudSim package, free of cost.

Following are the benefits of CloudSim:

* **No capital investment involved**. With a simulation tool like CloudSim there is no installation or maintenance cost.
* **Easy to use and Scalable**. You can change the requirements such as adding or deleting resources by changing just a few lines of code.
* **Risks can be evaluated at an earlier stage**. In Cloud Computing utilization of real testbeds limits the experiments to the scale of the testbed and makes the reproduction of results an extremely difficult undertaking. With simulation, you can test your product against test cases and resolve issues before actual deployment without any limitations.
* **No need for try-and-error approaches**. Instead of relying on theoretical and imprecise evaluations which can lead to inefficient service performance and revenue generation, you can test your services in a repeatable and controlled environment free of cost with CloudSim.

### Why use CloudSim?

* Open source and free of cost, so it favours researchers/developers working in the field.
* Easy to download and set-up.
* It is more generalized and extensible to support modelling and experimentation.
* Does not require any high-specs computer to work on.
* Provides pre-defined allocation policies and utilization models for managing resources, and allows implementation of user-defined algorithms as well.
* The documentation provides pre-coded examples for new developers to get familiar with the basic classes and functions.
* Tackle bottlenecks before deployment to reduce risk, lower costs, increase performance, and raise revenue.

### Features of CloudSim:

1. Large scale virtualized Datacenters, servers and hosts.
2. Customizable policies for provisioning host to virtual machines.
3. Energy-aware computational resources.
4. Application containers and federated clouds (joining and management of multiple public clouds).
5. Datacenter network topologies and message-passing applications.
6. Dynamic insertion of simulation entities with stop and resume of simulation.
7. User-defined allocation and provisioning policies.

* **Steps-** 
  + Download the cloudsim jar file-<https://github.com/Cloudslab/cloudsim/releases/tag/cloudsim-4.0>
  + Download and install java sdk from-https://www.oracle.com/java/technologies/downloads/#java11
  + Download and install eclipse from-https://www.eclipse.org/downloads/packages/release/kepler/sr1/eclipse-ide-java-developers
  + Write the java files for the any task scheduling algorithm
  + Add cloudsim jar file as external jar file in the build configuration
  + Run application

**Conlcusion:** Hence we are conclude that we are succefully Simulate a cloud scenario using CloudSim and run a scheduling algorithm that is not present in CloudSim.

**Assignment No : 4**

**Title:** Find a procedure to transfer the files from one virtual machine to another virtual machine

**Theory:**

A virtual machine (VM) is a digital version of a physical computer. Virtual machine software can run programs and operating systems, store data, connect to networks, and do other computing functions, and requires maintenance such as updates and system monitoring. Multiple VMs can be hosted on a single physical machine, often a server, and then managed using virtual machine software. This provides flexibility for compute resources (compute, storage, network) to be distributed among VMs as needed, increasing overall efficiency. This architecture provides the basic building blocks for the advanced virtualized resources we use today, including cloud computing.

### What are virtual machines used for?

VMs are the basic building blocks of virtualized computing resources and play a primary role in creating any application, tool, or environment—for virtual machines online and on-premises. Here are a few of the more common enterprise functions of virtual machines:

##### Consolidate servers

VMs can be set up as servers that host other VMs, which lets organizations reduce sprawl by concentrating more resources onto a single physical machine.

##### Create development and test environments

VMs can serve as isolated environments for testing and development that include full functionality but have no impact on the surrounding infrastructure.

##### Support DevOps

VMs can easily be turned off or on, migrated, and adapted, providing maximum flexibility for development.

* **Steps-**
  + Download and install Oracle's Virtual Box- https://www.virtualbox.org/wiki/Downloads
  + Download Ubuntu VMDK Image-

<https://app.vagrantup.com/bento/boxes/ubuntu-18.04>

* + Launch Virtualbox and create a new VM
  + Click on new and mention the Name and the machine folder along with the Type and Version of the Machine to be created.
  + Assign memory size for our VM (1024 MB sufficient for now).
  + Select the option Use an existing virtual hard disk file and locate the downloaded VMDK image and create VM
  + Now we have to create a NAT Network so go to File -> Preferences -> Network -> Add a New NAT Network (Click on +)
  + Right click and edit the Network name and CIDR if needed.
  + Repeat the process of launching the VM for 2 instances
  + Now go to the setting, go to the network setting and change the adapter to NAT Network and select the NAT Network you made
  + Launch the VM now
  + Install the net-tools to know the IP's of the instance
  + create a file and write something into it
  + If your file is on the VM with IP \*\*172.168.2.4\*\* and the second VM's IP is \*\*172.168.2.5\*\*.
  + Transfer the file using \*\*SCP\*\*

$ scp tranfer.txt [vagrant@172.168.2.5:/home/vagrant](mailto:vagrant@172.168.2.5:/home/vagrant)

* + Check for the file in the Second VM under the \*\*/home/vagrant\*\* directory

**Conlcusion:** Hence we are conclude that we are succefully find a procedure to transfer the files from one virtual machine to another virtual machine.

**Assignment No -5**

**Title:** Find a procedure to launch virtual machine using try stack (Online Open stack Demo Version)

**Theory:** A virtual machine (VM) is a digital version of a physical computer. Virtual machine software can run programs and operating systems, store data, connect to networks, and do other computing functions, and requires maintenance such as updates and system monitoring. Multiple VMs can be hosted on a single physical machine, often a server, and then managed using virtual machine software. This provides flexibility for compute resources (compute, storage, network) to be distributed among VMs as needed, increasing overall efficiency. This architecture provides the basic building blocks for the advanced virtualized resources we use today, including cloud computing.

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##### Consolidate servers

VMs can be set up as servers that host other VMs, which lets organizations reduce sprawl by concentrating more resources onto a single physical machine.

##### Create development and test environments

VMs can serve as isolated environments for testing and development that include full functionality but have no impact on the surrounding infrastructure.

##### Support DevOps

VMs can easily be turned off or on, migrated, and adapted, providing maximum flexibility for development.

### Steps :

#### AWS

1. Launch an Amazon EC2 Instance :

* Open Amazon EC2 console and then click Launch Instance to create and configure your virtual machine.

1. Configure your Instance

* In this screen, you are shown options to choose an Amazon Machine Image (AMI). AMIs are preconfigured server templates you can use to launch an instance. Each AMI includes an operating system, and can also include applications and application servers.
* You will now choose an instance type. Instance types comprise of varying combinations of CPU, memory, storage, and networking capacity so you can choose the appropriate mix for your applications
* You can review the configuration, storage, tagging, and security settings that have been selected for your instance
* On the next screen you will be asked to choose an existing key pair or create a new key pair. A key pair is used to securely access your Linux instance using SSH. Amazon Web Services stores the public part of the key pair which is just like a house lock. You download and use the private part of the key pair which is just like a house key.

Select Create a new key pair and give it the name MyKeyPair. Next click the Download Key Pair button.

After you download the MyKeyPair key, you will want to store your key in a secure location. If you lose your key, you won't be able to access your instance. If someone else gets access to your key, they will be able to access your instance.

1. Connect to your Instance (either via SSH)
2. Terminate Your Instance (go to the console and select the VM under actions and terminate)

**Conlcusion:** Hence we are conclude that we are succefully a procedure to launch virtual machine using try stack (Online Open stack Demo Version),AZURE,AWS.

**Assignment No-6**

**Title:** Design and deploy a web application in a PaaS environment

**Theory :**

Platform as a service (PaaS) [is a cloud computing model](https://www.techtarget.com/whatis/SaaS-IaaS-PaaS-Comparing-Cloud-Service-Models) where a third-party provider delivers hardware and software tools to users over the internet. Usually, these tools are needed for application development. A PaaS provider hosts the hardware and software on its own infrastructure. As a result, PaaS frees developers from having to install in-house hardware and software to develop or run a new application.

The PaaS delivery model represents a pre-defined “ready-to-use” environment typically comprised of already deployed and configured IT resources. Specifically, PaaS relies on (and is primarily defined by) the usage of a readymade environment that establishes a set of pre-packaged products and tools used to support the entire delivery lifecycle of custom applications

Common reasons a cloud consumer would use and invest in a PaaS environment include:

• The cloud consumer wants to extend on-premise environments into the cloud for scalability and economic purposes.

• The cloud consumer uses the ready-made environment to entirely substitute an on-premise environment.

• The cloud consumer wants to become a cloud provider and deploys its own cloud services to be made available to other external cloud consumers.

**Web Application:**

 Web applications evolved from sites of web or Web systems, This application builds on and extend a Web system to add business functionality . There are challenges that include scalability and high availability, Cloud data stores provide high availability and scalability properties for web applications . Cloud Computing offers the vision of a virtually infinite pool of storage, computing and networking resources where applications can be scalable deployed.

* **Steps-**
  + Login to the AWS console
  + Find for AWS Amplify in the services
  + Get Started with Amplify service
  + Click on Host a Web App
  + Then choose to launch it with Github and authenticate your GitHub account for the same
  + After that choose the Repository containing your source code
  + Then Launch the application with the default configurations provided by AWS Amplify

**Conlcusion:** Hence we are conclude that we are succefully Design and deploy a web application in a PaaS environment.

**Assignment 7**

**Title:** Design and develop custom Application (Mini Project) using Salesforce Cloud.

**Theory:**

Sales Cloud part of the Salesforce.com platform which is focused on enhancing the effectiveness of the sales team of an organization and hence increases the amount of sales. It stands unique when compared to other sales methods as it provides both the account information of the customer as well as the information gathered from the social platforms about the product and customer. This helps in judging the potential of a sales lead and closing the sales faster.

## Key Features of Sales Cloud

In this section, we will discuss the key features of Sales Cloud. The features are described below −

### Contact Management

Gives complete information on customers including previous communications, discussions, key contact numbers and emails.

### Opportunity Management

It helps create and change quotes in response to sales interaction and deal scenario.

### Salesforce Engage

Gives alerts on active leads and create personalized campaigns.

### Lead Management

Helps assign leads to right people and track the campaigns.

### Reports and Dashboards

Helps create dashboards which can be drilled down for further information. This leads to faster decisions.

[Salesforce offers a variety](https://www.educba.com/what-is-salesforce-technology/) of products and services that any organization would need to facilitate and run its business and services. A few of the salesforce offerings are Sales Cloud, Service Cloud, Marketing Cloud, Analytics Cloud, Community Cloud, App Cloud, etc. In this post, we will be discussing the Sales Cloud service Salesforce.

**Conclusion:** Thus, we have successfully implemented SalesForce cloud.

Assignment No 8

**Title**: Design an Assignment to retrieve, verify, and store user credentials using Firebase Authentication, the Google App Engine standard environment, and Google Cloud Data store.

**Theory**: The [GCloud CLI](https://cloud.google.com/cli) manages authentication, local configuration, developer workflow, and general interactions with Google Cloud resources. With the Google Cloud CLI, it’s easy to perform many common cloud tasks like creating a Compute Engine VM instance, managing a Google Kubernetes Engine cluster, and deploying an App Engine application, either from the command line or in scripts and other automations.

SDK Client Libraries for popular programming languages

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Firebase Authentication provides backend services, easy-to-use SDKs, and ready-made UI libraries to authenticate users to your app. It supports authentication using passwords, phone numbers, popular federated identity providers like Google, Facebook and Twitter, and more.

## How does it work?

To sign a user into your app, you first get authentication credentials from the user. These credentials can be the user's email address and password, or an OAuth token from a federated identity provider. Then, you pass these credentials to the Firebase Authentication SDK. Our backend services will then verify those credentials and return a response to the client.

After a successful sign in, you can access the user's basic profile information, and you can control the user's access to data stored in other Firebase products. You can also use the provided authentication token to verify the identity of users in your own backend services.

FirebaseUI provides a drop-in auth solution that handles the UI flows for signing in users with email addresses and passwords, phone numbers, and with popular federated identity providers, including Google Sign-In and Facebook Login.

The FirebaseUI Auth component implements best practices for authentication on mobile devices and websites, which can maximize sign-in and sign-up conversion for your app. It also handles edge cases like account recovery and account linking that can be security sensitive and error-prone to handle correctly.

FirebaseUI can be easily customized to fit in with the rest of your app's visual style, and it is open source, so you aren't constrained in realizing the user experience you want.

**Conclusion**: Hence we are successfully studied Design an Assignment to retrieve, verify, and store user credentials using Firebase Authentication, the Google App Engine standard environment, and Google Cloud Data store.